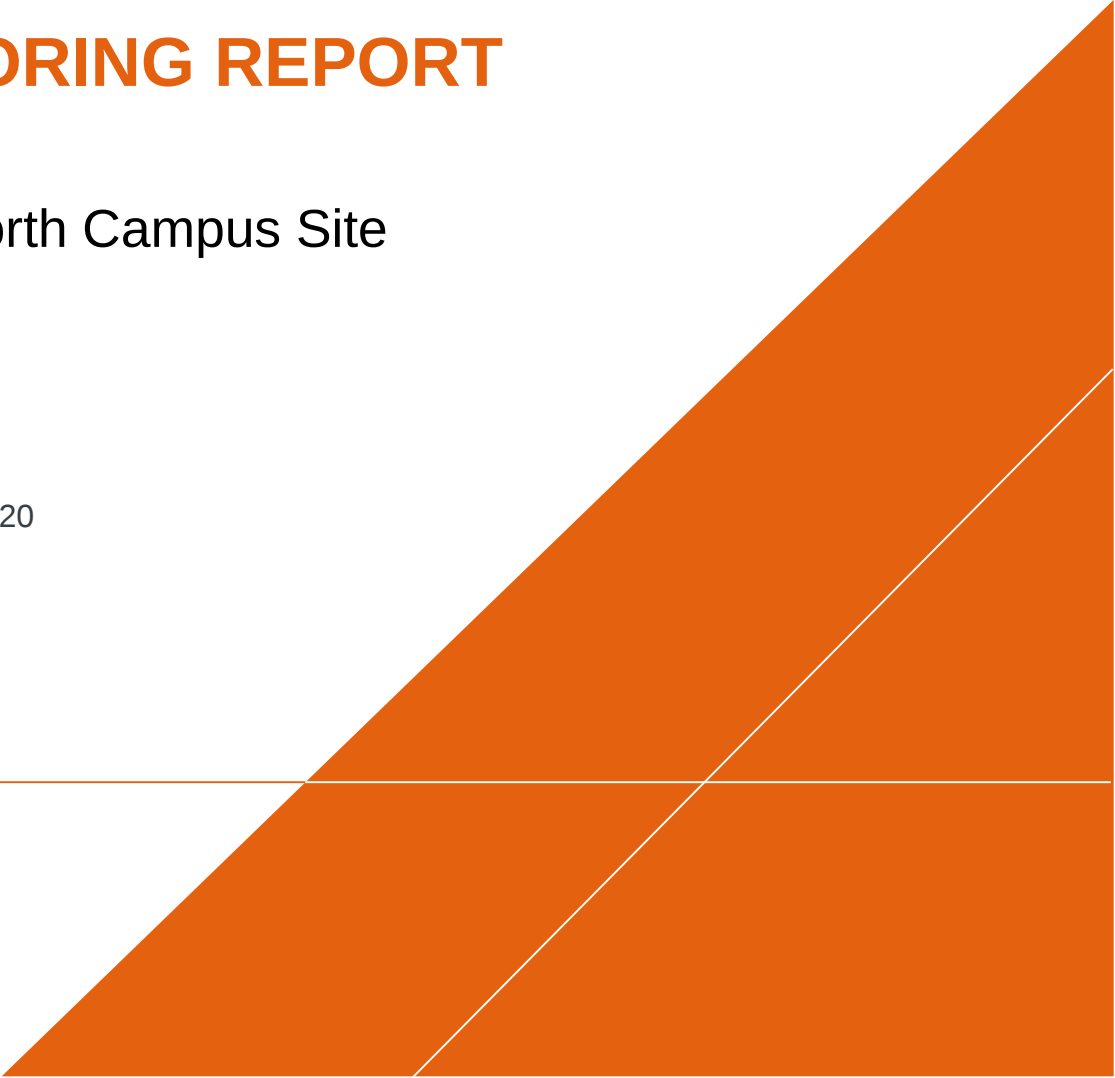


Revitalizing Auto Communities Environmental
Response Trust (RACER)

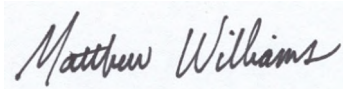
MONTCALM SEEP CONTROL SYSTEM INTERIM MEASURE MONITORING REPORT

Pontiac North Campus Site

September 10, 2020

A large, solid orange geometric shape, resembling a stylized triangle or a section of a larger triangle, is positioned in the bottom right corner of the page. It is composed of two overlapping triangles, creating a complex, angular form that extends from the bottom edge towards the top right corner.

MONTCALM SEEP CONTROL SYSTEM INTERIM MEASURE MONITORING



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Table 2. Groundwater Analytical Results

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Attachment A Groundwater Analytical Laboratory Reports

Attachment B Monitoring Trends – Chemical Concentration Graphs

1 INTRODUCTION AND OBJECTIVE

Arcadis of Michigan, LLS (Arcadis) has prepared this report on behalf of Revitalizing Auto Communities Environmental Response Trust (RACER) Trust in accordance with the April 2018 Montcalm Seep Interim Measure Work Plan (IMWP). This report describes the monitoring completed related to the operations of a hydraulic control groundwater extraction system with upgradient re-injection installed to mitigate a groundwater seep along the E. Montcalm Street right-of-way (ROW) near the southern property boundary of the RACER Trust Pontiac North Campus Site (Site) located in Pontiac, Michigan (**Figure 1**). Approval for the implementation of the IMWP was granted by the Michigan Department of Environment, Great Lakes and Energy (EGLE, formerly the Michigan Department of Environmental Quality [MDEQ]) on June 8, 2018, and by the United States Environmental Protection Agency (USEPA) on June 25, 2018.

The purpose of the system is to mitigate the potential for groundwater to seep along Montcalm St. and into the City of Pontiac's storm sewer system, and eliminate water flowing over the sidewalk and right-of-way into the street. The system relocates water from a pre-existing toe drain collection line adjacent to Montcalm St. to an upgradient area of the Site where it is re-injected into the subsurface. The system infrastructure includes the following: two upgradient groundwater injection wells, the toe drain along Montcalm St., an extraction sump and submersible pumping equipment, conveyance piping to route recovered water to the upgradient injection wells, and associated system controls. In addition, due to limitations in the system's groundwater reinjection capacity, it has been required to continuously operate a dewatering pump from the collection sump and discharge groundwater over the surface where it infiltrates back into the ground at an upgradient location.

This report describes the monitoring activities related to system operation which commenced in October 2018 and carried through May 2019. The system was fully operational by June 2019.

2 BACKGROUND

As summarized in the *Montcalm Seep Control System Interim Measure Completion Report* (Arcadis 2020), a monitoring well network was established to evaluate seep re-injection influence on water levels and potential contaminant mobility. Groundwater elevations were shown for baseline conditions prior to system operation in October 2018 and were included in the *Montcalm Seep Control System Interim Measure Completion Report* (Arcadis 2020). The baseline groundwater contour map is attached as **Figure 2**. Based on the groundwater contour trends observed during the first annual monitoring event following system start-up an additional contour map was produced from October 2019 water level measurements, which is displayed on **Figure 3**.

Water quality parameters, in addition to elevations, were also documented in October 2019 across the Site during the Site-wide annual groundwater sampling event and results were provided in the *2019 Annual Groundwater Monitoring Report* (Arcadis 2020). Data from that report is utilized as a subset of the monitoring summarized in this report which also includes semi-annual sampling of target compounds and geochemical analytical parameters as outlined in the *Montcalm Seep Interim Measure Work Plan* (Arcadis 2018).

3 SYSTEM OPERATION & MONITORING RESULTS

System operation and monitoring utilizes remote telemetry devices which were installed to monitor flow, pressure, water levels at the injection wells, and pump operation as described in Section 5.1 of the *Montcalm Seep Control System Interim Measure Completion Report* (Arcadis 2020).

3.1 Groundwater Level Monitoring

Consistent with the *Montcalm Seep Interim Measure Work Plan* (Arcadis 2018), groundwater levels have been monitored during select inspection events (**Table 1**) as previously defined to allow for the development of groundwater contours and evaluation of changes in groundwater flow due to system operation. Groundwater contours representing groundwater flow across the monitoring well network are displayed from the October 2018 baseline monitoring event on **Figure 2** and October 2019 monitoring event on **Figure 3**. Near the sump, groundwater gauging has shown localized groundwater flow towards the toe drain and sump which is more pronounced than compared to pre-system operation; however groundwater contours across this portion of the Site remain generally consistent with historical observations with groundwater flow moving towards the south/southwest. In addition, pressure transducers were installed in the injection wells to continuously monitor groundwater elevation in them and ensure the groundwater at the injection wells does not raise to ground surface. As expected, localized mounding has been observed at the injection wells (INJ-01-17 and INJ-02-18) and the nearest monitoring wells (MW-03-17 and MW-04-17) which are approximately 10 feet offset from INJ-01-17. Mounding has not been observed at the nearest downgradient well (TW-09-01), which is approximately 120 feet downgradient. Groundwater levels across the site are higher compared to 2018 prior to seep control system installation, but from the baseline event in May of 2019 groundwater levels at TW-09-01 have trended downward and mimic background fluctuations.

Groundwater flow from semi-annual inspection events is consistent with the observations noted from the October 2019 event. During operation of the seep re-injection system flooding has not been observed along Montcalm St. adjacent to the sump and toe drain.

3.2 Groundwater Sampling and Analysis

Groundwater sampling events and laboratory analysis have been conducted for target compounds as well for key water quality parameters to determine, in combination with flow contours, if the seep control system is functioning without causing undesirable contamination mobility. Results are tabulated in **Table 2** with groundwater laboratory analytical reports provided in **Attachment A**.

Low flow sampling from the monitoring well network as well as a grab samples collected from the sump were analyzed for volatile organic compounds (VOCs), metals, and polychlorinated biphenyls (PCBs). While certain metals results fluctuated from baseline in 2018 to 2019 when the system was operating, the data set remains limited to evaluate trends. Monitoring wells located down-gradient of the injection wells (MWW10-SEN02, MWW01-SEN03, and MWW01-SEN04) contained metals during both pre- and post-system start which exceeded EGLE non-residential drinking water and groundwater surface water

interface criteria. The same is true for monitoring wells located near the toe drain (TW-MD-01 through TW-MD-07). To date, there have been no appreciable mobility changes with VOCs, metals, and PCBs observed in association with injection activities. Groundwater quality observations of note include:

- Iron, manganese, and total dissolved solids concentrations have exhibited increased concentrations in the injection wells (INJ-01-17 and INJ-02-18) and monitoring wells in the immediate vicinity (MW-03-17 and MW-04-17) but not at the nearest downgradient well (TW-09-01).
- The iron concentration observed at INJ-01-17 in May of 2020 was 3,450 mg/L. This result is viewed as an anomaly as it exceeds typical saturation ranges in groundwater.
- PCBs and VOCs have not been detected across the monitoring network with the exception of Aroclor-1248 PCB detections from MWW01-SEN04. The sump, which collects groundwater downgradient of this location has not had a detection for PCBs to date.

Consistent with the monitoring network schedule, grab samples were also collected for select water quality parameters from the sump, injection wells, and a defined network of monitoring wells to monitor dissolved oxygen (DO) levels, pH, temperature, conductivity, oxidation reduction potential, total dissolved and suspended solids, iron, and hardness. Initially, samples were collected prior to system start up (baseline) and once per month for the first three months and then semi-annually thereafter. Results are tabulated in **Table 1**. There have been increases in iron, hardness, conductivity, and total dissolved solids as measured from the injection wells, injection area monitoring wells, and sump. As water enters the sump it is exposed to air and ferrous iron in the groundwater can rapidly oxidize to insoluble ferric iron in these conditions which precipitates and accumulates in the sump. In addition, exposure to air can result in carbon dioxide degassing and associated pH fluctuations can result in carbonate mineral oversaturation leading to scaling and mineral precipitation. Visually, this has been observed to be occurring in the sump during maintenance inspections. As material precipitates in the sump it can be suspended through the turbulence caused by the pumps and pumped to the injection area. Increases in iron, hardness, conductivity, and total dissolved solids at INJ-01-17, INJ-02-18, MW-03-17, and MW-04-17 indicate this is occurring. However, increases in these parameters are not observed in one of the nearest downgradient monitoring points from the injection area, TW-09-01; nor at any of the other monitoring wells in the network downgradient from the injection areas. These constituents were graphed for several injection area wells to allow for evaluation of trends in concentrations over time (**Attachment B**).

Given iron and hardness concentrations in the injection area monitoring wells, fouling and scaling derived from dissolved metals deposition and biofouling are suspected as the source for gradual reduction in well capacity realized between injection well redevelopment events. Geochemical sampling has shown increases in dissolved iron concentrations, total dissolved solids, and hardness in the sump and injection wells which can further promote scaling and the growth of iron-related-bacteria leading to biofouling and plugging of the formation surrounding the injection well screen. Injection system maintenance activities to address these conditions are described below in Section 3.3.1.

3.3 Ongoing Maintenance Activities

In addition to the remote telemetry monitoring, weekly in-person inspections are performed to confirm water levels in the sump, system reinjection pump and dewatering operation, and injection well water

levels. The following sections describe the more significant maintenance events that have occurred over the course of system operation to date.

3.3.1 Injection Well Redevelopment

Following system start up, well redevelopment was performed to mechanically redevelop injection wells INJ-01-17 and INJ-02-18 to improve well performance. Following observations of reduced flow to the injection wells, Arcadis subcontracted Stock Drilling of Ida, Michigan on July 23-24, 2019 and May 18-20, 2020 to redevelop the injection wells using mechanical surge tools with bailing and pumping to remove sediment from the well screens. Hydraulic tests were performed after redevelopment activities were complete and confirmed that specific capacity was increased to its baseline condition following each redevelopment event.

3.3.2 Replacement Components

Since start up several system components have been replaced due to malfunctions. The P-100 injection pump has been replaced twice; once due to a faulty capacitor and a second time due to shorted motor windings. Backups allowed for continuing operation of the system, and additional backup pumps have been purchased. A pressure transducer in the sump was also replaced due to a suspected short that required replacement of the instrument.

4 SCHEDULE

The next semi-annual monitoring event is scheduled for October 2020 in conjunction with the site-wide annual monitoring event. The operation of the reinjection system continues to be monitored through weekly in-person inspections and remote telemetry monitoring. Due to limitations in reinjection well capacity and the costs realized to maintain operation of the system, Arcadis is working with RACER to evaluate alternatives to the interim seep control system for long term feasibility as compared to expansion of the injection capabilities to accommodate the need for additional flow handling capability as observed throughout system operation to date.

5 REFERENCES

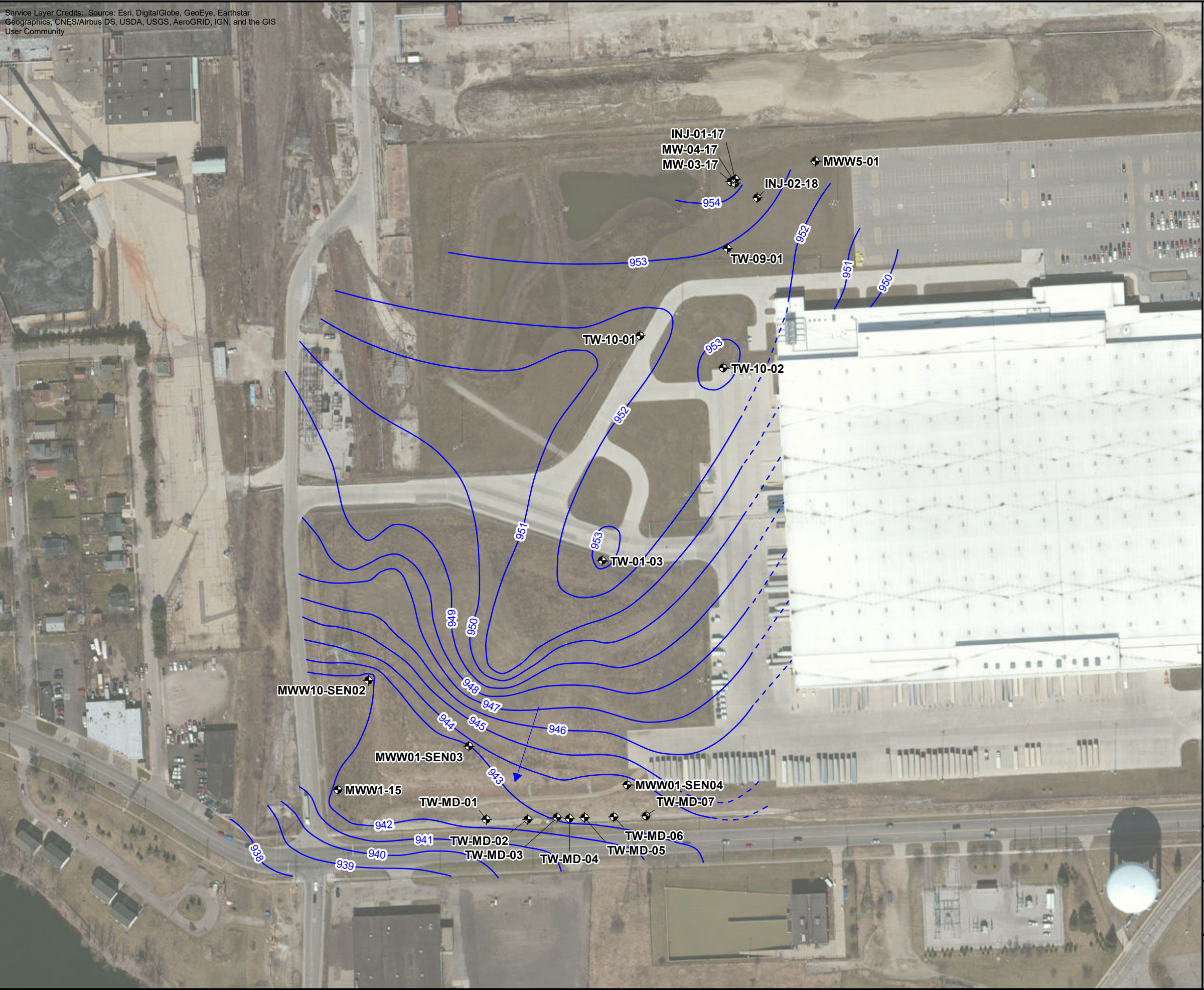
Arcadis 2018. Montcalm Seep Interim Measure Work Plan, RACER Trust, Pontiac Michigan, Revised April 2018.

Arcadis 2020. 2019 Annual Groundwater Monitoring Report, RACER Trust, Pontiac Michigan, Revised February 2020.

Arcadis 2020. Montcalm Seep Control System Interim Measure Completion Report, RACER Trust, Pontiac Michigan, July 2020.

FIGURES

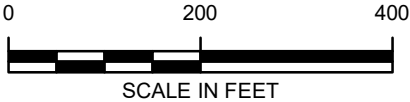




LEGEND

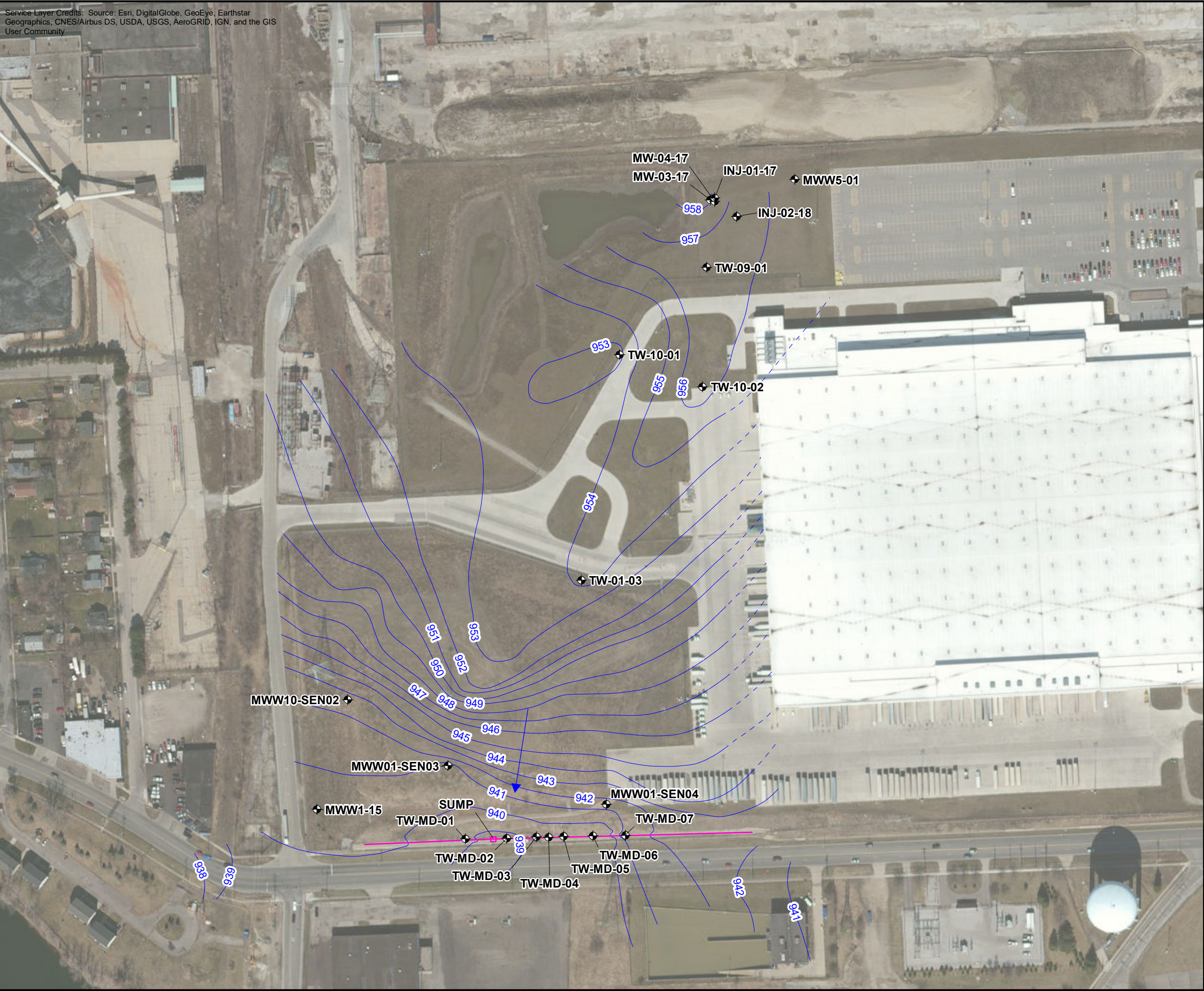
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- 955— GROUNDWATER CONTOUR (CONTOUR INTERVAL 1.0 FEET) (DASHED WHERE INFERRED)
- ← APPROXIMATE GROUNDWATER FLOW DIRECTION

1. WELLS SHOWN MAKE UP THE MONITORING NETWORK.
2. GROUNDWATER ELEVATIONS CALCULATED FROM WATER LEVELS COLLECTED ON OCTOBER 1 - 5, 2018.
3. ALL ELEVATIONS ARE REFERENCED TO A MEAN SEA LEVEL DATUM AND ARE IN UNITS OF FEET ABOVE MEAN SEA LEVEL.
4. THE EQUIVALENT GROUNDWATER ELEVATION IS CALCULATED WHERE LNAPL IS PRESENT USING THE LNAPL SURFACE ELEVATION, THE THICKNESS OF LNAPL AND THE APPROXIMATE SPECIFIC DENSITY OF



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PONTIAC NORTH CAMPUS

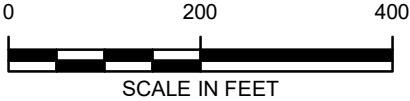
**GROUNDWATER CONTOUR MAP
BASELINE - OCTOBER 2018**



LEGEND

- GROUNDWATER MONITORING WELL LOCATION
- GROUNDWATER CONTOUR (CONTOUR INTERVAL 1.0 FEET) (DASHED WHERE INFERRED)
- APPROXIMATE GROUNDWATER FLOW DIRECTION
- TOE DRAIN AND SUMP

1. WELLS SHOWN MAKE UP THE MONITORING NETWORK.
2. GROUNDWATER ELEVATIONS CALCULATED FROM WATER LEVELS COLLECTED ON OCTOBER 7 - 10, 2019.
3. ALL ELEVATIONS ARE REFERENCED TO A MEAN SEA LEVEL DATUM AND ARE IN UNITS OF FEET ABOVE MEAN SEA LEVEL.
4. THE EQUIVALENT GROUNDWATER ELEVATION IS CALCULATED WHERE LNAPL IS PRESENT USING THE LNAPL SURFACE ELEVATION, THE THICKNESS OF LNAPL AND THE APPROXIMATE SPECIFIC DENSITY OF THE LNAPL (0.88).



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**GROUNDWATER CONTOUR MAP
SITE MONITORING - OCTOBER 2019**

TABLES



Table 1.
Montcalm Seep Re-Injection System Monitoring
RACER Pontiac North Campus
Pontiac, Michigan

Event Date Collected: Sample Name:	Units	Baseline (Oct 2018)	Monthly (May 2019)	Monthly (June 2019)	Monthly / Quarterly (July 2019)	Supplemental (Sept 2019)	Semiannual / Annual (Oct 2019)	Semiannual (May 2020)
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Monitoring Injection Location Influence

INJ-01-17

Groundwater Elevation (calculated ft amsl)	ft	954.31	957.99	958.60	956.37	960.60	957.73	956.43
Alkalinity, total (as CaCO ₃)	mg/L	238	NS	NS	NS	NS	394 [404]	NS
Calcium, total	mg/L	92	NS	NS	NS	NS	81.1 [84.6]	NS
Conductivity, field	mS/cm	0.727	NS	NS	0.54	1.3	1.34	2.12
Dissolved Oxygen (DO), field	mg/L	0.33	NS	NS	0.08	0.09	0.2	0.02
Hardness	mg/L	244	NS	NS	247	274	227 [231]	820
Iron, total	mg/L	0.36	NS	NS	6.88	13.6	5.4 [5.4]	3450
Magnesium, total	mg/L	20.1	NS	NS	NS	NS	24.1 [24.6]	NS
Manganese, total	mg/L	0.402	NS	NS	NS	NS	0.324 [0.331]	NS
Oxidation Reduction Potential (ORP), field	millivolts	82.9	NS	NS	-111.8	-107.2	-89.2	-131.5
pH (water)	S.U.	7.06	NS	NS	7.12	7.13	7.09	7.23
Temperature, field	deg F	57	NS	NS	54	66	64.8	48.9
Temperature, ambient outside	deg F	60	NS	NS	70	68	55	39
Total Dissolved Solids (TDS)	mg/L	562	NS	NS	424	768	844 [844]	1600
Total Suspended Solids (TSS)	mg/L	< 3	NS	NS	NS	NS	14 [14]	NS
Turbidity, field	NTU	1.43	NS	NS	37.0	51.3	7.91	3.81

INJ-02-18

Groundwater Elevation (calculated ft amsl)	ft	Well not surveyed	Well not surveyed	Well not surveyed	Well not surveyed	Well not surveyed	956.51	955.97
Alkalinity, total (as CaCO ₃)	mg/L	368	NS	NS	NS	NS	392	NS
Calcium, total	mg/L	99.4	NS	NS	NS	NS	85.6	NS
Conductivity, field	mS/cm	0.886	NS	NS	1.41	1.55	1.54	2.33
Dissolved Oxygen (DO), field	mg/L	2.30	NS	NS	0.33	0.07	0.06	0.18
Hardness	mg/L	246	NS	NS	341	312	222	472
Iron, total	mg/L	2.36	NS	NS	4.98	16.4	20.9	27.5
Magnesium, total	mg/L	23.7	NS	NS	NS	NS	25.8	NS
Manganese, total	mg/L	0.386	NS	NS	NS	NS	NS; 0.356 dissolved	NS
Oxidation Reduction Potential (ORP), field	millivolts	-79.9	NS	NS	-23.3	-131.6	-135.4	-112.9
pH (water)	S.U.	7.12	NS	NS	6.97	7.23	7.47	7.21
Temperature, field	deg F	57	NS	NS	66	65	63	48.6
Temperature, ambient outside	deg F	61	NS	NS	80	72	67	36
Total Dissolved Solids (TDS)	mg/L	556	NS	NS	906	874	903	1360
Total Suspended Solids (TSS)	mg/L	4	NS	NS	NS	NS	52	NS
Turbidity, field	NTU	1.43	NS	NS	27.5	124	120	54.1

Table 1.
Montcalm Seep Re-Injection System Monitoring
RACER Pontiac North Campus
Pontiac, Michigan

Event Date Collected: Sample Name:	Units	Baseline (Oct 2018)	Monthly (May 2019)	Monthly (June 2019)	Monthly / Quarterly (July 2019)	Supplemental (Sept 2019)	Semiannual / Annual (Oct 2019)	Semiannual (May 2020)
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MW-03-17

Groundwater Elevation (calculated ft amsl)	ft	954.39	958.04	958.67	956.46	957.82	958.49	956.78
Alkalinity, total (as CaCO ₃)	mg/L	250	NS	NS	NS	NS	388	NS
Calcium, total	mg/L	85.2	NS	NS	NS	NS	90	NS
Conductivity, field	mS/cm	0.687	NS	NS	0.65	1.55	1.5	0.87
Dissolved Oxygen (DO), field	mg/L	0.50	NS	NS	0.08	0.1	0.15	0.59
Hardness	mg/L	199	NS	NS	291	324	247	255
Iron, total	mg/L	0.08	NS	NS	0.31	0.33	0.42	0.34
Magnesium, total	mg/L	16.9	NS	NS	NS	NS	24	NS
Manganese, total	mg/L	0.562	NS	NS	NS	NS	0.84	NS
Oxidation Reduction Potential (ORP), field	millivolts	41.9	NS	NS	-6.3	-37.2	4.1	49.4
pH (water)	S.U.	7.02	NS	NS	7.09	7.14	7.08	7.38
Temperature, field	deg F	57	NS	NS	55	59	60.6	49.1
Temperature, ambient outside	deg F	60	NS	NS	70	62	67	39
Total Dissolved Solids (TDS)	mg/L	532	NS	NS	522	894	850	590
Total Suspended Solids (TSS)	mg/L	< 3	NS	NS	NS	NS	< 3	NS
Turbidity, field	NTU	8.46	NS	NS	0.27	0.02	0.02	7.64

MW-04-17

Groundwater Elevation (calculated ft amsl)	ft	954.25	957.88	958.48	956.34	957.82	957.72	956.43
Alkalinity, total (as CaCO ₃)	mg/L	240	NS	NS	NS	NS	398	NS
Calcium, total	mg/L	87	NS	NS	NS	NS	84.1	NS
Conductivity, field	mS/cm	0.697	NS	NS	0.67	1.55	1.52	2.36
Dissolved Oxygen (DO), field	mg/L	0.54	NS	NS	0.05	0.93	0.15	0.1
Hardness	mg/L	221	NS	NS	341	314 [316]	230	487 [248]
Iron, total	mg/L	0.04	NS	NS	4.98	5.50 [5.60]	6	22.3 [21.8]
Magnesium, total	mg/L	18.6	NS	NS	NS	NS	24.7	NS
Manganese, total	mg/L	0.487	NS	NS	NS	NS	0.597	NS
Oxidation Reduction Potential (ORP), field	millivolts	25.3	NS	NS	-70.6	-137.8	-100.6	-108.1
pH (water)	S.U.	7.07	NS	NS	7.27	7.2	7.12	7.22
Temperature, field	deg F	56	NS	NS	56	63	63.7	49.5
Temperature, ambient outside	deg F	60	NS	NS	70	74	55	43
Total Dissolved Solids (TDS)	mg/L	536	NS	NS	906	906 [890]	884	1370 [1350]
Total Suspended Solids (TSS)	mg/L	< 3	NS	NS	NS	NS	12	NS
Turbidity, field	NTU	2.45	NS	NS	0.67	0.02	0.02	3.00

Table 1.
Montcalm Seep Re-Injection System Monitoring
RACER Pontiac North Campus
Pontiac, Michigan

Event Date Collected: Sample Name:	Units	Baseline (Oct 2018)	Monthly (May 2019)	Monthly (June 2019)	Monthly / Quarterly (July 2019)	Supplemental (Sept 2019)	Semiannual / Annual (Oct 2019)	Semiannual (May 2020)
TW-09-01								
Groundwater Elevation (calculated ft amsl)	ft bgl	952.86	956.90	957.56	955.93	956.05	956.43	955.59
LNAPL Elevation (calculated ft amsl)	ft bgl	952.93	NS	NS	NA	NA	NA	NA
Alkalinity, total (as CaCO ₃)	mg/L	770	NS	NS	NS	NS	520	NS
Calcium, total	mg/L	265	NS	NS	NS	NS	101	NS
Conductivity, field	mS/cm	1.80	NS	NS	5.06	3.56	2.03	1.08
Dissolved Oxygen (DO), field	mg/L	0.29	NS	NS	0.34	0.96	0.05	0.04
Hardness	mg/L	675	NS	NS	1870 [1472]	448	261	344
Iron, total	mg/L	4.71	NS	NS	4.13 [4.49]	0.55	0.55	1.71
Magnesium, total	mg/L	36.6	NS	NS	NS	NS	12.1	NS
Manganese, total	mg/L	0.561	NS	NS	NS	NS	0.133	NS
Oxidation Reduction Potential (ORP), field	millivolts	-161.0	NS	NS	-279.4	-403.5	-291.2	-118.1
pH (water)	S.U.	7.08	NS	NS	7.03	7.65	7.47	7.59
Temperature, field	deg F	55	NS	NS	55	56	57.7	50.9
Temperature, ambient outside	deg F	51	NS	NS	80	63	67	50
Total Dissolved Solids (TDS)	mg/L	1460	NS	NS	4290 [4220]	2210	1230	686
Total Suspended Solids (TSS)	mg/L	11	NS	NS	NS	NS	< 3	NS
Turbidity, field	NTU	7.12	NS	NS	0.02	0.02	0.02	4.79
MWW5-01								
Groundwater Elevation (calculated ft amsl)	ft	952.50	956.07	957.65	954.75	954.76	955.21	955.10
Alkalinity, total (as CaCO ₃)	mg/L	558	NS	NS	NS	NS	436	NS
Calcium, total	mg/L	194	NS	NS	NS	NS	226	NS
Conductivity, field	mS/cm	1.199	NS	NS	1.26	1.26	1.45	3.11
Dissolved Oxygen (DO), field	mg/L	1.34	NS	NS	2.64	1.04	1.84	2.66
Hardness	mg/L	512	NS	NS	670	583	594	96
Iron, total	mg/L	2.18	NS	NS	6.69	29.2	15	4.58
Magnesium, total	mg/L	28.2	NS	NS	NS	NS	30.6	NS
Manganese, total	mg/L	0.52	NS	NS	NS	NS	4.27	NS
Oxidation Reduction Potential (ORP), field	millivolts	-56.8	NS	NS	-11.9	-24.8	38.7	10.5
pH (water)	S.U.	6.86	NS	NS	6.77	6.69	7.16	7.12
Temperature, field	deg F	56	NS	NS	65	60	62	49.6
Temperature, ambient outside	deg F	51	NS	NS	70	63	67	52
Total Dissolved Solids (TDS)	mg/L	810	NS	NS	840	766	926	1920
Total Suspended Solids (TSS)	mg/L	< 3	NS	NS	NS	NS	NS	NS
Turbidity, field	NTU	4.29	NS	NS	44.2	24	9.09	20.7

Table 1.
Montcalm Seep Re-Injection System Monitoring
RACER Pontiac North Campus
Pontiac, Michigan

Event Date Collected: Sample Name:	Units	Baseline (Oct 2018)	Monthly (May 2019)	Monthly (June 2019)	Monthly / Quarterly (July 2019)	Supplemental (Sept 2019)	Semiannual / Annual (Oct 2019)	Semiannual (May 2020)
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SUMP (GRAB)

Alkalinity, total (as CaCO ₃)	mg/L	408	NS	NS	NS	NS	408	NS
Calcium, total	mg/L	100	NS	NS	NS	NS	83.2	NS
Conductivity, field	mS/cm	NS	NS	NS	1.55	1.53	1.23	2.16
Dissolved Oxygen (DO), field	mg/L	NS	NS	NS	3.89	5.58	1.1	0.25
Hardness	mg/L	256	NS	NS	340	315	226	449
Iron, total	mg/L	7.05	NS	NS	12	10.7	9.61	19.1
Magnesium, total	mg/L	31.8	NS	NS	NS	NS	25.3	NS
Manganese, total	mg/L	0.521	NS	NS	NS	NS	0.36	NS
Oxidation Reduction Potential (ORP), field	millivolts	-98.1	NS	NS	75.9	-192.3	-50	-37.9
pH (water)	S.U.	7.13	NS	NS	6.87	7.35	6.89	7.19
Temperature, field	deg F	51	NS	NS	73	62	62.4	50.2
Temperature, ambient outside	deg F	41	NS	NS	80	64	68	34
Total Dissolved Solids (TDS)	mg/L	736	NS	NS	900	900	868	1230
Total Suspended Solids (TSS)	mg/L	35	NS	NS	NS	NS	22	NS
Turbidity, field	NTU	NS	NS	NS	44.2	NS	19.5	1.55

Monitoring Downgradient Influence / Mobility

TW-10-02

Groundwater Elevation (calculated ft amsl)	ft bgl	953.55	957.96	957.98	NS	NS	956.73	950.69
Alkalinity, total (as CaCO ₃)	mg/L	558	NS	NS	NS	NS	NS	NS
Calcium, total	mg/L	194	NS	NS	NS	NS	NS	NS
Conductivity, field	mS/cm	2.829	NS	NS	NS	NS	2.39	NS
Dissolved Oxygen (DO), field	mg/L	0.75	NS	NS	NS	NS	0.23	NS
Hardness (as CaCO ₃)	mg/L	512	NS	NS	NS	NS	NS	NS
Iron, total	mg/L	2.18	NS	NS	NS	NS	NS	NS
Magnesium, total	mg/L	28.2	NS	NS	NS	NS	NS	NS
Manganese, total	mg/L	0.52	NS	NS	NS	NS	NS	NS
Oxidation Reduction Potential (ORP), field	millivolts	-50.9	NS	NS	NS	NS	-87.6	NS
pH (water)	S.U.	6.48	NS	NS	NS	NS	6.6	NS
Temperature, field	deg F	56	NS	NS	NS	NS	59.5	NS
Temperature, ambient outside	deg F	51	NS	NS	NS	NS	67	NS
Total Dissolved Solids (TDS)	mg/L	810	NS	NS	NS	NS	NS	NS
Total Suspended Solids (TSS)	mg/L	< 3	NS	NS	NS	NS	NS	NS
Turbidity, field	NTU	4.89	NS	NS	NS	NS	0.02	NS

TW-10-01

Groundwater Elevation (calculated ft amsl)	ft bgl	951.23	953.33	953.86	NS	NS	952.93	NM
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TW-01-03

Groundwater Elevation (calculated ft amsl)	ft bgl	953.41	954.35	954.66	NS	NS	954.09	953.86
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Table 1.
Montcalm Seep Re-Injection System Monitoring
RACER Pontiac North Campus
Pontiac, Michigan

Event Date Collected: Sample Name:	Units	Baseline (Oct 2018)	Monthly (May 2019)	Monthly (June 2019)	Monthly / Quarterly (July 2019)	Supplemental (Sept 2019)	Semiannual / Annual (Oct 2019)	Semiannual (May 2020)
MWW10-SEN02								
Groundwater Elevation (calculated ft amsl)	ft bgl	941.86	943.95	943.78	NS	NS	942.08	943.58
Alkalinity, total (as CaCO ₃)	mg/L	686	NS	NS	NS	NS	696	NS
Calcium, total	mg/L	190	NS	NS	NS	NS	180	NS
Conductivity, field	mS/cm	1.301	NS	NS	NS	NS	1.01	NS
Dissolved Oxygen (DO), field	mg/L	3.14	NS	NS	NS	NS	2.09	NS
Hardness (as CaCO ₃)	mg/L	362	NS	NS	NS	NS	262	NS
Iron, total	mg/L	21.2	NS	NS	NS	NS	20.6	NS
Magnesium, total	mg/L	42.2	NS	NS	NS	NS	38.6	NS
Manganese, total	mg/L	0.563	NS	NS	NS	NS	0.294	NS
Oxidation Reduction Potential (ORP), field	millivolts	117	NS	NS	NS	NS	168.3	NS
pH (water)	S.U.	6.75	NS	NS	NS	NS	6.96	NS
Temperature, field	deg F	54	NS	NS	NS	NS	53.06	NS
Temperature, ambient outside	deg F	46	NS	NS	NS	NS	66	NS
Total Dissolved Solids (TDS)	mg/L	ND (Dry Well)	NS	NS	NS	NS	1280	NS
Total Suspended Solids (TSS)	mg/L	ND (Dry Well)	NS	NS	NS	NS	602	NS
Turbidity, field	NTU	ND (Dry Well)	NS	NS	NS	NS	7.22	NS
MWW01-SEN03								
Groundwater Elevation (calculated ft amsl)	ft bgl	942.66	943.96	942.99	NS	NS	940.99	942.40
Alkalinity, total (as CaCO ₃)	mg/L	754	NS	NS	NS	NS	416	NS
Calcium, total	mg/L	80.1	NS	NS	NS	NS	147	NS
Conductivity, field	mS/cm	1.443	NS	NS	NS	NS	1.13	NS
Dissolved Oxygen (DO), field	mg/L	1.90	NS	NS	NS	NS	9.04	NS
Hardness (as CaCO ₃)	mg/L	137	NS	NS	NS	NS	405	NS
Iron, total	mg/L	21.1	NS	NS	NS	NS	1.02	NS
Magnesium, total	mg/L	16.2	NS	NS	NS	NS	25.4	NS
Manganese, total	mg/L	0.477	NS	NS	NS	NS	0.279	NS
Oxidation Reduction Potential (ORP), field	millivolts	-108.3	NS	NS	NS	NS	-80.5	NS
pH (water)	S.U.	7.57	NS	NS	NS	NS	7.08	NS
Temperature, field	deg F	53	NS	NS	NS	NS	54	NS
Temperature, ambient outside	deg F	51	NS	NS	NS	NS	68	NS
Total Dissolved Solids (TDS)	mg/L	1110	NS	NS	NS	NS	704	NS
Total Suspended Solids (TSS)	mg/L	249	NS	NS	NS	NS	< 3	NS
Turbidity, field	NTU	141	NS	NS	NS	NS	185	NS

Table 1.
Montcalm Seep Re-Injection System Monitoring
RACER Pontiac North Campus
Pontiac, Michigan

Event Date Collected: Sample Name:	Units	Baseline (Oct 2018)	Monthly (May 2019)	Monthly (June 2019)	Monthly / Quarterly (July 2019)	Supplemental (Sept 2019)	Semiannual / Annual (Oct 2019)	Semiannual (May 2020)
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MWW01-SEN04

Groundwater Elevation (calculated ft amsl)	ft bgl	943.61	943.28	942.77	NS	NS	941.10	941.98
Alkalinity, total (as CaCO ₃)	mg/L	498	NS	NS	NS	NS	386	NS
Calcium, total	mg/L	86.4	NS	NS	NS	NS	290	NS
Conductivity, field	mS/cm	1.034	NS	NS	NS	NS	1.12	NS
Dissolved Oxygen (DO), field	mg/L	0.42	NS	NS	NS	NS	1.36	NS
Hardness (as CaCO ₃)	mg/L	218	NS	NS	NS	NS	278	NS
Iron, total	mg/L	14.5	NS	NS	NS	NS	100	NS
Magnesium, total	mg/L	27.6	NS	NS	NS	NS	39.4	NS
Manganese, total	mg/L	0.37	NS	NS	NS	NS	2.52	NS
Oxidation Reduction Potential (ORP), field	millivolts	-108.8	NS	NS	NS	NS	-99.4	NS
pH (water)	S.U.	6.92	NS	NS	NS	NS	6.97	NS
Temperature, field	deg F	61	NS	NS	NS	NS	50.9	NS
Temperature, ambient outside	deg F	70	NS	NS	NS	NS	66	NS
Total Dissolved Solids (TDS)	mg/L	580	NS	NS	NS	NS	1000	NS
Total Suspended Solids (TSS)	mg/L	27	NS	NS	NS	NS	2140	NS
Turbidity, field	NTU	13.2	NS	NS	NS	NS	174	NS

Monitoring Seep Area / Dewatering Influence

TW-MD-01

Groundwater Elevation (calculated ft amsl)	ft bgl	942.68	939.85	939.28	938.96	939.23	939.16	941.20
Alkalinity, total (as CaCO ₃)	mg/L	504	NS	NS	NS	NS	470	NS
Calcium, total	mg/L	125	NS	NS	NS	NS	103	NS
Conductivity, field	mS/cm	0.888	NS	NS	NS	NS	0.85	NS
Dissolved Oxygen (DO), field	mg/L	0.47	NS	NS	NS	NS	0.18	NS
Hardness (as CaCO ₃)	mg/L	314	NS	NS	NS	NS	271	NS
Iron, total	mg/L	10.8	NS	NS	NS	NS	7.05	NS
Magnesium, total	mg/L	30.1	NS	NS	NS	NS	25.1	NS
Manganese, total	mg/L	1.00	NS	NS	NS	NS	0.867	NS
Oxidation Reduction Potential (ORP), field	millivolts	-122.9	NS	NS	NS	NS	-128.7	NS
pH (water)	S.U.	6.90	NS	NS	NS	NS	7.14	NS
Temperature, field	deg F	63	NS	NS	NS	NS	61.2	NS
Temperature, ambient outside	deg F	60	NS	NS	NS	NS	66	NS
Total Dissolved Solids (TDS)	mg/L	630	NS	NS	NS	NS	680	NS
Total Suspended Solids (TSS)	mg/L	12	NS	NS	NS	NS	16	NS
Turbidity, field	NTU	7.79	NS	NS	NS	NS	0.41	NS

Table 1.
Montcalm Seep Re-Injection System Monitoring
RACER Pontiac North Campus
Pontiac, Michigan

Event Date Collected: Sample Name:	Units	Baseline (Oct 2018)	Monthly (May 2019)	Monthly (June 2019)	Monthly / Quarterly (July 2019)	Supplemental (Sept 2019)	Semiannual / Annual (Oct 2019)	Semiannual (May 2020)
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TW-MD-02

Groundwater Elevation (calculated ft amsl)	ft bgl	942.58	937.09	937.19	937.06	937.98	937.97	939.96
Alkalinity, total (as CaCO ₃)	mg/L	524	NS	NS	NS	NS	410	NS
Calcium, total	mg/L	101	NS	NS	NS	NS	90.6	NS
Conductivity, field	mS/cm	0.892	NS	NS	NS	NS	1.02	NS
Dissolved Oxygen (DO), field	mg/L	0.31	NS	NS	NS	NS	0.1	NS
Hardness (as CaCO ₃)	mg/L	253	NS	NS	NS	NS	219	NS
Iron, total	mg/L	14.3	NS	NS	NS	NS	11.2	NS
Magnesium, total	mg/L	22.4	NS	NS	NS	NS	20.2	NS
Manganese, total	mg/L	0.747	NS	NS	NS	NS	0.501	NS
Oxidation Reduction Potential (ORP), field	millivolts	-136.3	NS	NS	NS	NS	-153.9	NS
pH (water)	S.U.	6.90	NS	NS	NS	NS	7.25	NS
Temperature, field	deg F	63	NS	NS	NS	NS	62.6	NS
Temperature, ambient outside	deg F	73	NS	NS	NS	NS	66	NS
Total Dissolved Solids (TDS)	mg/L	620	NS	NS	NS	NS	728	NS
Total Suspended Solids (TSS)	mg/L	14	NS	NS	NS	NS	22	NS
Turbidity, field	NTU	6.26	NS	NS	NS	NS	1.01	NS

TW-MD-03

Groundwater Elevation (calculated ft amsl)	ft bgl	943.21	939.72	939.55	939.32	939.31	939.33	941.21
Alkalinity, total (as CaCO ₃)	mg/L	460	NS	NS	NS	NS	400	NS
Calcium, total	mg/L	109	NS	NS	NS	NS	61.9	NS
Conductivity, field	mS/cm	1.82	NS	NS	NS	NS	1.54	NS
Dissolved Oxygen (DO), field	mg/L	0.20	NS	NS	NS	NS	0.46	NS
Hardness (as CaCO ₃)	mg/L	294	NS	NS	NS	NS	185	NS
Iron, total	mg/L	18.0	NS	NS	NS	NS	2.03	NS
Magnesium, total	mg/L	28.6	NS	NS	NS	NS	20	NS
Manganese, total	mg/L	0.820	NS	NS	NS	NS	NS (0.250 dissolved)	NS
Oxidation Reduction Potential (ORP), field	millivolts	-149.9	NS	NS	NS	NS	-144.4	NS
pH (water)	S.U.	7.01	NS	NS	NS	NS	7.33	NS
Temperature, field	deg F	62	NS	NS	NS	NS	58.5	NS
Temperature, ambient outside	deg F	70	NS	NS	NS	NS	66	NS
Total Dissolved Solids (TDS)	mg/L	1180	NS	NS	NS	NS	780	NS
Total Suspended Solids (TSS)	mg/L	28	NS	NS	NS	NS	40	NS
Turbidity, field	NTU	3.06	NS	NS	NS	NS	47.1	NS

Table 1.
Montcalm Seep Re-Injection System Monitoring
RACER Pontiac North Campus
Pontiac, Michigan

Event Date Collected: Sample Name:	Units	Baseline (Oct 2018)	Monthly (May 2019)	Monthly (June 2019)	Monthly / Quarterly (July 2019)	Supplemental (Sept 2019)	Semiannual / Annual (Oct 2019)	Semiannual (May 2020)
TW-MD-04								
Groundwater Elevation (calculated ft amsl)	ft bgl	943.23	939.03	938.98	938.86	939.17	939.10	941.05
Alkalinity, total (as CaCO ₃)	mg/L	422	NS	NS	NS	NS	372	NS
Calcium, total	mg/L	166	NS	NS	NS	NS	75.5	NS
Conductivity, field	mS/cm	2.539	NS	NS	NS	NS	1.07	NS
Dissolved Oxygen (DO), field	mg/L	0.29	NS	NS	NS	NS	0.1	NS
Hardness (as CaCO ₃)	mg/L	390	NS	NS	NS	NS	201	NS
Iron, total	mg/L	21.9	NS	NS	NS	NS	13.8	NS
Magnesium, total	mg/L	43.7	NS	NS	NS	NS	20.7	NS
Manganese, total	mg/L	1.16	NS	NS	NS	NS	0.571	NS
Oxidation Reduction Potential (ORP), field	millivolts	-88.2	NS	NS	NS	NS	-170.1	NS
pH (water)	S.U.	6.69	NS	NS	NS	NS	7.12	NS
Temperature, field	deg F	62	NS	NS	NS	NS	59.2	NS
Temperature, ambient outside	deg F	75	NS	NS	NS	NS	66	NS
Total Dissolved Solids (TDS)	mg/L	1700	NS	NS	NS	NS	792	NS
Total Suspended Solids (TSS)	mg/L	37	NS	NS	NS	NS	30	NS
Turbidity, field	NTU	2.35	NS	NS	NS	NS	2.76	NS
TW-MD-05								
Groundwater Elevation (calculated ft amsl)	ft bgl	943.18	939.54	939.43	939.30	939.35	939.29	941.12
Alkalinity, total (as CaCO ₃)	mg/L	456	NS	NS	NS	NS	372	NS
Calcium, total	mg/L	47.2	NS	NS	NS	NS	58.4	NS
Conductivity, field	mS/cm	0.874	NS	NS	NS	NS	1.04	NS
Dissolved Oxygen (DO), field	mg/L	0.23	NS	NS	NS	NS	0.08	NS
Hardness (as CaCO ₃)	mg/L	113	NS	NS	NS	NS	156	NS
Iron, total	mg/L	11.5	NS	NS	NS	NS	13	NS
Magnesium, total	mg/L	21.9	NS	NS	NS	NS	26.5	NS
Manganese, total	mg/L	0.356	NS	NS	NS	NS	0.4	NS
Oxidation Reduction Potential (ORP), field	millivolts	-128.8	NS	NS	NS	NS	-174.8	NS
pH (water)	S.U.	6.85	NS	NS	NS	NS	7.25	NS
Temperature, field	deg F	61	NS	NS	NS	NS	56.5	NS
Temperature, ambient outside	deg F	75	NS	NS	NS	NS	66	NS
Total Dissolved Solids (TDS)	mg/L	586	NS	NS	NS	NS	784	NS
Total Suspended Solids (TSS)	mg/L	20	NS	NS	NS	NS	28	NS
Turbidity, field	NTU	8.92	NS	NS	NS	NS	1.21	NS

Table 1.
Montcalm Seep Re-Injection System Monitoring
RACER Pontiac North Campus
Pontiac, Michigan

Event Date Collected: Sample Name:	Units	Baseline (Oct 2018)	Monthly (May 2019)	Monthly (June 2019)	Monthly / Quarterly (July 2019)	Supplemental (Sept 2019)	Semiannual / Annual (Oct 2019)	Semiannual (May 2020)
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TW-MD-06

Groundwater Elevation (calculated ft amsl)	ft bgl	943.38	940.23	940.14	939.98	939.93	939.91	941.16
Alkalinity, total (as CaCO ₃)	mg/L	434	NS	NS	NS	NS	384	NS
Calcium, total	mg/L	152	NS	NS	NS	NS	89.8	NS
Conductivity, field	mS/cm	1.620	NS	NS	NS	NS	1.16	NS
Dissolved Oxygen (DO), field	mg/L	0.42	NS	NS	NS	NS	0.09	NS
Hardness (as CaCO ₃)	mg/L	390	NS	NS	NS	NS	248	NS
Iron, total	mg/L	24.9	NS	NS	NS	NS	9.57	NS
Magnesium, total	mg/L	43	NS	NS	NS	NS	27.3	NS
Manganese, total	mg/L	0.947	NS	NS	NS	NS	0.435	NS
Oxidation Reduction Potential (ORP), field	millivolts	-129.2	NS	NS	NS	NS	-144.9	NS
pH (water)	S.U.	6.81	NS	NS	NS	NS	7.16	NS
Temperature, field	deg F	60	NS	NS	NS	NS	55.9	NS
Temperature, ambient outside	deg F	71	NS	NS	NS	NS	66	NS
Total Dissolved Solids (TDS)	mg/L	1080	NS	NS	NS	NS	884	NS
Total Suspended Solids (TSS)	mg/L	46	NS	NS	NS	NS	21	NS
Turbidity, field	NTU	8.20	NS	NS	NS	NS	4.02	NS

TW-MD-07

Groundwater Elevation (calculated ft amsl)	ft bgl	943.87	940.23	941.21	941.16	941.10	941.12	941.71
Alkalinity, total (as CaCO ₃)	mg/L	494	NS	NS	NS	NS	410	NS
Calcium, total	mg/L	148	NS	NS	NS	NS	86.5	NS
Conductivity, field	mS/cm	1.459	NS	NS	NS	NS	1.61	NS
Dissolved Oxygen (DO), field	mg/L	0.34	NS	NS	NS	NS	0.54	NS
Hardness (as CaCO ₃)	mg/L	365	NS	NS	NS	NS	225	NS
Iron, total	mg/L	23.9	NS	NS	NS	NS	10	NS
Magnesium, total	mg/L	43.9	NS	NS	NS	NS	20.4	NS
Manganese, total	mg/L	0.201	NS	NS	NS	NS	0.378	NS
Oxidation Reduction Potential (ORP), field	millivolts	-86.9	NS	NS	NS	NS	-115.9	NS
pH (water)	S.U.	6.61	NS	NS	NS	NS	7.06	NS
Temperature, field	deg F	60	NS	NS	NS	NS	58.1	NS
Temperature, ambient outside	deg F	71	NS	NS	NS	NS	66	NS
Total Dissolved Solids (TDS)	mg/L	958	NS	NS	NS	NS	1220	NS
Total Suspended Solids (TSS)	mg/L	43	NS	NS	NS	NS	21	NS
Turbidity, field	NTU	3.40	NS	NS	NS	NS	2.96	NS

Table 1.
Montcalm Seep Re-Injection System Monitoring
RACER Pontiac North Campus
Pontiac, Michigan

Event Date Collected: Sample Name:	Units	Baseline (Oct 2018)	Monthly (May 2019)	Monthly (June 2019)	Monthly / Quarterly (July 2019)	Supplemental (Sept 2019)	Semiannual / Annual (Oct 2019)	Semiannual (May 2020)
MWW1-15								
Groundwater Elevation (calculated ft amsl)	ft bgl	942.34	942.58	942.00	940.89	940.41	940.70	941.64
Alkalinity, total (as CaCO ₃)	mg/L	528	NS	NS	NS	NS	416	NS
Calcium, total	mg/L	62	NS	NS	NS	NS	53.3	NS
Conductivity, field	mS/cm	1.361	NS	NS	NS	NS	0.94	NS
Dissolved Oxygen (DO), field	mg/L	0.41	NS	NS	NS	NS	0.1	NS
Hardness (as CaCO ₃)	mg/L	155	NS	NS	NS	NS	147	NS
Iron, total	mg/L	9.07	NS	NS	NS	NS	5.04	NS
Magnesium, total	mg/L	28.6	NS	NS	NS	NS	29	NS
Manganese, total	mg/L	0.236	NS	NS	NS	NS	0.207	NS
Oxidation Reduction Potential (ORP), field	millivolts	-147.1	NS	NS	NS	NS	-192.9	NS
pH (water)	S.U.	7.43	NS	NS	NS	NS	7.7	NS
Temperature, field	deg F	62	NS	NS	NS	NS	60.8	NS
Temperature, ambient outside	deg F	65	NS	NS	NS	NS	66	NS
Total Dissolved Solids (TDS)	mg/L	794	NS	NS	NS	NS	724	NS
Total Suspended Solids (TSS)	mg/L	9	NS	NS	NS	NS	4	NS
Turbidity, field	NTU	5.10	NS	NS	NS	NS	2.97	NS

Notes:

deg F = degrees Fahrenheit

ft bgl = feet below ground level

NM = Not Measured

NS = Not Sampled / Not Required to be Sampled

NTU = nephelometric unit

mg/L = milligram per liter

mS/cm = millisiemens per centimeter

S.U. = standard unit

Table 2
Groundwater Analytical Results
RACER Pontiac North Campus
Pontiac, Michigan

Location ID: Date Collected: Sample Name:	MDEQ 2013 Residential Drinking Water Criteria	MDEQ 2013 Non- Residential Drinking Water Criteria	MDEQ 2013 Groundwater Surface Water Interface Protection	Non-Residential Health Based Drinking Water Value	MDEQ 2013 Residential Groundwater Volatilization to Indoor Air Inhalation	MDEQ 2013 Non- Residential Groundwater Volatilization to Indoor Air Inhalation	MDEQ 2017 Res GW VIA RIALs	Units	INJ-01-17 10/02/18 INJ-01-17_GW-100218	INJ-01-17 10/08/19 INJ-01-17_GW-100819	INJ-02-18 10/02/18 INJ-02-18_GW-100218	INJ-02-18 10/08/19 INJ-02-18_GW-100819	MW-03-17 10/02/18 MW-03-17_GW-100218	MW-03-17 10/09/19 MW-03-17_GW-100919
Field Parameters														
pH	6.5-8.5 (E)	6.5-8.5 (E)	6.5-9.0	--	--	--	--	SU	7.06	7.09	7.12	7.47	7.02	7.08
Turbidity	--	--	--	--	--	--	--	NTU	1.43	7.91	1.43	120	8.46	0.02
PCBs														
Aroclor-1016	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U [0.0001 U]	0.0001 U	0.0001 U	0.0001 U	NA
Aroclor-1221	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U [0.0001 U]	0.0001 U	0.0001 U	0.0001 U	NA
Aroclor-1232	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U [0.0001 U]	0.0001 U	0.0001 U	0.0001 U	NA
Aroclor-1242	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U [0.0001 U]	0.0001 U	0.0001 U	0.0001 U	NA
Aroclor-1248	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U [0.0001 U]	0.0001 U	0.0001 U	0.0001 U	NA
Aroclor-1254	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U [0.0001 U]	0.0001 U	0.0001 U	0.0001 U	NA
Aroclor-1260	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U [0.0001 U]	0.0001 U	0.0001 U	0.0001 U	NA
Total PCBs	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U [0.0001 U]	0.0001 U	0.0001 U	0.0001 U	NA
Volatile Organics														
Acetone	0.73	2.1	1.7	--	1,000,000	1,000,000	12,000	mg/L	0.05 U	0.05 U [0.05 U]	0.05 U	0.05 U	0.05 U	0.05 U
Benzene	0.005	0.005	0.2	--	5.6	35	0.014	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
Bromodichloromethane	0.08	0.08	--	--	4.8	37	--	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
Bromoform	0.08	0.08	--	--	470	3,100	--	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
Bromomethane	0.01	0.029	0.005	--	4	9	--	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U
2-Butanone	13	38	2.2	--	240,000	240,000	--	mg/L	0.025 U	0.025 U [0.025 U]	0.025 U	0.025 U	0.025 U	0.025 U
Carbon Disulfide	0.8	2.3	--	--	250	550	--	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U
Carbon Tetrachloride	0.005	0.005	0.038	--	0.37	2.4	--	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
CFC-11	2.6	7.3	--	--	1,100	1,100	--	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
CFC-12	1.7	4.8	--	--	220	300	--	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U
Chlorobenzene	0.1	0.1	0.025	--	210	470	0.54	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
Chlorodibromomethane	0.08	0.08	--	--	14	110	--	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U
Chloroethane	0.43	1.7	1.1	--	5,700	5,700	6.7	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U
Chloroform	0.08	0.08	0.35	--	28	180	0.0076	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
Chloromethane	0.26	1.1	--	--	8.6	45	0.16	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U
Cyclohexane	--	--	--	--	--	--	--	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dibromo-3-chloropropane	0.0002	0.0002	--	--	0.22	1.2	--	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dibromoethane	0.00005	0.00005	0.0057	--	2.4	15	--	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dichlorobenzene	0.6	0.6	0.013	--	160	160	--	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
1,3-Dichlorobenzene	0.0066	0.019	0.028	--	18	41	0.052	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
1,4-Dichlorobenzene	0.075	0.075	0.017	--	16	74	0.12	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
1,1-Dichloroethane	0.88	2.5	0.74	--	1,000	2,300	0.067	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dichloroethane	0.005	0.005	0.36	--	9.6	59	--	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
1,1-Dichloroethene	0.007	0.007	0.13	--	0.2	1.3	0.17	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
cis-1,2-Dichloroethene	0.07	0.07	0.62	--	93	210	0.048	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
trans-1,2-Dichloroethene	0.1	0.1	1.5	--	85	200	0.65	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
Dichloromethane	0.005	0.005	1.5	--	220	1,400	3.9	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dichloropropane	0.005	0.005	0.23	--	16	36	--	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
cis-1,3-Dichloropropene	--	--	--	--	--	--	--	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
trans-1,3-Dichloropropene	--	--	--	--	--	--	--	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
Ethylbenzene*	0.074 (E)	0.074 (E)	0.018	0.7	110	170	0.045	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
Isopropylbenzene	0.8	2.3	0.028	--	56	56	--	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
Methyl acetate	--	--	--	--	--	--	--	mg/L	0.01 U	0.01 U [0.01 U]	0.01 U	0.01 U	0.01 U	0.01 U
Methyl N-Butyl Ketone	1	2.9	--	--	4,200	8,700	--	mg/L	0.05 U	0.05 U [0.05 U]	0.05 U	0.05 U	0.05 U	0.05 U
Methylcyclohexane	--	--	--	--	--	--	--	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
4-Methyl-2-pentanone	1.8	5.2	--	--	20,000	20,000	--	mg/L	0.05 U	0.05 U [0.05 U]	0.05 U	0.05 U	0.05 U	0.05 U
Methyl tert-butyl ether*	0.04 (E)	0.04 (E)	7.1	0.69	47,000	47,000	4	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U
Styrene	0.1	0.1	0.08	--	170	310	--	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
1,1,2,2-Tetrachloroethane	0.0085	0.035	0.078	--	12	77	--	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
Tetrachloroethene	0.005	0.005	0.06	--	25	170	0.096	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
Toluene*	0.79 (E)	0.79 (E)	0.27	1	530	530	23	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
1,2,4-Trichlorobenzene	0.07	0.07	0.099	--	300	300	0.095	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U
1,1,1-Trichloroethane	0.2	0.2	0.089	--	660	1,300	8.6	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
1,1,2-Trichloroethane	0.005	0.005	0.33	--	17	110	--	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
Trichloroethene	0.005	0.005	0.2	--	2.2	4.9	0.0061	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
1,1,2-trichloro-1,2,2-trifluoroethane	170	170	0.032	--	170	170	--	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
Vinyl Chloride	0.002	0.002	0.013	--	1.1	13	0.00096 (M)	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
m&p-Xylene	--	--	--	--	--	--	--	mg/L	0.002 U	0.002 U [0.002 U]	0.002 U	0.002 U	0.002 U	0.002 U
o-Xylene	--	--	--	--	--	--	--	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	0.001 U	0.001 U	0.001 U
Total Xylenes*	0.28 (E)	0.28 (E)	0.49	10	190	190	1.2	mg/L	0.002 U	0.002 U [0.002 U]	0.002 U	0.002 U	0.002 U	0.002 U

See Notes on last page.

Table 2
Groundwater Analytical Results
RACER Pontiac North Campus
Pontiac, Michigan

Location ID: Date Collected: Sample Name:	MDEQ 2013 Residential Drinking Water Criteria	MDEQ 2013 Non- Residential Drinking Water Criteria	MDEQ 2013 Groundwater Surface Water Interface Protection	Non-Residential Health Based Drinking Water Value	MDEQ 2013 Residential Groundwater Volatilization to Indoor Air Inhalation	MDEQ 2013 Non- Residential Groundwater Volatilization to Indoor Air Inhalation	MDEQ 2017 Res GW VIA RIALs	Units	INJ-01-17 10/02/18 INJ-01-17_GW-100218	INJ-01-17 10/08/19 INJ-01-17_GW-100819	INJ-02-18 10/02/18 INJ-02-18_GW-100218	INJ-02-18 10/08/19 INJ-02-18_GW-100819	MW-03-17 10/02/18 MW-03-17_GW-100218	MW-03-17 10/09/19 MW-03-17_GW-100919
Inorganics														
Antimony	0.006	0.006	0.13	--	--	--	--	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	NA	0.005 U	0.005 U
Arsenic	0.01	0.01	0.01	--	--	--	--	mg/L	0.002 U	0.003 [0.003]	0.007	NA	0.002 U	0.002 U
Barium	2	2	0.67	--	--	--	--	mg/L	0.048	0.168 [0.17]	0.163	NA	0.047	0.112
Beryllium	0.004	0.004	0.0067	--	--	--	--	mg/L	0.001 U	0.001 U [0.001 U]	0.001 U	NA	0.001 U	0.001 U
Cadmium	0.005	0.005	0.0025	--	--	--	--	mg/L	0.0005 U	0.0005 U [0.0005 U]	0.0005 U	NA	0.0005 U	0.0005 U
Calcium	--	--	--	--	--	--	--	mg/L	92	81.1 [84.6]	99.4	85.6	85.2	90.0
Chromium	0.1	0.1	0.011	--	--	--	--	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	NA	0.005 U	0.005 U
Cobalt	0.04	0.1	0.1	--	--	--	--	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	NA	0.005 U	0.005 U
Copper*	1 (E)	1 (E)	0.013	4	--	--	--	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	NA	0.005 U	0.005 U
Iron*	0.3 (E)	0.3 (E)	--	5.6	--	--	--	mg/L	0.36	5.40 [5.40]	2.36	20.9	0.08	0.42
Lead	0.004	0.004	0.014	--	--	--	--	mg/L	0.003 U	0.003 U [0.003 U]	0.003 U	NA	0.003 U	0.003 U
Magnesium	400	1,100	--	--	--	--	--	mg/L	20.1	24.1 [24.6]	23.7	25.8	16.9	24.0
Manganese*	0.05 (E)	0.05 (E)	1.3	2.5	--	--	--	mg/L	0.402	0.324 [0.331]	0.386	NA	0.562	0.840
Mercury	0.002	0.002	0.0000013	--	0.056	0.056	--	mg/L	0.0002 U	0.0002 U [0.0002 U]	0.0002 U	NA	0.0002 U	0.0002 U
Nickel	0.1	0.1	0.073	--	--	--	--	mg/L	0.005 U	0.005 U [0.005 U]	0.03	NA	0.006	0.005 U
Selenium	0.05	0.05	0.005	--	--	--	--	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	NA	0.005 U	0.005 U
Silver	0.034	0.098	0.0002	--	--	--	--	mg/L	0.0005 U	0.0005 U [0.0005 U]	0.0005 U	NA	0.0005 U	0.0005 U
Thallium	0.002	0.002	0.0037	--	--	--	--	mg/L	0.002 U	0.002 U [0.002 U]	0.002 U	NA	0.002 U	0.002 U
Vanadium	0.0045	0.062	0.027	--	--	--	--	mg/L	0.005 U	0.005 U [0.005 U]	0.005 U	NA	0.005 U	0.005 U
Zinc	2.4	5 (E)	0.17	--	--	--	--	mg/L	0.005 U	0.007 [0.008]	0.005 U	NA	0.005 U	0.005 U
Inorganics-Filtered														
Antimony (dissolved)	0.006	0.006	0.13	--	--	--	--	mg/L	NA	NA	NA	0.005 Uf	NA	NA
Arsenic (dissolved)	0.01	0.01	0.01	--	--	--	--	mg/L	NA	NA	NA	0.002 Uf	NA	NA
Barium (dissolved)	2	2	0.67	--	--	--	--	mg/L	NA	NA	NA	0.140 f	NA	NA
Beryllium (dissolved)	0.004	0.004	0.0067	--	--	--	--	mg/L	NA	NA	NA	0.001 Uf	NA	NA
Cadmium (dissolved)	0.005	0.005	0.0025	--	--	--	--	mg/L	NA	NA	NA	0.0005 Uf	NA	NA
Chromium (dissolved)	0.1	0.1	0.011	--	--	--	--	mg/L	NA	NA	NA	0.005 Uf	NA	NA
Cobalt (dissolved)	0.04	0.1	0.1	--	--	--	--	mg/L	NA	NA	NA	0.005 Uf	NA	NA
Copper (dissolved)*	1 (E)	1 (E)	0.013	4	--	--	--	mg/L	NA	NA	NA	0.005 Uf	NA	NA
Lead (dissolved)	0.004	0.004	0.014	--	--	--	--	mg/L	NA	NA	NA	0.003 Uf	NA	NA
Manganese (dissolved)*	0.05 (E)	0.05 (E)	1.3	2.5	--	--	--	mg/L	NA	NA	NA	0.356 f	NA	NA
Mercury (dissolved)	0.002	0.002	0.0000013	--	0.056	0.056	--	mg/L	NA	NA	NA	0.0002 Uf	NA	NA
Nickel (dissolved)	0.1	0.1	0.073	--	--	--	--	mg/L	NA	NA	NA	0.005 Uf	NA	NA
Selenium (dissolved)	0.05	0.05	0.005	--	--	--	--	mg/L	NA	NA	NA	0.005 Uf	NA	NA
Silver (dissolved)	0.034	0.098	0.0002	--	--	--	--	mg/L	NA	NA	NA	0.0005 Uf	NA	NA
Thallium (dissolved)	0.002	0.002	0.0037	--	--	--	--	mg/L	NA	NA	NA	0.002 Uf	NA	NA
Vanadium (dissolved)	0.0045	0.062	0.027	--	--	--	--	mg/L	NA	NA	NA	0.005 Uf	NA	NA
Zinc (dissolved)	2.4	5 (E)	0.17	--	--	--	--	mg/L	NA	NA	NA	0.005 Uf	NA	NA
Miscellaneous														
Alkalinity, total (as CaCO3)	--	--	--	--	--	--	--	mg/L	238	394 [404]	368	392	250	388
Hardness	--	--	--	--	--	--	--	mg/L	244	227 [231]	246	222	199	247
Total Dissolved Solids	500 (E)	500 (E)	500	--	--	--	--	mg/L	562	844 [844]	556	903	532	850
Total Suspended Solids	--	--	--	--	--	--	--	mg/L	3 U	14 [14]	4	52	3 U	3 U

See Notes on last page.

Table 2
Groundwater Analytical Results
RACER Pontiac North Campus
Pontiac, Michigan

Location ID: Date Collected: Sample Name:	MDEQ 2013 Residential Drinking Water Criteria	MDEQ 2013 Non- Residential Drinking Water Criteria	MDEQ 2013 Groundwater Surface Water Interface Protection	Non-Residential Health Based Drinking Water Value	MDEQ 2013 Residential Groundwater Volatilization to Indoor Air Inhalation	MDEQ 2013 Non- Residential Groundwater Volatilization to Indoor Air Inhalation	MDEQ 2017 Res GW VIA RIALs	Units	MW-04-17 10/02/18 MW-04-17_GW-100218	MW-04-17 10/08/19 MW-04-17_GW-100819	MWW1-15 10/03/18 MWW1-15_GW-100318	MWW1-15 10/08/19 MWW1-15_GW-100819	MWW01-SEN03 10/05/18 MWW01-SEN03-GW-100518	MWW01-SEN03 10/10/19 MWW01-SEN03_GW-101019	
Field Parameters															
pH	6.5-8.5 (E)	6.5-8.5 (E)	6.5-9.0	--	--	--	--	SU	7.07	7.12	7.43	7.70	7.57	7.08	
Turbidity	--	--	--	--	--	--	--	NTU	2.45	0.02	5.10	2.97	141	185	
PCBs															
Aroclor-1016	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	
Aroclor-1221	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	
Aroclor-1232	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	
Aroclor-1242	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	
Aroclor-1248	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	
Aroclor-1254	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	
Aroclor-1260	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	
Total PCBs	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	
Volatile Organics															
Acetone	0.73	2.1	1.7	--	1,000,000	1,000,000	12,000	mg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	
Benzene	0.005	0.005	0.2	--	5.6	35	0.014	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
Bromodichloromethane	0.08	0.08	--	--	4.8	37	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
Bromoform	0.08	0.08	--	--	470	3,100	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
Bromomethane	0.01	0.029	0.005	--	4	9	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	
2-Butanone	13	38	2.2	--	240,000	240,000	--	mg/L	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	
Carbon Disulfide	0.8	2.3	--	--	250	550	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	
Carbon Tetrachloride	0.005	0.005	0.038	--	0.37	2.4	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
CFC-11	2.6	7.3	--	--	1,100	1,100	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
CFC-12	1.7	4.8	--	--	220	300	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	
Chlorobenzene	0.1	0.1	0.025	--	210	470	0.54	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
Chlorodibromomethane	0.08	0.08	--	--	14	110	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	
Chloroethane	0.43	1.7	1.1	--	5,700	5,700	6.7	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	
Chloroform	0.08	0.08	0.35	--	28	180	0.0076	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
Chloromethane	0.26	1.1	--	--	8.6	45	0.16	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	
Cyclohexane	--	--	--	--	--	--	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
1,2-Dibromo-3-chloropropane	0.0002	0.0002	--	--	0.22	1.2	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	
1,2-Dibromoethane	0.00005	0.00005	0.0057	--	2.4	15	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
1,2-Dichlorobenzene	0.6	0.6	0.013	--	160	160	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
1,3-Dichlorobenzene	0.0066	0.019	0.028	--	18	41	0.052	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
1,4-Dichlorobenzene	0.075	0.075	0.017	--	16	74	0.12	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
1,1-Dichloroethane	0.88	2.5	0.74	--	1,000	2,300	0.067	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
1,2-Dichloroethane	0.005	0.005	0.36	--	9.6	59	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
1,1-Dichloroethene	0.007	0.007	0.13	--	0.2	1.3	0.17	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
cis-1,2-Dichloroethene	0.07	0.07	0.62	--	93	210	0.048	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
trans-1,2-Dichloroethene	0.1	0.1	1.5	--	85	200	0.65	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
Dichloromethane	0.005	0.005	1.5	--	220	1,400	3.9	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	
1,2-Dichloropropane	0.005	0.005	0.23	--	16	36	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
cis-1,3-Dichloropropene	--	--	--	--	--	--	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
trans-1,3-Dichloropropene	--	--	--	--	--	--	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
Ethylbenzene*	0.074 (E)	0.074 (E)	0.018	0.7	110	170	0.045	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
Isopropylbenzene	0.8	2.3	0.028	--	56	56	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
Methyl acetate	--	--	--	--	--	--	--	mg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	
Methyl N-Butyl Ketone	1	2.9	--	--	4,200	8,700	--	mg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	
Methylcyclohexane	--	--	--	--	--	--	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
4-Methyl-2-pentanone	1.8	5.2	--	--	20,000	20,000	--	mg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	
Methyl tert-butyl ether*	0.04 (E)	0.04 (E)	7.1	0.69	47,000	47,000	4	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	
Styrene	0.1	0.1	0.08	--	170	310	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
1,1,2,2-Tetrachloroethane	0.0085	0.035	0.078	--	12	77	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
Tetrachloroethene	0.005	0.005	0.06	--	25	170	0.096	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
Toluene*	0.79 (E)	0.79 (E)	0.27	1	530	530	23	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
1,2,4-Trichlorobenzene	0.07	0.07	0.099	--	300	300	0.095	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	
1,1,1-Trichloroethane	0.2	0.2	0.089	--	660	1,300	8.6	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
1,1,2-Trichloroethane	0.005	0.005	0.33	--	17	110	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
Trichloroethene	0.005	0.005	0.2	--	2.2	4.9	0.0061	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
1,1,2-trichloro-1,2,2-trifluoroethane	170	170	0.032	--	170	170	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
Vinyl Chloride	0.002	0.002	0.013	--	1.1	13	0.00096 (M)	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
m&p-Xylene	--	--	--	--	--	--	--	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	
o-Xylene	--	--	--	--	--	--	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	
Total Xylenes*	0.28 (E)	0.28 (E)	0.49	10	190	190	1.2	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	

See Notes on last page.

Table 2
Groundwater Analytical Results
RACER Pontiac North Campus
Pontiac, Michigan

Location ID: Date Collected: Sample Name:	MDEQ 2013 Residential Drinking Water Criteria	MDEQ 2013 Non- Residential Drinking Water Criteria	MDEQ 2013 Groundwater Surface Water Interface Protection	Non-Residential Health Based Drinking Water Value	MDEQ 2013 Residential Groundwater Volatilization to Indoor Air Inhalation	MDEQ 2013 Non- Residential Groundwater Volatilization to Indoor Air Inhalation	MDEQ 2017 Res GW VIA RIALs	Units	MW-04-17 10/02/18 MW-04-17_GW-100218	MW-04-17 10/08/19 MW-04-17_GW-100819	MWW1-15 10/03/18 MWW1-15_GW-100318	MWW1-15 10/08/19 MWW1-15_GW-100819	MWW01-SEN03 10/05/18 MWW01-SEN03-GW-100518	MWW01-SEN03 10/10/19 MWW01-SEN03_GW-101019
Inorganics														
Antimony	0.006	0.006	0.13	--	--	--	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Arsenic	0.01	0.01	0.01	--	--	--	--	mg/L	0.002 U	0.007	0.002	0.002	0.008	0.002
Barium	2	2	0.67	--	--	--	--	mg/L	0.06	0.179	0.139	0.116	0.17	0.083
Beryllium	0.004	0.004	0.0067	--	--	--	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium	0.005	0.005	0.0025	--	--	--	--	mg/L	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.001	0.0005 U
Calcium	--	--	--	--	--	--	--	mg/L	87	84.1	62	53.3	80.1	147
Chromium	0.1	0.1	0.011	--	--	--	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.029	0.005 U
Cobalt	0.04	0.1	0.1	--	--	--	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.006	0.005 U
Copper*	1 (E)	1 (E)	0.013	4	--	--	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.016	0.005 U
Iron*	0.3 (E)	0.3 (E)	--	5.6	--	--	--	mg/L	0.04	6.00	9.07	5.04	21.1	1.02
Lead	0.004	0.004	0.014	--	--	--	--	mg/L	0.003 U	0.003 U	0.003 U	0.003 U	0.011	0.003 U
Magnesium	400	1,100	--	--	--	--	--	mg/L	18.6	24.7	28.6	29.0	16.2	25.4
Manganese*	0.05 (E)	0.05 (E)	1.3	2.5	--	--	--	mg/L	0.487	0.597	0.236	0.207	0.477	0.279
Mercury	0.002	0.002	0.0000013	--	0.056	0.056	--	mg/L	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Nickel	0.1	0.1	0.073	--	--	--	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.023	0.005 U
Selenium	0.05	0.05	0.005	--	--	--	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Silver	0.034	0.098	0.0002	--	--	--	--	mg/L	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Thallium	0.002	0.002	0.0037	--	--	--	--	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Vanadium	0.0045	0.062	0.027	--	--	--	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.007	0.005 U
Zinc	2.4	5 (E)	0.17	--	--	--	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.027	0.005 U
Inorganics-Filtered														
Antimony (dissolved)	0.006	0.006	0.13	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Arsenic (dissolved)	0.01	0.01	0.01	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Barium (dissolved)	2	2	0.67	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Beryllium (dissolved)	0.004	0.004	0.0067	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Cadmium (dissolved)	0.005	0.005	0.0025	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Chromium (dissolved)	0.1	0.1	0.011	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Cobalt (dissolved)	0.04	0.1	0.1	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Copper (dissolved)*	1 (E)	1 (E)	0.013	4	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Lead (dissolved)	0.004	0.004	0.014	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Manganese (dissolved)*	0.05 (E)	0.05 (E)	1.3	2.5	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Mercury (dissolved)	0.002	0.002	0.0000013	--	0.056	0.056	--	mg/L	NA	NA	NA	NA	NA	NA
Nickel (dissolved)	0.1	0.1	0.073	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Selenium (dissolved)	0.05	0.05	0.005	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Silver (dissolved)	0.034	0.098	0.0002	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Thallium (dissolved)	0.002	0.002	0.0037	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Vanadium (dissolved)	0.0045	0.062	0.027	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Zinc (dissolved)	2.4	5 (E)	0.17	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Miscellaneous														
Alkalinity, total (as CaCO3)	--	--	--	--	--	--	--	mg/L	240	398	528	416	754	416
Hardness	--	--	--	--	--	--	--	mg/L	221	230	155	147	137	405
Total Dissolved Solids	500 (E)	500 (E)	500	--	--	--	--	mg/L	536	884	794	724	1,110	704
Total Suspended Solids	--	--	--	--	--	--	--	mg/L	3 U	12	9	4	249	3 U

See Notes on last page.

Table 2
Groundwater Analytical Results
RACER Pontiac North Campus
Pontiac, Michigan

Location ID: Date Collected: Sample Name:	MDEQ 2013 Residential Drinking Water Criteria	MDEQ 2013 Non- Residential Drinking Water Criteria	MDEQ 2013 Groundwater Surface Water Interface Protection	Non-Residential Health Based Drinking Water Value	MDEQ 2013 Residential Groundwater Volatilization to Indoor Air Inhalation	MDEQ 2013 Non- Residential Groundwater Volatilization to Indoor Air Inhalation	MDEQ 2017 Res GW VIA RIALs	Units	MWW01-SEN04 10/03/18 MWW01-SEN04_GW-100318	MWW01-SEN04 10/09/19 MWW01-SEN04_GW-100919	MWW5-01 10/01/18 MWW5-01_GW-100118	MWW5-01 10/09/19 MWW5-01_GW-100919	MWW10-SEN02 10/05/18 MWW10-SEN02-GW-100518	MWW10-SEN02 10/08/19 MWW10-SEN02_GW-100819
Field Parameters														
pH	6.5-8.5 (E)	6.5-8.5 (E)	6.5-9.0	--	--	--	--	SU	6.92	6.97	6.86	7.16	6.75	6.96
Turbidity	--	--	--	--	--	--	--	NTU	13.2	174	4.29	9.09	NA	7.22
PCBs														
Aroclor-1016	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U [0.0001 U]	0.002 UY	0.0001 U	NA	NA	0.0001 U
Aroclor-1221	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U [0.0001 U]	0.002 UY	0.0001 U	NA	NA	0.0001 U
Aroclor-1232	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U [0.0001 U]	0.002 UY	0.0001 U	NA	NA	0.0001 U
Aroclor-1242	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U [0.0001 U]	0.002 UY	0.0001 U	NA	NA	0.0001 U
Aroclor-1248	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0002 [0.0001]	0.015 Y	0.0001 U	NA	NA	0.0001 U
Aroclor-1254	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U [0.0001 U]	0.002 UY	0.0001 U	NA	NA	0.0001 U
Aroclor-1260	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U [0.0001 U]	0.002 UY	0.0001 U	NA	NA	0.0001 U
Total PCBs	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0002 [0.0001]	0.015 Y	0.0001 U	NA	NA	0.0001 U
Volatile Organics														
Acetone	0.73	2.1	1.7	--	1,000,000	1,000,000	12,000	mg/L	0.05 U [0.05 U]	0.05 U	0.05 U	NA	0.05 U	0.05 U
Benzene	0.005	0.005	0.2	--	5.6	35	0.014	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
Bromodichloromethane	0.08	0.08	--	--	4.8	37	--	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
Bromoform	0.08	0.08	--	--	470	3,100	--	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
Bromomethane	0.01	0.029	0.005	--	4	9	--	mg/L	0.005 U [0.005 U]	0.005 U	0.005 U	NA	0.005 U	0.005 U
2-Butanone	13	38	2.2	--	240,000	240,000	--	mg/L	0.025 U [0.025 U]	0.025 U	0.025 U	NA	0.025 U	0.025 U
Carbon Disulfide	0.8	2.3	--	--	250	550	--	mg/L	0.005 U [0.005 U]	0.005 U	0.005 U	NA	0.005 U	0.005 U
Carbon Tetrachloride	0.005	0.005	0.038	--	0.37	2.4	--	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
CFC-11	2.6	7.3	--	--	1,100	1,100	--	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
CFC-12	1.7	4.8	--	--	220	300	--	mg/L	0.005 U [0.005 U]	0.005 U	0.005 U	NA	0.005 U	0.005 U
Chlorobenzene	0.1	0.1	0.025	--	210	470	0.54	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
Chlorodibromomethane	0.08	0.08	--	--	14	110	--	mg/L	0.005 U [0.005 U]	0.005 U	0.005 U	NA	0.005 U	0.005 U
Chloroethane	0.43	1.7	1.1	--	5,700	5,700	6.7	mg/L	0.005 U [0.005 U]	0.005 U	0.021	NA	0.005 U	0.005 U
Chloroform	0.08	0.08	0.35	--	28	180	0.0076	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
Chloromethane	0.26	1.1	--	--	8.6	45	0.16	mg/L	0.005 U [0.005 U]	0.005 U	0.005 U	NA	0.005 U	0.005 U
Cyclohexane	--	--	--	--	--	--	--	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
1,2-Dibromo-3-chloropropane	0.0002	0.0002	--	--	0.22	1.2	--	mg/L	0.005 U [0.005 U]	0.005 U	0.005 U	NA	0.005 U	0.005 U
1,2-Dibromoethane	0.00005	0.00005	0.0057	--	2.4	15	--	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
1,2-Dichlorobenzene	0.6	0.6	0.013	--	160	160	--	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
1,3-Dichlorobenzene	0.0066	0.019	0.028	--	18	41	0.052	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
1,4-Dichlorobenzene	0.075	0.075	0.017	--	16	74	0.12	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
1,1-Dichloroethane	0.88	2.5	0.74	--	1,000	2,300	0.067	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
1,2-Dichloroethane	0.005	0.005	0.36	--	9.6	59	--	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
1,1-Dichloroethene	0.007	0.007	0.13	--	0.2	1.3	0.17	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
cis-1,2-Dichloroethene	0.07	0.07	0.62	--	93	210	0.048	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
trans-1,2-Dichloroethene	0.1	0.1	1.5	--	85	200	0.65	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
Dichloromethane	0.005	0.005	1.5	--	220	1,400	3.9	mg/L	0.005 U [0.005 U]	0.005 U	0.005 U	NA	0.005 U	0.005 U
1,2-Dichloropropane	0.005	0.005	0.23	--	16	36	--	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
cis-1,3-Dichloropropene	--	--	--	--	--	--	--	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
trans-1,3-Dichloropropene	--	--	--	--	--	--	--	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
Ethylbenzene*	0.074 (E)	0.074 (E)	0.018	0.7	110	170	0.045	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
Isopropylbenzene	0.8	2.3	0.028	--	56	56	--	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
Methyl acetate	--	--	--	--	--	--	--	mg/L	0.01 U [0.01 U]	0.01 U	0.01 U	NA	0.01 U	0.01 U
Methyl N-Butyl Ketone	1	2.9	--	--	4,200	8,700	--	mg/L	0.05 U [0.05 U]	0.05 U	0.05 U	NA	0.05 U	0.05 U
Methylcyclohexane	--	--	--	--	--	--	--	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
4-Methyl-2-pentanone	1.8	5.2	--	--	20,000	20,000	--	mg/L	0.05 U [0.05 U]	0.05 U	0.05 U	NA	0.05 U	0.05 U
Methyl tert-butyl ether*	0.04 (E)	0.04 (E)	7.1	0.69	47,000	47,000	4	mg/L	0.005 U [0.005 U]	0.005 U	0.005 U	NA	0.005 U	0.005 U
Styrene	0.1	0.1	0.08	--	170	310	--	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
1,1,2,2-Tetrachloroethane	0.0085	0.035	0.078	--	12	77	--	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
Tetrachloroethene	0.005	0.005	0.06	--	25	170	0.096	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
Toluene*	0.79 (E)	0.79 (E)	0.27	1	530	530	23	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
1,2,4-Trichlorobenzene	0.07	0.07	0.099	--	300	300	0.095	mg/L	0.005 U [0.005 U]	0.005 U	0.005 U	NA	0.005 U	0.005 U
1,1,1-Trichloroethane	0.2	0.2	0.089	--	660	1,300	8.6	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
1,1,2-Trichloroethane	0.005	0.005	0.33	--	17	110	--	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
Trichloroethene	0.005	0.005	0.2	--	2.2	4.9	0.0061	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
1,1,2-trichloro-1,2,2-trifluoroethane	170	170	0.032	--	170	170	--	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
Vinyl Chloride	0.002	0.002	0.013	--	1.1	13	0.00096 (M)	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
m&p-Xylene	--	--	--	--	--	--	--	mg/L	0.002 U [0.002 U]	0.002 U	0.002 U	NA	0.002 U	0.002 U
o-Xylene	--	--	--	--	--	--	--	mg/L	0.001 U [0.001 U]	0.001 U	0.001 U	NA	0.001 U	0.001 U
Total Xylenes*	0.28 (E)	0.28 (E)	0.49	10	190	190	1.2	mg/L	0.002 U [0.002 U]	0.002 U	0.002 U	NA	0.002 U	0.002 U

See Notes on last page.

Table 2
Groundwater Analytical Results
RACER Pontiac North Campus
Pontiac, Michigan

Location ID: Date Collected: Sample Name:	MDEQ 2013 Residential Drinking Water Criteria	MDEQ 2013 Non- Residential Drinking Water Criteria	MDEQ 2013 Groundwater Surface Water Interface Protection	Non-Residential Health Based Drinking Water Value	MDEQ 2013 Residential Groundwater Volatilization to Indoor Air Inhalation	MDEQ 2013 Non- Residential Groundwater Volatilization to Indoor Air Inhalation	MDEQ 2017 Res GW VIA RIALs	Units	MWW01-SEN04 10/03/18 MWW01-SEN04_GW-100318	MWW01-SEN04 10/09/19 MWW01-SEN04_GW-100919	MWW5-01 10/01/18 MWW5-01_GW-100118	MWW5-01 10/09/19 MWW5-01_GW-100919	MWW10-SEN02 10/05/18 MWW10-SEN02-GW-100518	MWW10-SEN02 10/08/19 MWW10-SEN02_GW-100819
Inorganics														
Antimony	0.006	0.006	0.13	--	--	--	--	mg/L	0.005 U [0.005 U]	0.005	0.005 U	0.005 U	0.005 U	0.005 U
Arsenic	0.01	0.01	0.01	--	--	--	--	mg/L	0.005 [0.005]	0.020	0.004	0.014	0.007	0.009
Barium	2	2	0.67	--	--	--	--	mg/L	0.129 [0.128]	0.424	0.087	0.190	0.141	0.137
Beryllium	0.004	0.004	0.0067	--	--	--	--	mg/L	0.001 U [0.001 U]	0.002	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium	0.005	0.005	0.0025	--	--	--	--	mg/L	0.0005 U [0.0005 U]	0.0010	0.0005 U	0.0012	0.0005 U	0.0005 U
Calcium	--	--	--	--	--	--	--	mg/L	86.4	290	194	226	190	180
Chromium	0.1	0.1	0.011	--	--	--	--	mg/L	0.005 U [0.005 U]	0.190	0.005 U	0.005 U	0.053	0.096
Cobalt	0.04	0.1	0.1	--	--	--	--	mg/L	0.005 U [0.005 U]	0.013	0.005 U	0.012	0.011	0.008
Copper*	1 (E)	1 (E)	0.013	4	--	--	--	mg/L	0.005 U [0.005 U]	0.174	0.005 U	0.078	0.054	0.058
Iron*	0.3 (E)	0.3 (E)	--	5.6	--	--	--	mg/L	14.5	100	2.18	15.0	21.2	20.6
Lead	0.004	0.004	0.014	--	--	--	--	mg/L	0.004 [0.003]	1.70	0.003 U	0.007	0.012	0.009
Magnesium	400	1,100	--	--	--	--	--	mg/L	27.6	39.4	28.2	30.6	42.2	38.6
Manganese*	0.05 (E)	0.05 (E)	1.3	2.5	--	--	--	mg/L	0.37 [0.369]	2.52	0.52	4.27	0.563	0.294
Mercury	0.002	0.002	0.0000013	--	0.056	0.056	--	mg/L	0.0002 U [0.0002 U]	0.0004	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Nickel	0.1	0.1	0.073	--	--	--	--	mg/L	0.005 U [0.005 U]	0.111	0.005 U	0.014	0.128	0.105
Selenium	0.05	0.05	0.005	--	--	--	--	mg/L	0.005 U [0.005 U]	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Silver	0.034	0.098	0.0002	--	--	--	--	mg/L	0.0005 U [0.0005 U]	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Thallium	0.002	0.002	0.0037	--	--	--	--	mg/L	0.002 U [0.002 U]	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Vanadium	0.0045	0.062	0.027	--	--	--	--	mg/L	0.005 U [0.005 U]	0.062	0.005 U	0.014	0.021	0.022
Zinc	2.4	5 (E)	0.17	--	--	--	--	mg/L	0.005 U [0.005 U]	0.191	0.005 U	0.140	0.051	0.057
Inorganics-Filtered														
Antimony (dissolved)	0.006	0.006	0.13	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Arsenic (dissolved)	0.01	0.01	0.01	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Barium (dissolved)	2	2	0.67	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Beryllium (dissolved)	0.004	0.004	0.0067	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Cadmium (dissolved)	0.005	0.005	0.0025	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Chromium (dissolved)	0.1	0.1	0.011	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Cobalt (dissolved)	0.04	0.1	0.1	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Copper (dissolved)*	1 (E)	1 (E)	0.013	4	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Lead (dissolved)	0.004	0.004	0.014	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Manganese (dissolved)*	0.05 (E)	0.05 (E)	1.3	2.5	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Mercury (dissolved)	0.002	0.002	0.0000013	--	0.056	0.056	--	mg/L	NA	NA	NA	NA	NA	NA
Nickel (dissolved)	0.1	0.1	0.073	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Selenium (dissolved)	0.05	0.05	0.005	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Silver (dissolved)	0.034	0.098	0.0002	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Thallium (dissolved)	0.002	0.002	0.0037	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Vanadium (dissolved)	0.0045	0.062	0.027	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Zinc (dissolved)	2.4	5 (E)	0.17	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Miscellaneous														
Alkalinity, total (as CaCO3)	--	--	--	--	--	--	--	mg/L	498	386	558	436	686	696
Hardness	--	--	--	--	--	--	--	mg/L	218	278	512	594	NA	262
Total Dissolved Solids	500 (E)	500 (E)	500	--	--	--	--	mg/L	580	1,000	810	926	NA	1,280
Total Suspended Solids	--	--	--	--	--	--	--	mg/L	27	2,140	3 U	NA	4,940	602

See Notes on last page.

Table 2
Groundwater Analytical Results
RACER Pontiac North Campus
Pontiac, Michigan

Location ID: Date Collected: Sample Name:	MDEQ 2013 Residential Drinking Water Criteria	MDEQ 2013 Non- Residential Drinking Water Criteria	MDEQ 2013 Groundwater Surface Water Interface Protection	Non-Residential Health Based Drinking Water Value	MDEQ 2013 Residential Groundwater Volatilization to Indoor Air Inhalation	MDEQ 2013 Non- Residential Groundwater Volatilization to Indoor Air Inhalation	MDEQ 2017 Res GW VIA RIALs	Units	SUMP 10/10/19 SUMP_GW-101019	TW-09-01 10/01/18 TW-09-01_GW-100118	TW-09-01 10/09/19 TW-09-01_GW-100919	TW-MD-01 10/03/18 TW-MD-01_GW-100318	TW-MD-01 10/08/19 TW-MD-01_GW-100819	TW-MD-02 10/03/18 TW-MD-02_GW-100318
Field Parameters														
pH	6.5-8.5 (E)	6.5-8.5 (E)	6.5-9.0	--	--	--	--	SU	6.89	7.08	7.47	6.90	7.14	6.90
Turbidity	--	--	--	--	--	--	--	NTU	19.5	7.12	0.02	7.79	0.41	6.26
PCBs														
Aroclor-1016	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1221	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1232	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1242	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1248	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1254	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1260	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Total PCBs	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Volatile Organics														
Acetone	0.73	2.1	1.7	--	1,000,000	1,000,000	12,000	mg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzene	0.005	0.005	0.2	--	5.6	35	0.014	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromodichloromethane	0.08	0.08	--	--	4.8	37	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromoform	0.08	0.08	--	--	470	3,100	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromomethane	0.01	0.029	0.005	--	4	9	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
2-Butanone	13	38	2.2	--	240,000	240,000	--	mg/L	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Carbon Disulfide	0.8	2.3	--	--	250	550	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Carbon Tetrachloride	0.005	0.005	0.038	--	0.37	2.4	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
CFC-11	2.6	7.3	--	--	1,100	1,100	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
CFC-12	1.7	4.8	--	--	220	300	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chlorobenzene	0.1	0.1	0.025	--	210	470	0.54	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Chlorodibromomethane	0.08	0.08	--	--	14	110	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chloroethane	0.43	1.7	1.1	--	5,700	5,700	6.7	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chloroform	0.08	0.08	0.35	--	28	180	0.0076	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Chloromethane	0.26	1.1	--	--	8.6	45	0.16	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Cyclohexane	--	--	--	--	--	--	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dibromo-3-chloropropane	0.0002	0.0002	--	--	0.22	1.2	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dibromoethane	0.00005	0.00005	0.0057	--	2.4	15	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dichlorobenzene	0.6	0.6	0.013	--	160	160	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,3-Dichlorobenzene	0.0066	0.019	0.028	--	18	41	0.052	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,4-Dichlorobenzene	0.075	0.075	0.017	--	16	74	0.12	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1-Dichloroethane	0.88	2.5	0.74	--	1,000	2,300	0.067	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dichloroethane	0.005	0.005	0.36	--	9.6	59	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1-Dichloroethene	0.007	0.007	0.13	--	0.2	1.3	0.17	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
cis-1,2-Dichloroethene	0.07	0.07	0.62	--	93	210	0.048	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
trans-1,2-Dichloroethene	0.1	0.1	1.5	--	85	200	0.65	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Dichloromethane	0.005	0.005	1.5	--	220	1,400	3.9	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dichloropropane	0.005	0.005	0.23	--	16	36	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
cis-1,3-Dichloropropene	--	--	--	--	--	--	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
trans-1,3-Dichloropropene	--	--	--	--	--	--	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Ethylbenzene*	0.074 (E)	0.074 (E)	0.018	0.7	110	170	0.045	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Isopropylbenzene	0.8	2.3	0.028	--	56	56	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Methyl acetate	--	--	--	--	--	--	--	mg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Methyl N-Butyl Ketone	1	2.9	--	--	4,200	8,700	--	mg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methylcyclohexane	--	--	--	--	--	--	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
4-Methyl-2-pentanone	1.8	5.2	--	--	20,000	20,000	--	mg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methyl tert-butyl ether*	0.04 (E)	0.04 (E)	7.1	0.69	47,000	47,000	4	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Styrene	0.1	0.1	0.08	--	170	310	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1,2,2-Tetrachloroethane	0.0085	0.035	0.078	--	12	77	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Tetrachloroethene	0.005	0.005	0.06	--	25	170	0.096	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Toluene*	0.79 (E)	0.79 (E)	0.27	1	530	530	23	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2,4-Trichlorobenzene	0.07	0.07	0.099	--	300	300	0.095	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,1,1-Trichloroethane	0.2	0.2	0.089	--	660	1,300	8.6	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1,2-Trichloroethane	0.005	0.005	0.33	--	17	110	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Trichloroethene	0.005	0.005	0.2	--	2.2	4.9	0.0061	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1,2-trichloro-1,2,2-trifluoroethane	170	170	0.032	--	170	170	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vinyl Chloride	0.002	0.002	0.013	--	1.1	13	0.00096 (M)	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
m&p-Xylene	--	--	--	--	--	--	--	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
o-Xylene	--	--	--	--	--	--	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Total Xylenes*	0.28 (E)	0.28 (E)	0.49	10	190	190	1.2	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U

See Notes on last page.

Table 2
Groundwater Analytical Results
RACER Pontiac North Campus
Pontiac, Michigan

Location ID: Date Collected: Sample Name:	MDEQ 2013 Residential Drinking Water Criteria	MDEQ 2013 Non- Residential Drinking Water Criteria	MDEQ 2013 Groundwater Surface Water Interface Protection	Non-Residential Health Based Drinking Water Value	MDEQ 2013 Residential Groundwater Volatilization to Indoor Air Inhalation	MDEQ 2013 Non- Residential Groundwater Volatilization to Indoor Air Inhalation	MDEQ 2017 Res GW VIA RIALs	Units	SUMP 10/10/19 SUMP_GW-101019	TW-09-01 10/01/18 TW-09-01_GW-100118	TW-09-01 10/09/19 TW-09-01_GW-100919	TW-MD-01 10/03/18 TW-MD-01_GW-100318	TW-MD-01 10/08/19 TW-MD-01_GW-100819	TW-MD-02 10/03/18 TW-MD-02_GW-100318
Inorganics														
Antimony	0.006	0.006	0.13	--	--	--	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Arsenic	0.01	0.01	0.01	--	--	--	--	mg/L	0.004	0.02	0.017	0.002 U	0.002	0.008
Barium	2	2	0.67	--	--	--	--	mg/L	0.184	0.539	0.186	0.126	0.110	0.163
Beryllium	0.004	0.004	0.0067	--	--	--	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium	0.005	0.005	0.0025	--	--	--	--	mg/L	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Calcium	--	--	--	--	--	--	--	mg/L	83.2	265	101	125	103	101
Chromium	0.1	0.1	0.011	--	--	--	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Cobalt	0.04	0.1	0.1	--	--	--	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Copper*	1 (E)	1 (E)	0.013	4	--	--	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Iron*	0.3 (E)	0.3 (E)	--	5.6	--	--	--	mg/L	9.61	4.71	0.55	10.8	7.05	14.3
Lead	0.004	0.004	0.014	--	--	--	--	mg/L	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U
Magnesium	400	1,100	--	--	--	--	--	mg/L	25.3	36.6	12.1	30.1	25.1	22.4
Manganese*	0.05 (E)	0.05 (E)	1.3	2.5	--	--	--	mg/L	0.360	0.561	0.133	1	0.867	0.747
Mercury	0.002	0.002	0.0000013	--	0.056	0.056	--	mg/L	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Nickel	0.1	0.1	0.073	--	--	--	--	mg/L	0.005 U	0.005 U	0.005	0.005 U	0.005 U	0.005 U
Selenium	0.05	0.05	0.005	--	--	--	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Silver	0.034	0.098	0.0002	--	--	--	--	mg/L	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0007	0.0005 U
Thallium	0.002	0.002	0.0037	--	--	--	--	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Vanadium	0.0045	0.062	0.027	--	--	--	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Zinc	2.4	5 (E)	0.17	--	--	--	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Inorganics-Filtered														
Antimony (dissolved)	0.006	0.006	0.13	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Arsenic (dissolved)	0.01	0.01	0.01	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Barium (dissolved)	2	2	0.67	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Beryllium (dissolved)	0.004	0.004	0.0067	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Cadmium (dissolved)	0.005	0.005	0.0025	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Chromium (dissolved)	0.1	0.1	0.011	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Cobalt (dissolved)	0.04	0.1	0.1	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Copper (dissolved)*	1 (E)	1 (E)	0.013	4	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Lead (dissolved)	0.004	0.004	0.014	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Manganese (dissolved)*	0.05 (E)	0.05 (E)	1.3	2.5	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Mercury (dissolved)	0.002	0.002	0.0000013	--	0.056	0.056	--	mg/L	NA	NA	NA	NA	NA	NA
Nickel (dissolved)	0.1	0.1	0.073	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Selenium (dissolved)	0.05	0.05	0.005	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Silver (dissolved)	0.034	0.098	0.0002	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Thallium (dissolved)	0.002	0.002	0.0037	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Vanadium (dissolved)	0.0045	0.062	0.027	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Zinc (dissolved)	2.4	5 (E)	0.17	--	--	--	--	mg/L	NA	NA	NA	NA	NA	NA
Miscellaneous														
Alkalinity, total (as CaCO3)	--	--	--	--	--	--	--	mg/L	408	770	520	504	470	524
Hardness	--	--	--	--	--	--	--	mg/L	226	675	261	314	271	253
Total Dissolved Solids	500 (E)	500 (E)	500	--	--	--	--	mg/L	868	1,460	1,230	630	680	620
Total Suspended Solids	--	--	--	--	--	--	--	mg/L	22	11	3 U	12	16	14

See Notes on last page.

Table 2
Groundwater Analytical Results
RACER Pontiac North Campus
Pontiac, Michigan

Location ID: Date Collected: Sample Name:	MDEQ 2013 Residential Drinking Water Criteria	MDEQ 2013 Non- Residential Drinking Water Criteria	MDEQ 2013 Groundwater Surface Water Interface Protection	Non-Residential Health Based Drinking Water Value	MDEQ 2013 Residential Groundwater Volatilization to Indoor Air Inhalation	MDEQ 2013 Non- Residential Groundwater Volatilization to Indoor Air Inhalation	MDEQ 2017 Res GW VIA RIALs	Units	TW-MD-02 10/08/19 TW-MD-02_GW-100819	TW-MD-03 10/03/18 TW-MD-03_GW-100318	TW-MD-03 10/08/19 TW-MD-03_GW-100819	TW-MD-04 10/03/18 TW-MD-04_GW-100318	TW-MD-04 10/09/19 TW-MD-04_GW-100919	TW-MD-05 10/03/18 TW-MD-05_GW-100318
Field Parameters														
pH	6.5-8.5 (E)	6.5-8.5 (E)	6.5-9.0	--	--	--	--	SU	7.25	7.01	7.33	6.69	7.12	6.85
Turbidity	--	--	--	--	--	--	--	NTU	1.01	3.06	47.1	2.35	2.76	8.92
PCBs														
Aroclor-1016	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1221	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1232	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1242	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1248	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1254	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1260	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Total PCBs	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Volatile Organics														
Acetone	0.73	2.1	1.7	--	1,000,000	1,000,000	12,000	mg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzene	0.005	0.005	0.2	--	5.6	35	0.014	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromodichloromethane	0.08	0.08	--	--	4.8	37	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromoform	0.08	0.08	--	--	470	3,100	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromomethane	0.01	0.029	0.005	--	4	9	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
2-Butanone	13	38	2.2	--	240,000	240,000	--	mg/L	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Carbon Disulfide	0.8	2.3	--	--	250	550	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Carbon Tetrachloride	0.005	0.005	0.038	--	0.37	2.4	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
CFC-11	2.6	7.3	--	--	1,100	1,100	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
CFC-12	1.7	4.8	--	--	220	300	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chlorobenzene	0.1	0.1	0.025	--	210	470	0.54	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Chlorodibromomethane	0.08	0.08	--	--	14	110	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chloroethane	0.43	1.7	1.1	--	5,700	5,700	6.7	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chloroform	0.08	0.08	0.35	--	28	180	0.0076	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Chloromethane	0.26	1.1	--	--	8.6	45	0.16	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Cyclohexane	--	--	--	--	--	--	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dibromo-3-chloropropane	0.0002	0.0002	--	--	0.22	1.2	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dibromoethane	0.00005	0.00005	0.0057	--	2.4	15	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dichlorobenzene	0.6	0.6	0.013	--	160	160	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,3-Dichlorobenzene	0.0066	0.019	0.028	--	18	41	0.052	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,4-Dichlorobenzene	0.075	0.075	0.017	--	16	74	0.12	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1-Dichloroethane	0.88	2.5	0.74	--	1,000	2,300	0.067	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dichloroethane	0.005	0.005	0.36	--	9.6	59	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1-Dichloroethene	0.007	0.007	0.13	--	0.2	1.3	0.17	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
cis-1,2-Dichloroethene	0.07	0.07	0.62	--	93	210	0.048	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
trans-1,2-Dichloroethene	0.1	0.1	1.5	--	85	200	0.65	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Dichloromethane	0.005	0.005	1.5	--	220	1,400	3.9	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dichloropropane	0.005	0.005	0.23	--	16	36	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
cis-1,3-Dichloropropene	--	--	--	--	--	--	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
trans-1,3-Dichloropropene	--	--	--	--	--	--	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Ethylbenzene*	0.074 (E)	0.074 (E)	0.018	0.7	110	170	0.045	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Isopropylbenzene	0.8	2.3	0.028	--	56	56	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Methyl acetate	--	--	--	--	--	--	--	mg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Methyl N-Butyl Ketone	1	2.9	--	--	4,200	8,700	--	mg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methylcyclohexane	--	--	--	--	--	--	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
4-Methyl-2-pentanone	1.8	5.2	--	--	20,000	20,000	--	mg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methyl tert-butyl ether*	0.04 (E)	0.04 (E)	7.1	0.69	47,000	47,000	4	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Styrene	0.1	0.1	0.08	--	170	310	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1,2,2-Tetrachloroethane	0.0085	0.035	0.078	--	12	77	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Tetrachloroethene	0.005	0.005	0.06	--	25	170	0.096	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Toluene*	0.79 (E)	0.79 (E)	0.27	1	530	530	23	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2,4-Trichlorobenzene	0.07	0.07	0.099	--	300	300	0.095	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,1,1-Trichloroethane	0.2	0.2	0.089	--	660	1,300	8.6	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1,2-Trichloroethane	0.005	0.005	0.33	--	17	110	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Trichloroethene	0.005	0.005	0.2	--	2.2	4.9	0.0061	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1,2-trichloro-1,2,2-trifluoroethane	170	170	0.032	--	170	170	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vinyl Chloride	0.002	0.002	0.013	--	1.1	13	0.00096 (M)	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
m&p-Xylene	--	--	--	--	--	--	--	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
o-Xylene	--	--	--	--	--	--	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Total Xylenes*	0.28 (E)	0.28 (E)	0.49	10	190	190	1.2	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U

See Notes on last page.

Table 2
Groundwater Analytical Results
RACER Pontiac North Campus
Pontiac, Michigan

Location ID: Date Collected: Sample Name:	MDEQ 2013 Residential Drinking Water Criteria	MDEQ 2013 Non- Residential Drinking Water Criteria	MDEQ 2013 Groundwater Surface Water Interface Protection	Non-Residential Health Based Drinking Water Value	MDEQ 2013 Residential Groundwater Volatilization to Indoor Air Inhalation	MDEQ 2013 Non- Residential Groundwater Volatilization to Indoor Air Inhalation	MDEQ 2017 Res GW VIA RIALS	Units	TW-MD-02 10/08/19 TW-MD-02_GW-100819	TW-MD-03 10/03/18 TW-MD-03_GW-100318	TW-MD-03 10/08/19 TW-MD-03_GW-100819	TW-MD-04 10/03/18 TW-MD-04_GW-100318	TW-MD-04 10/09/19 TW-MD-04_GW-100919	TW-MD-05 10/03/18 TW-MD-05_GW-100318
Inorganics														
Antimony	0.006	0.006	0.13	--	--	--	--	mg/L	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.005 U
Arsenic	0.01	0.01	0.01	--	--	--	--	mg/L	0.006	0.005	NA	0.002	0.006	0.004
Barium	2	2	0.67	--	--	--	--	mg/L	0.193	0.309	NA	0.341	0.136	0.095
Beryllium	0.004	0.004	0.0067	--	--	--	--	mg/L	0.001 U	0.001 U	NA	0.001 U	0.001 U	0.001 U
Cadmium	0.005	0.005	0.0025	--	--	--	--	mg/L	0.0005 U	0.0005 U	NA	0.0005 U	0.0005 U	0.0005 U
Calcium	--	--	--	--	--	--	--	mg/L	90.6	109	61.9	166	75.5	47.2
Chromium	0.1	0.1	0.011	--	--	--	--	mg/L	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.005 U
Cobalt	0.04	0.1	0.1	--	--	--	--	mg/L	0.005 U	0.005 U	NA	0.009	0.005 U	0.005 U
Copper*	1 (E)	1 (E)	0.013	4	--	--	--	mg/L	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.005 U
Iron*	0.3 (E)	0.3 (E)	--	5.6	--	--	--	mg/L	11.2	18	2.03	21.9	13.8	11.5
Lead	0.004	0.004	0.014	--	--	--	--	mg/L	0.003 U	0.003 U	NA	0.003 U	0.003 U	0.003 U
Magnesium	400	1,100	--	--	--	--	--	mg/L	20.2	28.6	20.0	43.7	20.7	21.9
Manganese*	0.05 (E)	0.05 (E)	1.3	2.5	--	--	--	mg/L	0.501	0.82	NA	1.16	0.571	0.356
Mercury	0.002	0.002	0.0000013	--	0.056	0.056	--	mg/L	0.0002 U	0.0002 U	NA	0.0002 U	0.0002 U	0.0002 U
Nickel	0.1	0.1	0.073	--	--	--	--	mg/L	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.005 U
Selenium	0.05	0.05	0.005	--	--	--	--	mg/L	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.005 U
Silver	0.034	0.098	0.0002	--	--	--	--	mg/L	0.0005 U	0.0005 U	NA	0.0005 U	0.0005 U	0.0005 U
Thallium	0.002	0.002	0.0037	--	--	--	--	mg/L	0.002 U	0.002 U	NA	0.002 U	0.002 U	0.002 U
Vanadium	0.0045	0.062	0.027	--	--	--	--	mg/L	0.005 U	0.005 U	NA	0.005 U	0.005 U	0.005 U
Zinc	2.4	5 (E)	0.17	--	--	--	--	mg/L	0.008	0.005 U	NA	0.005 U	0.005 U	0.005 U
Inorganics-Filtered														
Antimony (dissolved)	0.006	0.006	0.13	--	--	--	--	mg/L	NA	NA	0.005 Uf	NA	NA	NA
Arsenic (dissolved)	0.01	0.01	0.01	--	--	--	--	mg/L	NA	NA	0.004 f	NA	NA	NA
Barium (dissolved)	2	2	0.67	--	--	--	--	mg/L	NA	NA	0.126 f	NA	NA	NA
Beryllium (dissolved)	0.004	0.004	0.0067	--	--	--	--	mg/L	NA	NA	0.001 Uf	NA	NA	NA
Cadmium (dissolved)	0.005	0.005	0.0025	--	--	--	--	mg/L	NA	NA	0.0005 Uf	NA	NA	NA
Chromium (dissolved)	0.1	0.1	0.011	--	--	--	--	mg/L	NA	NA	0.005 Uf	NA	NA	NA
Cobalt (dissolved)	0.04	0.1	0.1	--	--	--	--	mg/L	NA	NA	0.005 Uf	NA	NA	NA
Copper (dissolved)*	1 (E)	1 (E)	0.013	4	--	--	--	mg/L	NA	NA	0.005 Uf	NA	NA	NA
Lead (dissolved)	0.004	0.004	0.014	--	--	--	--	mg/L	NA	NA	0.003 Uf	NA	NA	NA
Manganese (dissolved)*	0.05 (E)	0.05 (E)	1.3	2.5	--	--	--	mg/L	NA	NA	0.250 f	NA	NA	NA
Mercury (dissolved)	0.002	0.002	0.0000013	--	0.056	0.056	--	mg/L	NA	NA	0.0002 Uf	NA	NA	NA
Nickel (dissolved)	0.1	0.1	0.073	--	--	--	--	mg/L	NA	NA	0.010 f	NA	NA	NA
Selenium (dissolved)	0.05	0.05	0.005	--	--	--	--	mg/L	NA	NA	0.005 Uf	NA	NA	NA
Silver (dissolved)	0.034	0.098	0.0002	--	--	--	--	mg/L	NA	NA	0.0005 Uf	NA	NA	NA
Thallium (dissolved)	0.002	0.002	0.0037	--	--	--	--	mg/L	NA	NA	0.002 Uf	NA	NA	NA
Vanadium (dissolved)	0.0045	0.062	0.027	--	--	--	--	mg/L	NA	NA	0.005 Uf	NA	NA	NA
Zinc (dissolved)	2.4	5 (E)	0.17	--	--	--	--	mg/L	NA	NA	0.005 Uf	NA	NA	NA
Miscellaneous														
Alkalinity, total (as CaCO3)	--	--	--	--	--	--	--	mg/L	410	460	400	422	372	456
Hardness	--	--	--	--	--	--	--	mg/L	219	294	185	390	201	113
Total Dissolved Solids	500 (E)	500 (E)	500	--	--	--	--	mg/L	728	1,180	780	1,700	792	586
Total Suspended Solids	--	--	--	--	--	--	--	mg/L	22	28	40	37	30	20

See Notes on last page.

Table 2
Groundwater Analytical Results
RACER Pontiac North Campus
Pontiac, Michigan

Location ID: Date Collected: Sample Name:	MDEQ 2013 Residential Drinking Water Criteria	MDEQ 2013 Non- Residential Drinking Water Criteria	MDEQ 2013 Groundwater Surface Water Interface Protection	Non-Residential Health Based Drinking Water Value	MDEQ 2013 Residential Groundwater Volatilization to Indoor Air Inhalation	MDEQ 2013 Non- Residential Groundwater Volatilization to Indoor Air Inhalation	MDEQ 2017 Res GW VIA RIALs	Units	TW-MD-05 10/09/19 TW-MD-05_GW-100919	TW-MD-06 10/04/18 TW-MD-06_GW-100418	TW-MD-06 10/09/19 TW-MD-06_GW-100919	TW-MD-07 10/04/18 TW-MD-07_GW-100418	TW-MD-07 10/09/19 TW-MD-07_GW-100919
Field Parameters													
pH	6.5-8.5 (E)	6.5-8.5 (E)	6.5-9.0	--	--	--	--	SU	7.25	6.81	7.16	6.61	7.06
Turbidity	--	--	--	--	--	--	--	NTU	1.21	8.20	4.02	3.40	2.96
PCBs													
Aroclor-1016	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1221	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1232	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1242	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1248	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0002	0.0001 U	0.0001 U
Aroclor-1254	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Aroclor-1260	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Total PCBs	0.0005	0.0005	0.0002	--	0.045	0.045	--	mg/L	0.0001 U	0.0001 U	0.0002	0.0001 U	0.0001 U
Volatile Organics													
Acetone	0.73	2.1	1.7	--	1,000,000	1,000,000	12,000	mg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Benzene	0.005	0.005	0.2	--	5.6	35	0.014	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromodichloromethane	0.08	0.08	--	--	4.8	37	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromoform	0.08	0.08	--	--	470	3,100	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Bromomethane	0.01	0.029	0.005	--	4	9	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
2-Butanone	13	38	2.2	--	240,000	240,000	--	mg/L	0.025 U	0.025 U	0.025 U	0.025 U	0.025 U
Carbon Disulfide	0.8	2.3	--	--	250	550	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Carbon Tetrachloride	0.005	0.005	0.038	--	0.37	2.4	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
CFC-11	2.6	7.3	--	--	1,100	1,100	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
CFC-12	1.7	4.8	--	--	220	300	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chlorobenzene	0.1	0.1	0.025	--	210	470	0.54	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Chlorodibromomethane	0.08	0.08	--	--	14	110	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chloroethane	0.43	1.7	1.1	--	5,700	5,700	6.7	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Chloroform	0.08	0.08	0.35	--	28	180	0.0076	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Chloromethane	0.26	1.1	--	--	8.6	45	0.16	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Cyclohexane	--	--	--	--	--	--	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dibromo-3-chloropropane	0.0002	0.0002	--	--	0.22	1.2	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dibromoethane	0.00005	0.00005	0.0057	--	2.4	15	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dichlorobenzene	0.6	0.6	0.013	--	160	160	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,3-Dichlorobenzene	0.0066	0.019	0.028	--	18	41	0.052	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,4-Dichlorobenzene	0.075	0.075	0.017	--	16	74	0.12	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1-Dichloroethane	0.88	2.5	0.74	--	1,000	2,300	0.067	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2-Dichloroethane	0.005	0.005	0.36	--	9.6	59	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1-Dichloroethene	0.007	0.007	0.13	--	0.2	1.3	0.17	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
cis-1,2-Dichloroethene	0.07	0.07	0.62	--	93	210	0.048	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
trans-1,2-Dichloroethene	0.1	0.1	1.5	--	85	200	0.65	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Dichloromethane	0.005	0.005	1.5	--	220	1,400	3.9	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dichloropropane	0.005	0.005	0.23	--	16	36	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
cis-1,3-Dichloropropene	--	--	--	--	--	--	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
trans-1,3-Dichloropropene	--	--	--	--	--	--	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Ethylbenzene*	0.074 (E)	0.074 (E)	0.018	0.7	110	170	0.045	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Isopropylbenzene	0.8	2.3	0.028	--	56	56	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Methyl acetate	--	--	--	--	--	--	--	mg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Methyl N-Butyl Ketone	1	2.9	--	--	4,200	8,700	--	mg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methylcyclohexane	--	--	--	--	--	--	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
4-Methyl-2-pentanone	1.8	5.2	--	--	20,000	20,000	--	mg/L	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Methyl tert-butyl ether*	0.04 (E)	0.04 (E)	7.1	0.69	47,000	47,000	4	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Styrene	0.1	0.1	0.08	--	170	310	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1,2,2-Tetrachloroethane	0.0085	0.035	0.078	--	12	77	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Tetrachloroethene	0.005	0.005	0.06	--	25	170	0.096	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Toluene*	0.79 (E)	0.79 (E)	0.27	1	530	530	23	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,2,4-Trichlorobenzene	0.07	0.07	0.099	--	300	300	0.095	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
1,1,1-Trichloroethane	0.2	0.2	0.089	--	660	1,300	8.6	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1,2-Trichloroethane	0.005	0.005	0.33	--	17	110	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Trichloroethene	0.005	0.005	0.2	--	2.2	4.9	0.0061	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
1,1,2-trichloro-1,2,2-trifluoroethane	170	170	0.032	--	170	170	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vinyl Chloride	0.002	0.002	0.013	--	1.1	13	0.00096 (M)	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
m&p-Xylene	--	--	--	--	--	--	--	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
o-Xylene	--	--	--	--	--	--	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Total Xylenes*	0.28 (E)	0.28 (E)	0.49	10	190	190	1.2	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U

See Notes on last page.

Table 2
Groundwater Analytical Results
RACER Pontiac North Campus
Pontiac, Michigan

Location ID: Date Collected: Sample Name:	MDEQ 2013 Residential Drinking Water Criteria	MDEQ 2013 Non- Residential Drinking Water Criteria	MDEQ 2013 Groundwater Surface Water Interface Protection	Non-Residential Health Based Drinking Water Value	MDEQ 2013 Residential Groundwater Volatilization to Indoor Air Inhalation	MDEQ 2013 Non- Residential Groundwater Volatilization to Indoor Air Inhalation	MDEQ 2017 Res GW VIA RIALs	Units	TW-MD-05 10/09/19 TW-MD-05_GW-100919	TW-MD-06 10/04/18 TW-MD-06_GW-100418	TW-MD-06 10/09/19 TW-MD-06_GW-100919	TW-MD-07 10/04/18 TW-MD-07_GW-100418	TW-MD-07 10/09/19 TW-MD-07_GW-100919
Inorganics													
Antimony	0.006	0.006	0.13	--	--	--	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Arsenic	0.01	0.01	0.01	--	--	--	--	mg/L	0.005	0.01	0.007	0.002 U	0.004
Barium	2	2	0.67	--	--	--	--	mg/L	0.104	0.18	0.117	0.206	0.135
Beryllium	0.004	0.004	0.0067	--	--	--	--	mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium	0.005	0.005	0.0025	--	--	--	--	mg/L	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Calcium	--	--	--	--	--	--	--	mg/L	58.4	152	89.8	148	86.5
Chromium	0.1	0.1	0.011	--	--	--	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Cobalt	0.04	0.1	0.1	--	--	--	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Copper*	1 (E)	1 (E)	0.013	4	--	--	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Iron*	0.3 (E)	0.3 (E)	--	5.6	--	--	--	mg/L	13.0	24.9	9.57	23.9	10.0
Lead	0.004	0.004	0.014	--	--	--	--	mg/L	0.003 U	0.003 U	0.003 U	0.003 U	0.003 U
Magnesium	400	1,100	--	--	--	--	--	mg/L	26.5	43	27.3	43.9	20.4
Manganese*	0.05 (E)	0.05 (E)	1.3	2.5	--	--	--	mg/L	0.400	0.947	0.435	0.201	0.378
Mercury	0.002	0.002	0.0000013	--	0.056	0.056	--	mg/L	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
Nickel	0.1	0.1	0.073	--	--	--	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Selenium	0.05	0.05	0.005	--	--	--	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Silver	0.034	0.098	0.0002	--	--	--	--	mg/L	0.0005 U	0.0005 U	0.0005 U	0.0005 U	0.0005 U
Thallium	0.002	0.002	0.0037	--	--	--	--	mg/L	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Vanadium	0.0045	0.062	0.027	--	--	--	--	mg/L	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U
Zinc	2.4	5 (E)	0.17	--	--	--	--	mg/L	0.005 U	0.009	0.005 U	0.005 U	0.005 U
Inorganics-Filtered													
Antimony (dissolved)	0.006	0.006	0.13	--	--	--	--	mg/L	NA	NA	NA	NA	NA
Arsenic (dissolved)	0.01	0.01	0.01	--	--	--	--	mg/L	NA	NA	NA	NA	NA
Barium (dissolved)	2	2	0.67	--	--	--	--	mg/L	NA	NA	NA	NA	NA
Beryllium (dissolved)	0.004	0.004	0.0067	--	--	--	--	mg/L	NA	NA	NA	NA	NA
Cadmium (dissolved)	0.005	0.005	0.0025	--	--	--	--	mg/L	NA	NA	NA	NA	NA
Chromium (dissolved)	0.1	0.1	0.011	--	--	--	--	mg/L	NA	NA	NA	NA	NA
Cobalt (dissolved)	0.04	0.1	0.1	--	--	--	--	mg/L	NA	NA	NA	NA	NA
Copper (dissolved)*	1 (E)	1 (E)	0.013	4	--	--	--	mg/L	NA	NA	NA	NA	NA
Lead (dissolved)	0.004	0.004	0.014	--	--	--	--	mg/L	NA	NA	NA	NA	NA
Manganese (dissolved)*	0.05 (E)	0.05 (E)	1.3	2.5	--	--	--	mg/L	NA	NA	NA	NA	NA
Mercury (dissolved)	0.002	0.002	0.0000013	--	0.056	0.056	--	mg/L	NA	NA	NA	NA	NA
Nickel (dissolved)	0.1	0.1	0.073	--	--	--	--	mg/L	NA	NA	NA	NA	NA
Selenium (dissolved)	0.05	0.05	0.005	--	--	--	--	mg/L	NA	NA	NA	NA	NA
Silver (dissolved)	0.034	0.098	0.0002	--	--	--	--	mg/L	NA	NA	NA	NA	NA
Thallium (dissolved)	0.002	0.002	0.0037	--	--	--	--	mg/L	NA	NA	NA	NA	NA
Vanadium (dissolved)	0.0045	0.062	0.027	--	--	--	--	mg/L	NA	NA	NA	NA	NA
Zinc (dissolved)	2.4	5 (E)	0.17	--	--	--	--	mg/L	NA	NA	NA	NA	NA
Miscellaneous													
Alkalinity, total (as CaCO3)	--	--	--	--	--	--	--	mg/L	372	434	384	494	410
Hardness	--	--	--	--	--	--	--	mg/L	156	390	248	365	225
Total Dissolved Solids	500 (E)	500 (E)	500	--	--	--	--	mg/L	784	1,080	884	958	1,220
Total Suspended Solids	--	--	--	--	--	--	--	mg/L	28	46	21	43	21

See Notes on last page.

Table 2
Groundwater Analytical Results
RACER Pontiac North Campus
Pontiac, Michigan

Notes:

- 1) Criteria listed are from the Michigan Department of Environmental Quality (MDEQ) Clean Up Criteria Requirements Table 1: Groundwater: Residential and Nonresidential, Part 201 Generic Cleanup Criteria and Screening Levels, January 10, 2018; GSI criteria updated June 25, 2018.
- 2) Res GW VIA RIASLs are from the Media-Specific Volatilization to Indoor Air Interim Action Screening Levels, August 2017.
- 3) Groundwater Surface Water Interface Criteria listed for barium, beryllium, cadmium, chromium, copper, lead, manganese, nickel and zinc are calculated based on a hardness of 150 mg/L-CaCO₃ for southern Lower Peninsula protected as a drinking water source.
- 4) Yellow highlighted values denotes exceedance and/or equal to Michigan Residential Drinking Water.
- 5) Orange highlighted values denotes exceedance and/or equal to Non-Residential Drinking Water.
- 6) Grey shaded values denotes exceedance and/or equal to Michigan Groundwater Surface Water Interface.
- 7) Bold values denotes exceedance and/or equal to Non-Residential Health Based Drinking Water Value.
- 8) Values in italics denotes exceedance and/or equal to Residential Groundwater Volatilization to Indoor Air Inhalation.
- 9) Values in red type denotes exceedance and/or equal to Non-Residential Groundwater Volatilization to Indoor Air Inhalation.
- 10) Bold boxed values denotes exceedance and/or equal to Residential Groundwater Volatilization to Indoor Air Recommended Interim Action Screening Levels.
- 11) Duplicate analyses are presented in brackets.
- 12) Constituents flagged with an (*) symbol have Residential and Non-Residential Drinking Water criteria which represent aesthetic drinking water values. The Non-Residential Health Based Drinking Water Value associated with these constituents will be utilized for Site comparison as is more applicable.

Abbreviations:

mg/L	Milligrams per liter.
E	Criterion is the aesthetic drinking water value, as required by Section 20120a(5) of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA).
f	Filtered and preserved in lab.
M	Qualifier in Draft Res VIA RIASLs: Site-specific criterion may be below target detection limits (TDL).
U	Compound was analyzed for but not detected. The associated value is the compound quantitation limit.
Y	Elevated reporting limit due to high target concentrations.
NA	Not analyzed.

ATTACHMENTS



ATTACHMENT A

Groundwater Analytical Laboratory Reports





Analytical Laboratory Report

Report ID: S97296.01(01)
Generated on 12/11/2018

Report to

Attention: Colleen Barton
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: NA FAX: 248-994-2241
Email: Colleen.barton@arcadis.com

Additional Contacts: Brad Saunders

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S97296.01-S97296.03
Project: PNC Racer
Collected Date: 11/29/2018 - 11/30/2018
Submitted Date/Time: 12/03/2018 14:25
Sampled by: C. Zilio
P.O. #: B0064607.2018

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Sample Summary (Page 5)

Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.
Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.
Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

There is no additional narrative for this analytical report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
E200.8	EPA Method 200.8 Revision 5.4
E245.1	EPA Method 245.1 Revision 3.0
E608.3	EPA Method 608.3 December 2016
N/A	Not Applicable
SM2320B	Standard Method 2320 B 2011
SM2340C	Standard Method 2340 C 2011
SM2540C	Standard Method 2540 C 2011
SM2540D	Standard Method 2540 D 2011
SW3015A	SW 846 Method 3015A Revision 1 February 2007
SW3510C	SW 846 Method 3510C Revision 3 December 1996
SW5030C/8260C	SW 846 Method 8260C Revision 3 August 2006 / 5030C Revision 3 May 2003



Analytical Laboratory Report

Sample Summary (3 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S97296.01	MWW10-SEN02_112918	Groundwater	11/29/18 11:00
S97296.02	SUMP_113018	Groundwater	11/30/18 15:40
S97296.03	Trip Blank	Water	11/30/18 00:01



Analytical Laboratory Report

Lab Sample ID: S97296.01

Sample Tag: MWW10-SEN02_112918

Collected Date/Time: 11/29/2018 11:00

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	1L Amber	None	Yes	4.8	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Extraction, PCB	Completed	SW3510C	12/06/18 16:00	ANW	

Inorganics

Method: SM2540C, Run Date: 12/04/18 18:45, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	1,910	100		mg/L	10		X

Method: SM2540D, Run Date: 12/04/18 16:05, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	4,940	30		mg/L	10		

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 12/06/18 16:04, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

X-Elevated reporting limit due to matrix interference



Analytical Laboratory Report

Lab Sample ID: S97296.02

Sample Tag: SUMP_113018

Collected Date/Time: 11/30/2018 15:40

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.8	IR
2	1L Amber	None	Yes	4.8	IR
1	125ml Plastic	HNO3	Yes	4.8	IR
1	250ml Plastic	None	Yes	4.8	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	12/10/18 11:00	JRH	
pH check for VOCs*	<2	N/A	12/06/18 12:35	KAG	
Metal Digestion	Completed	SW3015A	12/06/18 09:15	JRH	
Extraction, PCB	Completed	SW3510C	12/06/18 16:00	ANW	

Inorganics

Method: SM2320B, Run Date: 12/10/18 12:08, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	408	2		mg/L	2		

Method: SM2340C, Run Date: 12/06/18 14:08, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	256	10		mg/L	10		

Method: SM2540C, Run Date: 12/04/18 18:45, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	736	20		mg/L	2		

Method: SM2540D, Run Date: 12/04/18 16:05, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	35	3		mg/L	1		

Metals

Method: E200.8, Run Date: 12/06/18 11:45, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.002	0.002		mg/L	5	7440-38-2	
Barium	0.145	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.004		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	
Iron	7.05	0.02		mg/L	5	7439-89-6	
Lead	0.004	0.003		mg/L	5	7439-92-1	
Manganese	0.521	0.005		mg/L	5	7439-96-5	
Nickel	0.007	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.004		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	



Analytical Laboratory Report

Lab Sample ID: S97296.02 (continued)

Sample Tag: SUMP_113018

Method: E200.8, Run Date: 12/06/18 11:45, Analyst: JRH (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	0.009	0.005		mg/L	5	7440-66-6	

Method: E200.8, Run Date: 12/07/18 08:07, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	100	2.5		mg/L	5	7440-70-2	
Magnesium	31.8	2.5		mg/L	5	7439-95-4	

Method: E245.1, Run Date: 12/10/18 14:10, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 12/06/18 16:48, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 12/05/18 18:34, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	12.55	50	0.56	ug/L	1	67-64-1	JB
2-Butanone (MEK)	40	25	0.26	ug/L	1	78-93-3	
Benzene	Not detected	1	0.20	ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1	0.23	ug/L	1	75-27-4	
Bromoform	Not detected	1	0.22	ug/L	1	75-25-2	
Bromomethane	Not detected	5	0.32	ug/L	1	74-83-9	
Carbon disulfide	Not detected	5	0.24	ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1	0.20	ug/L	1	56-23-5	
Chlorobenzene	Not detected	1	0.17	ug/L	1	108-90-7	
Chloroethane	Not detected	5	0.34	ug/L	1	75-00-3	
Chloroform	Not detected	1	0.20	ug/L	1	67-66-3	
Chloromethane	Not detected	5	0.26	ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5	0.47	ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1	0.28	ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1	0.16	ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1	0.20	ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1	0.24	ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1	0.23	ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1	0.26	ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5	0.24	ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5	0.50	ug/L	1	75-71-8	

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S97296.02 (continued)

Sample Tag: SUMP_113018

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 12/05/18 18:34, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
trans-1,2-Dichloroethene	Not detected	1	0.20	ug/L	1	156-60-5	
Ethylbenzene	Not detected	1	0.26	ug/L	1	100-41-4	
2-Hexanone	Not detected	50	0.29	ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50	0.14	ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5	0.19	ug/L	1	1634-04-4	
Methylene chloride	Not detected	5	0.29	ug/L	1	75-09-2	
Styrene	Not detected	1	0.18	ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1	0.28	ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1	0.28	ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5	0.19	ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1	0.20	ug/L	1	127-18-4	
Toluene	Not detected	1	0.25	ug/L	1	108-88-3	
Trichloroethene	Not detected	1	0.23	ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1	0.33	ug/L	1	75-69-4	
Vinyl chloride	Not detected	1	0.31	ug/L	1	75-01-4	
o-Xylene	Not detected	1	0.25	ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2	0.41	ug/L	1		
Isopropylbenzene	Not detected	1	0.25	ug/L	1	98-82-8	
Cyclohexane	Not detected	1	0.29	ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1	0.20	ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1	0.27	ug/L	1	75-35-4	
Methyl Acetate	Not detected	10	0.25	ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1	0.21	ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1	0.18	ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1	0.30	ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1	0.18	ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1	0.19	ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1	0.25	ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S97296.03

Sample Tag: Trip Blank

Collected Date/Time: 11/30/2018 00:01

Matrix: Water

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	HCL	Yes	4.8	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	12/06/18 12:35	KAG	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 12/05/18 15:03, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	5.03	50	0.56	ug/L	1	67-64-1	JB
2-Butanone (MEK)	Not detected	25	0.26	ug/L	1	78-93-3	
Benzene	Not detected	1	0.20	ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1	0.23	ug/L	1	75-27-4	
Bromoform	Not detected	1	0.22	ug/L	1	75-25-2	
Bromomethane	Not detected	5	0.32	ug/L	1	74-83-9	
Carbon disulfide	Not detected	5	0.24	ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1	0.20	ug/L	1	56-23-5	
Chlorobenzene	Not detected	1	0.17	ug/L	1	108-90-7	
Chloroethane	Not detected	5	0.34	ug/L	1	75-00-3	
Chloroform	Not detected	1	0.20	ug/L	1	67-66-3	
Chloromethane	Not detected	5	0.26	ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5	0.47	ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1	0.28	ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1	0.16	ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1	0.20	ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1	0.24	ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1	0.23	ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1	0.26	ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5	0.24	ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5	0.50	ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1	0.20	ug/L	1	156-60-5	
Ethylbenzene	Not detected	1	0.26	ug/L	1	100-41-4	
2-Hexanone	Not detected	50	0.29	ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50	0.14	ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5	0.19	ug/L	1	1634-04-4	
Methylene chloride	0.41	5	0.29	ug/L	1	75-09-2	J
Styrene	Not detected	1	0.18	ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1	0.28	ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1	0.28	ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5	0.19	ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1	0.20	ug/L	1	127-18-4	
Toluene	Not detected	1	0.25	ug/L	1	108-88-3	
Trichloroethene	Not detected	1	0.23	ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1	0.33	ug/L	1	75-69-4	
Vinyl chloride	Not detected	1	0.31	ug/L	1	75-01-4	

J-Estimated value less than reporting limit, but greater than MDL B-Compound also found in associated method blank



Analytical Laboratory Report

Lab Sample ID: S97296.03 (continued)

Sample Tag: Trip Blank

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 12/05/18 15:03, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
o-Xylene	Not detected	1	0.25	ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2	0.41	ug/L	1		
Isopropylbenzene	Not detected	1	0.25	ug/L	1	98-82-8	
Cyclohexane	Not detected	1	0.29	ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1	0.20	ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1	0.27	ug/L	1	75-35-4	
Methyl Acetate	Not detected	10	0.25	ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1	0.21	ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1	0.18	ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1	0.30	ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1	0.18	ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1	0.19	ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1	0.25	ug/L	1	10061-02-6	

Merit Laboratories Login Checklist

Lab Set ID:S97296

Client:ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: PNC Racer

Submitted: 12/03/2018 14:25 Login User: SRS

Attention: Colleen Barton

Address: Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: NA

FAX: 248-994-2241

Email: Colleen.barton@arcadis.com

Selection	Description	Note
Sample Receiving		
01. ☒ Yes ☐ No ☐ N/A	Samples are received at 4C +/- 2C Thermometer #	IR 4.8
02. ☒ Yes ☐ No ☐ N/A	Received on ice/ cooling process begun	
03. ☐ Yes ☒ No ☐ N/A	Samples shipped	
04. ☐ Yes ☒ No ☐ N/A	Samples left in 24 hr. drop box	
05. ☐ Yes ☐ No ☒ N/A	Are there custody seals/tape or is the drop box locked	
Chain of Custody		
06. ☒ Yes ☐ No ☐ N/A	COC adequately filled out	
07. ☒ Yes ☐ No ☐ N/A	COC signed and relinquished to the lab	
08. ☐ Yes ☒ No ☐ N/A	Sample tag on bottles match COC	Missing Trip blank on COC
09. ☐ Yes ☒ No ☐ N/A	Subcontracting needed? Subcontacted to:	
Preservation		
10. ☒ Yes ☐ No ☐ N/A	Do sample have correct chemical preservation	
11. ☒ Yes ☐ No ☐ N/A	Completed pH checks on preserved samples? (no VOAs)	
12. ☐ Yes ☒ No ☐ N/A	Did any samples need to be preserved in the lab?	
Bottle Conditions		
13. ☒ Yes ☐ No ☐ N/A	All bottles intact	
14. ☒ Yes ☐ No ☐ N/A	Appropriate analytical bottles are used	
15. ☒ Yes ☐ No ☐ N/A	Merit bottles used	
16. ☒ Yes ☐ No ☐ N/A	Sufficient sample volume received	
17. ☐ Yes ☒ No ☐ N/A	Samples require laboratory filtration	
18. ☒ Yes ☐ No ☐ N/A	Samples submitted within holding time	
19. ☐ Yes ☒ No ☐ N/A	Do water VOC or TOX bottles contain headspace	

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

Merit Laboratories Bottle Preservation Check

Lab Set ID: S97296 Initials: SRS

Client: ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: PNC Racer

Submitted: 12/03/2018 14:25 Login User:

Attention: Colleen Barton

Address: Arcadis

28550 Cabot Drive

Suite 500

Novi, MI 48377

Phone: NA

FAX: 248-994-2241

Email: Colleen.barton@arcadis.com

Lab ID	125 ml Plastic HNO ₃	250 ml Plastic HNO ₃	1 L Plastic HNO ₃	250 ml Plastic H ₂ SO ₄	125 ml Amber H ₂ SO ₄	32 oz Glass HCl	125 ml Plastic NaOH	125 ml Amber PbCO ₃ NaOH	pH					Notes
									<2	>12	other	ml add	new pH	
S97296.01	X								X					
S97296.02	X								X					

REPORT TO

CONTACT NAME Colleen Barton			
COMPANY Arcadis			
ADDRESS 28550 Cabot Drive #500			
CITY Novi			STATE MI ZIP CODE 48377
PHONE NO. 810.225.1909		FAX NO.	P.O. NO. B0064607.2018.
E-MAIL ADDRESS Colleen.Barton@arcadis.com; Brad Saunders@arc			QUOTE NO.

CHAIN OF CUSTODY RECORD

CONTACT NAME		Accounts Payable		☐ SAME	
COMPANY		Arcadis			
ADDRESS		630 Plaza Drive Suite 600			
CITY		Highlands Ranch		STATE	CO
				ZIP CODE	80129
PHONE NO.		E-MAIL ADDRESS			
		accountspayable.administration@arcadis-us.com			

INVOICE TO[illegible]

RELINQUISHED BY:	<i>[Signature]</i> ARCADIS	DATE	TIME	RELINQUISHED BY:	<i>[Signature]</i> ARCADIS	DATE	TIME
SIGNATURE/ORGANIZATION		12.3.18	0800	SIGNATURE/ORGANIZATION		12.3.18	1000
RECEIVED BY:	<i>[Signature]</i> NOV1 FRIDGE	DATE	TIME	RECEIVED BY:	<i>[Signature]</i> MB	DATE	TIME
SIGNATURE/ORGANIZATION		12.3.18	0800	SIGNATURE/ORGANIZATION		12.3.18	1500
RELINQUISHED BY:	<i>[Signature]</i> MB	DATE	TIME	SEAL NO.	SEAL INTACT	INITIALS	NOTES:
SIGNATURE/ORGANIZATION		12.3.18	1425		YES ☐ NO ☐		TEMP. ON ARRIVAL
RECEIVED BY:	<i>[Signature]</i> MB	DATE	TIME	SEAL NO.	SEAL INTACT	INITIALS	4.8
SIGNATURE/ORGANIZATION		12.3.18	1425		YES ☐ NO ☐		

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

Rev. 5.18.12

Table 4
Summary of Groundwater Analytical Results
RACER Trust Pontiac North Campus
Pontiac, Michigan

PNC VOC Analyte List - 8260C		
Volatile Organic Compounds		
VOC	Acetone	1
VOC	Benzene	1
VOC	Bromodichloromethane	1
VOC	Bromoform	1
VOC	Bromomethane	1
VOC	2-Butanone	1
VOC	Carbon Disulfide	1
VOC	Carbon Tetrachloride	1
VOC	Chlorobenzene	1
VOC	Chloroethane	1
VOC	Chloroform	1
VOC	Chloromethane	1
VOC	Cumene	1
VOC	Cyclohexane	1
VOC	1,2-Dibromo-3-chloropropane	1
VOC	Dibromochloromethane	1
VOC	1,2-Dibromoethane	1
VOC	1,2-Dichlorobenzene	1
VOC	1,3-Dichlorobenzene	1
VOC	1,4-Dichlorobenzene	1
VOC	Dichlorodifluoromethane	1
VOC	1,1-Dichloroethane	1
VOC	1,2-Dichloroethane	1
VOC	1,1-Dichloroethene	1
VOC	cis-1,2-Dichloroethene	1
VOC	trans-1,2-Dichloroethene	1
VOC	1,2-Dichloropropane	1
VOC	1,3-Dichloropropene (summed)	1
VOC	Ethyl Benzene	1
VOC	2-Hexanone	1
VOC	Methyl Acetate	1
VOC	Methyl tert-butyl ether	1
VOC	4-Methyl-2-pentanone	1
VOC	Methylcyclohexane	1
VOC	Methylene Chloride	1
VOC	Styrene	1
VOC	1,1,2,2-Tetrachloroethane	1
VOC	Tetrachloroethene	1
VOC	Toluene	1
VOC	1,2,4-Trichlorobenzene	1
VOC	1,1,1-Trichloroethane	1
VOC	1,1,2-Trichloroethane	1
VOC	Trichloroethene	1
VOC	Trichlorofluoromethane	1
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	1
VOC	Vinyl Chloride	1
VOC	Xylenes (total)	1

Montcalm inorganics list

(Method 200.8)

antimony
arsenic
barium
beryllium
cadmium
chromium
cobalt
copper
lead
manganese
mercury
nickel
selenium
silver
thallium
vanadium
zinc

Geochemical analytical list

calcium
iron
magnesium
alkalinity
hardness
dissolved and suspended solids



Analytical Laboratory Report

Report ID: S95072.01(01)
Generated on 10/12/2018

Report to
Attention: Colleen Barton
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Novi, MI 48377

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Report Summary
Lab Sample ID(s): S95072.01-S95072.16
Project: PNC 2018 Annual MW Sampling
Collected Date: 10/01/2018 - 10/02/2018
Submitted Date/Time: 10/03/2018 08:00
Sampled by: C. Zilio / K. Voet
P.O. #: B0064607.2018.00600

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- Method Summary (Page 4)
- Sample Summary (Page 5)


Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.
Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.
Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

There is no additional narrative for this analytical report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
E200.8	EPA Method 200.8 Revision 5.4
E245.1	EPA Method 245.1 Revision 3.0
E608.3	EPA Method 608.3 December 2016
N/A	Not Applicable
SM2320B	Standard Method 2320 B 2011
SM2340C	Standard Method 2340 C 2011
SM2540C	Standard Method 2540 C 2011
SM2540D	Standard Method 2540 D 2011
SW3015A	SW 846 Method 3015A Revision 1 February 2007
SW3510C	SW 846 Method 3510C Revision 3 December 1996
SW5030C/8260C	SW 846 Method 8260C Revision 3 August 2006 / 5030C Revision 3 May 2003
SW8260B - SIM	SW 846 Method 8260B Revision 2 December 1996 SIMs



Analytical Laboratory Report

Sample Summary (16 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S95072.01	TW-10-02_GW-100118	Groundwater	10/01/18 15:20
S95072.02	MWW5-01_GW-100118	Groundwater	10/01/18 16:40
S95072.03	INJ-02-18_GW-100218	Groundwater	10/02/18 09:30
S95072.04	MW-05-18_GW-100118	Groundwater	10/01/18 10:30
S95072.05	MWF16-23_GW-100118	Groundwater	10/01/18 12:20
S95072.06	MWF16-25_GW-100118	Groundwater	10/01/18 13:35
S95072.07	MWOS-01_GW-100118	Groundwater	10/01/18 14:45
S95072.08	TW-09-01_GW-100118	Groundwater	10/01/18 16:25
S95072.09	DUP-01_GW-100118	Groundwater	10/01/18 00:01
S95072.10	MW-04-17_GW-100218	Groundwater	10/02/18 09:05
S95072.11	MW-03-17_GW-100218	Groundwater	10/02/18 10:00
S95072.12	INJ-01-17_GW-100218	Groundwater	10/02/18 11:00
S95072.13	MWM16-31_GW-100218	Groundwater	10/02/18 12:30
S95072.14	MWM-16-02_GW-100218	Groundwater	10/02/18 13:50
S95072.15	Trip Blank 1	Water	10/02/18 00:01
S95072.16	Trip Blank 2	Water	10/02/18 00:01



Analytical Laboratory Report

Lab Sample ID: S95072.01
Sample Tag: TW-10-02_GW-100118
Collected Date/Time: 10/01/2018 15:20
Matrix: Groundwater
COC Reference: 111870

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/11/18 12:00	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/10/18 15:03, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	45	1		ug/L	1	123-91-1	



Analytical Laboratory Report

Lab Sample ID: S95072.02

Sample Tag: MWW5-01_GW-100118

Collected Date/Time: 10/01/2018 16:40

Matrix: Groundwater

COC Reference: 111870

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.3	IR
2	1L Amber	None	Yes	4.3	IR
1	500ml Plastic	None	Yes	4.3	IR
1	125ml Plastic	HNO3	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/12/18 09:45	JRH	
pH check for VOCs*	<2	N/A	10/04/18 12:00	JML	
Metal Digestion	Completed	SW3015A	10/03/18 10:00	JRH	
Extraction, PCB	Completed	SW3510C	10/08/18 09:00	PLB	

Inorganics

Method: SM2320B, Run Date: 10/03/18 14:24, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	558	2		mg/L	2		

Method: SM2340C, Run Date: 10/05/18 12:12, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	512	10		mg/L	10		

Method: SM2540C, Run Date: 10/05/18 17:40, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	810	20		mg/L	2		

Method: SM2540D, Run Date: 10/03/18 12:05, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	Not detected	3		mg/L	1		

Metals

Method: E200.8, Run Date: 10/03/18 12:22, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.004	0.002		mg/L	5	7440-38-2	
Barium	0.087	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	
Iron	2.18	0.02		mg/L	5	7439-89-6	
Lead	Not detected	0.003		mg/L	5	7439-92-1	
Manganese	0.520	0.005		mg/L	5	7439-96-5	
Nickel	Not detected	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	



Analytical Laboratory Report

Lab Sample ID: S95072.02 (continued)

Sample Tag: MWW5-01_GW-100118

Method: E200.8, Run Date: 10/03/18 12:22, Analyst: JRH (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	Not detected	0.005		mg/L	5	7440-66-6	

Method: E200.8, Run Date: 10/03/18 14:35, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	194	0.25		mg/L	5	7440-70-2	
Magnesium	28.2	0.25		mg/L	5	7439-95-4	

Method: E245.1, Run Date: 10/12/18 12:37, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/08/18 15:02, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 15:27, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	21	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	



Analytical Laboratory Report

Lab Sample ID: S95072.02 (continued)

Sample Tag: MWW5-01_GW-100118

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 15:27, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S95072.03

Sample Tag: INJ-02-18_GW-100218

Collected Date/Time: 10/02/2018 09:30

Matrix: Groundwater

COC Reference: 111870

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.3	IR
2	1L Amber	None	Yes	4.3	IR
1	500ml Plastic	None	Yes	4.3	IR
1	125ml Plastic	HNO3	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/12/18 09:45	JRH	
pH check for VOCs*	<2	N/A	10/04/18 12:00	JML	
Metal Digestion	Completed	SW3015A	10/03/18 10:00	JRH	
Extraction, PCB	Completed	SW3510C	10/08/18 09:00	PLB	

Inorganics

Method: SM2320B, Run Date: 10/03/18 14:26, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	368	2		mg/L	2		

Method: SM2340C, Run Date: 10/05/18 12:16, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	246	10		mg/L	10		

Method: SM2540C, Run Date: 10/05/18 17:40, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	556	20		mg/L	2		

Method: SM2540D, Run Date: 10/03/18 12:05, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	4	3		mg/L	1		

Metals

Method: E200.8, Run Date: 10/03/18 12:26, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.007	0.002		mg/L	5	7440-38-2	
Barium	0.163	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	
Iron	2.36	0.02		mg/L	5	7439-89-6	
Lead	Not detected	0.003		mg/L	5	7439-92-1	
Manganese	0.386	0.005		mg/L	5	7439-96-5	
Nickel	0.030	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	



Analytical Laboratory Report

Lab Sample ID: S95072.03 (continued)

Sample Tag: INJ-02-18_GW-100218

Method: E200.8, Run Date: 10/03/18 12:26, Analyst: JRH (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	Not detected	0.005		mg/L	5	7440-66-6	

Method: E200.8, Run Date: 10/03/18 14:37, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	99.4	0.25		mg/L	5	7440-70-2	
Magnesium	23.7	0.25		mg/L	5	7439-95-4	

Method: E245.1, Run Date: 10/12/18 12:39, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/08/18 15:13, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 15:47, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	



Analytical Laboratory Report

Lab Sample ID: S95072.03 (continued)

Sample Tag: INJ-02-18_GW-100218

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 15:47, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S95072.04

Sample Tag: MW-05-18_GW-100118

Collected Date/Time: 10/01/2018 10:30

Matrix: Groundwater

COC Reference: 111870

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/04/18 12:00	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/10/18 15:23, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	2	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 16:06, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	6	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	4	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	



Analytical Laboratory Report

Lab Sample ID: S95072.04 (continued)

Sample Tag: MW-05-18_GW-100118

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 16:06, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	4	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S95072.05

Sample Tag: MWF16-23_GW-100118

Collected Date/Time: 10/01/2018 12:20

Matrix: Groundwater

COC Reference: 111870

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/04/18 12:00	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/10/18 15:44, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	4	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 16:25, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	19	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	4	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	9	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	



Analytical Laboratory Report

Lab Sample ID: S95072.05 (continued)

Sample Tag: MWF16-23_GW-100118

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 16:25, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Trichloroethene	15	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	9	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S95072.06

Sample Tag: MWF16-25_GW-100118

Collected Date/Time: 10/01/2018 13:35

Matrix: Groundwater

COC Reference: 111870

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/04/18 12:00	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/10/18 16:05, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	7	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 16:44, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	4	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	5	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	3	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	



Analytical Laboratory Report

Lab Sample ID: S95072.06 (continued)

Sample Tag: MWF16-25_GW-100118

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 16:44, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	3	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S95072.07

Sample Tag: MWOS-01_GW-100118

Collected Date/Time: 10/01/2018 14:45

Matrix: Groundwater

COC Reference: 111870

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/04/18 12:00	JML	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 17:03, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	



Analytical Laboratory Report

Lab Sample ID: S95072.07 (continued)
Sample Tag: MWOS-01_GW-100118

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 17:03, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S95072.08

Sample Tag: TW-09-01_GW-100118

Collected Date/Time: 10/01/2018 16:25

Matrix: Groundwater

COC Reference: 111870

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.3	IR
2	1L Amber	None	Yes	4.3	IR
1	500ml Plastic	None	Yes	4.3	IR
1	125ml Plastic	HNO3	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/12/18 09:45	JRH	
pH check for VOCs*	>2	N/A	10/04/18 12:00	JML	
Metal Digestion	Completed	SW3015A	10/03/18 10:00	JRH	
Extraction, PCB	Completed	SW3510C	10/08/18 09:00	PLB	

Inorganics

Method: SM2320B, Run Date: 10/03/18 14:28, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	770	2		mg/L	2		

Method: SM2340C, Run Date: 10/05/18 12:18, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	675	10		mg/L	10		

Method: SM2540C, Run Date: 10/05/18 17:40, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	1,460	20		mg/L	2		

Method: SM2540D, Run Date: 10/03/18 12:05, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	11	3		mg/L	1		

Metals

Method: E200.8, Run Date: 10/03/18 12:29, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.020	0.002		mg/L	5	7440-38-2	
Barium	0.539	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	
Iron	4.71	0.02		mg/L	5	7439-89-6	
Lead	Not detected	0.003		mg/L	5	7439-92-1	
Manganese	0.561	0.005		mg/L	5	7439-96-5	
Nickel	Not detected	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	



Analytical Laboratory Report

Lab Sample ID: S95072.08 (continued)

Sample Tag: TW-09-01_GW-100118

Method: E200.8, Run Date: 10/03/18 12:29, Analyst: JRH (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	Not detected	0.005		mg/L	5	7440-66-6	

Method: E200.8, Run Date: 10/03/18 14:42, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	265	0.25		mg/L	5	7440-70-2	
Magnesium	36.6	0.25		mg/L	5	7439-95-4	

Method: E245.1, Run Date: 10/12/18 12:42, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/08/18 15:57, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 17:22, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	



Analytical Laboratory Report

Lab Sample ID: S95072.08 (continued)

Sample Tag: TW-09-01_GW-100118

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 17:22, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S95072.09

Sample Tag: DUP-01_GW-100118

Collected Date/Time: 10/01/2018 00:01

Matrix: Groundwater

COC Reference: 111870

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/04/18 12:00	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/10/18 16:27, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	2	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 17:41, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	6	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	4	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	



Analytical Laboratory Report

Lab Sample ID: S95072.09 (continued)
Sample Tag: DUP-01_GW-100118

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 17:41, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	4	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S95072.10

Sample Tag: MW-04-17_GW-100218

Collected Date/Time: 10/02/2018 09:05

Matrix: Groundwater

COC Reference: 111870

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.3	IR
2	1L Amber	None	Yes	4.3	IR
1	500ml Plastic	None	Yes	4.3	IR
1	125ml Plastic	HNO3	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/12/18 09:45	JRH	
pH check for VOCs*	<2	N/A	10/04/18 12:00	JML	
Metal Digestion	Completed	SW3015A	10/03/18 10:00	JRH	
Extraction, PCB	Completed	SW3510C	10/08/18 09:00	PLB	

Inorganics

Method: SM2320B, Run Date: 10/03/18 14:30, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	240	2		mg/L	2		

Method: SM2340C, Run Date: 10/05/18 12:20, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	221	10		mg/L	10		

Method: SM2540C, Run Date: 10/05/18 17:40, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	536	20		mg/L	2		

Method: SM2540D, Run Date: 10/03/18 12:05, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	Not detected	3		mg/L	1		

Metals

Method: E200.8, Run Date: 10/03/18 12:32, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	Not detected	0.002		mg/L	5	7440-38-2	
Barium	0.060	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	
Iron	0.04	0.02		mg/L	5	7439-89-6	
Lead	Not detected	0.003		mg/L	5	7439-92-1	
Manganese	0.487	0.005		mg/L	5	7439-96-5	
Nickel	Not detected	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	



Analytical Laboratory Report

Lab Sample ID: S95072.10 (continued)

Sample Tag: MW-04-17_GW-100218

Method: E200.8, Run Date: 10/03/18 12:32, Analyst: JRH (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	Not detected	0.005		mg/L	5	7440-66-6	

Method: E200.8, Run Date: 10/03/18 14:43, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	87.0	0.25		mg/L	5	7440-70-2	
Magnesium	18.6	0.25		mg/L	5	7439-95-4	

Method: E245.1, Run Date: 10/12/18 12:43, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/08/18 15:24, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 21:48, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	



Analytical Laboratory Report

Lab Sample ID: S95072.10 (continued)

Sample Tag: MW-04-17_GW-100218

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 21:48, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S95072.11

Sample Tag: MW-03-17_GW-100218

Collected Date/Time: 10/02/2018 10:00

Matrix: Groundwater

COC Reference: 111870

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.3	IR
2	1L Amber	None	Yes	4.3	IR
1	500ml Plastic	None	Yes	4.3	IR
1	125ml Plastic	HNO3	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/12/18 09:45	JRH	
pH check for VOCs*	<2	N/A	10/04/18 12:00	JML	
Metal Digestion	Completed	SW3015A	10/03/18 10:00	JRH	
Extraction, PCB	Completed	SW3510C	10/08/18 09:00	PLB	

Inorganics

Method: SM2320B, Run Date: 10/03/18 14:32, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	250	2		mg/L	2		

Method: SM2340C, Run Date: 10/05/18 12:22, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	199	10		mg/L	10		

Method: SM2540C, Run Date: 10/05/18 17:40, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	532	20		mg/L	2		

Method: SM2540D, Run Date: 10/03/18 12:05, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	Not detected	3		mg/L	1		

Metals

Method: E200.8, Run Date: 10/03/18 12:36, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	Not detected	0.002		mg/L	5	7440-38-2	
Barium	0.047	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	
Iron	0.08	0.02		mg/L	5	7439-89-6	
Lead	Not detected	0.003		mg/L	5	7439-92-1	
Manganese	0.562	0.005		mg/L	5	7439-96-5	
Nickel	0.006	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	



Analytical Laboratory Report

Lab Sample ID: S95072.11 (continued)

Sample Tag: MW-03-17_GW-100218

Method: E200.8, Run Date: 10/03/18 12:36, Analyst: JRH (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	Not detected	0.005		mg/L	5	7440-66-6	

Method: E200.8, Run Date: 10/03/18 14:44, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	85.2	0.25		mg/L	5	7440-70-2	
Magnesium	16.9	0.25		mg/L	5	7439-95-4	

Method: E245.1, Run Date: 10/12/18 12:54, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/08/18 15:35, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 22:08, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	



Analytical Laboratory Report

Lab Sample ID: S95072.11 (continued)

Sample Tag: MW-03-17_GW-100218

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 22:08, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S95072.12

Sample Tag: INJ-01-17_GW-100218

Collected Date/Time: 10/02/2018 11:00

Matrix: Groundwater

COC Reference: 111870

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.3	IR
2	1L Amber	None	Yes	4.3	IR
1	500ml Plastic	None	Yes	4.3	IR
1	125ml Plastic	HNO3	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/12/18 09:45	JRH	
pH check for VOCs*	<2	N/A	10/04/18 12:00	JML	
Metal Digestion	Completed	SW3015A	10/03/18 10:00	JRH	
Extraction, PCB	Completed	SW3510C	10/08/18 09:00	PLB	

Inorganics

Method: SM2320B, Run Date: 10/03/18 14:34, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	238	2		mg/L	2		

Method: SM2340C, Run Date: 10/05/18 12:24, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	244	10		mg/L	10		

Method: SM2540C, Run Date: 10/05/18 17:40, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	562	20		mg/L	2		

Method: SM2540D, Run Date: 10/03/18 12:05, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	Not detected	3		mg/L	1		

Metals

Method: E200.8, Run Date: 10/03/18 12:39, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	Not detected	0.002		mg/L	5	7440-38-2	
Barium	0.048	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	
Iron	0.36	0.02		mg/L	5	7439-89-6	
Lead	Not detected	0.003		mg/L	5	7439-92-1	
Manganese	0.402	0.005		mg/L	5	7439-96-5	
Nickel	Not detected	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	



Analytical Laboratory Report

Lab Sample ID: S95072.12 (continued)

Sample Tag: INJ-01-17_GW-100218

Method: E200.8, Run Date: 10/03/18 12:39, Analyst: JRH (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	Not detected	0.005		mg/L	5	7440-66-6	

Method: E200.8, Run Date: 10/03/18 14:45, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	92.0	0.25		mg/L	5	7440-70-2	
Magnesium	20.1	0.25		mg/L	5	7439-95-4	

Method: E245.1, Run Date: 10/12/18 12:45, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/08/18 15:46, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 22:27, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	



Analytical Laboratory Report

Lab Sample ID: S95072.12 (continued)

Sample Tag: INJ-01-17_GW-100218

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 22:27, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S95072.13

Sample Tag: MWM16-31_GW-100218

Collected Date/Time: 10/02/2018 12:30

Matrix: Groundwater

COC Reference: 111872

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/04/18 12:00	JML	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 22:46, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	1	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	



Analytical Laboratory Report

Lab Sample ID: S95072.13 (continued)
Sample Tag: MWM16-31_GW-100218

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 22:46, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S95072.14

Sample Tag: MWM-16-02_GW-100218

Collected Date/Time: 10/02/2018 13:50

Matrix: Groundwater

COC Reference: 111872

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/04/18 12:00	JML	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 23:05, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	



Analytical Laboratory Report

Lab Sample ID: S95072.14 (continued)
Sample Tag: MWM-16-02_GW-100218

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 23:05, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S95072.15

Sample Tag: Trip Blank 1

Collected Date/Time: 10/02/2018 00:01

Matrix: Water

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/04/18 12:00	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/10/18 14:00, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	Not detected	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 21:10, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	



Analytical Laboratory Report

Lab Sample ID: S95072.15 (continued)

Sample Tag: Trip Blank 1

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 21:10, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S95072.16

Sample Tag: Trip Blank 2

Collected Date/Time: 10/02/2018 00:01

Matrix: Water

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	HCL	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/04/18 12:00	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/10/18 14:21, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	Not detected	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 21:29, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	



Analytical Laboratory Report

Lab Sample ID: S95072.16 (continued)

Sample Tag: Trip Blank 2

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/04/18 21:29, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	

Merit Laboratories Login Checklist

Lab Set ID:S95072

Client:ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: PNC 2018 Annual MW Sampling

Submitted: 10/03/2018 08:00 Login User: MMC

Attention: Colleen Barton

Address: Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: NA

FAX: 248-994-2241

Email: Colleen.barton@arcadis.com

Selection	Description	Note
Sample Receiving		
01. ☒ Yes ☐ No ☐ N/A	Samples are received at 4C +/- 2C Thermometer #	IR 4.3
02. ☒ Yes ☐ No ☐ N/A	Received on ice/ cooling process begun	
03. ☐ Yes ☒ No ☐ N/A	Samples shipped	
04. ☐ Yes ☒ No ☐ N/A	Samples left in 24 hr. drop box	
05. ☐ Yes ☐ No ☒ N/A	Are there custody seals/tape or is the drop box locked	
Chain of Custody		
06. ☐ Yes ☒ No ☐ N/A	COC adequately filled out	Trip blank not listed
07. ☒ Yes ☐ No ☐ N/A	COC signed and relinquished to the lab	
08. ☒ Yes ☐ No ☐ N/A	Sample tag on bottles match COC	
09. ☐ Yes ☒ No ☐ N/A	Subcontracting needed? Subcontacted to:	
Preservation		
10. ☒ Yes ☐ No ☐ N/A	Do sample have correct chemical preservation	
11. ☒ Yes ☐ No ☐ N/A	Completed pH checks on preserved samples? (no VOAs)	
12. ☐ Yes ☒ No ☐ N/A	Did any samples need to be preserved in the lab?	
Bottle Conditions		
13. ☒ Yes ☐ No ☐ N/A	All bottles intact	
14. ☒ Yes ☐ No ☐ N/A	Appropriate analytical bottles are used	
15. ☒ Yes ☐ No ☐ N/A	Merit bottles used	
16. ☒ Yes ☐ No ☐ N/A	Sufficient sample volume received	
17. ☐ Yes ☒ No ☐ N/A	Samples require laboratory filtration	
18. ☒ Yes ☐ No ☐ N/A	Samples submitted within holding time	
19. ☐ Yes ☐ No ☒ N/A	Do water VOC or TOX bottles contain headspace	

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

Merit Laboratories Bottle Preservation Check

Lab Set ID: S95072 Initials: MMC

Attention: Colleen Barton
Address: Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Client: ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: PNC 2018 Annual MW Sampling

Submitted: 10/03/2018 08:00 Login User:

Phone: NA FAX: 248-994-2241
Email: Colleen.barton@arcadis.com

Lab ID	125 ml Plastic HNO ₃	250 ml Plastic HNO ₃	1 L Plastic HNO ₃	250 ml Plastic H ₂ SO ₄	125 ml Amber H ₂ SO ₄	32 oz Glass HCl	125 ml Plastic NaOH	125 ml Amber PbCO ₃ NaOH	pH					Notes
									<2	>12	other	ml add	new pH	
S95072.02	X								X					
S95072.03	X								X					
S95072.08	X								X					
S95072.10	X								X					
S95072.11	X								X					
S95072.12	X								X					



2680 East Lansing Dr., East Lansing, MI 48823
Phone (517) 332-0167 Fax (517) 332-4034
www.meritlabs.com

C.O.C. PAGE # 1 OF 2

111870

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME Colleen Barton	CONTACT NAME Accounts Payable	☐ SAME
COMPANY Arcadis	COMPANY Arcadis	
ADDRESS 28550 Cabot Drive #500	ADDRESS 630 Plaza Drive Suite 600	
CITY Novi	CITY Highlands Ranch	STATE CO ZIP CODE 80129
PHONE NO. 810 225 1909	PHONE NO. 800 646 0720	E-MAIL ADDRESS
FAX NO.		
E-MAIL ADDRESS colleen.barton@arcadis.com; brad.saunders@arcadis.com		
QUOTE NO.		

PROJECT NO./NAME PNC 2018 ANNUAL MW SAMPLING	SAMPLER(S) - PLEASE PRINT/SIGN NAME C. ZILLO / K. VOET
TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER	
DELIVERABLES REQUIRED ☐ STD ☒ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☒ EDD ☐ OTHER	
MATRIX CODE: GW=GROUNDWATER SL=SLUDGE WW=WASTEWATER DW=DRINKING WATER S=SOIL O=OIL L=LIQUID WP=WIFE SD=SOLID A=AIR W=WASTE	# Containers & Preservatives

MERIT LAB NO. FOR LAB USE ONLY	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	Preservatives										ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)										Other Special Instructions
	DATE	TIME				NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER	* VOCs	1,4-D	Manganese	Lead	Antimony	Vanadium	* Montcalm Inorganics	* Montcalm Geochemistry	PCB					
95072.01	10/1/18	1520	Tw-10-02-GW-100118	GW	3		3								3										* SEE VOC LIST	
.02	10/1/18	1640	MWWS-01-GW-100118	GW	7	3	3	1						3					1	1	2					
.03	10/2/18	0930	INTJ-02-18-GW-100218	GW	7	3	3	1						3					1	1	2				** SEE MONTCAIN LIST	
.04	10-1-18	1030	MW-05-18-GW-100118	GW	3		3							3	3											
.05	10-1-18	1220	MWF16-23-GW-100118	GW	3		3							3	3											
.06	10-1-18	1335	MWF16-25-GW-100118	GW	3		3							3	3										RL For 1,4-D	
.07	10-1-18	1445	MW05-01-GW-100118	GW	3		3							3											MUST B < 7.2 PPB	
.08	10-1-18	1625	Tw-09-01-GW-100118	GW	7	3	3	1						3					1	1	2					
.09	10-1-18	—	DUP-01-GW-100118	GW	3		3							3	3											
.10	10-2-18	0905	MW-04-17-GW-100218	GW	7	3	3	1						3					1	1	2					
.11	10-2-18	1000	MW-03-17-GW-100218	GW	7	3	3	1						3					1	1	2					
.12	10-2-18	11005	INTJ-01-17-GW-100218	GW	7	3	3	1						3					1	1	2					

RELINQUISHED BY: SIGNATURE/ORGANIZATION [Signature]	DATE 10-2-18	TIME 1525	RELINQUISHED BY: SIGNATURE/ORGANIZATION Merit Fridge	DATE 10/3/18	TIME 0800		
RECEIVED BY: SIGNATURE/ORGANIZATION [Signature]	DATE 10/2/18	TIME 15:25	RECEIVED BY: SIGNATURE/ORGANIZATION M. Gilchrist	DATE 10/3/18	TIME 0800		
RELINQUISHED BY: SIGNATURE/ORGANIZATION [Signature]	DATE 10/2/18	TIME 1610	SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS	NOTES:	TEMP ON ARRIVAL
RECEIVED BY: SIGNATURE/ORGANIZATION Merit Fridge	DATE 10/2/18	TIME 1650	SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS		4.3

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

Table 4
Summary of Groundwater Analytical Results
RACER Trust Pontiac North Campus
Pontiac, Michigan

PNC VOC Analyte List - 8260C		
	Volatile Organic Compounds	1
VOC	Acetone	1
VOC	Benzene	1
VOC	Bromodichloromethane	1
VOC	Bromoform	1
VOC	Bromomethane	1
VOC	2-Butanone	1
VOC	Carbon Disulfide	1
VOC	Carbon Tetrachloride	1
VOC	Chlorobenzene	1
VOC	Chloroethane	1
VOC	Chloroform	1
VOC	Chloromethane	1
VOC	Cumene	1
VOC	Cyclohexane	1
VOC	1,2-Dibromo-3-chloropropane	1
VOC	Dibromochloromethane	1
VOC	1,2-Dibromoethane	1
VOC	1,2-Dichlorobenzene	1
VOC	1,3-Dichlorobenzene	1
VOC	1,4-Dichlorobenzene	1
VOC	Dichlorodifluoromethane	1
VOC	1,1-Dichloroethane	1
VOC	1,2-Dichloroethane	1
VOC	1,1-Dichloroethene	1
VOC	cis-1,2-Dichloroethene	1
VOC	trans-1,2-Dichloroethene	1
VOC	1,2-Dichloropropane	1
VOC	1,3-Dichloropropene (summed)	1
VOC	Ethyl Benzene	1
VOC	2-Hexanone	1
VOC	Methyl Acetate	1
VOC	Methyl tert-butyl ether	1
VOC	4-Methyl-2-pentanone	1
VOC	Methylcyclohexane	1
VOC	Methylene Chloride	1
VOC	Styrene	1
VOC	1,1,2,2-Tetrachloroethane	1
VOC	Tetrachloroethene	1
VOC	Toluene	1
VOC	1,2,4-Trichlorobenzene	1
VOC	1,1,1-Trichloroethane	1
VOC	1,1,2-Trichloroethane	1
VOC	Trichloroethene	1
VOC	Trichlorofluoromethane	1
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	1
VOC	Vinyl Chloride	1
VOC	Xylenes (total)	1

Montcalm inorganics list
antimony
arsenic
barium
beryllium
cadmium
chromium
cobalt
copper
lead
manganese
mercury
nickel
selenium
silver
thallium
vanadium
zinc

Geochemical analytical list
calcium
iron
manganese
magnesium
alkalinity
hardness
dissolved and suspended solids



Report ID: S95110.01(02)
Generated on 10/19/2018
Replaces report S95110.01(01) generated on 10/17/2018

Report to

Attention: Colleen Barton
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Report Summary

Lab Sample ID(s): S95110.01-S95110.18
Project: RACER PNC
Collected Date: 10/02/2018 - 10/03/2018
Submitted Date/Time: 10/04/2018 08:00
Sampled by: C. Zilio / K. Voet
P.O. #: B0064607.2018.00600

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Maya Murshak
Technical Director



General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

Sample .16 tag corrected

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Method Summary

Method	Version
E200.8	EPA Method 200.8 Revision 5.4
E245.1	EPA Method 245.1 Revision 3.0
E608.3	EPA Method 608.3 December 2016
N/A	Not Applicable
SM2320B	Standard Method 2320 B 2011
SM2340C	Standard Method 2340 C 2011
SM2540C	Standard Method 2540 C 2011
SM2540D	Standard Method 2540 D 2011
SW3015A	SW 846 Method 3015A Revision 1 February 2007
SW3510C	SW 846 Method 3510C Revision 3 December 1996
SW5030C/8260C	SW 846 Method 8260C Revision 3 August 2006 / 5030C Revision 3 May 2003
SW8260B - SIM	SW 846 Method 8260B Revision 2 December 1996 SIMs

Sample Summary (18 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S95110.01	MWM32-01_GW-100218	Groundwater	10/02/18 11:25
S95110.02	MWM32-01_GW-100218 MS	Groundwater	10/02/18 11:25
S95110.03	MWM32-01_GW-100218 MSD	Groundwater	10/02/18 11:25
S95110.04	MWM16-37_GW-100218	Groundwater	10/02/18 13:05
S95110.05	MWM31-02_GW-100218	Groundwater	10/02/18 14:25
S95110.06	MWW10-03_GW-100218	Groundwater	10/02/18 16:35
S95110.07	MWF12-01_GW-100318	Groundwater	10/03/18 09:15
S95110.08	MW-01-17_GW-100318	Groundwater	10/03/18 11:15
S95110.09	MWW1-15_GW-100318	Groundwater	10/03/18 12:35
S95110.10	MWW01-SEN04_GW-100318	Groundwater	10/03/18 14:05
S95110.11	DUP-02	Groundwater	10/03/18 00:01
S95110.12	Trip Blank	Water	10/03/18 00:01
S95110.13	MW-02-17_GW-100218	Groundwater	10/02/18 16:10
S95110.14	MWF12-02_GW-100318	Groundwater	10/03/18 09:30
S95110.15	MW-40-99_GW-100318	Groundwater	10/03/18 11:40
S95110.16	TW-MD-01_GW-100318	Groundwater	10/03/18 12:25
S95110.17	TW-MD-02_GW-100318	Groundwater	10/03/18 13:25
S95110.18	TW-MD-03_GW-100318	Groundwater	10/03/18 14:40



Lab Sample ID: S95110.01

Sample Tag: MWM32-01_GW-100218

Collected Date/Time: 10/02/2018 11:25

Matrix: Groundwater

COC Reference: 111869

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/04/18 14:20	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/10/18 16:48, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	Not detected	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/15/18 16:28, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	



Lab Sample ID: S95110.01 (continued)

Sample Tag: MWM32-01_GW-100218

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/15/18 16:28, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	

**Lab Sample ID: S95110.02**

Sample Tag: MWM32-01_GW-100218 MS

Collected Date/Time: 10/02/2018 11:25

Matrix: Groundwater

COC Reference: 111869

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/04/18 14:20	JML	

Organics - Volatiles**Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/15/18 22:09, Analyst: JML**

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	58	50		ug/L	1	67-64-1	1
2-Butanone (MEK)	58	25		ug/L	1	78-93-3	1
Benzene	52	1		ug/L	1	71-43-2	1
Bromodichloromethane	53	1		ug/L	1	75-27-4	1
Bromoform	52	1		ug/L	1	75-25-2	1
Bromomethane	50	5		ug/L	1	74-83-9	1
Carbon disulfide	47	5		ug/L	1	75-15-0	1
Carbon tetrachloride	50	1		ug/L	1	56-23-5	1
Chlorobenzene	51	1		ug/L	1	108-90-7	1
Chloroethane	48	5		ug/L	1	75-00-3	1
Chloroform	52	1		ug/L	1	67-66-3	1
Chloromethane	55	5		ug/L	1	74-87-3	1
1,2-Dibromo-3-chloropropane	56	5		ug/L	1	96-12-8	1
1,2-Dichlorobenzene	50	1		ug/L	1	95-50-1	1
1,2-Dichloroethane	51	1		ug/L	1	107-06-2	1
1,2-Dichloropropane	52	1		ug/L	1	78-87-5	1
1,3-Dichlorobenzene	49	1		ug/L	1	541-73-1	1
1,4-Dichlorobenzene	50	1		ug/L	1	106-46-7	1
cis-1,2-Dichloroethene	51	1		ug/L	1	156-59-2	1
Dibromochloromethane	51	5		ug/L	1	124-48-1	1
Dichlorodifluoromethane	50	5		ug/L	1	75-71-8	1
trans-1,2-Dichloroethene	51	1		ug/L	1	156-60-5	1
Ethylbenzene	51	1		ug/L	1	100-41-4	1
2-Hexanone	58	50		ug/L	1	591-78-6	1
4-Methyl-2-pentanone (MIBK)	57	50		ug/L	1	108-10-1	1
tert-Methyl butyl ether (MTBE)	49	5		ug/L	1	1634-04-4	1
Methylene chloride	50	5		ug/L	1	75-09-2	1
Styrene	51	1		ug/L	1	100-42-5	1
1,1,1-Trichloroethane	50	1		ug/L	1	71-55-6	1
1,1,2-Trichloroethane	55	1		ug/L	1	79-00-5	1
1,2,4-Trichlorobenzene	50	5		ug/L	1	120-82-1	1
Tetrachloroethene	46	1		ug/L	1	127-18-4	1
Toluene	53	1		ug/L	1	108-88-3	1
Trichloroethene	52	1		ug/L	1	79-01-6	1
Trichlorofluoromethane	50	1		ug/L	1	75-69-4	1
Vinyl chloride	53	1		ug/L	1	75-01-4	1

1-spiked at 50ug/L



Lab Sample ID: S95110.02 (continued)

Sample Tag: MWM32-01_GW-100218 MS

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/15/18 22:09, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
o-Xylene	51	1		ug/L	1	95-47-6	1
p,m-Xylene*	102	2		ug/L	1		1
Isopropylbenzene	51	1		ug/L	1	98-82-8	1
Cyclohexane	48	1		ug/L	1	110-82-7	1
1,1-Dichloroethane	51	1		ug/L	1	75-34-3	1
1,1-Dichloroethene	51	1		ug/L	1	75-35-4	1
Methyl Acetate	48	10		ug/L	1	79-20-9	1
Methyl cyclohexane	49	1		ug/L	1	108-87-2	1
1,1,2-Trichloro-1,2,2-trifluoroethane	48	1		ug/L	1	76-13-1	1
1,2-Dibromoethane	54	1		ug/L	1	106-93-4	1
1,1,2,2-Tetrachloroethane	56	1		ug/L	1	79-34-5	1
cis-1,3-Dichloropropene	50	1		ug/L	1	10061-01-5	1
trans-1,3-Dichloropropene	51	1		ug/L	1	10061-02-6	1

1-spiked at 50ug/L

**Lab Sample ID: S95110.03**

Sample Tag: MWM32-01_GW-100218 MSD

Collected Date/Time: 10/02/2018 11:25

Matrix: Groundwater

COC Reference: 111869

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/04/18 14:20	JML	

Organics - Volatiles**Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/15/18 22:29, Analyst: JML**

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	58	50		ug/L	1	67-64-1	1
2-Butanone (MEK)	57	25		ug/L	1	78-93-3	1
Benzene	51	1		ug/L	1	71-43-2	1
Bromodichloromethane	53	1		ug/L	1	75-27-4	1
Bromoform	54	1		ug/L	1	75-25-2	1
Bromomethane	52	5		ug/L	1	74-83-9	1
Carbon disulfide	48	5		ug/L	1	75-15-0	1
Carbon tetrachloride	51	1		ug/L	1	56-23-5	1
Chlorobenzene	51	1		ug/L	1	108-90-7	1
Chloroethane	50	5		ug/L	1	75-00-3	1
Chloroform	54	1		ug/L	1	67-66-3	1
Chloromethane	54	5		ug/L	1	74-87-3	1
1,2-Dibromo-3-chloropropane	57	5		ug/L	1	96-12-8	1
1,2-Dichlorobenzene	50	1		ug/L	1	95-50-1	1
1,2-Dichloroethane	51	1		ug/L	1	107-06-2	1
1,2-Dichloropropane	51	1		ug/L	1	78-87-5	1
1,3-Dichlorobenzene	49	1		ug/L	1	541-73-1	1
1,4-Dichlorobenzene	50	1		ug/L	1	106-46-7	1
cis-1,2-Dichloroethene	52	1		ug/L	1	156-59-2	1
Dibromochloromethane	53	5		ug/L	1	124-48-1	1
Dichlorodifluoromethane	50	5		ug/L	1	75-71-8	1
trans-1,2-Dichloroethene	52	1		ug/L	1	156-60-5	1
Ethylbenzene	51	1		ug/L	1	100-41-4	1
2-Hexanone	59	50		ug/L	1	591-78-6	1
4-Methyl-2-pentanone (MIBK)	58	50		ug/L	1	108-10-1	1
tert-Methyl butyl ether (MTBE)	52	5		ug/L	1	1634-04-4	1
Methylene chloride	51	5		ug/L	1	75-09-2	1
Styrene	52	1		ug/L	1	100-42-5	1
1,1,1-Trichloroethane	52	1		ug/L	1	71-55-6	1
1,1,2-Trichloroethane	54	1		ug/L	1	79-00-5	1
1,2,4-Trichlorobenzene	51	5		ug/L	1	120-82-1	1
Tetrachloroethene	45	1		ug/L	1	127-18-4	1
Toluene	52	1		ug/L	1	108-88-3	1
Trichloroethene	51	1		ug/L	1	79-01-6	1
Trichlorofluoromethane	52	1		ug/L	1	75-69-4	1
Vinyl chloride	54	1		ug/L	1	75-01-4	1

1-spiked at 50ug/L

Lab Sample ID: S95110.03 (continued)

Sample Tag: MWM32-01_GW-100218 MSD

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/15/18 22:29, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
o-Xylene	52	1		ug/L	1	95-47-6	1
p,m-Xylene*	104	2		ug/L	1		1
Isopropylbenzene	51	1		ug/L	1	98-82-8	1
Cyclohexane	48	1		ug/L	1	110-82-7	1
1,1-Dichloroethane	53	1		ug/L	1	75-34-3	1
1,1-Dichloroethene	52	1		ug/L	1	75-35-4	1
Methyl Acetate	51	10		ug/L	1	79-20-9	1
Methyl cyclohexane	48	1		ug/L	1	108-87-2	1
1,1,2-Trichloro-1,2,2-trifluoroethane	48	1		ug/L	1	76-13-1	1
1,2-Dibromoethane	55	1		ug/L	1	106-93-4	1
1,1,2,2-Tetrachloroethane	57	1		ug/L	1	79-34-5	1
cis-1,3-Dichloropropene	51	1		ug/L	1	10061-01-5	1
trans-1,3-Dichloropropene	51	1		ug/L	1	10061-02-6	1

1-spiked at 50ug/L



Lab Sample ID: S95110.04

Sample Tag: MWM16-37_GW-100218

Collected Date/Time: 10/02/2018 13:05

Matrix: Groundwater

COC Reference: 111869

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/04/18 14:20	JML	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 09:14, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	3	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	



Lab Sample ID: S95110.04 (continued)

Sample Tag: MWM16-37_GW-100218

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 09:14, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Lab Sample ID: S95110.05

Sample Tag: MWM31-02_GW-100218

Collected Date/Time: 10/02/2018 14:25

Matrix: Groundwater

COC Reference: 111869

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/04/18 14:20	JML	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 10:12, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	



Lab Sample ID: S95110.05 (continued)

Sample Tag: MWM31-02_GW-100218

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 10:12, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	

**Lab Sample ID: S95110.06**

Sample Tag: MWW10-03_GW-100218

Collected Date/Time: 10/02/2018 16:35

Matrix: Groundwater

COC Reference: 111869

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	3.9	IR
1	125ml Plastic	HNO3	Yes	3.9	IR
2	1L Amber	None	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/04/18 14:20	JML	
Metal Digestion	Completed	SW3015A	10/11/18 09:00	JRH	
Extraction, PCB	Completed	SW3510C	10/09/18 09:00	PLB	

Metals**Method: E200.8, Run Date: 10/11/18 11:11, Analyst: JRH**

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Lead	Not detected	0.003		mg/L	5	7439-92-1	
Manganese	0.338	0.005		mg/L	5	7439-96-5	

Organics - PCBs/Pesticides**PCB, Method: E608.3, Run Date: 10/09/18 17:08, Analyst: JANB**

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles**Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 10:50, Analyst: JML**

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	

Lab Sample ID: S95110.06 (continued)

Sample Tag: MWW10-03_GW-100218

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 10:50, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	

**Lab Sample ID: S95110.07**

Sample Tag: MWF12-01_GW-100318

Collected Date/Time: 10/03/2018 09:15

Matrix: Groundwater

COC Reference: 111869

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/11/18 12:00	JML	

Organics - Volatiles**Method: SW8260B - SIM, Run Date: 10/10/18 17:09, Analyst: JML**

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	5	1		ug/L	1	123-91-1	

Lab Sample ID: S95110.08

Sample Tag: MW-01-17_GW-100318

Collected Date/Time: 10/03/2018 11:15

Matrix: Groundwater

COC Reference: 111869

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/04/18 14:20	JML	

Organics - Volatiles
Method: SW8260B - SIM, Run Date: 10/10/18 17:30, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	Not detected	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 11:29, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	



Lab Sample ID: S95110.08 (continued)

Sample Tag: MW-01-17_GW-100318

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 11:29, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	

Lab Sample ID: S95110.09

Sample Tag: MWW1-15_GW-100318

Collected Date/Time: 10/03/2018 12:35

Matrix: Groundwater

COC Reference: 111869

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	3.9	IR
2	1L Amber	None	Yes	3.9	IR
1	500ml Plastic	None	Yes	3.9	IR
1	125ml Plastic	HNO3	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/12/18 09:45	JRH	
pH check for VOCs*	<2	N/A	10/04/18 14:20	JML	
Metal Digestion	Completed	SW3015A	10/11/18 09:00	JRH	
Extraction, PCB	Completed	SW3510C	10/09/18 09:00	PLB	

Inorganics
Method: SM2320B, Run Date: 10/11/18 13:12, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	528	2		mg/L	2		

Method: SM2340C, Run Date: 10/05/18 12:26, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	155	10		mg/L	10		

Method: SM2540C, Run Date: 10/05/18 17:40, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	794	20		mg/L	2		

Method: SM2540D, Run Date: 10/10/18 19:40, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	9	3		mg/L	1		

Metals
Method: E200.8, Run Date: 10/11/18 11:13, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.002	0.002		mg/L	5	7440-38-2	
Barium	0.139	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	
Iron	9.07	0.02		mg/L	5	7439-89-6	
Lead	Not detected	0.003		mg/L	5	7439-92-1	
Manganese	0.236	0.005		mg/L	5	7439-96-5	
Nickel	Not detected	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	

Lab Sample ID: S95110.09 (continued)

Sample Tag: MWW1-15_GW-100318

Method: E200.8, Run Date: 10/11/18 11:13, Analyst: JRH (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	Not detected	0.005		mg/L	5	7440-66-6	

Method: E200.8, Run Date: 10/12/18 10:57, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	62.0	0.25		mg/L	5	7440-70-2	
Magnesium	28.6	0.25		mg/L	5	7439-95-4	

Method: E245.1, Run Date: 10/12/18 13:31, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/09/18 17:20, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 11:48, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	

Lab Sample ID: S95110.09 (continued)

Sample Tag: MWW1-15_GW-100318

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 11:48, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	

**Lab Sample ID: S95110.10**

Sample Tag: MWW01-SEN04_GW-100318

Collected Date/Time: 10/03/2018 14:05

Matrix: Groundwater

COC Reference: 111869

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	3.9	IR
2	1L Amber	None	Yes	3.9	IR
1	500ml Plastic	None	Yes	3.9	IR
1	125ml Plastic	HNO3	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/12/18 09:45	JRH	
pH check for VOCs*	<2	N/A	10/09/18 12:30	JML	
Metal Digestion	Completed	SW3015A	10/11/18 09:00	JRH	
Extraction, PCB	Completed	SW3510C	10/09/18 09:00	PLB	

Inorganics**Method: SM2320B, Run Date: 10/11/18 13:16, Analyst: JKB**

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	498	2		mg/L	2		

Method: SM2340C, Run Date: 10/05/18 12:28, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	218	10		mg/L	10		

Method: SM2540C, Run Date: 10/05/18 17:40, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	580	20		mg/L	2		

Method: SM2540D, Run Date: 10/10/18 19:40, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	27	3		mg/L	1		

Metals**Method: E200.8, Run Date: 10/11/18 11:14, Analyst: JRH**

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.005	0.002		mg/L	5	7440-38-2	
Barium	0.129	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	
Iron	14.5	0.02		mg/L	5	7439-89-6	
Lead	0.004	0.003		mg/L	5	7439-92-1	
Manganese	0.370	0.005		mg/L	5	7439-96-5	
Nickel	Not detected	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	

Lab Sample ID: S95110.10 (continued)
Sample Tag: MWW01-SEN04_GW-100318

Method: E200.8, Run Date: 10/11/18 11:14, Analyst: JRH (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	Not detected	0.005		mg/L	5	7440-66-6	

Method: E200.8, Run Date: 10/12/18 10:59, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	86.4	0.25		mg/L	5	7440-70-2	
Magnesium	27.6	0.25		mg/L	5	7439-95-4	

Method: E245.1, Run Date: 10/12/18 13:32, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides
PCB, Method: E608.3, Run Date: 10/09/18 17:31, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	0.2	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	0.2	0.1		ug/L	1	1336-36-3	

Organics - Volatiles
Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/08/18 15:45, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	

Lab Sample ID: S95110.10 (continued)

Sample Tag: MWW01-SEN04_GW-100318

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/08/18 15:45, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	

Lab Sample ID: S95110.11

Sample Tag: DUP-02

Collected Date/Time: 10/03/2018 00:01

Matrix: Groundwater

COC Reference: 111869

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	3.9	IR
2	1L Amber	None	Yes	3.9	IR
1	125ml Plastic	HNO3	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/12/18 09:45	JRH	
pH check for VOCs*	<2	N/A	10/04/18 14:20	JML	
Metal Digestion	Completed	SW3015A	10/11/18 09:00	JRH	
Extraction, PCB	Completed	SW3510C	10/09/18 09:00	PLB	

Metals

Method: E200.8, Run Date: 10/11/18 11:16, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.005	0.002		mg/L	5	7440-38-2	
Barium	0.128	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	
Lead	0.003	0.003		mg/L	5	7439-92-1	
Manganese	0.369	0.005		mg/L	5	7439-96-5	
Nickel	Not detected	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	Not detected	0.005		mg/L	5	7440-66-6	

Method: E245.1, Run Date: 10/12/18 13:34, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/09/18 17:42, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	0.1	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	0.1	0.1		ug/L	1	1336-36-3	

Lab Sample ID: S95110.11 (continued)

Sample Tag: DUP-02

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 12:07, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Lab Sample ID: S95110.12

Sample Tag: Trip Blank

Collected Date/Time: 10/03/2018 00:01

Matrix: Water

COC Reference: 111869

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	HCL	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/04/18 14:20	JML	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 06:42, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	



Lab Sample ID: S95110.12 (continued)

Sample Tag: Trip Blank

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 06:42, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Lab Sample ID: S95110.13

Sample Tag: MW-02-17_GW-100218

Collected Date/Time: 10/02/2018 16:10

Matrix: Groundwater

COC Reference: 111869

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/04/18 14:20	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/10/18 17:51, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	21	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 12:26, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	6	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	6	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	



Lab Sample ID: S95110.13 (continued)

Sample Tag: MW-02-17_GW-100218

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 12:26, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Trichloroethene	2	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	2	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	

Lab Sample ID: S95110.14

Sample Tag: MWF12-02_GW-100318

Collected Date/Time: 10/03/2018 09:30

Matrix: Groundwater

COC Reference: 111869

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	3.9	IR
1	125ml Plastic	HNO3	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/04/18 14:20	JML	
Metal Digestion	Completed	SW3015A	10/11/18 09:00	JRH	

Metals
Method: E200.8, Run Date: 10/11/18 11:18, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Manganese	0.292	0.005		mg/L	5	7439-96-5	

Organics - Volatiles
Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 12:45, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	1	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	

Lab Sample ID: S95110.14 (continued)

Sample Tag: MWF12-02_GW-100318

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 12:45, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	2	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	

Lab Sample ID: S95110.15

Sample Tag: MW-40-99_GW-100318

Collected Date/Time: 10/03/2018 11:40

Matrix: Groundwater

COC Reference: 111874

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	3.9	IR
2	1L Amber	None	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/04/18 14:20	JML	
Extraction, PCB	Completed	SW3510C	10/09/18 09:00	PLB	

Organics - PCBs/Pesticides
PCB, Method: E608.3, Run Date: 10/09/18 17:53, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles
Method: SW8260B - SIM, Run Date: 10/10/18 18:12, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	Not detected	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 13:05, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	



Lab Sample ID: S95110.15 (continued)

Sample Tag: MW-40-99_GW-100318

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 13:05, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	

Lab Sample ID: S95110.16

Sample Tag: TW-MD-01_GW-100318

Collected Date/Time: 10/03/2018 12:25

Matrix: Groundwater

COC Reference: 111874

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	3.9	IR
2	1L Amber	None	Yes	3.9	IR
1	500ml Plastic	None	Yes	3.9	IR
1	125ml Plastic	HNO3	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/12/18 09:45	JRH	
pH check for VOCs*	<2	N/A	10/04/18 14:20	JML	
Metal Digestion	Completed	SW3015A	10/11/18 09:00	JRH	
Extraction, PCB	Completed	SW3510C	10/09/18 09:00	PLB	

Inorganics
Method: SM2320B, Run Date: 10/11/18 13:18, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	504	2		mg/L	2		

Method: SM2340C, Run Date: 10/05/18 12:30, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	314	10		mg/L	10		

Method: SM2540C, Run Date: 10/05/18 17:40, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	630	20		mg/L	2		

Method: SM2540D, Run Date: 10/10/18 19:40, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	12	3		mg/L	1		

Metals
Method: E200.8, Run Date: 10/11/18 11:19, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	Not detected	0.002		mg/L	5	7440-38-2	
Barium	0.126	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	
Iron	10.8	0.02		mg/L	5	7439-89-6	
Lead	Not detected	0.003		mg/L	5	7439-92-1	
Manganese	1.00	0.005		mg/L	5	7439-96-5	
Nickel	Not detected	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	

Lab Sample ID: S95110.16 (continued)

Sample Tag: TW-MD-01_GW-100318

Method: E200.8, Run Date: 10/11/18 11:19, Analyst: JRH (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	Not detected	0.005		mg/L	5	7440-66-6	

Method: E200.8, Run Date: 10/12/18 11:01, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	125	0.25		mg/L	5	7440-70-2	
Magnesium	30.1	0.25		mg/L	5	7439-95-4	

Method: E245.1, Run Date: 10/12/18 13:36, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/09/18 18:04, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/10/18 18:33, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	Not detected	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 13:24, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	

Lab Sample ID: S95110.16 (continued)

Sample Tag: TW-MD-01_GW-100318

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 13:24, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	

Lab Sample ID: S95110.17

Sample Tag: TW-MD-02_GW-100318

Collected Date/Time: 10/03/2018 13:25

Matrix: Groundwater

COC Reference: 111874

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	3.9	IR
2	1L Amber	None	Yes	3.9	IR
1	500ml Plastic	None	Yes	3.9	IR
1	125ml Plastic	HNO3	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/12/18 09:45	JRH	
pH check for VOCs*	<2	N/A	10/04/18 14:20	JML	
Metal Digestion	Completed	SW3015A	10/11/18 09:00	JRH	
Extraction, PCB	Completed	SW3510C	10/09/18 09:00	PLB	

Inorganics
Method: SM2320B, Run Date: 10/11/18 13:20, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	524	2		mg/L	2		

Method: SM2340C, Run Date: 10/05/18 12:32, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	253	10		mg/L	10		

Method: SM2540C, Run Date: 10/05/18 17:40, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	620	20		mg/L	2		

Method: SM2540D, Run Date: 10/10/18 19:40, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	14	3		mg/L	1		

Metals
Method: E200.8, Run Date: 10/11/18 11:21, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.008	0.002		mg/L	5	7440-38-2	
Barium	0.163	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	
Iron	14.3	0.02		mg/L	5	7439-89-6	
Lead	Not detected	0.003		mg/L	5	7439-92-1	
Manganese	0.747	0.005		mg/L	5	7439-96-5	
Nickel	Not detected	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	

Lab Sample ID: S95110.17 (continued)

Sample Tag: TW-MD-02_GW-100318

Method: E200.8, Run Date: 10/11/18 11:21, Analyst: JRH (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	Not detected	0.005		mg/L	5	7440-66-6	

Method: E200.8, Run Date: 10/12/18 11:04, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	101	0.25		mg/L	5	7440-70-2	
Magnesium	22.4	0.25		mg/L	5	7439-95-4	

Method: E245.1, Run Date: 10/12/18 13:40, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/09/18 18:15, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 13:43, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	



Lab Sample ID: S95110.17 (continued)

Sample Tag: TW-MD-02_GW-100318

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 13:43, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	

Lab Sample ID: S95110.18

Sample Tag: TW-MD-03_GW-100318

Collected Date/Time: 10/03/2018 14:40

Matrix: Groundwater

COC Reference: 111874

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	3.9	IR
2	1L Amber	None	Yes	3.9	IR
1	500ml Plastic	None	Yes	3.9	IR
1	125ml Plastic	HNO3	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/12/18 09:45	JRH	
pH check for VOCs*	<2	N/A	10/04/18 14:20	JML	
Metal Digestion	Completed	SW3015A	10/11/18 09:00	JRH	
Extraction, PCB	Completed	SW3510C	10/09/18 09:00	PLB	

Inorganics
Method: SM2320B, Run Date: 10/11/18 13:22, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	460	2		mg/L	2		

Method: SM2340C, Run Date: 10/05/18 12:34, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	294	10		mg/L	10		

Method: SM2540C, Run Date: 10/05/18 17:40, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	1,180	20		mg/L	2		

Method: SM2540D, Run Date: 10/10/18 19:40, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	28	3		mg/L	1		

Metals
Method: E200.8, Run Date: 10/11/18 11:31, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.005	0.002		mg/L	5	7440-38-2	
Barium	0.309	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	
Iron	18.0	0.02		mg/L	5	7439-89-6	
Lead	Not detected	0.003		mg/L	5	7439-92-1	
Manganese	0.820	0.005		mg/L	5	7439-96-5	
Nickel	Not detected	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	

Lab Sample ID: S95110.18 (continued)

Sample Tag: TW-MD-03_GW-100318

Method: E200.8, Run Date: 10/11/18 11:31, Analyst: JRH (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	Not detected	0.005		mg/L	5	7440-66-6	

Method: E200.8, Run Date: 10/12/18 11:06, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	109	0.25		mg/L	5	7440-70-2	
Magnesium	28.6	0.25		mg/L	5	7439-95-4	

Method: E245.1, Run Date: 10/12/18 13:38, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/09/18 18:26, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 14:02, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	

Lab Sample ID: S95110.18 (continued)

Sample Tag: TW-MD-03_GW-100318

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 14:02, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	

Merit Laboratories Login Checklist

Lab Set ID:S95110

Client:ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: RACER PNC

Submitted: 10/04/2018 08:00 Login User: MMC

Attention: Colleen Barton

Address: Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: NA

FAX: 248-994-2241

Email: Colleen.barton@arcadis.com

Selection	Description	Note
Sample Receiving		
01. ☒ Yes ☐ No ☐ N/A	Samples are received at 4C +/- 2C Thermometer #	IR 3.9
02. ☒ Yes ☐ No ☐ N/A	Received on ice/ cooling process begun	
03. ☐ Yes ☒ No ☐ N/A	Samples shipped	
04. ☐ Yes ☒ No ☐ N/A	Samples left in 24 hr. drop box	
05. ☐ Yes ☐ No ☒ N/A	Are there custody seals/tape or is the drop box locked	
Chain of Custody		
06. ☒ Yes ☐ No ☐ N/A	COC adequately filled out	
07. ☒ Yes ☐ No ☐ N/A	COC signed and relinquished to the lab	
08. ☒ Yes ☐ No ☐ N/A	Sample tag on bottles match COC	
09. ☐ Yes ☒ No ☐ N/A	Subcontracting needed? Subcontacted to:	
Preservation		
10. ☒ Yes ☐ No ☐ N/A	Do sample have correct chemical preservation	
11. ☒ Yes ☐ No ☐ N/A	Completed pH checks on preserved samples? (no VOAs)	
12. ☐ Yes ☒ No ☐ N/A	Did any samples need to be preserved in the lab?	
Bottle Conditions		
13. ☒ Yes ☐ No ☐ N/A	All bottles intact	
14. ☒ Yes ☐ No ☐ N/A	Appropriate analytical bottles are used	
15. ☒ Yes ☐ No ☐ N/A	Merit bottles used	
16. ☒ Yes ☐ No ☐ N/A	Sufficient sample volume received	
17. ☐ Yes ☒ No ☐ N/A	Samples require laboratory filtration	
18. ☒ Yes ☐ No ☐ N/A	Samples submitted within holding time	
19. ☐ Yes ☐ No ☒ N/A	Do water VOC or TOX bottles contain headspace	

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

Merit Laboratories Bottle Preservation Check

Lab Set ID: S95110 Initials: MMC

Attention: Colleen Barton
Address: Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Client: ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: RACER PNC

Submitted: 10/04/2018 08:00 Login User:

Phone: NA FAX: 248-994-2241
Email: Colleen.barton@arcadis.com

Lab ID	125 ml Plastic HNO ₃	250 ml Plastic HNO ₃	1 L Plastic HNO ₃	250 ml Plastic H ₂ SO ₄	125 ml Amber H ₂ SO ₄	32 oz Glass HCl	125 ml Plastic NaOH	125 ml Amber PbCO ₃ NaOH	pH					Notes
									<2	>12	other	ml add	new pH	
S95110.06	X								X					
S95110.09	X								X					
S95110.10	X								X					
S95110.11	X								X					
S95110.14	X								X					
S95110.16	X								X					
S95110.17	X								X					
S95110.18	X								X					



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C.O.C. PAGE # 1 OF 2

111869

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME Colleen Barton
COMPANY Arcadis
ADDRESS 28550 Cabot Drive #500
CITY Novi STATE MI ZIP CODE 48377
PHONE NO 810 225 1909 FAX NO
P.O. NO. 8006AGE07.2018.00600
E-MAIL ADDRESS colleen.barton@arcadis.com; brad.sanders@arcadis.com
QUOTE NO.

CONTACT NAME Accounts Payable
COMPANY Arcadis
ADDRESS 630 Plaza Drive Suite 600
CITY Highlands Ranch STATE CO ZIP CODE 80129
PHONE NO
E-MAIL ADDRESS

PROJECT NO./NAME RACER PNC
SAMPLER(S) - PLEASE PRINT/SIGN NAME K. Voet B. Zilio
TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER
DELIVERABLES REQUIRED ☐ STD ☒ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☒ EDD ☐ OTHER

MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID
SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIFE A=AIR W=WASTE

Containers & Preservatives

MERIT LAB NO. FOR LAB USE ONLY	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER	* VOC	1,4	Ma	Lea	Ant	Var	** Ni	** Mn	PCB	Other Pontiac, MI
	DATE	TIME											Special Instructions									
95110.01 1021.03	10/2/18	1125	MWM32-01-GW-100218	GW	9		9						9									MS/MSD
.04	10/2/18	1305	MWM16-37-GW-100218	GW	3		3						3									* See attached VOC list
.05	10/2/18	1425	MWM31-02-GW-100218	BW	3		3						3									** See attached Montcalm
.06	10/2/18	1635	MWW10-03-GW-100218	GW	6	2	3	1					3		1						2	Inorganics * geochem 15
.07	10/3/18	0915	MWF12-01-GW-100318	GW	3		3						3									RL for 1,4 D must be
.08	10/3/18	1115	MW-01-17-GW-100318	GW	3		3						3									<7.2 ppb
.09	10/3/18	1235	MWW1-15-GW-100318	GW	7	3	3	1					3						1	1	2	
.10	10/3/18	1405	MWW01-SEN04-GW-100318	GW	7	3	3	1					3						1	1	2	
.11	10/3/18	-	DUP-02	GW	6	2	3	1					3						1		2	
.12	10/3/18	-	Trip Blank	W	1		1						1									
.13	10/2/18	1610	mw-02-17-GW-100218	GW	3		3						3									
.14	10/3/18	0930	mwf12-02-GW-100318	GW	4		3	1					3		1							

RELINQUISHED BY: SIGNATURE/ORGANIZATION K. Voet
RECEIVED BY: SIGNATURE/ORGANIZATION M. Fridge
RELINQUISHED BY: SIGNATURE/ORGANIZATION M. Fridge
RECEIVED BY: SIGNATURE/ORGANIZATION M. Fridge
DATE/TIME 10/3/18 1525
DATE/TIME 10/3/18 1525
DATE/TIME 10/3/18 1045
DATE/TIME 10/3/18 1645

RELINQUISHED BY: SIGNATURE/ORGANIZATION Merit Fridge
RECEIVED BY: SIGNATURE/ORGANIZATION M. Fridge
SEAL NO. SEAL INTACT YES ☐ NO ☐ INITIALS
SEAL NO. SEAL INTACT YES ☐ NO ☐ INITIALS
NOTES: TEMP ON ARRIVAL 3.9
DATE/TIME 10/4/18 0800
DATE/TIME 10/4/18 0800

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE



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C.O.C. PAGE # 2 OF 2

111874

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME Colleen Barton				CONTACT NAME See page 1				☐ SAME					
COMPANY Arcadis				COMPANY									
ADDRESS 28550 Cadot Drive #500								ADDRESS					
CITY Novi				STATE MI		ZIP CODE 48377		CITY		STATE		ZIP CODE	
PHONE NO 810 225 1909				FAX NO.		P.O. NO. 80064607.2018.00600		PHONE NO		E-MAIL ADDRESS			
E-MAIL ADDRESS colleen.barton@arcadis.com; brad.saunders@arcadis.com				QUOTE NO.									

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME RACER PNC				SAMPLER(S) - PLEASE PRINT/SIGN NAME K. Voet & C. Zilio																																																			
TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☐ STANDARD ☐ OTHER																																																							
DELIVERABLES REQUIRED ☐ STD ☒ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☒ EDD ☐ OTHER																																																							
MATRIX CODE:		GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIFE A=AIR W=WASTE																																																					
		# Containers & Preservatives																																																					
MERIT LAB NO. FOR LAB USE ONLY		YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION										MATRIX		# OF BOTTLES		NONE		HCl		HNO ₃		H ₂ SO ₄		NaOH		MeOH		OTHER		* VOC 8260		BAGO		1,4 Dioxane		SIMS		Manganese		Lead		Antimony		Vanadium		** Montcalm Inorganics		** Montcalm Geochem		PCB		Certifications	
		DATE		TIME																																								☐ OHIO VAP ☐ Drinking Water											
																																										☐ DoD ☐ NPDES													
																																										Project Locations													
																																										☐ Detroit ☐ New York													
																																										☒ Other Pontiac, MI													
																																										Special Instructions													
95110.15		10/3/18		1140		mw-40-99-GW-100318										GW		5		2		3																						* Attached VOC list											
.16		10/3/18		1225		TW-MO-01-GW-100318										GW		7		3		3		1																		** Attached Montcalm													
.17		10/3/18		1325		TW-MD-02-GW-100318										GW		7		3		3		1																Inorganics & Geochem															
.18		10/3/18		1440		TW-MD-03-GW-100318										GW		7		3		3		1																RL for IAD must be															
																																								< 7.2 ppb															

RELINQUISHED BY: SIGNATURE/ORGANIZATION [Signature] A Sampler				DATE/TIME 10/3/18 15:25				RELINQUISHED BY: SIGNATURE/ORGANIZATION Merit Fridge				DATE/TIME 10/4/18 0800							
RECEIVED BY: SIGNATURE/ORGANIZATION [Signature]				DATE/TIME 10/3/18 15:25				RECEIVED BY: SIGNATURE/ORGANIZATION M. Calabrese				DATE/TIME 10/4/18 0800							
RELINQUISHED BY: SIGNATURE/ORGANIZATION [Signature]				DATE/TIME 10/3/18 16:45				SEAL NO.				SEAL INTACT YES ☐ NO ☐		INITIALS		NOTES:		TEMP ON ARRIVAL	
RECEIVED BY: SIGNATURE/ORGANIZATION Merit Fridge				DATE/TIME 10/3/18 16:45				SEAL NO.				SEAL INTACT YES ☐ NO ☐		INITIALS				3.9	

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

Table 4
Summary of Groundwater Analytical Results
RACER Trust Pontiac North Campus
Pontiac, Michigan

PNC VOC Analyte List - 8260C		
	Volatile Organic Compounds	1
VOC	Acetone	1
VOC	Benzene	1
VOC	Bromodichloromethane	1
VOC	Bromoform	1
VOC	Bromomethane	1
VOC	2-Butanone	1
VOC	Carbon Disulfide	1
VOC	Carbon Tetrachloride	1
VOC	Chlorobenzene	1
VOC	Chloroethane	1
VOC	Chloroform	1
VOC	Chloromethane	1
VOC	Cumene	1
VOC	Cyclohexane	1
VOC	1,2-Dibromo-3-chloropropane	1
VOC	Dibromochloromethane	1
VOC	1,2-Dibromoethane	1
VOC	1,2-Dichlorobenzene	1
VOC	1,3-Dichlorobenzene	1
VOC	1,4-Dichlorobenzene	1
VOC	Dichlorodifluoromethane	1
VOC	1,1-Dichloroethane	1
VOC	1,2-Dichloroethane	1
VOC	1,1-Dichloroethene	1
VOC	cis-1,2-Dichloroethene	1
VOC	trans-1,2-Dichloroethene	1
VOC	1,2-Dichloropropane	1
VOC	1,3-Dichloropropene (summed)	1
VOC	Ethyl Benzene	1
VOC	2-Hexanone	1
VOC	Methyl Acetate	1
VOC	Methyl tert-butyl ether	1
VOC	4-Methyl-2-pentanone	1
VOC	Methylcyclohexane	1
VOC	Methylene Chloride	1
VOC	Styrene	1
VOC	1,1,2,2-Tetrachloroethane	1
VOC	Tetrachloroethene	1
VOC	Toluene	1
VOC	1,2,4-Trichlorobenzene	1
VOC	1,1,1-Trichloroethane	1
VOC	1,1,2-Trichloroethane	1
VOC	Trichloroethene	1
VOC	Trichlorofluoromethane	1
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	1
VOC	Vinyl Chloride	1
VOC	Xylenes (total)	1

Montcalm inorganics list

(Method 200.8)

antimony
arsenic
barium
beryllium
cadmium
chromium
cobalt
copper
lead
manganese
mercury
nickel
selenium
silver
thallium
vanadium
zinc

Geochemical analytical list

calcium
iron
magnesium
alkalinity
hardness
dissolved and suspended solids



Analytical Laboratory Report

Report ID: S95153.01(01)
Generated on 10/19/2018

Report to

Attention: Colleen Barton
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: NA FAX: 248-994-2241
Email: Colleen.barton@arcadis.com

Additional Contacts: Brad Saunders

Report produced by

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Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S95153.01-S95153.13
Project: PNC Racer
Collected Date: 10/03/2018 - 10/04/2018
Submitted Date/Time: 10/05/2018 08:00
Sampled by: K. Voets / C. Zilio
P.O. #: B0064607.2017

Table of Contents

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Method Summary (Page 4)
Sample Summary (Page 5)

Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.
Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.
Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

There is no additional narrative for this analytical report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
E200.8	EPA Method 200.8 Revision 5.4
E245.1	EPA Method 245.1 Revision 3.0
E608.3	EPA Method 608.3 December 2016
N/A	Not Applicable
SM2320B	Standard Method 2320 B 2011
SM2340C	Standard Method 2340 C 2011
SM2540C	Standard Method 2540 C 2011
SM2540D	Standard Method 2540 D 2011
SW3015A	SW 846 Method 3015A Revision 1 February 2007
SW3510C	SW 846 Method 3510C Revision 3 December 1996
SW5030C/8260C	SW 846 Method 8260C Revision 3 August 2006 / 5030C Revision 3 May 2003
SW8260B - SIM	SW 846 Method 8260B Revision 2 December 1996 SIMs



Analytical Laboratory Report

Sample Summary (13 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S95153.01	MWF7-02_GW-100418	Groundwater	10/04/18 09:20
S95153.02	MWF16-06_GW-100418	Groundwater	10/04/18 10:25
S95153.03	MWF16-06_GW-100418 MS	Groundwater	10/04/18 10:25
S95153.04	MWF16-06_GW-100418 MSD	Groundwater	10/04/18 10:25
S95153.05	MWF8-01_GW-100418	Groundwater	10/04/18 11:55
S95153.06	TW-MD-04_GW-100318	Groundwater	10/03/18 16:10
S95153.07	TW-MD-05_GW-100318	Groundwater	10/03/18 17:20
S95153.08	TW-MD-06_GW-100418	Groundwater	10/04/18 09:50
S95153.09	TW-MD-07_GW-100418	Groundwater	10/04/18 12:10
S95153.10	MWW1-04_GW-100418	Groundwater	10/04/18 14:05
S95153.11	Dup-03_GW-100418	Groundwater	10/04/18 00:01
S95153.12	Dup-04	Groundwater	10/04/18 00:01
S95153.13	Trip Blank	Water	10/04/18 00:01



Analytical Laboratory Report

Lab Sample ID: S95153.01

Sample Tag: MWF7-02_GW-100418

Collected Date/Time: 10/04/2018 09:20

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/09/18 12:30	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/16/18 14:34, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	500	20		ug/L	20	123-91-1	Y

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 18:10, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	1	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	3	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	73	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	34	1		ug/L	1	127-18-4	

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Lab Sample ID: S95153.01 (continued)

Sample Tag: MWF7-02_GW-100418

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 18:10, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	3	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	48	1		ug/L	1	75-34-3	
1,1-Dichloroethene	11	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S95153.02

Sample Tag: MWF16-06_GW-100418

Collected Date/Time: 10/04/2018 10:25

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/11/18 12:00	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/10/18 14:42, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	15	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/18/18 15:28, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	250		ug/L	5	67-64-1	Y
2-Butanone (MEK)	Not detected	130		ug/L	5	78-93-3	Y
Benzene	Not detected	5		ug/L	5	71-43-2	Y
Bromodichloromethane	Not detected	5		ug/L	5	75-27-4	Y
Bromoform	Not detected	5		ug/L	5	75-25-2	Y
Bromomethane	Not detected	30		ug/L	5	74-83-9	Y
Carbon disulfide	Not detected	30		ug/L	5	75-15-0	Y
Carbon tetrachloride	14	5		ug/L	5	56-23-5	Y
Chlorobenzene	Not detected	5		ug/L	5	108-90-7	Y
Chloroethane	Not detected	30		ug/L	5	75-00-3	Y
Chloroform	38	5		ug/L	5	67-66-3	Y
Chloromethane	Not detected	30		ug/L	5	74-87-3	Y
1,2-Dibromo-3-chloropropane	Not detected	30		ug/L	5	96-12-8	Y
1,2-Dichlorobenzene	Not detected	5		ug/L	5	95-50-1	Y
1,2-Dichloroethane	Not detected	5		ug/L	5	107-06-2	Y
1,2-Dichloropropane	Not detected	5		ug/L	5	78-87-5	Y
1,3-Dichlorobenzene	Not detected	5		ug/L	5	541-73-1	Y
1,4-Dichlorobenzene	Not detected	5		ug/L	5	106-46-7	Y
cis-1,2-Dichloroethene	12	5		ug/L	5	156-59-2	Y
Dibromochloromethane	Not detected	30		ug/L	5	124-48-1	Y
Dichlorodifluoromethane	Not detected	30		ug/L	5	75-71-8	Y
trans-1,2-Dichloroethene	Not detected	5		ug/L	5	156-60-5	Y
Ethylbenzene	Not detected	5		ug/L	5	100-41-4	Y
2-Hexanone	Not detected	250		ug/L	5	591-78-6	Y
4-Methyl-2-pentanone (MIBK)	Not detected	250		ug/L	5	108-10-1	Y
tert-Methyl butyl ether (MTBE)	Not detected	30		ug/L	5	1634-04-4	Y
Methylene chloride	Not detected	30		ug/L	5	75-09-2	Y
Styrene	Not detected	5		ug/L	5	100-42-5	Y
1,1,1-Trichloroethane	163	5		ug/L	5	71-55-6	Y
1,1,2-Trichloroethane	Not detected	5		ug/L	5	79-00-5	Y
1,2,4-Trichlorobenzene	Not detected	30		ug/L	5	120-82-1	Y
Tetrachloroethene	70	5		ug/L	5	127-18-4	Y

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Lab Sample ID: S95153.02 (continued)
Sample Tag: MWF16-06_GW-100418

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/18/18 15:28, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Toluene	Not detected	5		ug/L	5	108-88-3	Y
Trichloroethene	12	5		ug/L	5	79-01-6	Y
Trichlorofluoromethane	Not detected	5		ug/L	5	75-69-4	Y
Vinyl chloride	Not detected	5		ug/L	5	75-01-4	Y
o-Xylene	Not detected	5		ug/L	5	95-47-6	Y
p,m-Xylene*	Not detected	10		ug/L	5		Y
Isopropylbenzene	Not detected	5		ug/L	5	98-82-8	Y
Cyclohexane	Not detected	5		ug/L	5	110-82-7	Y
1,1-Dichloroethane	47	5		ug/L	5	75-34-3	Y
1,1-Dichloroethene	9	5		ug/L	5	75-35-4	Y
Methyl Acetate	Not detected	50		ug/L	5	79-20-9	Y
Methyl cyclohexane	Not detected	5		ug/L	5	108-87-2	Y
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	5		ug/L	5	76-13-1	Y
1,2-Dibromoethane	Not detected	5		ug/L	5	106-93-4	Y
1,1,2,2-Tetrachloroethane	Not detected	5		ug/L	5	79-34-5	Y
cis-1,3-Dichloropropene	Not detected	5		ug/L	5	10061-01-5	Y
trans-1,3-Dichloropropene	Not detected	5		ug/L	5	10061-02-6	Y

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Lab Sample ID: S95153.03

Sample Tag: MWF16-06_GW-100418 MS

Collected Date/Time: 10/04/2018 10:25

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/11/18 12:00	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/10/18 20:38, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	81	1		ug/L	1	123-91-1	1

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/18/18 12:07, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	250		ug/L	5	67-64-1	Y1
2-Butanone (MEK)	250	130		ug/L	5	78-93-3	Y1
Benzene	268	5		ug/L	5	71-43-2	Y1
Bromodichloromethane	281	5		ug/L	5	75-27-4	Y1
Bromoform	277	5		ug/L	5	75-25-2	Y1
Bromomethane	250	30		ug/L	5	74-83-9	Y1
Carbon disulfide	230	30		ug/L	5	75-15-0	Y1
Carbon tetrachloride	287	5		ug/L	5	56-23-5	Y1
Chlorobenzene	277	5		ug/L	5	108-90-7	Y1
Chloroethane	240	30		ug/L	5	75-00-3	Y1
Chloroform	307	5		ug/L	5	67-66-3	Y1
Chloromethane	260	30		ug/L	5	74-87-3	Y1
1,2-Dibromo-3-chloropropane	270	30		ug/L	5	96-12-8	Y1
1,2-Dichlorobenzene	275	5		ug/L	5	95-50-1	Y1
1,2-Dichloroethane	272	5		ug/L	5	107-06-2	Y1
1,2-Dichloropropane	263	5		ug/L	5	78-87-5	Y1
1,3-Dichlorobenzene	274	5		ug/L	5	541-73-1	Y1
1,4-Dichlorobenzene	276	5		ug/L	5	106-46-7	Y1
cis-1,2-Dichloroethene	271	5		ug/L	5	156-59-2	Y1
Dibromochloromethane	280	30		ug/L	5	124-48-1	Y1
Dichlorodifluoromethane	230	30		ug/L	5	75-71-8	Y1
trans-1,2-Dichloroethene	258	5		ug/L	5	156-60-5	Y1
Ethylbenzene	280	5		ug/L	5	100-41-4	Y1
2-Hexanone	270	250		ug/L	5	591-78-6	Y1
4-Methyl-2-pentanone (MIBK)	270	250		ug/L	5	108-10-1	Y1
tert-Methyl butyl ether (MTBE)	250	30		ug/L	5	1634-04-4	Y1
Methylene chloride	250	30		ug/L	5	75-09-2	Y1
Styrene	283	5		ug/L	5	100-42-5	Y1
1,1,1-Trichloroethane	439	5		ug/L	5	71-55-6	Y1
1,1,2-Trichloroethane	274	5		ug/L	5	79-00-5	Y1
1,2,4-Trichlorobenzene	280	30		ug/L	5	120-82-1	Y1

1-spiked at 50ug/L

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Lab Sample ID: S95153.03 (continued)

Sample Tag: MWF16-06_GW-100418 MS

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/18/18 12:07, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Tetrachloroethene	322	5		ug/L	5	127-18-4	Y1
Toluene	275	5		ug/L	5	108-88-3	Y1
Trichloroethene	283	5		ug/L	5	79-01-6	Y1
Trichlorofluoromethane	260	5		ug/L	5	75-69-4	Y1
Vinyl chloride	254	5		ug/L	5	75-01-4	Y1
o-Xylene	278	5		ug/L	5	95-47-6	Y1
p,m-Xylene*	560	10		ug/L	5		Y1
Isopropylbenzene	278	5		ug/L	5	98-82-8	Y1
Cyclohexane	244	5		ug/L	5	110-82-7	Y1
1,1-Dichloroethane	308	5		ug/L	5	75-34-3	Y1
1,1-Dichloroethene	263	5		ug/L	5	75-35-4	Y1
Methyl Acetate	252	50		ug/L	5	79-20-9	Y1
Methyl cyclohexane	267	5		ug/L	5	108-87-2	Y1
1,1,2-Trichloro-1,2,2-trifluoroethane	236	5		ug/L	5	76-13-1	Y1
1,2-Dibromoethane	287	5		ug/L	5	106-93-4	Y1
1,1,2,2-Tetrachloroethane	283	5		ug/L	5	79-34-5	Y1
cis-1,3-Dichloropropene	273	5		ug/L	5	10061-01-5	Y1
trans-1,3-Dichloropropene	272	5		ug/L	5	10061-02-6	Y1

Y-Elevated reporting limit due to high target concentration 1-Spiked at 50ug/L



Analytical Laboratory Report

Lab Sample ID: S95153.04

Sample Tag: MWF16-06_GW-100418 MSD

Collected Date/Time: 10/04/2018 10:25

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/11/18 12:00	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/10/18 20:58, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	70	1		ug/L	1	123-91-1	1

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/18/18 12:27, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	250		ug/L	5	67-64-1	Y1
2-Butanone (MEK)	270	130		ug/L	5	78-93-3	Y1
Benzene	264	5		ug/L	5	71-43-2	Y1
Bromodichloromethane	277	5		ug/L	5	75-27-4	Y1
Bromoform	262	5		ug/L	5	75-25-2	Y1
Bromomethane	250	30		ug/L	5	74-83-9	Y1
Carbon disulfide	230	30		ug/L	5	75-15-0	Y1
Carbon tetrachloride	282	5		ug/L	5	56-23-5	Y1
Chlorobenzene	262	5		ug/L	5	108-90-7	Y1
Chloroethane	230	30		ug/L	5	75-00-3	Y1
Chloroform	309	5		ug/L	5	67-66-3	Y1
Chloromethane	260	30		ug/L	5	74-87-3	Y1
1,2-Dibromo-3-chloropropane	270	30		ug/L	5	96-12-8	Y1
1,2-Dichlorobenzene	258	5		ug/L	5	95-50-1	Y1
1,2-Dichloroethane	267	5		ug/L	5	107-06-2	Y1
1,2-Dichloropropane	259	5		ug/L	5	78-87-5	Y1
1,3-Dichlorobenzene	258	5		ug/L	5	541-73-1	Y1
1,4-Dichlorobenzene	259	5		ug/L	5	106-46-7	Y1
cis-1,2-Dichloroethene	275	5		ug/L	5	156-59-2	Y1
Dibromochloromethane	260	30		ug/L	5	124-48-1	Y1
Dichlorodifluoromethane	230	30		ug/L	5	75-71-8	Y1
trans-1,2-Dichloroethene	263	5		ug/L	5	156-60-5	Y1
Ethylbenzene	264	5		ug/L	5	100-41-4	Y1
2-Hexanone	270	250		ug/L	5	591-78-6	Y1
4-Methyl-2-pentanone (MIBK)	270	250		ug/L	5	108-10-1	Y1
tert-Methyl butyl ether (MTBE)	260	30		ug/L	5	1634-04-4	Y1
Methylene chloride	250	30		ug/L	5	75-09-2	Y1
Styrene	267	5		ug/L	5	100-42-5	Y1
1,1,1-Trichloroethane	449	5		ug/L	5	71-55-6	Y1
1,1,2-Trichloroethane	272	5		ug/L	5	79-00-5	Y1
1,2,4-Trichlorobenzene	270	30		ug/L	5	120-82-1	Y1

1-spiked at 50ug/L

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Lab Sample ID: S95153.04 (continued)
Sample Tag: MWF16-06_GW-100418 MSD

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/18/18 12:27, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Tetrachloroethene	324	5		ug/L	5	127-18-4	Y1
Toluene	269	5		ug/L	5	108-88-3	Y1
Trichloroethene	279	5		ug/L	5	79-01-6	Y1
Trichlorofluoromethane	262	5		ug/L	5	75-69-4	Y1
Vinyl chloride	257	5		ug/L	5	75-01-4	Y1
o-Xylene	263	5		ug/L	5	95-47-6	Y1
p,m-Xylene*	530	10		ug/L	5		Y1
Isopropylbenzene	263	5		ug/L	5	98-82-8	Y1
Cyclohexane	241	5		ug/L	5	110-82-7	Y1
1,1-Dichloroethane	312	5		ug/L	5	75-34-3	Y1
1,1-Dichloroethene	262	5		ug/L	5	75-35-4	Y1
Methyl Acetate	271	50		ug/L	5	79-20-9	Y1
Methyl cyclohexane	267	5		ug/L	5	108-87-2	Y1
1,1,2-Trichloro-1,2,2-trifluoroethane	231	5		ug/L	5	76-13-1	Y1
1,2-Dibromoethane	270	5		ug/L	5	106-93-4	Y1
1,1,2,2-Tetrachloroethane	269	5		ug/L	5	79-34-5	Y1
cis-1,3-Dichloropropene	267	5		ug/L	5	10061-01-5	Y1
trans-1,3-Dichloropropene	269	5		ug/L	5	10061-02-6	Y1

Y-Elevated reporting limit due to high target concentration 1-Spiked at 50ug/L



Analytical Laboratory Report

Lab Sample ID: S95153.05

Sample Tag: MWF8-01_GW-100418

Collected Date/Time: 10/04/2018 11:55

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/09/18 12:30	JML	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 18:29, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	2	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	



Analytical Laboratory Report

Lab Sample ID: S95153.05 (continued)
Sample Tag: MWF8-01_GW-100418

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 18:29, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S95153.06

Sample Tag: TW-MD-04_GW-100318

Collected Date/Time: 10/03/2018 16:10

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.0	IR
2	1L Amber	None	Yes	4.0	IR
1	500ml Plastic	None	Yes	4.0	IR
1	125ml Plastic	HNO3	Yes	4.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/12/18 09:45	JRH	
pH check for VOCs*	<2	N/A	10/09/18 12:30	JML	
Metal Digestion	Completed	SW3015A	10/11/18 09:00	JRH	
Extraction, PCB	Completed	SW3510C	10/09/18 16:00	PLB	

Inorganics

Method: SM2320B, Run Date: 10/11/18 13:24, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	422	2		mg/L	2		

Method: SM2340C, Run Date: 10/12/18 16:12, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	390	10		mg/L	10		

Method: SM2540C, Run Date: 10/10/18 20:30, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	1,700	20		mg/L	2		

Method: SM2540D, Run Date: 10/10/18 19:40, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	37	3		mg/L	1		

Metals

Method: E200.8, Run Date: 10/11/18 11:49, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.002	0.002		mg/L	5	7440-38-2	
Barium	0.341	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	0.009	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	
Iron	21.9	0.02		mg/L	5	7439-89-6	
Lead	Not detected	0.003		mg/L	5	7439-92-1	
Manganese	1.16	0.005		mg/L	5	7439-96-5	
Nickel	Not detected	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	



Analytical Laboratory Report

Lab Sample ID: S95153.06 (continued)

Sample Tag: TW-MD-04_GW-100318

Method: E200.8, Run Date: 10/11/18 11:49, Analyst: JRH (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	Not detected	0.005		mg/L	5	7440-66-6	

Method: E200.8, Run Date: 10/12/18 11:21, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	166	0.25		mg/L	5	7440-70-2	
Magnesium	43.7	0.25		mg/L	5	7439-95-4	

Method: E245.1, Run Date: 10/12/18 13:57, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/10/18 14:17, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 18:48, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	



Analytical Laboratory Report

Lab Sample ID: S95153.06 (continued)

Sample Tag: TW-MD-04_GW-100318

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 18:48, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S95153.07

Sample Tag: TW-MD-05_GW-100318

Collected Date/Time: 10/03/2018 17:20

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.0	IR
2	1L Amber	None	Yes	4.0	IR
1	500ml Plastic	None	Yes	4.0	IR
1	125ml Plastic	HNO3	Yes	4.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/12/18 09:45	JRH	
pH check for VOCs*	<2	N/A	10/09/18 12:30	JML	
Metal Digestion	Completed	SW3015A	10/11/18 09:00	JRH	
Extraction, PCB	Completed	SW3510C	10/10/18 15:20	PLB	

Inorganics

Method: SM2320B, Run Date: 10/11/18 13:26, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	456	2		mg/L	2		

Method: SM2340C, Run Date: 10/12/18 16:16, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	113	10		mg/L	10		

Method: SM2540C, Run Date: 10/10/18 20:30, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	586	20		mg/L	2		

Method: SM2540D, Run Date: 10/10/18 19:40, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	20	3		mg/L	1		

Metals

Method: E200.8, Run Date: 10/11/18 11:51, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.004	0.002		mg/L	5	7440-38-2	
Barium	0.095	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	
Iron	11.5	0.02		mg/L	5	7439-89-6	
Lead	Not detected	0.003		mg/L	5	7439-92-1	
Manganese	0.356	0.005		mg/L	5	7439-96-5	
Nickel	Not detected	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	



Analytical Laboratory Report

Lab Sample ID: S95153.07 (continued)

Sample Tag: TW-MD-05_GW-100318

Method: E200.8, Run Date: 10/11/18 11:51, Analyst: JRH (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	Not detected	0.005		mg/L	5	7440-66-6	

Method: E200.8, Run Date: 10/12/18 11:23, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	47.2	0.25		mg/L	5	7440-70-2	
Magnesium	21.9	0.25		mg/L	5	7439-95-4	

Method: E245.1, Run Date: 10/12/18 13:59, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/10/18 19:38, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 19:07, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	



Analytical Laboratory Report

Lab Sample ID: S95153.07 (continued)

Sample Tag: TW-MD-05_GW-100318

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 19:07, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S95153.08

Sample Tag: TW-MD-06_GW-100418

Collected Date/Time: 10/04/2018 09:50

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.0	IR
2	1L Amber	None	Yes	4.0	IR
1	500ml Plastic	None	Yes	4.0	IR
1	125ml Plastic	HNO3	Yes	4.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/12/18 09:45	JRH	
pH check for VOCs*	<2	N/A	10/09/18 12:30	JML	
Metal Digestion	Completed	SW3015A	10/11/18 09:00	JRH	
Extraction, PCB	Completed	SW3510C	10/10/18 15:20	PLB	

Inorganics

Method: SM2320B, Run Date: 10/11/18 13:28, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	434	2		mg/L	2		

Method: SM2340C, Run Date: 10/12/18 16:18, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	390	10		mg/L	10		

Method: SM2540C, Run Date: 10/10/18 20:30, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	1,080	20		mg/L	2		

Method: SM2540D, Run Date: 10/10/18 19:40, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	46	3		mg/L	1		

Metals

Method: E200.8, Run Date: 10/11/18 11:53, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.010	0.002		mg/L	5	7440-38-2	
Barium	0.180	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	
Iron	24.9	0.02		mg/L	5	7439-89-6	
Lead	Not detected	0.003		mg/L	5	7439-92-1	
Manganese	0.947	0.005		mg/L	5	7439-96-5	
Nickel	Not detected	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	



Analytical Laboratory Report

Lab Sample ID: S95153.08 (continued)

Sample Tag: TW-MD-06_GW-100418

Method: E200.8, Run Date: 10/11/18 11:53, Analyst: JRH (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	0.009	0.005		mg/L	5	7440-66-6	

Method: E200.8, Run Date: 10/12/18 11:25, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	152	0.25		mg/L	5	7440-70-2	
Magnesium	43.0	0.25		mg/L	5	7439-95-4	

Method: E245.1, Run Date: 10/12/18 14:01, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/10/18 19:50, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 19:26, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	



Analytical Laboratory Report

Lab Sample ID: S95153.08 (continued)

Sample Tag: TW-MD-06_GW-100418

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 19:26, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S95153.09

Sample Tag: TW-MD-07_GW-100418

Collected Date/Time: 10/04/2018 12:10

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.0	IR
2	1L Amber	None	Yes	4.0	IR
1	500ml Plastic	None	Yes	4.0	IR
1	125ml Plastic	HNO3	Yes	4.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/12/18 09:45	JRH	
pH check for VOCs*	<2	N/A	10/11/18 12:00	JML	
Metal Digestion	Completed	SW3015A	10/11/18 09:00	JRH	
Extraction, PCB	Completed	SW3510C	10/10/18 15:20	PLB	

Inorganics

Method: SM2320B, Run Date: 10/11/18 13:30, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	494	2		mg/L	2		

Method: SM2340C, Run Date: 10/12/18 16:20, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	365	10		mg/L	10		

Method: SM2540C, Run Date: 10/10/18 20:30, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	958	20		mg/L	2		

Method: SM2540D, Run Date: 10/10/18 19:40, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	43	3		mg/L	1		

Metals

Method: E200.8, Run Date: 10/11/18 11:54, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	Not detected	0.002		mg/L	5	7440-38-2	
Barium	0.206	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	
Iron	23.9	0.02		mg/L	5	7439-89-6	
Lead	Not detected	0.003		mg/L	5	7439-92-1	
Manganese	0.201	0.005		mg/L	5	7439-96-5	
Nickel	Not detected	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	



Analytical Laboratory Report

Lab Sample ID: S95153.09 (continued)

Sample Tag: TW-MD-07_GW-100418

Method: E200.8, Run Date: 10/11/18 11:54, Analyst: JRH (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	Not detected	0.005		mg/L	5	7440-66-6	

Method: E200.8, Run Date: 10/12/18 11:28, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	148	0.25		mg/L	5	7440-70-2	
Magnesium	43.9	0.25		mg/L	5	7439-95-4	

Method: E245.1, Run Date: 10/12/18 14:03, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/10/18 20:01, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/18 14:25, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	



Analytical Laboratory Report

Lab Sample ID: S95153.09 (continued)

Sample Tag: TW-MD-07_GW-100418

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/18 14:25, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S95153.10

Sample Tag: MWW1-04_GW-100418

Collected Date/Time: 10/04/2018 14:05

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.0	IR
2	1L Amber	None	Yes	4.0	IR
1	125ml Plastic	HNO3	Yes	4.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/09/18 12:30	JML	
Metal Digestion	Completed	SW3015A	10/11/18 09:00	JRH	
Extraction, PCB	Completed	SW3510C	10/10/18 15:20	PLB	

Metals

Method: E200.8, Run Date: 10/11/18 11:56, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Vanadium	0.016	0.005		mg/L	5	7440-62-2	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/10/18 20:12, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	0.1	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	0.1	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/16/18 13:53, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	Not detected	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/08/18 16:04, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	



Analytical Laboratory Report

Lab Sample ID: S95153.10 (continued)

Sample Tag: MWW1-04_GW-100418

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/08/18 16:04, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S95153.11

Sample Tag: Dup-03_GW-100418

Collected Date/Time: 10/04/2018 00:01

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.0	IR
2	1L Amber	None	Yes	4.0	IR
1	125ml Plastic	HNO3	Yes	4.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/09/18 12:30	JML	
Metal Digestion	Completed	SW3015A	10/11/18 09:00	JRH	
Extraction, PCB	Completed	SW3510C	10/10/18 15:20	PLB	

Metals

Method: E200.8, Run Date: 10/11/18 11:58, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Vanadium	0.015	0.005		mg/L	5	7440-62-2	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/10/18 20:23, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/16/18 13:31, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	Not detected	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 19:45, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	



Analytical Laboratory Report

Lab Sample ID: S95153.11 (continued)

Sample Tag: Dup-03_GW-100418

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 19:45, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S95153.12

Sample Tag: Dup-04

Collected Date/Time: 10/04/2018 00:01

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/09/18 12:30	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/16/18 14:55, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	500	20		ug/L	20	123-91-1	Y

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 20:04, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	3	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	73	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	33	1		ug/L	1	127-18-4	

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Lab Sample ID: S95153.12 (continued)
Sample Tag: Dup-04

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 20:04, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	3	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	48	1		ug/L	1	75-34-3	
1,1-Dichloroethene	11	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S95153.13

Sample Tag: Trip Blank

Collected Date/Time: 10/04/2018 00:01

Matrix: Water

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	HCL	Yes	4.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/09/18 12:30	JML	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 16:54, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	



Analytical Laboratory Report

Lab Sample ID: S95153.13 (continued)

Sample Tag: Trip Blank

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/05/18 16:54, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	

Merit Laboratories Login Checklist

Lab Set ID:S95153

Client:ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: PNC Racer

Submitted: 10/05/2018 08:00 Login User: SRS

Attention: Colleen Barton

Address: Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: NA

FAX: 248-994-2241

Email: Colleen.barton@arcadis.com

Selection	Description	Note
Sample Receiving		
01. ☒ Yes ☐ No ☐ N/A	Samples are received at 4C +/- 2C	Thermometer # IR 4.0
02. ☒ Yes ☐ No ☐ N/A	Received on ice/ cooling process begun	
03. ☐ Yes ☒ No ☐ N/A	Samples shipped	
04. ☐ Yes ☒ No ☐ N/A	Samples left in 24 hr. drop box	
05. ☐ Yes ☐ No ☒ N/A	Are there custody seals/tape or is the drop box locked	
Chain of Custody		
06. ☒ Yes ☐ No ☐ N/A	COC adequately filled out	
07. ☒ Yes ☐ No ☐ N/A	COC signed and relinquished to the lab	
08. ☒ Yes ☐ No ☐ N/A	Sample tag on bottles match COC	
09. ☐ Yes ☒ No ☐ N/A	Subcontracting needed? Subcontacted to:	
Preservation		
10. ☒ Yes ☐ No ☐ N/A	Do sample have correct chemical preservation	
11. ☒ Yes ☐ No ☐ N/A	Completed pH checks on preserved samples? (no VOAs)	
12. ☐ Yes ☒ No ☐ N/A	Did any samples need to be preserved in the lab?	
Bottle Conditions		
13. ☒ Yes ☐ No ☐ N/A	All bottles intact	
14. ☒ Yes ☐ No ☐ N/A	Appropriate analytical bottles are used	
15. ☒ Yes ☐ No ☐ N/A	Merit bottles used	
16. ☒ Yes ☐ No ☐ N/A	Sufficient sample volume received	
17. ☐ Yes ☒ No ☐ N/A	Samples require laboratory filtration	
18. ☒ Yes ☐ No ☐ N/A	Samples submitted within holding time	
19. ☐ Yes ☒ No ☐ N/A	Do water VOC or TOX bottles contain headspace	

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

Merit Laboratories Bottle Preservation Check

Lab Set ID: S95153 Initials: SRS

Client: ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: PNC Racer

Submitted: 10/05/2018 08:00 Login User:

Attention: Colleen Barton

Address: Arcadis

28550 Cabot Drive

Suite 500

Novi, MI 48377

Phone: NA

FAX: 248-994-2241

Email: Colleen.barton@arcadis.com

Lab ID	125 ml Plastic HNO ₃	250 ml Plastic HNO ₃	1 L Plastic HNO ₃	250 ml Plastic H ₂ SO ₄	125 ml Amber H ₂ SO ₄	32 oz Glass HCl	125 ml Plastic NaOH	125 ml Amber PbCO ₃ NaOH	pH					Notes
									<2	>12	other	ml add	new pH	
S95153.06	X								X					
S95153.07	X								X					
S95153.08	X								X					
S95153.09	X								X					
S95153.10	X								X					
S95153.11	X								X					

Table 4
Summary of Groundwater Analytical Results
RACER Trust Pontiac North Campus
Pontiac, Michigan

PNC VOC Analyte List - 8260C		
	Volatile Organic Compounds	1
VOC	Acetone	1
VOC	Benzene	1
VOC	Bromodichloromethane	1
VOC	Bromoform	1
VOC	Bromomethane	1
VOC	2-Butanone	1
VOC	Carbon Disulfide	1
VOC	Carbon Tetrachloride	1
VOC	Chlorobenzene	1
VOC	Chloroethane	1
VOC	Chloroform	1
VOC	Chloromethane	1
VOC	Cumene	1
VOC	Cyclohexane	1
VOC	1,2-Dibromo-3-chloropropane	1
VOC	Dibromochloromethane	1
VOC	1,2-Dibromoethane	1
VOC	1,2-Dichlorobenzene	1
VOC	1,3-Dichlorobenzene	1
VOC	1,4-Dichlorobenzene	1
VOC	Dichlorodifluoromethane	1
VOC	1,1-Dichloroethane	1
VOC	1,2-Dichloroethane	1
VOC	1,1-Dichloroethene	1
VOC	cis-1,2-Dichloroethene	1
VOC	trans-1,2-Dichloroethene	1
VOC	1,2-Dichloropropane	1
VOC	1,3-Dichloropropene (summed)	1
VOC	Ethyl Benzene	1
VOC	2-Hexanone	1
VOC	Methyl Acetate	1
VOC	Methyl tert-butyl ether	1
VOC	4-Methyl-2-pentanone	1
VOC	Methylcyclohexane	1
VOC	Methylene Chloride	1
VOC	Styrene	1
VOC	1,1,2,2-Tetrachloroethane	1
VOC	Tetrachloroethene	1
VOC	Toluene	1
VOC	1,2,4-Trichlorobenzene	1
VOC	1,1,1-Trichloroethane	1
VOC	1,1,2-Trichloroethane	1
VOC	Trichloroethene	1
VOC	Trichlorofluoromethane	1
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	1
VOC	Vinyl Chloride	1
VOC	Xylenes (total)	1

Montcalm inorganics list
antimony
arsenic
barium
beryllium
cadmium
chromium
cobalt
copper
lead
manganese
mercury
nickel
selenium
silver
thallium
vanadium
zinc

Geochemical analytical list
calcium
iron
manganese
magnesium
alkalinity
hardness
dissolved and suspended solids



Analytical Laboratory Report

Report ID: S95338.01(01)
Generated on 10/17/2018

Report to

Attention: Colleen Barton
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: NA FAX: 248-994-2241
Email: Colleen.barton@arcadis.com

Additional Contacts: Brad Saunders

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S95338.01-S95338.03
Project: PNC Racer
Collected Date: 10/05/2018
Submitted Date/Time: 10/09/2018 15:00
Sampled by: K. Voets / C. Zilio
P.O. #: B0064607.2017

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.
Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.
Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

There is no additional narrative for this analytical report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
E200.8	EPA Method 200.8 Revision 5.4
E245.1	EPA Method 245.1 Revision 3.0
E608.3	EPA Method 608.3 December 2016
N/A	Not Applicable
SM2320B	Standard Method 2320 B 2011
SM2340C	Standard Method 2340 C 2011
SM2540C	Standard Method 2540 C 2011
SM2540D	Standard Method 2540 D 2011
SW3015A	SW 846 Method 3015A Revision 1 February 2007
SW3510C	SW 846 Method 3510C Revision 3 December 1996
SW5030C/8260C	SW 846 Method 8260C Revision 3 August 2006 / 5030C Revision 3 May 2003
SW8260B - SIM	SW 846 Method 8260B Revision 2 December 1996 SIMs



Analytical Laboratory Report

Sample Summary (3 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S95338.01	MWW10-SEN02-GW-100518	Groundwater	10/05/18 08:30
S95338.02	MWW01-SEN03-GW-100518	Groundwater	10/05/18 13:15
S95338.03	Trip Blank	Water	10/05/18 00:01



Analytical Laboratory Report

Lab Sample ID: S95338.01

Sample Tag: MWW10-SEN02-GW-100518

Collected Date/Time: 10/05/2018 08:30

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.2	IR
1	1L Amber	None	Yes	5.2	IR
1	125ml Plastic	HNO3	Yes	5.2	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/15/18 14:00	JRH	
pH check for VOCs*	<2	N/A	10/12/18 11:50	JML	
Metal Digestion	Completed	SW3015A	10/11/18 09:00	JRH	

Inorganics

Method: SM2320B, Run Date: 10/11/18 13:32, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	686	2		mg/L	2		

Method: SM2340C, Run Date: 10/12/18 16:22, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	362	10		mg/L	10		

Metals

Method: E200.8, Run Date: 10/11/18 11:25, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.007	0.002		mg/L	5	7440-38-2	
Barium	0.141	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	0.053	0.005		mg/L	5	7440-47-3	
Cobalt	0.011	0.005		mg/L	5	7440-48-4	
Copper	0.054	0.005		mg/L	5	7440-50-8	
Iron	21.2	0.02		mg/L	5	7439-89-6	
Lead	0.012	0.003		mg/L	5	7439-92-1	
Manganese	0.563	0.005		mg/L	5	7439-96-5	
Nickel	0.128	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	0.021	0.005		mg/L	5	7440-62-2	
Zinc	0.051	0.005		mg/L	5	7440-66-6	

Method: E200.8, Run Date: 10/12/18 11:30, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	190	0.25		mg/L	5	7440-70-2	
Magnesium	42.2	0.25		mg/L	5	7439-95-4	



Analytical Laboratory Report

Lab Sample ID: S95338.01 (continued)
Sample Tag: MWW10-SEN02-GW-100518

Method: E245.1, Run Date: 10/16/18 14:39, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/11/18 17:42, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	



Analytical Laboratory Report

Lab Sample ID: S95338.01 (continued)
Sample Tag: MWW10-SEN02-GW-100518

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/11/18 17:42, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S95338.02

Sample Tag: MWW01-SEN03-GW-100518

Collected Date/Time: 10/05/2018 13:15

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.2	IR
2	1L Amber	None	Yes	5.2	IR
1	125ml Plastic	HNO3	Yes	5.2	IR
1	500ml Plastic	None	Yes	5.2	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/15/18 14:00	JRH	
pH check for VOCs*	<2	N/A	10/12/18 11:50	JML	
Metal Digestion	Completed	SW3015A	10/11/18 09:00	JRH	
Extraction, PCB	Completed	SW3510C	10/11/18 17:30	ADB	

Inorganics

Method: SM2320B, Run Date: 10/11/18 13:34, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	754	2		mg/L	2		

Method: SM2340C, Run Date: 10/12/18 16:24, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	137	10		mg/L	10		

Method: SM2540C, Run Date: 10/10/18 20:30, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	1,110	20		mg/L	2		

Method: SM2540D, Run Date: 10/12/18 19:45, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	249	3		mg/L	1		

Metals

Method: E200.8, Run Date: 10/12/18 11:32, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	80.1	0.25		mg/L	5	7440-70-2	
Magnesium	16.2	0.25		mg/L	5	7439-95-4	

Method: E200.8, Run Date: 10/17/18 11:32, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.008	0.002		mg/L	5	7440-38-2	
Barium	0.170	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	0.0010	0.0005		mg/L	5	7440-43-9	
Chromium	0.029	0.005		mg/L	5	7440-47-3	
Cobalt	0.006	0.005		mg/L	5	7440-48-4	
Copper	0.016	0.005		mg/L	5	7440-50-8	
Iron	21.1	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Lab Sample ID: S95338.02 (continued)
Sample Tag: MWW01-SEN03-GW-100518

Method: E200.8, Run Date: 10/17/18 11:32, Analyst: JRH (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Lead	0.011	0.003		mg/L	5	7439-92-1	
Manganese	0.477	0.005		mg/L	5	7439-96-5	
Nickel	0.023	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	0.007	0.005		mg/L	5	7440-62-2	
Zinc	0.027	0.005		mg/L	5	7440-66-6	

Method: E245.1, Run Date: 10/16/18 14:40, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/15/18 12:44, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/16/18 14:13, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	26	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/11/18 18:01, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	



Analytical Laboratory Report

Lab Sample ID: S95338.02 (continued)
Sample Tag: MWW01-SEN03-GW-100518

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/11/18 18:01, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S95338.03

Sample Tag: Trip Blank

Collected Date/Time: 10/05/2018 00:01

Matrix: Water

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	HCL	Yes	5.2	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/12/18 11:50	JML	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/11/18 14:01, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	



Analytical Laboratory Report

Lab Sample ID: S95338.03 (continued)

Sample Tag: Trip Blank

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/11/18 14:01, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	

Merit Laboratories Login Checklist

Lab Set ID:S95338

Client:ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: PNC Racer

Submitted: 10/09/2018 15:00 Login User: SRS

Attention: Colleen Barton

Address: Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: NA

FAX: 248-994-2241

Email: Colleen.barton@arcadis.com

Selection	Description	Note
Sample Receiving		
01. ☒ Yes ☐ No ☐ N/A	Samples are received at 4C +/- 2C Thermometer #	IR 5.2
02. ☒ Yes ☐ No ☐ N/A	Received on ice/ cooling process begun	
03. ☐ Yes ☒ No ☐ N/A	Samples shipped	
04. ☐ Yes ☒ No ☐ N/A	Samples left in 24 hr. drop box	
05. ☐ Yes ☐ No ☒ N/A	Are there custody seals/tape or is the drop box locked	
Chain of Custody		
06. ☒ Yes ☐ No ☐ N/A	COC adequately filled out	
07. ☒ Yes ☐ No ☐ N/A	COC signed and relinquished to the lab	
08. ☒ Yes ☐ No ☐ N/A	Sample tag on bottles match COC	
09. ☐ Yes ☒ No ☐ N/A	Subcontracting needed? Subcontacted to:	
Preservation		
10. ☒ Yes ☐ No ☐ N/A	Do sample have correct chemical preservation	
11. ☒ Yes ☐ No ☐ N/A	Completed pH checks on preserved samples? (no VOAs)	
12. ☐ Yes ☒ No ☐ N/A	Did any samples need to be preserved in the lab?	
Bottle Conditions		
13. ☒ Yes ☐ No ☐ N/A	All bottles intact	
14. ☒ Yes ☐ No ☐ N/A	Appropriate analytical bottles are used	
15. ☒ Yes ☐ No ☐ N/A	Merit bottles used	
16. ☐ Yes ☒ No ☐ N/A	Sufficient sample volume received	Sample .02 does not have sufficient non-preserved volume
17. ☐ Yes ☒ No ☐ N/A	Samples require laboratory filtration	
18. ☒ Yes ☐ No ☐ N/A	Samples submitted within holding time	
19. ☐ Yes ☒ No ☐ N/A	Do water VOC or TOX bottles contain headspace	

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

Merit Laboratories Bottle Preservation Check

Lab Set ID: S95338 Initials: SRS

Client: ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: PNC Racer

Submitted: 10/09/2018 15:00 Login User:

Attention: Colleen Barton

Address: Arcadis

28550 Cabot Drive

Suite 500

Novi, MI 48377

Phone: NA

FAX: 248-994-2241

Email: Colleen.barton@arcadis.com

Lab ID	125 ml Plastic HNO ₃	250 ml Plastic HNO ₃	1 L Plastic HNO ₃	250 ml Plastic H ₂ SO ₄	125 ml Amber H ₂ SO ₄	32 oz Glass HCl	125 ml Plastic NaOH	125 ml Amber PbCO ₃ NaOH	pH					Notes
									<2	>12	other	ml add	new pH	
S95338.01	X								X					
S95338.02	X								X					

REPORT TO

CONTACT NAME				Colleen Barton			
COMPANY				Arcadis			
ADDRESS				28550 Cabot Drive #500			
CITY			Novi		STATE MI		ZIP CODE 48377
PHONE NO.		810.225.1909		FAX NO.		P.O. NO. B0064607.2017.	
E-MAIL ADDRESS						QUOTE NO.	
Colleen.Barton@arcadis.com; Brad Saunders@arc							

CHAIN OF CUSTODY RECORD

CONTACT NAME		Accounts Payable		☐ SAME	
COMPANY		Arcadis			
ADDRESS		630 Plaza Drive Suite 600			
CITY			STATE	CO	ZIP CODE
Highlands Ranch					80129
PHONE NO.		E-MAIL ADDRESS			
		accountspayable.administration@arcadis-us.com			

INVOICE TO

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME	PNC Racer	SAMPLER(S) - PLEASE PRINT/SIGN NAME	K. Voet 3 C. Zillo
------------------	-----------	-------------------------------------	-------------------------------

TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER

DELIVERABLES REQUIRED ☐ STD ☒ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☒ EDD ☐ OTHER

MATRIX	GW=GROUNDWATER	WW=WASTEWATER	S=SOIL	L=LIQUID	SD=SOLID
CODE:	SL=SLUDGE	DW=DRINKING WATER	O=OIL	WP=WPIE	A=AIR W=WASTE

Containers & Preservatives

Certifications

☐ OHIO VAP ☐ Drinking Water
☐ DoD ☐ NPDES

Project Locations

☐ Detroit ☐ New York

☒ Other Pontiac, MI

Special Instructions

[illegible]

MWW105NO2 has limited volume collected in 1L Amber and may need to combine geochem analysis if possible

RELINQUISHED BY:		ARCADIS	☒ Sampler	DATE	TIME
SIGNATURE/ORGANIZATION				10-5-18	1430
RECEIVED BY:		NWI FRIDGE		DATE	TIME
SIGNATURE/ORGANIZATION				10-5-18	1325
RELINQUISHED BY:		ARCADIS		DATE	TIME
SIGNATURE/ORGANIZATION				10-5-18	1330
RECEIVED BY:		NWI		DATE	TIME
SIGNATURE/ORGANIZATION				10-5-18	1330

RELINQUISHED BY: SIGNATURE/ORGANIZATION <i>Nov: FLOGE</i>			DATE <i>10.5.10</i>	TIME <i>1430</i>
RECEIVED BY: SIGNATURE/ORGANIZATION <i>Alan Byn / ARCADIS</i>			DATE <i>10.6.18</i>	TIME <i>1325</i>
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS	NOTES: TEMP. ON ARRIVAL <u>5.2</u>	
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS		

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE



Design & Consultancy
for natural and
built assets

PNC VOC Analyte List1

Montcalm inorganics list

(Method 200.8)

antimony
arsenic
barium
beryllium
cadmium
chromium
cobalt
copper
lead
manganese
mercury
nickel
selenium
silver
thallium
vanadium
zinc

Geochemical analytical list

calcium
iron
magnesium
alkalinity
hardness
dissolved and suspended solids



Analytical Laboratory Report

Report ID: S04975.01(01)
Generated on 07/31/2019

Report to

Attention: Colleen Barton
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-225-1909 FAX: 248-994-2241
Email: Colleen.barton@arcadis.com

Additional Contacts: Brad Saunders

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S04975.01-S04975.10
Project: PNC Racer
Collected Date(s): 07/22/2019 - 07/23/2019
Submitted Date/Time: 07/25/2019 09:45
Sampled by: G. Schafer / D. Kamath
P.O. #: 30006882.00007

Table of Contents

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

There is no additional narrative for this analytical report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
E200.8	EPA Method 200.8 Revision 5.4
SM2340C	Standard Method 2340 C 2011
SM2540C	Standard Method 2540 C 2011
SW3015A	SW 846 Method 3015A Revision 1 February 2007



Analytical Laboratory Report

Sample Summary (10 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S04975.01	INJ-01-17_GW-072219	Groundwater	07/22/19 10:55
S04975.02	MW-04-17_GW-072219	Groundwater	07/22/19 11:55
S04975.03	MW-03-17_GW-072219	Groundwater	07/22/19 13:50
S04975.04	INJ-02-18_GW-072219	Groundwater	07/22/19 16:10
S04975.05	INJ-02-18_GW-072219 MS	Groundwater	07/22/19 16:10
S04975.06	INJ-02-18_GW-072219 MSD	Groundwater	07/22/19 16:10
S04975.07	MWW-5-01_GW-072319	Groundwater	07/23/19 10:35
S04975.08	SUMP_GW-072319	Groundwater	07/23/19 14:10
S04975.09	TW-09-01_GW-072319	Groundwater	07/23/19 15:30
S04975.10	DUP-01_GW-072319	Groundwater	07/23/19 00:01



Analytical Laboratory Report

Lab Sample ID: S04975.01

Sample Tag: INJ-01-17_GW-072219

Collected Date/Time: 07/22/2019 10:55

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	3.5	IR
1	500ml Plastic	None	Yes	3.5	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	07/26/19 15:10	CCM	

Inorganics

Method: SM2340C, Run Date: 07/31/19 11:14, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	247	2		mg/L	1		

Method: SM2540C, Run Date: 07/26/19 19:50, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	424	20		mg/L	2		

Metals

Method: E200.8, Run Date: 07/26/19 16:28, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	6.88	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Lab Sample ID: S04975.02

Sample Tag: MW-04-17_GW-072219

Collected Date/Time: 07/22/2019 11:55

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	3.5	IR
1	500ml Plastic	None	Yes	3.5	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	07/26/19 15:10	CCM	

Inorganics

Method: SM2340C, Run Date: 07/31/19 11:16, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	311	2		mg/L	1		

Method: SM2540C, Run Date: 07/26/19 19:50, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	522	20		mg/L	2		

Metals

Method: E200.8, Run Date: 07/26/19 16:32, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	0.52	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Lab Sample ID: S04975.03

Sample Tag: MW-03-17_GW-072219

Collected Date/Time: 07/22/2019 13:50

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	3.5	IR
1	500ml Plastic	None	Yes	3.5	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	07/26/19 15:10	CCM	

Inorganics

Method: SM2340C, Run Date: 07/31/19 11:18, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	291	2		mg/L	1		

Method: SM2540C, Run Date: 07/26/19 19:50, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	522	20		mg/L	2		

Metals

Method: E200.8, Run Date: 07/26/19 16:35, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	0.31	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Lab Sample ID: S04975.04

Sample Tag: INJ-02-18_GW-072219

Collected Date/Time: 07/22/2019 16:10

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	3.5	IR
1	500ml Plastic	None	Yes	3.5	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	07/26/19 15:10	CCM	

Inorganics

Method: SM2340C, Run Date: 07/31/19 11:20, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	341	2		mg/L	1		

Method: SM2540C, Run Date: 07/26/19 19:50, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	906	20		mg/L	2		

Metals

Method: E200.8, Run Date: 07/26/19 16:38, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	4.98	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Lab Sample ID: S04975.05

Sample Tag: INJ-02-18_GW-072219 MS

Collected Date/Time: 07/22/2019 16:10

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	3.5	IR
1	500ml Plastic	None	Yes	3.5	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	07/26/19 15:10	CCM	

Inorganics

Method: SM2340C, Run Date: 07/31/19 11:22, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	449	2		mg/L	1		

Metals

Method: E200.8, Run Date: 07/26/19 16:59, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	5.63	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Lab Sample ID: S04975.06

Sample Tag: INJ-02-18_GW-072219 MSD

Collected Date/Time: 07/22/2019 16:10

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	3.5	IR
1	500ml Plastic	None	Yes	3.5	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	07/26/19 15:10	CCM	

Inorganics

Method: SM2340C, Run Date: 07/31/19 11:24, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	442	2		mg/L	1		

Metals

Method: E200.8, Run Date: 07/26/19 17:02, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	5.40	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Lab Sample ID: S04975.07
Sample Tag: MWW-5-01_GW-072319
Collected Date/Time: 07/23/2019 10:35
Matrix: Groundwater
COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	3.5	IR
1	500ml Plastic	None	Yes	3.5	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	07/26/19 15:10	CCM	

Inorganics

Method: SM2340C, Run Date: 07/31/19 11:26, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	670	2		mg/L	20		

Method: SM2540C, Run Date: 07/26/19 19:50, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	840	20		mg/L	2		

Metals

Method: E200.8, Run Date: 07/26/19 16:42, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	6.69	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Lab Sample ID: S04975.08

Sample Tag: SUMP_GW-072319

Collected Date/Time: 07/23/2019 14:10

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	3.5	IR
1	500ml Plastic	None	Yes	3.5	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	07/26/19 15:10	CCM	

Inorganics

Method: SM2340C, Run Date: 07/31/19 11:28, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	340	2		mg/L	1		

Method: SM2540C, Run Date: 07/26/19 19:50, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	900	20		mg/L	2		

Metals

Method: E200.8, Run Date: 07/26/19 16:47, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	12.0	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Lab Sample ID: S04975.09

Sample Tag: TW-09-01_GW-072319

Collected Date/Time: 07/23/2019 15:30

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	3.5	IR
1	500ml Plastic	None	Yes	3.5	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	07/26/19 15:10	CCM	

Inorganics

Method: SM2340C, Run Date: 07/31/19 11:30, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	1,870	2		mg/L	100		

Method: SM2540C, Run Date: 07/26/19 19:50, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	4,290	40		mg/L	4		

Metals

Method: E200.8, Run Date: 07/26/19 16:51, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	4.13	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Lab Sample ID: S04975.10
Sample Tag: DUP-01_GW-072319
Collected Date/Time: 07/23/2019 00:01
Matrix: Groundwater
COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	3.5	IR
1	500ml Plastic	None	Yes	3.5	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	07/26/19 15:10	CCM	

Inorganics

Method: SM2340C, Run Date: 07/31/19 11:32, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	1,472	2		mg/L	20		

Method: SM2540C, Run Date: 07/26/19 19:50, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	4,220	40		mg/L	4		

Metals

Method: E200.8, Run Date: 07/26/19 16:55, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	4.49	0.02		mg/L	5	7439-89-6	

Merit Laboratories Login Checklist

Lab Set ID:S04975

Client:ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: PNC Racer

Submitted:07/25/2019 09:45 Login User: MMC

Attention: Colleen Barton

Address: Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-225-1909

FAX: 248-994-2241

Email: Colleen.barton@arcadis.com

Selection	Description	Note
Sample Receiving		
01.	☒ Yes ☐ No ☐ N/A	Samples are received at 4C +/- 2C Thermometer # IR 3.5
02.	☒ Yes ☐ No ☐ N/A	Received on ice/ cooling process begun
03.	☐ Yes ☒ No ☐ N/A	Samples shipped
04.	☐ Yes ☒ No ☐ N/A	Samples left in 24 hr. drop box
05.	☐ Yes ☐ No ☒ N/A	Are there custody seals/tape or is the drop box locked
Chain of Custody		
06.	☒ Yes ☐ No ☐ N/A	COC adequately filled out
07.	☒ Yes ☐ No ☐ N/A	COC signed and relinquished to the lab
08.	☒ Yes ☐ No ☐ N/A	Sample tag on bottles match COC
09.	☐ Yes ☒ No ☐ N/A	Subcontracting needed? Subcontacted to:
Preservation		
10.	☒ Yes ☐ No ☐ N/A	Do sample have correct chemical preservation
11.	☒ Yes ☐ No ☐ N/A	Completed pH checks on preserved samples? (no VOAs)
12.	☐ Yes ☒ No ☐ N/A	Did any samples need to be preserved in the lab?
Bottle Conditions		
13.	☒ Yes ☐ No ☐ N/A	All bottles intact
14.	☒ Yes ☐ No ☐ N/A	Appropriate analytical bottles are used
15.	☒ Yes ☐ No ☐ N/A	Merit bottles used
16.	☒ Yes ☐ No ☐ N/A	Sufficient sample volume received
17.	☐ Yes ☒ No ☐ N/A	Samples require laboratory filtration
18.	☒ Yes ☐ No ☐ N/A	Samples submitted within holding time
19.	☐ Yes ☐ No ☒ N/A	Do water VOC or TOX bottles contain headspace

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

Merit Laboratories Bottle Preservation Check

Lab Set ID: S04975 Initials: MMC

Client: ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: PNC Racer

Submitted: 07/25/2019 09:45 Login User:

Attention: Colleen Barton

Address: Arcadis

28550 Cabot Drive

Suite 500

Novi, MI 48377

Phone: 810-225-1909

FAX: 248-994-2241

Email: Colleen.barton@arcadis.com

Lab ID	125 ml Plastic HNO ₃	250 ml Plastic HNO ₃	1 L Plastic HNO ₃	250 ml Plastic H ₂ SO ₄	125 ml Amber H ₂ SO ₄	32 oz Glass HCl	125 ml Plastic NaOH	125 ml Amber PbCO ₃ NaOH	pH					Notes
									<2	>12	other	ml add	new pH	
S04975.01	X								X					
S04975.02	X								X					
S04975.03	X								X					
S04975.04	X								X					
S04975.05	X								X					
S04975.06	X								X					
S04975.07	X								X					
S04975.08	X								X					
S04975.09	X								X					
S04975.10	X								X					



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Phone (517) 332-0167 Fax (517) 332-4034
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C.O.C. PAGE # 1 OF 1

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME Colleen Barton			
COMPANY Arcadis			
ADDRESS 28550 Cabot Drive #500			
CITY Novi	STATE MI	ZIP CODE 48377	
PHONE NO. 810.225.1909	FAX NO.	P.O. NO. 30006882.00007	
E-MAIL ADDRESS Colleen.Barton@arcadis.com; Brad Saunders@arc		QUOTE NO.	

CONTACT NAME Accounts Payable			☐ SAME
COMPANY Arcadis			
ADDRESS 630 Plaza Drive Suite 600			
CITY Highlands Ranch	STATE CO	ZIP CODE 80129	
PHONE NO.	E-MAIL ADDRESS accountspayable.administration@arcadis-us.com		

PROJECT NO./NAME PNC Racer	SAMPLER(S) - PLEASE PRINT/SIGN NAME DKAMATH
TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER	
DELIVERABLES REQUIRED ☐ STD ☒ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☒ EDD ☐ OTHER	
MATRIX GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID CODE: SL=SLUDGE DW=DRINKING WATER O=DIL WP=WIFE A=AIR W=WASTE	

MERIT LAB NO. FOR LAB USE ONLY	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	# Containers & Preservatives										Iron	Hardness	total Dissolved Solids											Certifications ☐ OHIO VAP ☐ Drinking Water ☐ DoD ☐ NPDES Project Locations ☐ Detroit ☐ New York ☒ Other Pontiac, MI Special Instructions
	DATE	TIME				NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	NaOH	MeOH	OTHER																
04975.01	7/22/19	1055	NJ-01-17-GW-072219	GW	2	1	1							X	X	X												TURBIDITY=37 NTU	
.02		1155	MW-04-17-GW-072219		2	1	1																						
.03		1350	MW-03-17-GW-072219		2	1	1																						
.04/.05/.06		1610	NJ-02-18-GW-072219		6	3	3							X	X	X												MS/MSD	
.07	7/23/19	1035	MWW-5-01-GW-072319		2	1	1							X	X	X												MWW-5-01-GW-072319	
.08		1410	SUMP-GW-072319		2	1	1																					GRAB SAMPLE	
.09		1530	TW-09-01-GW-072319		2	1	1																						
.10		-	DUP-01-GW-072319		2	1	1																						

RELINQUISHED BY: SIGNATURE/ORGANIZATION DIVYA KAMATH/ARCADIS	DATE 7/23/19	TIME 1720
RECEIVED BY: SIGNATURE/ORGANIZATION NOVI FRIDUE/ARCADIS	DATE 7/23/19	TIME 1720
RELINQUISHED BY: SIGNATURE/ORGANIZATION	DATE	TIME
RECEIVED BY: SIGNATURE/ORGANIZATION	DATE	TIME

RELINQUISHED BY: SIGNATURE/ORGANIZATION	DATE 7/24/19	TIME 1330
RECEIVED BY: SIGNATURE/ORGANIZATION	DATE 7/25/19	TIME 930
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS
NOTES:		TEMP. ON ARRIVAL 3.5

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

Rev. 5.18.12



Analytical Laboratory Report

Report ID: S06738.01(01)
Generated on 09/17/2019

Report to

Attention: Colleen Barton
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-225-1909 FAX: 248-994-2241
Email: Colleen.barton@arcadis.com

Additional Contacts: Brad Saunders

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S06738.01-S06738.10
Project: PNC Racer
Collected Date(s): 09/03/2019 - 09/04/2019
Submitted Date/Time: 09/06/2019 08:15
Sampled by: Shantel Johnson
P.O. #: 30006882.00007

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.
Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.
Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

There is no additional narrative for this analytical report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
E200.8	EPA Method 200.8 Revision 5.4
SM2340C	Standard Method 2340 C 2011
SM2540C	Standard Method 2540 C 2011
SW3015A	SW 846 Method 3015A Revision 1 February 2007



Analytical Laboratory Report

Sample Summary (10 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S06738.01	INJ-01-17_GW-090319	Groundwater	09/03/19 11:30
S06738.02	INJ-02-18_GW-090319	Groundwater	09/03/19 12:50
S06738.03	MW-04-17_GW-090319	Groundwater	09/03/19 14:11
S06738.04	MW-03-17_GW-090419	Groundwater	09/04/19 09:45
S06738.05	MW-03-17_GW-090419 MS	Groundwater	09/04/19 09:45
S06738.06	MW-03-17_GW-090419 MSD	Groundwater	09/04/19 09:45
S06738.07	TW-09-01_GW-090419	Groundwater	09/04/19 11:25
S06738.08	SUMP_GW-090419	Groundwater	09/04/19 12:10
S06738.09	MWW5-01_GW-090419	Groundwater	09/04/19 13:30
S06738.10	DUP-01_GW-090319	Groundwater	09/03/19 00:01



Analytical Laboratory Report

Lab Sample ID: S06738.01

Sample Tag: INJ-01-17_GW-090319

Collected Date/Time: 09/03/2019 11:30

Matrix: Groundwater

COC Reference: 113932

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	4.6	IR
1	500ml Plastic	None	Yes	4.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	09/17/19 10:50	CCM	

Inorganics

Method: SM2340C, Run Date: 09/10/19 16:08, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	274	2		mg/L	10		

Method: SM2540C, Run Date: 09/06/19 19:30, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	768	20		mg/L	2		

Metals

Method: E200.8, Run Date: 09/17/19 14:24, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	13.6	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Lab Sample ID: S06738.02

Sample Tag: INJ-02-18_GW-090319

Collected Date/Time: 09/03/2019 12:50

Matrix: Groundwater

COC Reference: 113932

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	4.6	IR
1	500ml Plastic	None	Yes	4.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	09/17/19 10:50	CCM	

Inorganics

Method: SM2340C, Run Date: 09/10/19 16:12, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	312	2		mg/L	10		

Method: SM2540C, Run Date: 09/06/19 19:30, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	874	20		mg/L	2		

Metals

Method: E200.8, Run Date: 09/17/19 14:32, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	16.4	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Lab Sample ID: S06738.03

Sample Tag: MW-04-17_GW-090319

Collected Date/Time: 09/03/2019 14:11

Matrix: Groundwater

COC Reference: 113932

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	4.6	IR
1	500ml Plastic	None	Yes	4.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	09/17/19 10:50	CCM	

Inorganics

Method: SM2340C, Run Date: 09/10/19 16:14, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	314	2		mg/L	10		

Method: SM2540C, Run Date: 09/06/19 19:30, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	906	20		mg/L	2		

Metals

Method: E200.8, Run Date: 09/17/19 14:37, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	5.50	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Lab Sample ID: S06738.04

Sample Tag: MW-03-17_GW-090419

Collected Date/Time: 09/04/2019 09:45

Matrix: Groundwater

COC Reference: 113932

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	4.6	IR
1	500ml Plastic	None	Yes	4.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	09/17/19 10:50	CCM	

Inorganics

Method: SM2340C, Run Date: 09/10/19 16:16, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	324	2		mg/L	10		

Method: SM2540C, Run Date: 09/06/19 19:30, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	894	20		mg/L	2		

Metals

Method: E200.8, Run Date: 09/17/19 14:43, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	0.33	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Lab Sample ID: S06738.05

Sample Tag: MW-03-17_GW-090419 MS

Collected Date/Time: 09/04/2019 09:45

Matrix: Groundwater

COC Reference: 113932

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	4.6	IR
1	500ml Plastic	None	Yes	4.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	09/17/19 10:50	CCM	

Inorganics

Method: SM2340C, Run Date: 09/10/19 16:18, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	425	2		mg/L	10		

Metals

Method: E200.8, Run Date: 09/17/19 15:06, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	0.56	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Lab Sample ID: S06738.06

Sample Tag: MW-03-17_GW-090419 MSD

Collected Date/Time: 09/04/2019 09:45

Matrix: Groundwater

COC Reference: 113932

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	4.6	IR
1	500ml Plastic	None	Yes	4.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	09/17/19 10:50	CCM	

Inorganics

Method: SM2340C, Run Date: 09/10/19 16:20, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	425	2		mg/L	10		

Metals

Method: E200.8, Run Date: 09/17/19 15:07, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	0.62	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Lab Sample ID: S06738.07

Sample Tag: TW-09-01_GW-090419

Collected Date/Time: 09/04/2019 11:25

Matrix: Groundwater

COC Reference: 113932

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	4.6	IR
1	500ml Plastic	None	Yes	4.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	09/17/19 10:50	CCM	

Inorganics

Method: SM2340C, Run Date: 09/10/19 16:22, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	448	2		mg/L	10		

Method: SM2540C, Run Date: 09/06/19 19:30, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	2,210	20		mg/L	2		

Metals

Method: E200.8, Run Date: 09/17/19 14:45, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	0.55	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Lab Sample ID: S06738.08

Sample Tag: SUMP_GW-090419

Collected Date/Time: 09/04/2019 12:10

Matrix: Groundwater

COC Reference: 113932

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	4.6	IR
1	500ml Plastic	None	Yes	4.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	09/17/19 10:50	CCM	

Inorganics

Method: SM2340C, Run Date: 09/10/19 16:24, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	315	2		mg/L	10		

Method: SM2540C, Run Date: 09/06/19 19:30, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	900	20		mg/L	2		

Metals

Method: E200.8, Run Date: 09/17/19 14:48, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	10.7	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Lab Sample ID: S06738.09
Sample Tag: MWW5-01_GW-090419
Collected Date/Time: 09/04/2019 13:30
Matrix: Groundwater
COC Reference: 113932

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	4.6	IR
1	500ml Plastic	None	Yes	4.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	09/17/19 10:50	CCM	

Inorganics

Method: SM2340C, Run Date: 09/10/19 16:26, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	583	2		mg/L	10		

Method: SM2540C, Run Date: 09/06/19 19:30, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	766	20		mg/L	2		

Metals

Method: E200.8, Run Date: 09/17/19 14:52, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	29.2	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Lab Sample ID: S06738.10
Sample Tag: DUP-01_GW-090319
Collected Date/Time: 09/03/2019 00:01
Matrix: Groundwater
COC Reference: 113932

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	4.6	IR
1	500ml Plastic	None	Yes	4.6	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	09/17/19 10:50	CCM	

Inorganics

Method: SM2340C, Run Date: 09/10/19 16:28, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	316	2		mg/L	10		

Method: SM2540C, Run Date: 09/06/19 19:30, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	890	20		mg/L	2		

Metals

Method: E200.8, Run Date: 09/17/19 15:02, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	5.60	0.02		mg/L	5	7439-89-6	

Merit Laboratories Login Checklist

Lab Set ID:S06738

Client:ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: PNC Racer

Submitted:09/06/2019 08:15 Login User: SRS

Attention: Colleen Barton

Address: Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-225-1909

FAX: 248-994-2241

Email: Colleen.barton@arcadis.com

Selection	Description	Note
Sample Receiving		
01.	☒ Yes ☐ No ☐ N/A	Samples are received at 4C +/- 2C Thermometer # IR 4.6
02.	☒ Yes ☐ No ☐ N/A	Received on ice/ cooling process begun
03.	☐ Yes ☒ No ☐ N/A	Samples shipped
04.	☐ Yes ☒ No ☐ N/A	Samples left in 24 hr. drop box
05.	☐ Yes ☐ No ☒ N/A	Are there custody seals/tape or is the drop box locked
Chain of Custody		
06.	☒ Yes ☐ No ☐ N/A	COC adequately filled out
07.	☒ Yes ☐ No ☐ N/A	COC signed and relinquished to the lab
08.	☒ Yes ☐ No ☐ N/A	Sample tag on bottles match COC
09.	☐ Yes ☒ No ☐ N/A	Subcontracting needed? Subcontacted to:
Preservation		
10.	☒ Yes ☐ No ☐ N/A	Do sample have correct chemical preservation
11.	☒ Yes ☐ No ☐ N/A	Completed pH checks on preserved samples? (no VOAs)
12.	☐ Yes ☒ No ☐ N/A	Did any samples need to be preserved in the lab?
Bottle Conditions		
13.	☒ Yes ☐ No ☐ N/A	All bottles intact
14.	☒ Yes ☐ No ☐ N/A	Appropriate analytical bottles are used
15.	☒ Yes ☐ No ☐ N/A	Merit bottles used
16.	☒ Yes ☐ No ☐ N/A	Sufficient sample volume received
17.	☐ Yes ☒ No ☐ N/A	Samples require laboratory filtration
18.	☒ Yes ☐ No ☐ N/A	Samples submitted within holding time
19.	☐ Yes ☐ No ☒ N/A	Do water VOC or TOX bottles contain headspace

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

Merit Laboratories Bottle Preservation Check

Lab Set ID: S06738 Initials: SRS

Client: ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: PNC Racer

Submitted: 09/06/2019 08:15 Login User:

Attention: Colleen Barton

Address: Arcadis

28550 Cabot Drive

Suite 500

Novi, MI 48377

Phone: 810-225-1909

FAX: 248-994-2241

Email: Colleen.barton@arcadis.com

Lab ID	125 ml Plastic HNO ₃	250 ml Plastic HNO ₃	1 L Plastic HNO ₃	250 ml Plastic H ₂ SO ₄	125 ml Amber H ₂ SO ₄	32 oz Glass HCl	125 ml Plastic NaOH	125 ml Amber PbCO ₃ NaOH	pH					Notes
									<2	>12	other	ml add	new pH	
S06738.01	X								X					
S06738.02	X								X					
S06738.03	X								X					
S06738.04	X								X					
S06738.05	X								X					
S06738.06	X								X					
S06738.07	X								X					
S06738.08	X								X					
S06738.09	X								X					
S06738.10	X								X					



113932

INVOICE TO

CONTACT NAME		ACCOUNTS PAYABLE		☐ SAME	
COMPANY					
ARADIS					
ADDRESS					
630 PLAZA DR #600					
CITY				STATE	
HIGHLANDS RANCH				CO	
PHONE NO.		ZIP CODE			
		80129			
E-MAIL ADDRESS		ACCOUNTSPAYABLE ADMINISTRATION@ARADIS.COM			

Certifications

☐ OHIO VAP ☐ Drinking Water

☐ DoD ☐ NPDES

Project Locations

☐ Detroit ☐ New York

☒ Other PONTIAC, MI

Special Instructions

Containers & Preservatives[illegible]

RELINQUISHED BY: SIGNATURE/ORGANIZATION		DATE		TIME
RECEIVED BY: SIGNATURE/ORGANIZATION		DATE		TIME
SEAL NO.	SEAL INTACT YES ☒ NO ☐	INITIALS	NOTES	TEMP. ON ARRIVAL
SEAL NO.	SEAL INTACT YES ☒ NO ☐	INITIALS		

Rev. 5.18.12



Analytical Laboratory Report

Report ID: S08056.01(01)
Generated on 10/23/2019

Report to

Attention: Colleen Barton
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-225-1909 FAX: 248-994-2241
Email: Colleen.barton@arcadis.com

Additional Contacts: Brad Saunders

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S08056.01-S08056.08
Project: PNC Racer
Collected Date(s): 10/07/2019
Submitted Date/Time: 10/08/2019 13:50
Sampled by: Christina Weaver
P.O. #: B0064607.2017

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

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'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
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Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

There is no additional narrative for this analytical report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
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B	Compound also found in associated method blank
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F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
N/A	Not Applicable
SW5030C/8260C	SW 846 Method 8260C Revision 3 August 2006 / 5030C Revision 3 May 2003
SW8260B - SIM	SW 846 Method 8260B Revision 2 December 1996 SIMs



Analytical Laboratory Report

Sample Summary (8 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S08056.01	MWF8-01_GW-100719	Groundwater	10/07/19 10:44
S08056.02	MW-02-17_GW-100719	Groundwater	10/07/19 12:10
S08056.03	MW-05-18_GW-100719	Groundwater	10/07/19 13:15
S08056.04	MWF16-23_GW-100719	Groundwater	10/07/19 15:50
S08056.05	MWF16-23_GW-100719 MS	Groundwater	10/07/19 15:50
S08056.06	MWF16-23_GW-100719 MSD	Groundwater	10/07/19 15:50
S08056.07	MWF16-25_GW-100719	Groundwater	10/07/19 17:05
S08056.08	Trip Blank	Water	10/07/19 00:01



Analytical Laboratory Report

Lab Sample ID: S08056.01

Sample Tag: MWF8-01_GW-100719

Collected Date/Time: 10/07/2019 10:44

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/11/19 13:00	JML	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/11/19 16:37, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	



Analytical Laboratory Report

Lab Sample ID: S08056.01 (continued)
Sample Tag: MWF8-01_GW-100719

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/11/19 16:37, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S08056.02

Sample Tag: MW-02-17_GW-100719

Collected Date/Time: 10/07/2019 12:10

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/11/19 13:00	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/11/19 15:38, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	29	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 14:53, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	7	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	10	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	



Analytical Laboratory Report

Lab Sample ID: S08056.02 (continued)

Sample Tag: MW-02-17_GW-100719

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 14:53, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Trichloroethene	4	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	2	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S08056.03

Sample Tag: MW-05-18_GW-100719

Collected Date/Time: 10/07/2019 13:15

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/11/19 13:00	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/17/19 22:51, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	4	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 15:12, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	13	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	8	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	



Analytical Laboratory Report

Lab Sample ID: S08056.03 (continued)
Sample Tag: MW-05-18_GW-100719

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 15:12, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	9	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S08056.04

Sample Tag: MWF16-23_GW-100719

Collected Date/Time: 10/07/2019 15:50

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/17/19 18:26, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	Not detected	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/15/19 14:52, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	21	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	3	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	9	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	



Analytical Laboratory Report

Lab Sample ID: S08056.04 (continued)

Sample Tag: MWF16-23_GW-100719

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/15/19 14:52, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Trichloroethene	20	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	6	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S08056.05

Sample Tag: MWF16-23_GW-100719 MS

Collected Date/Time: 10/07/2019 15:50

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/15/19 11:05, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	60	1		ug/L	1	123-91-1	1

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/15/19 18:45, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	53	50		ug/L	1	67-64-1	1
2-Butanone (MEK)	61	25		ug/L	1	78-93-3	1
Benzene	47	1		ug/L	1	71-43-2	1
Bromodichloromethane	50	1		ug/L	1	75-27-4	1
Bromoform	56	1		ug/L	1	75-25-2	1
Bromomethane	42	5		ug/L	1	74-83-9	1
Carbon disulfide	38	5		ug/L	1	75-15-0	1
Carbon tetrachloride	46	1		ug/L	1	56-23-5	1
Chlorobenzene	49	1		ug/L	1	108-90-7	1
Chloroethane	45	5		ug/L	1	75-00-3	1
Chloroform	49	1		ug/L	1	67-66-3	1
Chloromethane	43	5		ug/L	1	74-87-3	1
1,2-Dibromo-3-chloropropane	59	5		ug/L	1	96-12-8	1
1,2-Dichlorobenzene	49	1		ug/L	1	95-50-1	1
1,2-Dichloroethane	49	1		ug/L	1	107-06-2	1
1,2-Dichloropropane	50	1		ug/L	1	78-87-5	1
1,3-Dichlorobenzene	48	1		ug/L	1	541-73-1	1
1,4-Dichlorobenzene	48	1		ug/L	1	106-46-7	1
cis-1,2-Dichloroethene	64	1		ug/L	1	156-59-2	1
Dibromochloromethane	52	5		ug/L	1	124-48-1	1
Dichlorodifluoromethane	45	5		ug/L	1	75-71-8	1
trans-1,2-Dichloroethene	47	1		ug/L	1	156-60-5	1
Ethylbenzene	48	1		ug/L	1	100-41-4	1
2-Hexanone	66	50		ug/L	1	591-78-6	1
4-Methyl-2-pentanone (MIBK)	62	50		ug/L	1	108-10-1	1
tert-Methyl butyl ether (MTBE)	49	5		ug/L	1	1634-04-4	1
Methylene chloride	46	5		ug/L	1	75-09-2	1
Styrene	50	1		ug/L	1	100-42-5	1
1,1,1-Trichloroethane	56	1		ug/L	1	71-55-6	1
1,1,2-Trichloroethane	55	1		ug/L	1	79-00-5	1
1,2,4-Trichlorobenzene	43	5		ug/L	1	120-82-1	1
Tetrachloroethene	47	1		ug/L	1	127-18-4	1

1-spiked at 50ug/L



Analytical Laboratory Report

Lab Sample ID: S08056.05 (continued)

Sample Tag: MWF16-23_GW-100719 MS

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/15/19 18:45, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Toluene	49	1		ug/L	1	108-88-3	1
Trichloroethene	64	1		ug/L	1	79-01-6	1
Trichlorofluoromethane	46	1		ug/L	1	75-69-4	1
Vinyl chloride	44	1		ug/L	1	75-01-4	1
o-Xylene	49	1		ug/L	1	95-47-6	1
p,m-Xylene*	96	2		ug/L	1		1
Isopropylbenzene	50	1		ug/L	1	98-82-8	1
Cyclohexane	42	1		ug/L	1	110-82-7	1
1,1-Dichloroethane	53	1		ug/L	1	75-34-3	1
1,1-Dichloroethene	47	1		ug/L	1	75-35-4	1
Methyl Acetate	55	10		ug/L	1	79-20-9	1
Methyl cyclohexane	42	1		ug/L	1	108-87-2	1
1,1,2-Trichloro-1,2,2-trifluoroethane	45	1		ug/L	1	76-13-1	1
1,2-Dibromoethane	52	1		ug/L	1	106-93-4	1
1,1,2,2-Tetrachloroethane	61	1		ug/L	1	79-34-5	1
cis-1,3-Dichloropropene	50	1		ug/L	1	10061-01-5	1
trans-1,3-Dichloropropene	51	1		ug/L	1	10061-02-6	1

1-Spiked at 50ug/L



Analytical Laboratory Report

Lab Sample ID: S08056.06

Sample Tag: MWF16-23_GW-100719 MSD

Collected Date/Time: 10/07/2019 15:50

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/15/19 11:26, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	75	1		ug/L	1	123-91-1	1

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/15/19 19:04, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	54	50		ug/L	1	67-64-1	1
2-Butanone (MEK)	62	25		ug/L	1	78-93-3	1
Benzene	48	1		ug/L	1	71-43-2	1
Bromodichloromethane	51	1		ug/L	1	75-27-4	1
Bromoform	56	1		ug/L	1	75-25-2	1
Bromomethane	43	5		ug/L	1	74-83-9	1
Carbon disulfide	39	5		ug/L	1	75-15-0	1
Carbon tetrachloride	48	1		ug/L	1	56-23-5	1
Chlorobenzene	49	1		ug/L	1	108-90-7	1
Chloroethane	45	5		ug/L	1	75-00-3	1
Chloroform	51	1		ug/L	1	67-66-3	1
Chloromethane	44	5		ug/L	1	74-87-3	1
1,2-Dibromo-3-chloropropane	60	5		ug/L	1	96-12-8	1
1,2-Dichlorobenzene	51	1		ug/L	1	95-50-1	1
1,2-Dichloroethane	50	1		ug/L	1	107-06-2	1
1,2-Dichloropropane	51	1		ug/L	1	78-87-5	1
1,3-Dichlorobenzene	50	1		ug/L	1	541-73-1	1
1,4-Dichlorobenzene	50	1		ug/L	1	106-46-7	1
cis-1,2-Dichloroethene	67	1		ug/L	1	156-59-2	1
Dibromochloromethane	53	5		ug/L	1	124-48-1	1
Dichlorodifluoromethane	47	5		ug/L	1	75-71-8	1
trans-1,2-Dichloroethene	49	1		ug/L	1	156-60-5	1
Ethylbenzene	49	1		ug/L	1	100-41-4	1
2-Hexanone	65	50		ug/L	1	591-78-6	1
4-Methyl-2-pentanone (MIBK)	63	50		ug/L	1	108-10-1	1
tert-Methyl butyl ether (MTBE)	51	5		ug/L	1	1634-04-4	1
Methylene chloride	48	5		ug/L	1	75-09-2	1
Styrene	50	1		ug/L	1	100-42-5	1
1,1,1-Trichloroethane	57	1		ug/L	1	71-55-6	1
1,1,2-Trichloroethane	56	1		ug/L	1	79-00-5	1
1,2,4-Trichlorobenzene	43	5		ug/L	1	120-82-1	1
Tetrachloroethene	48	1		ug/L	1	127-18-4	1

1-spiked at 50ug/L



Analytical Laboratory Report

Lab Sample ID: S08056.06 (continued)
Sample Tag: MWF16-23_GW-100719 MSD

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/15/19 19:04, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Toluene	49	1		ug/L	1	108-88-3	1
Trichloroethene	65	1		ug/L	1	79-01-6	1
Trichlorofluoromethane	48	1		ug/L	1	75-69-4	1
Vinyl chloride	44	1		ug/L	1	75-01-4	1
o-Xylene	49	1		ug/L	1	95-47-6	1
p,m-Xylene*	97	2		ug/L	1		1
Isopropylbenzene	49	1		ug/L	1	98-82-8	1
Cyclohexane	44	1		ug/L	1	110-82-7	1
1,1-Dichloroethane	55	1		ug/L	1	75-34-3	1
1,1-Dichloroethene	48	1		ug/L	1	75-35-4	1
Methyl Acetate	57	10		ug/L	1	79-20-9	1
Methyl cyclohexane	44	1		ug/L	1	108-87-2	1
1,1,2-Trichloro-1,2,2-trifluoroethane	47	1		ug/L	1	76-13-1	1
1,2-Dibromoethane	54	1		ug/L	1	106-93-4	1
1,1,2,2-Tetrachloroethane	60	1		ug/L	1	79-34-5	1
cis-1,3-Dichloropropene	51	1		ug/L	1	10061-01-5	1
trans-1,3-Dichloropropene	52	1		ug/L	1	10061-02-6	1

1-Spiked at 50ug/L



Analytical Laboratory Report

Lab Sample ID: S08056.07

Sample Tag: MWF16-25_GW-100719

Collected Date/Time: 10/07/2019 17:05

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/11/19 13:00	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/17/19 23:14, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	4	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 15:31, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	1	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	5	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	8	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	4	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	



Analytical Laboratory Report

Lab Sample ID: S08056.07 (continued)

Sample Tag: MWF16-25_GW-100719

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 15:31, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	4	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S08056.08

Sample Tag: Trip Blank

Collected Date/Time: 10/07/2019 00:01

Matrix: Water

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	HCL	Yes	4.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/11/19 13:00	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/17/19 18:03, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	Not detected	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 13:38, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	



Analytical Laboratory Report

Lab Sample ID: S08056.08 (continued)

Sample Tag: Trip Blank

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 13:38, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	

Merit Laboratories Login Checklist

Lab Set ID:S08056

Client:ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: PNC Racer

Submitted: 10/08/2019 13:50 Login User: MMC

Attention: Colleen Barton

Address: Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-225-1909

FAX: 248-994-2241

Email: Colleen.barton@arcadis.com

Selection	Description	Note
Sample Receiving		
01.	☒ Yes ☐ No ☐ N/A	Samples are received at 4C +/- 2C Thermometer # IR 4.0
02.	☒ Yes ☐ No ☐ N/A	Received on ice/ cooling process begun
03.	☐ Yes ☒ No ☐ N/A	Samples shipped
04.	☐ Yes ☒ No ☐ N/A	Samples left in 24 hr. drop box
05.	☐ Yes ☐ No ☒ N/A	Are there custody seals/tape or is the drop box locked
Chain of Custody		
06.	☒ Yes ☐ No ☐ N/A	COC adequately filled out
07.	☒ Yes ☐ No ☐ N/A	COC signed and relinquished to the lab
08.	☒ Yes ☐ No ☐ N/A	Sample tag on bottles match COC
09.	☐ Yes ☒ No ☐ N/A	Subcontracting needed? Subcontacted to:
Preservation		
10.	☒ Yes ☐ No ☐ N/A	Do sample have correct chemical preservation
11.	☐ Yes ☐ No ☒ N/A	Completed pH checks on preserved samples? (no VOAs)
12.	☐ Yes ☒ No ☐ N/A	Did any samples need to be preserved in the lab?
Bottle Conditions		
13.	☒ Yes ☐ No ☐ N/A	All bottles intact
14.	☒ Yes ☐ No ☐ N/A	Appropriate analytical bottles are used
15.	☒ Yes ☐ No ☐ N/A	Merit bottles used
16.	☒ Yes ☐ No ☐ N/A	Sufficient sample volume received
17.	☐ Yes ☒ No ☐ N/A	Samples require laboratory filtration
18.	☒ Yes ☐ No ☐ N/A	Samples submitted within holding time
19.	☐ Yes ☐ No ☒ N/A	Do water VOC or TOX bottles contain headspace

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____



2680 East Lansing Dr., East Lansing, MI 48823
Phone (517) 332-0167 Fax (517) 332-4034
www.meritlabs.com

C.O.C. PAGE # 1 OF 1

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME Colleen Barton			
COMPANY Arcadis			
ADDRESS 28550 Cabot Drive #500			
CITY Novi		STATE MI	ZIP CODE 48377
PHONE NO. 810.225.1909	FAX NO.	P.O. NO. B0064607.2017.	
E-MAIL ADDRESS Colleen.Barton@arcadis.com; Brad.Saunders@arc		QUOTE NO.	

CONTACT NAME Accounts Payable		☐ SAME	
COMPANY Arcadis			
ADDRESS 630 Plaza Drive Suite 600			
CITY Highlands Ranch		STATE CO	ZIP CODE 80129
PHONE NO.	E-MAIL ADDRESS accountspayable.administration@arcadis-us.com		

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME PNC Racer			SAMPLER(S) - PLEASE PRINT/SIGN NAME Christina Weaver																			
TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER																						
DELIVERABLES REQUIRED ☐ STD ☒ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☒ EDD ☐ OTHER																						
MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIFE A=AIR W=WASTE			# Containers & Preservatives																			
MERIT LAB NO. FOR LAB USE ONLY	YEAR DATE TIME		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NONE	HCl	HNO3	H2SO4	HClO4	MeOH	OTHER	* VOCs (8260)	1,4-dioxane (8260 SIMs)	Manganese	Lead	Antimony	Vanadium	** Montcalm Inorganics	** Montcalm Geochemistry	PCB	Certifications ☐ OHIO VAP ☐ Drinking Water ☐ DoD ☐ NPDES
080601	10/7/19	1041	MWF8-01-GW-100719	GW	3		X						X									☐ Detroit ☐ New York ☒ Other Pontiac, MI
02	10/7/19	1210	MW-02-17-GW-100719	GW	3		X						X	X								* See attached VOC list
03	10/7/19	1315	MW-05-18-GW-100719	GW	3		X						X	X								** See attached Montcalm inorganics/geochemistry lists
04/05/06	10/7/19	1550	MWF16-23-GW-100719	GW	9		X						X	X								*** RL for 1,4-dioxane must be <7.2 ppb (MS/MS collected)
07	10/7/19	1705	MWF16-25-GW-100719	GW	3		X						X	X								
08	10/7/19	-	Tip Blank																			

RELINQUISHED BY: SIGNATURE/ORGANIZATION Christina Weaver / Arcadis	DATE 10/7/19	TIME 1820
RECEIVED BY: SIGNATURE/ORGANIZATION Novi Cold Storage	DATE 10/7/19	TIME 1820
RELINQUISHED BY: SIGNATURE/ORGANIZATION [Signature]	DATE 10-8-19	TIME 1855
RECEIVED BY: SIGNATURE/ORGANIZATION [Signature]	DATE 10-8-19	TIME 1855

RELINQUISHED BY: SIGNATURE/ORGANIZATION [Signature]	DATE 10/8/19	TIME 1350
RECEIVED BY: SIGNATURE/ORGANIZATION [Signature]	DATE 10/8/19	TIME 1350
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS
NOTES:		TEMP. ON ARRIVAL 4.0

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

Table 4
Summary of Groundwater Analytical Results
RACER Trust Pontiac North Campus
Pontiac, Michigan

PNC VOC Analyte List - 8260C		
Volatile Organic Compounds		
VOC	Acetone	1
VOC	Benzene	1
VOC	Bromodichloromethane	1
VOC	Bromoform	1
VOC	Bromomethane	1
VOC	2-Butanone	1
VOC	Carbon Disulfide	1
VOC	Carbon Tetrachloride	1
VOC	Chlorobenzene	1
VOC	Chloroethane	1
VOC	Chloroform	1
VOC	Chloromethane	1
VOC	Cumene	1
VOC	Cyclohexane	1
VOC	1,2-Dibromo-3-chloropropane	1
VOC	Dibromochloromethane	1
VOC	1,2-Dibromoethane	1
VOC	1,2-Dichlorobenzene	1
VOC	1,3-Dichlorobenzene	1
VOC	1,4-Dichlorobenzene	1
VOC	Dichlorodifluoromethane	1
VOC	1,1-Dichloroethane	1
VOC	1,2-Dichloroethane	1
VOC	1,1-Dichloroethene	1
VOC	cis-1,2-Dichloroethene	1
VOC	trans-1,2-Dichloroethene	1
VOC	1,2-Dichloropropane	1
VOC	1,3-Dichloropropene (summed)	1
VOC	Ethyl Benzene	1
VOC	2-Hexanone	1
VOC	Methyl Acetate	1
VOC	Methyl tert-butyl ether	1
VOC	4-Methyl-2-pentanone	1
VOC	Methylcyclohexane	1
VOC	Methylene Chloride	1
VOC	Styrene	1
VOC	1,1,2,2-Tetrachloroethane	1
VOC	Tetrachloroethene	1
VOC	Toluene	1
VOC	1,2,4-Trichlorobenzene	1
VOC	1,1,1-Trichloroethane	1
VOC	1,1,2-Trichloroethane	1
VOC	Trichloroethene	1
VOC	Trichlorofluoromethane	1
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	1
VOC	Vinyl Chloride	1
VOC	Xylenes (total)	1



Analytical Laboratory Report

Report ID: S08107.01(01)
Generated on 10/23/2019

Report to

Attention: Colleen Barton
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-225-1909 FAX: 248-994-2241
Email: Colleen.barton@arcadis.com

Additional Contacts: Brad Saunders

Report produced by

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Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S08107.01-S08107.13
Project: PNC Racer
Collected Date(s): 10/07/2019 - 10/08/2019
Submitted Date/Time: 10/09/2019 15:30
Sampled by: C. Zilio
P.O. #: 30006882.00006

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.
Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.
Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

There is no additional narrative for this analytical report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
E200.8	EPA Method 200.8 Revision 5.4
E245.1	EPA Method 245.1 Revision 3.0
E608.3	EPA Method 608.3 December 2016
N/A	Not Applicable
SM2320B	Standard Method 2320 B 2011
SM2340C	Standard Method 2340 C 2011
SM2540C	Standard Method 2540 C 2011
SM2540D	Standard Method 2540 D 2011
SW3015A	SW 846 Method 3015A Revision 1 February 2007
SW5030C/8260C	SW 846 Method 8260C Revision 3 August 2006 / 5030C Revision 3 May 2003
SW8260B - SIM	SW 846 Method 8260B Revision 2 December 1996 SIMs



Analytical Laboratory Report

Sample Summary (13 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S08107.01	MWF12-02_GW-100719	Groundwater	10/07/19 11:05
S08107.02	MWF16-06_GW-100719	Groundwater	10/07/19 12:10
S08107.03	MWF7-02_GW-100719	Groundwater	10/07/19 13:00
S08107.04	MWOS-01_GW-100719	Groundwater	10/07/19 14:50
S08107.05	MWW1-04_GW-100719	Groundwater	10/07/19 17:05
S08107.06	MWW1-15_GW-100819	Groundwater	10/08/19 10:00
S08107.07	MW-01-17_GW-100819	Groundwater	10/08/19 11:55
S08107.08	TW-MD-01_GW-100819	Groundwater	10/08/19 12:45
S08107.09	TW-MD-02_GW-100819	Groundwater	10/08/19 14:20
S08107.10	TW-MD-02_GW-100819 MS	Groundwater	10/08/19 14:20
S08107.11	TW-MD-02_GW-100819 MSD	Groundwater	10/08/19 14:20
S08107.12	TW-MD-03_GW-100819	Groundwater	10/08/19 16:15
S08107.13	Trip Blank	Water	10/08/19 00:01



Analytical Laboratory Report

Lab Sample ID: S08107.01

Sample Tag: MWF12-02_GW-100719

Collected Date/Time: 10/07/2019 11:05

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.7	IR
1	125ml Plastic	HNO3	Yes	4.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/11/19 13:00	JML	
Metal Digestion	Completed	SW3015A	10/17/19 10:00	CCM	

Metals

Method: E200.8, Run Date: 10/17/19 12:00, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Manganese	0.330	0.005		mg/L	5	7439-96-5	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 17:54, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	1	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	



Analytical Laboratory Report

Lab Sample ID: S08107.01 (continued)

Sample Tag: MWF12-02_GW-100719

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 17:54, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	2	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S08107.02

Sample Tag: MWF16-06_GW-100719

Collected Date/Time: 10/07/2019 12:10

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/11/19 13:00	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/11/19 17:46, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	29	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 18:13, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	13	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	34	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	1	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	17	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	164	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	76	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	



Analytical Laboratory Report

Lab Sample ID: S08107.02 (continued)

Sample Tag: MWF16-06_GW-100719

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 18:13, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Trichloroethene	12	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	67	1		ug/L	1	75-34-3	
1,1-Dichloroethene	12	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S08107.03

Sample Tag: MWF7-02_GW-100719

Collected Date/Time: 10/07/2019 13:00

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/11/19 13:00	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/14/19 16:23, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	300	10		ug/L	10	123-91-1	Y

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 18:33, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	3	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	60	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	54	1		ug/L	1	127-18-4	

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Lab Sample ID: S08107.03 (continued)
Sample Tag: MWF7-02_GW-100719

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 18:33, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	3	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	38	1		ug/L	1	75-34-3	
1,1-Dichloroethene	10	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S08107.04

Sample Tag: MWOS-01_GW-100719

Collected Date/Time: 10/07/2019 14:50

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/11/19 13:00	JML	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 18:52, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	



Analytical Laboratory Report

Lab Sample ID: S08107.04 (continued)
Sample Tag: MWOS-01_GW-100719

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 18:52, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S08107.05

Sample Tag: MWW1-04_GW-100719

Collected Date/Time: 10/07/2019 17:05

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.7	IR
1	125ml Plastic	HNO3	Yes	4.7	IR
2	1L Amber	None	Yes	4.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/11/19 13:00	JML	
Metal Digestion	Completed	SW3015A	10/16/19 10:00	CCM	
Extraction, PCB*	Completed	E608.3	10/10/19 12:30	BPS	

Metals

Method: E200.8, Run Date: 10/16/19 11:58, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Vanadium	0.008	0.005		mg/L	5	7440-62-2	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/11/19 17:24, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	0.2	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	0.2	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/14/19 14:59, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	Not detected	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 19:11, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	



Analytical Laboratory Report

Lab Sample ID: S08107.05 (continued)

Sample Tag: MWW1-04_GW-100719

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 19:11, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S08107.06

Sample Tag: MWW1-15_GW-100819

Collected Date/Time: 10/08/2019 10:00

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.7	IR
1	125ml Plastic	HNO3	Yes	4.7	IR
2	1L Amber	None	Yes	4.7	IR
1	1L Plastic	None	Yes	4.7	IR
1	500ml Plastic	None	Yes	4.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/16/19 10:15	JRH	
pH check for VOCs*	<2	N/A	10/11/19 13:00	JML	
Metal Digestion	Completed	SW3015A	10/16/19 10:00	CCM	
Extraction, PCB*	Completed	E608.3	10/10/19 12:30	BPS	

Inorganics

Method: SM2320B, Run Date: 10/10/19 15:18, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	416	2		mg/L	2		

Method: SM2340C, Run Date: 10/15/19 15:42, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	147	2		mg/L	10		

Method: SM2540C, Run Date: 10/10/19 16:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	724	40		mg/L	4		

Method: SM2540D, Run Date: 10/11/19 14:30, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	4	3		mg/L	4		

Metals

Method: E200.8, Run Date: 10/14/19 11:38, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	53.3	2.5		mg/L	50	7440-70-2	
Magnesium	29.0	2.5		mg/L	50	7439-95-4	

Method: E200.8, Run Date: 10/16/19 12:02, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.002	0.002		mg/L	5	7440-38-2	
Barium	0.116	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	



Analytical Laboratory Report

Lab Sample ID: S08107.06 (continued)

Sample Tag: MWW1-15_GW-100819

Method: E200.8, Run Date: 10/16/19 12:02, Analyst: CCM (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	5.04	0.02		mg/L	5	7439-89-6	
Lead	Not detected	0.003		mg/L	5	7439-92-1	
Manganese	0.207	0.005		mg/L	5	7439-96-5	
Nickel	Not detected	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	Not detected	0.005		mg/L	5	7440-66-6	

Method: E245.1, Run Date: 10/17/19 12:40, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/11/19 17:35, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 19:31, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	



Analytical Laboratory Report

Lab Sample ID: S08107.06 (continued)

Sample Tag: MWW1-15_GW-100819

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 19:31, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S08107.07

Sample Tag: MW-01-17_GW-100819

Collected Date/Time: 10/08/2019 11:55

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/15/19 13:09, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	Not detected	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 22:46, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	



Analytical Laboratory Report

Lab Sample ID: S08107.07 (continued)
Sample Tag: MW-01-17_GW-100819

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 22:46, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S08107.08

Sample Tag: TW-MD-01_GW-100819

Collected Date/Time: 10/08/2019 12:45

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.7	IR
1	125ml Plastic	HNO3	Yes	4.7	IR
2	1L Amber	None	Yes	4.7	IR
1	1L Plastic	None	Yes	4.7	IR
1	500ml Plastic	None	Yes	4.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/16/19 10:15	JRH	
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	
Metal Digestion	Completed	SW3015A	10/16/19 10:00	CCM	
Extraction, PCB*	Completed	E608.3	10/10/19 12:30	BPS	

Inorganics

Method: SM2320B, Run Date: 10/10/19 15:20, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	470	2		mg/L	2		

Method: SM2340C, Run Date: 10/15/19 15:44, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	271	2		mg/L	10		

Method: SM2540C, Run Date: 10/11/19 14:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	680	40		mg/L	4		

Method: SM2540D, Run Date: 10/11/19 14:30, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	16	3		mg/L	2.5		

Metals

Method: E200.8, Run Date: 10/14/19 11:41, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	103	2.5		mg/L	50	7440-70-2	
Magnesium	25.1	2.5		mg/L	50	7439-95-4	

Method: E200.8, Run Date: 10/16/19 12:08, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.002	0.002		mg/L	5	7440-38-2	
Barium	0.110	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	



Analytical Laboratory Report

Lab Sample ID: S08107.08 (continued)

Sample Tag: TW-MD-01_GW-100819

Method: E200.8, Run Date: 10/16/19 12:08, Analyst: CCM (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	7.05	0.02		mg/L	5	7439-89-6	
Lead	Not detected	0.003		mg/L	5	7439-92-1	
Manganese	0.867	0.005		mg/L	5	7439-96-5	
Nickel	Not detected	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	0.0007	0.0005		mg/L	5	7440-22-4	
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	Not detected	0.005		mg/L	5	7440-66-6	

Method: E245.1, Run Date: 10/17/19 12:42, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/11/19 17:46, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/11/19 19:10, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	6	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 23:05, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	



Analytical Laboratory Report

Lab Sample ID: S08107.08 (continued)

Sample Tag: TW-MD-01_GW-100819

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 23:05, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S08107.09

Sample Tag: TW-MD-02_GW-100819

Collected Date/Time: 10/08/2019 14:20

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.7	IR
1	125ml Plastic	HNO3	Yes	4.7	IR
2	1L Amber	None	Yes	4.7	IR
1	1L Plastic	None	Yes	4.7	IR
1	500ml Plastic	None	Yes	4.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/16/19 10:15	JRH	
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	
Metal Digestion	Completed	SW3015A	10/16/19 10:00	CCM	
Extraction, PCB*	Completed	E608.3	10/10/19 12:30	BPS	

Inorganics

Method: SM2320B, Run Date: 10/10/19 15:22, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	410	2		mg/L	2		

Method: SM2340C, Run Date: 10/15/19 15:46, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	219	2		mg/L	10		

Method: SM2540C, Run Date: 10/10/19 16:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	728	40		mg/L	4		

Method: SM2540D, Run Date: 10/11/19 14:30, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	22	3		mg/L	2.86		

Metals

Method: E200.8, Run Date: 10/14/19 11:42, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	90.6	2.5		mg/L	50	7440-70-2	
Magnesium	20.2	2.5		mg/L	50	7439-95-4	

Method: E200.8, Run Date: 10/16/19 12:16, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.006	0.002		mg/L	5	7440-38-2	
Barium	0.193	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	



Analytical Laboratory Report

Lab Sample ID: S08107.09 (continued)

Sample Tag: TW-MD-02_GW-100819

Method: E200.8, Run Date: 10/16/19 12:16, Analyst: CCM (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	11.2	0.02		mg/L	5	7439-89-6	
Lead	Not detected	0.003		mg/L	5	7439-92-1	
Manganese	0.501	0.005		mg/L	5	7439-96-5	
Nickel	Not detected	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	0.008	0.005		mg/L	5	7440-66-6	

Method: E245.1, Run Date: 10/17/19 12:44, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/11/19 16:26, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/17/19 00:37, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	



Analytical Laboratory Report

Lab Sample ID: S08107.09 (continued)

Sample Tag: TW-MD-02_GW-100819

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/17/19 00:37, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S08107.10

Sample Tag: TW-MD-02_GW-100819 MS

Collected Date/Time: 10/08/2019 14:20

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.7	IR
1	125ml Plastic	HNO3	Yes	4.7	IR
2	1L Amber	None	Yes	4.7	IR
1	1L Plastic	None	Yes	4.7	IR
1	500ml Plastic	None	Yes	4.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/16/19 10:15	JRH	
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	
Metal Digestion	Completed	SW3015A	10/16/19 10:00	CCM	
Extraction, PCB*	Completed	E608.3	10/10/19 12:30	BPS	

Inorganics

Method: SM2320B, Run Date: 10/10/19 15:24, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	508	2		mg/L	2		

Method: SM2340C, Run Date: 10/15/19 15:48, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	425	2		mg/L	10		

Metals

Method: E200.8, Run Date: 10/14/19 11:50, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	190	2.5		mg/L	50	7440-70-2	
Magnesium	118	2.5		mg/L	50	7439-95-4	

Method: E200.8, Run Date: 10/16/19 12:46, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	0.201	0.005		mg/L	5	7440-36-0	
Arsenic	0.265	0.002		mg/L	5	7440-38-2	
Barium	0.445	0.005		mg/L	5	7440-39-3	
Beryllium	0.263	0.001		mg/L	5	7440-41-7	
Cadmium	0.242	0.0005		mg/L	5	7440-43-9	
Chromium	0.261	0.005		mg/L	5	7440-47-3	
Cobalt	0.242	0.005		mg/L	5	7440-48-4	
Copper	0.239	0.005		mg/L	5	7440-50-8	
Iron	11.4	0.02		mg/L	5	7439-89-6	
Lead	0.223	0.003		mg/L	5	7439-92-1	
Manganese	0.785	0.005		mg/L	5	7439-96-5	
Nickel	0.249	0.005		mg/L	5	7440-02-0	
Selenium	0.253	0.005		mg/L	5	7782-49-2	
Silver	0.214	0.0005		mg/L	5	7440-22-4	
Thallium	0.220	0.002		mg/L	5	7440-28-0	
Vanadium	0.261	0.005		mg/L	5	7440-62-2	



Analytical Laboratory Report

Lab Sample ID: S08107.10 (continued)

Sample Tag: TW-MD-02_GW-100819 MS

Method: E200.8, Run Date: 10/16/19 12:46, Analyst: CCM (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Zinc	0.251	0.005		mg/L	5	7440-66-6	

Method: E245.1, Run Date: 10/17/19 12:45, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	0.0020	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/11/19 16:44, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	0.4	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	0.4	0.1		ug/L	1	11096-82-5	
PCB, Total*	0.8	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/17/19 07:04, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	70	50		ug/L	1	67-64-1	1
2-Butanone (MEK)	68	25		ug/L	1	78-93-3	1
Benzene	52	1		ug/L	1	71-43-2	1
Bromodichloromethane	53	1		ug/L	1	75-27-4	1
Bromoform	57	1		ug/L	1	75-25-2	1
Bromomethane	45	5		ug/L	1	74-83-9	1
Carbon disulfide	44	5		ug/L	1	75-15-0	1
Carbon tetrachloride	49	1		ug/L	1	56-23-5	1
Chlorobenzene	52	1		ug/L	1	108-90-7	1
Chloroethane	48	5		ug/L	1	75-00-3	1
Chloroform	51	1		ug/L	1	67-66-3	1
Chloromethane	46	5		ug/L	1	74-87-3	1
1,2-Dibromo-3-chloropropane	63	5		ug/L	1	96-12-8	1
1,2-Dichlorobenzene	51	1		ug/L	1	95-50-1	1
1,2-Dichloroethane	52	1		ug/L	1	107-06-2	1
1,2-Dichloropropane	54	1		ug/L	1	78-87-5	1
1,3-Dichlorobenzene	49	1		ug/L	1	541-73-1	1
1,4-Dichlorobenzene	50	1		ug/L	1	106-46-7	1
cis-1,2-Dichloroethene	49	1		ug/L	1	156-59-2	1
Dibromochloromethane	54	5		ug/L	1	124-48-1	1
Dichlorodifluoromethane	46	5		ug/L	1	75-71-8	1
trans-1,2-Dichloroethene	49	1		ug/L	1	156-60-5	1
Ethylbenzene	51	1		ug/L	1	100-41-4	1
2-Hexanone	80	50		ug/L	1	591-78-6	1
4-Methyl-2-pentanone (MIBK)	74	50		ug/L	1	108-10-1	1
tert-Methyl butyl ether (MTBE)	50	5		ug/L	1	1634-04-4	1
Methylene chloride	50	5		ug/L	1	75-09-2	1
Styrene	51	1		ug/L	1	100-42-5	1

1-Spiked at 50ug/L



Analytical Laboratory Report

Lab Sample ID: S08107.10 (continued)
Sample Tag: TW-MD-02_GW-100819 MS

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/17/19 07:04, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,1,1-Trichloroethane	49	1		ug/L	1	71-55-6	1
1,1,2-Trichloroethane	58	1		ug/L	1	79-00-5	1
1,2,4-Trichlorobenzene	44	5		ug/L	1	120-82-1	1
Tetrachloroethene	51	1		ug/L	1	127-18-4	1
Toluene	54	1		ug/L	1	108-88-3	1
Trichloroethene	51	1		ug/L	1	79-01-6	1
Trichlorofluoromethane	49	1		ug/L	1	75-69-4	1
Vinyl chloride	47	1		ug/L	1	75-01-4	1
o-Xylene	52	1		ug/L	1	95-47-6	1
p,m-Xylene*	103	2		ug/L	1		1
Isopropylbenzene	52	1		ug/L	1	98-82-8	1
Cyclohexane	46	1		ug/L	1	110-82-7	1
1,1-Dichloroethane	51	1		ug/L	1	75-34-3	1
1,1-Dichloroethene	50	1		ug/L	1	75-35-4	1
Methyl Acetate	47	10		ug/L	1	79-20-9	1
Methyl cyclohexane	45	1		ug/L	1	108-87-2	1
1,1,2-Trichloro-1,2,2-trifluoroethane	46	1		ug/L	1	76-13-1	1
1,2-Dibromoethane	55	1		ug/L	1	106-93-4	1
1,1,2,2-Tetrachloroethane	62	1		ug/L	1	79-34-5	1
cis-1,3-Dichloropropene	51	1		ug/L	1	10061-01-5	1
trans-1,3-Dichloropropene	52	1		ug/L	1	10061-02-6	1

1-Spiked at 50ug/L



Analytical Laboratory Report

Lab Sample ID: S08107.11

Sample Tag: TW-MD-02_GW-100819 MSD

Collected Date/Time: 10/08/2019 14:20

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.7	IR
1	125ml Plastic	HNO3	Yes	4.7	IR
2	1L Amber	None	Yes	4.7	IR
1	1L Plastic	None	Yes	4.7	IR
1	500ml Plastic	None	Yes	4.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/16/19 10:15	JRH	
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	
Metal Digestion	Completed	SW3015A	10/16/19 10:00	CCM	
Extraction, PCB*	Completed	E608.3	10/10/19 12:30	BPS	

Inorganics

Method: SM2320B, Run Date: 10/10/19 15:26, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	508	2		mg/L	2		

Method: SM2340C, Run Date: 10/15/19 15:50, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	418	2		mg/L	10		

Metals

Method: E200.8, Run Date: 10/14/19 11:52, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	188	2.5		mg/L	50	7440-70-2	
Magnesium	118	2.5		mg/L	50	7439-95-4	

Method: E200.8, Run Date: 10/16/19 12:47, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	0.205	0.005		mg/L	5	7440-36-0	
Arsenic	0.249	0.002		mg/L	5	7440-38-2	
Barium	0.443	0.005		mg/L	5	7440-39-3	
Beryllium	0.269	0.001		mg/L	5	7440-41-7	
Cadmium	0.228	0.0005		mg/L	5	7440-43-9	
Chromium	0.238	0.005		mg/L	5	7440-47-3	
Cobalt	0.238	0.005		mg/L	5	7440-48-4	
Copper	0.224	0.005		mg/L	5	7440-50-8	
Iron	11.1	0.02		mg/L	5	7439-89-6	
Lead	0.224	0.003		mg/L	5	7439-92-1	
Manganese	0.733	0.005		mg/L	5	7439-96-5	
Nickel	0.243	0.005		mg/L	5	7440-02-0	
Selenium	0.271	0.005		mg/L	5	7782-49-2	
Silver	0.217	0.0005		mg/L	5	7440-22-4	
Thallium	0.224	0.002		mg/L	5	7440-28-0	
Vanadium	0.242	0.005		mg/L	5	7440-62-2	



Analytical Laboratory Report

Lab Sample ID: S08107.11 (continued)
Sample Tag: TW-MD-02_GW-100819 MSD

Method: E200.8, Run Date: 10/16/19 12:47, Analyst: CCM (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Zinc	0.235	0.005		mg/L	5	7440-66-6	

Method: E245.1, Run Date: 10/17/19 12:47, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	0.0020	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/11/19 17:13, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	0.4	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	0.4	0.1		ug/L	1	11096-82-5	
PCB, Total*	0.8	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/17/19 07:23, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	72	50		ug/L	1	67-64-1	1
2-Butanone (MEK)	69	25		ug/L	1	78-93-3	1
Benzene	51	1		ug/L	1	71-43-2	1
Bromodichloromethane	52	1		ug/L	1	75-27-4	1
Bromoform	59	1		ug/L	1	75-25-2	1
Bromomethane	45	5		ug/L	1	74-83-9	1
Carbon disulfide	46	5		ug/L	1	75-15-0	1
Carbon tetrachloride	49	1		ug/L	1	56-23-5	1
Chlorobenzene	52	1		ug/L	1	108-90-7	1
Chloroethane	48	5		ug/L	1	75-00-3	1
Chloroform	50	1		ug/L	1	67-66-3	1
Chloromethane	47	5		ug/L	1	74-87-3	1
1,2-Dibromo-3-chloropropane	66	5		ug/L	1	96-12-8	1
1,2-Dichlorobenzene	52	1		ug/L	1	95-50-1	1
1,2-Dichloroethane	51	1		ug/L	1	107-06-2	1
1,2-Dichloropropane	52	1		ug/L	1	78-87-5	1
1,3-Dichlorobenzene	50	1		ug/L	1	541-73-1	1
1,4-Dichlorobenzene	51	1		ug/L	1	106-46-7	1
cis-1,2-Dichloroethene	48	1		ug/L	1	156-59-2	1
Dibromochloromethane	56	5		ug/L	1	124-48-1	1
Dichlorodifluoromethane	45	5		ug/L	1	75-71-8	1
trans-1,2-Dichloroethene	48	1		ug/L	1	156-60-5	1
Ethylbenzene	52	1		ug/L	1	100-41-4	1
2-Hexanone	80	50		ug/L	1	591-78-6	1
4-Methyl-2-pentanone (MIBK)	74	50		ug/L	1	108-10-1	1
tert-Methyl butyl ether (MTBE)	51	5		ug/L	1	1634-04-4	1
Methylene chloride	49	5		ug/L	1	75-09-2	1
Styrene	52	1		ug/L	1	100-42-5	1

1-Spiked at 50ug/L



Analytical Laboratory Report

Lab Sample ID: S08107.11 (continued)
Sample Tag: TW-MD-02_GW-100819 MSD

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/17/19 07:23, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,1,1-Trichloroethane	49	1		ug/L	1	71-55-6	1
1,1,2-Trichloroethane	56	1		ug/L	1	79-00-5	1
1,2,4-Trichlorobenzene	46	5		ug/L	1	120-82-1	1
Tetrachloroethene	50	1		ug/L	1	127-18-4	1
Toluene	52	1		ug/L	1	108-88-3	1
Trichloroethene	50	1		ug/L	1	79-01-6	1
Trichlorofluoromethane	49	1		ug/L	1	75-69-4	1
Vinyl chloride	48	1		ug/L	1	75-01-4	1
o-Xylene	52	1		ug/L	1	95-47-6	1
p,m-Xylene*	103	2		ug/L	1		1
Isopropylbenzene	52	1		ug/L	1	98-82-8	1
Cyclohexane	44	1		ug/L	1	110-82-7	1
1,1-Dichloroethane	50	1		ug/L	1	75-34-3	1
1,1-Dichloroethene	50	1		ug/L	1	75-35-4	1
Methyl Acetate	49	10		ug/L	1	79-20-9	1
Methyl cyclohexane	42	1		ug/L	1	108-87-2	1
1,1,2-Trichloro-1,2,2-trifluoroethane	45	1		ug/L	1	76-13-1	1
1,2-Dibromoethane	58	1		ug/L	1	106-93-4	1
1,1,2,2-Tetrachloroethane	63	1		ug/L	1	79-34-5	1
cis-1,3-Dichloropropene	50	1		ug/L	1	10061-01-5	1
trans-1,3-Dichloropropene	51	1		ug/L	1	10061-02-6	1

1-Spiked at 50ug/L



Analytical Laboratory Report

Lab Sample ID: S08107.12

Sample Tag: TW-MD-03_GW-100819

Collected Date/Time: 10/08/2019 16:15

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.7	IR
1	125ml Plastic	HNO3	Yes	4.7	IR
2	1L Amber	None	Yes	4.7	IR
1	1L Plastic	None	Yes	4.7	IR
1	500ml Plastic	None	Yes	4.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/16/19 10:15	JRH	
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	
Metal Digestion	Completed	SW3015A	10/16/19 10:00	CCM	
Metal Digestion	Completed	SW3015A	10/17/19 10:00	CCM	
Extraction, PCB*	Completed	E608.3	10/10/19 12:30	BPS	

Inorganics

Method: SM2320B, Run Date: 10/10/19 15:28, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	400	2		mg/L	2		

Method: SM2340C, Run Date: 10/15/19 15:52, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	185	2		mg/L	10		

Method: SM2540C, Run Date: 10/10/19 16:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	780	40		mg/L	4		

Method: SM2540D, Run Date: 10/11/19 14:30, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	40	3		mg/L	2		

Metals

Method: E200.8, Run Date: 10/17/19 12:02, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	2.03	0.02		mg/L	5	7439-89-6	

Method: E200.8, Run Date: 10/14/19 11:43, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	61.9	2.5		mg/L	50	7440-70-2	
Magnesium	20.0	2.5		mg/L	50	7439-95-4	

Method: E200.8, Run Date: 10/16/19 12:23, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony, Dissolved	Not detected	0.005		mg/L	5	7440-36-0	f
Arsenic, Dissolved	0.004	0.002		mg/L	5	7440-38-2	f

f-Filtered and preserved in lab



Analytical Laboratory Report

Lab Sample ID: S08107.12 (continued)

Sample Tag: TW-MD-03_GW-100819

Method: E200.8, Run Date: 10/16/19 12:23, Analyst: CCM (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Barium, Dissolved	0.126	0.005		mg/L	5	7440-39-3	f
Beryllium, Dissolved	Not detected	0.001		mg/L	5	7440-41-7	f
Cadmium, Dissolved	Not detected	0.0005		mg/L	5	7440-43-9	f
Chromium, Dissolved	Not detected	0.005		mg/L	5	7440-47-3	f
Cobalt, Dissolved	Not detected	0.005		mg/L	5	7440-48-4	f
Copper, Dissolved	Not detected	0.005		mg/L	5	7440-50-8	f
Lead, Dissolved	Not detected	0.003		mg/L	5	7439-92-1	f
Manganese, Dissolved	0.250	0.005		mg/L	5	7439-96-5	f
Nickel, Dissolved	0.010	0.005		mg/L	5	7440-02-0	f
Selenium, Dissolved	Not detected	0.005		mg/L	5	7782-49-2	f
Silver, Dissolved	Not detected	0.0005		mg/L	5	7440-22-4	f
Thallium, Dissolved	Not detected	0.002		mg/L	5	7440-28-0	f
Vanadium, Dissolved	Not detected	0.005		mg/L	5	7440-62-2	f
Zinc, Dissolved	Not detected	0.005		mg/L	5	7440-66-6	f

Method: E245.1, Run Date: 10/17/19 12:49, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury, Dissolved	Not detected	0.0002		mg/L	1	7439-97-6	f

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/11/19 17:57, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 23:25, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	

f-Filtered and preserved in lab



Analytical Laboratory Report

Lab Sample ID: S08107.12 (continued)

Sample Tag: TW-MD-03_GW-100819

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 23:25, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S08107.13

Sample Tag: Trip Blank

Collected Date/Time: 10/08/2019 00:01

Matrix: Water

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	HCL	Yes	4.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 22:07, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	



Analytical Laboratory Report

Lab Sample ID: S08107.13 (continued)

Sample Tag: Trip Blank

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 22:07, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	

Merit Laboratories Login Checklist

Lab Set ID:S08107

Client:ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: PNC Racer

Submitted: 10/09/2019 15:30 Login User: SRS

Attention: Colleen Barton

Address: Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-225-1909

FAX: 248-994-2241

Email: Colleen.barton@arcadis.com

Selection	Description	Note
Sample Receiving		
01.	☒ Yes ☐ No ☐ N/A	Samples are received at 4C +/- 2C Thermometer # IR 4.7
02.	☒ Yes ☐ No ☐ N/A	Received on ice/ cooling process begun
03.	☐ Yes ☒ No ☐ N/A	Samples shipped
04.	☐ Yes ☒ No ☐ N/A	Samples left in 24 hr. drop box
05.	☐ Yes ☐ No ☒ N/A	Are there custody seals/tape or is the drop box locked
Chain of Custody		
06.	☒ Yes ☐ No ☐ N/A	COC adequately filled out
07.	☒ Yes ☐ No ☐ N/A	COC signed and relinquished to the lab
08.	☒ Yes ☐ No ☐ N/A	Sample tag on bottles match COC
09.	☐ Yes ☒ No ☐ N/A	Subcontracting needed? Subcontracted to:
Preservation		
10.	☒ Yes ☐ No ☐ N/A	Do sample have correct chemical preservation
11.	☒ Yes ☐ No ☐ N/A	Completed pH checks on preserved samples? (no VOAs)
12.	☐ Yes ☒ No ☐ N/A	Did any samples need to be preserved in the lab?
Bottle Conditions		
13.	☒ Yes ☐ No ☐ N/A	All bottles intact
14.	☒ Yes ☐ No ☐ N/A	Appropriate analytical bottles are used
15.	☒ Yes ☐ No ☐ N/A	Merit bottles used
16.	☒ Yes ☐ No ☐ N/A	Sufficient sample volume received
17.	☐ Yes ☒ No ☐ N/A	Samples require laboratory filtration
18.	☒ Yes ☐ No ☐ N/A	Samples submitted within holding time
19.	☐ Yes ☒ No ☐ N/A	Do water VOC or TOX bottles contain headspace

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

Merit Laboratories Bottle Preservation Check

Lab Set ID: S08107 Initials: SRS

Attention: Colleen Barton
Address: Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Client: ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: PNC Racer

Submitted: 10/09/2019 15:30 Login User:

Phone: 810-225-1909 FAX: 248-994-2241
Email: Colleen.barton@arcadis.com

Lab ID	125 ml Plastic HNO ₃	250 ml Plastic HNO ₃	1 L Plastic HNO ₃	250 ml Plastic H ₂ SO ₄	125 ml Amber H ₂ SO ₄	32 oz Glass HCl	125 ml Plastic NaOH	125 ml Amber PbCO ₃ NaOH	pH					Notes
									<2	>12	other	ml add	new pH	
S08107.01	X								X					
S08107.05	X								X					
S08107.06	X								X					
S08107.08	X								X					
S08107.09	X								X					
S08107.10	X								X					
S08107.11	X								X					
S08107.12	X								X					



2680 East Lansing Dr., East Lansing, MI 48823
Phone (517) 332-0167 Fax (517) 332-4034
www.meritlabs.com

C.O.C. PAGE #

1 OF 1

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME Colleen Barton
COMPANY Arcadis
ADDRESS 28550 Cabot Drive #500
CITY Novi STATE MI ZIP CODE 48377
PHONE NO. 810.225.1909 FAX NO. P.O. NO. B0064607-2017.
E-MAIL ADDRESS Colleen.Barton@arcadis.com; Brad.Saunders@arc QUOTE NO. 30006882

CONTACT NAME Accounts Payable ☐ SAME
COMPANY Arcadis
ADDRESS 630 Plaza Drive Suite 600
CITY Highlands Ranch STATE CO ZIP CODE 80129
PHONE NO. E-MAIL ADDRESS accountspayable.administration@arcadis-us.com

PROJECT NO./NAME PNC Racer
TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER
DELIVERABLES REQUIRED ☐ STD ☒ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☒ EDD ☐ OTHER

MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID
SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIFE A=AIR W=WASTE

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

MERIT LAB NO. FOR LAB USE ONLY	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NCNE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER	* VOC	1,4-dic	Mang	Lead	Antim	Vanad	** Mon	** Mon	PCB	☒ Other Pontiac, MI
	DATE	TIME																				Special Instructions
08/07.01	10.7.19	1105	mwf12-02-GW-100719	GW	4		3	1					X		X							*See attached VOC list
.02		1210	mwf16-06-GW-100719		3		3						X	X								**See attached Montcalm inorganics/ geochemistry lists
.03		1300	mwf7-02-GW-100719		3		3						X	X								
.04		1450	mwf05-01-GW-100719		3		3						X									***RL for 1,4-dioxane must be <7.2 ppb
.05		1705	mww1-04-GW-100719		6	2	3	1					X	X			X	X			X	
.06	10.8.19	1000	mww1-15-GW-100819										X						X	X	X	
.07		1155	mww-01-17-GW-100819		3		3						X	X								
.08		1245 1205	TW-MD-01-GW-100819		8	4	3	1					X	X					X	X	X	MS/MSD ¹²
09/10/11		1420	TW-MD-02-GW-100819		24	12	9	3					X						X	X	X	MS/MSD
.12		1615	TW-MD-03-GW-100819		8	4	3	1					X						X	X	X	LAB FILTER
.13			TRIP BLANK		1								X									

RELINQUISHED BY: SIGNATURE/ORGANIZATION C. Zilio ARCADIS DATE 10.8.19 TIME 1905
RECEIVED BY: SIGNATURE/ORGANIZATION Novi Cold Storage DATE 10.8.19 TIME 1905
RELINQUISHED BY: SIGNATURE/ORGANIZATION DATE 10.9.19 TIME 1030
RECEIVED BY: SIGNATURE/ORGANIZATION DATE 10.9.19 TIME 1030

RELINQUISHED BY: SIGNATURE/ORGANIZATION DATE 10.9.19 TIME 1030
RECEIVED BY: SIGNATURE/ORGANIZATION DATE 10.9.19 TIME 1030
SEAL NO. SEAL INTACT YES ☐ NO ☐ INITIALS
SEAL NO. SEAL INTACT YES ☐ NO ☐ INITIALS
NOTES: TEMP. ON ARRIVAL 4.7

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

Montcalm inorganics list

(Method 200.8)

antimony		
arsenic		
barium		
beryllium		
cadmium		
chromium		
cobalt		
copper		
lead		
manganese		
mercury		
nickel		
selenium		
silver		
thallium		
vanadium		
zinc		

Geochemical analytical list

calcium	
iron	
magnesium	
alkalinity	
hardness	
dissolved and suspended solids	

Table 4
Summary of Groundwater Analytical Results
RACER Trust Pontiac North Campus
Pontiac, Michigan



PNC VOC Analyte List - 8260C	
Volatile Organic Compounds	
VOC	Acetone
VOC	Benzene
VOC	Bromodichloromethane
VOC	Bromoform
VOC	Bromomethane
VOC	2-Butanone
VOC	Carbon Disulfide
VOC	Carbon Tetrachloride
VOC	Chlorobenzene
VOC	Chloroethane
VOC	Chloroform
VOC	Chloromethane
VOC	Cumene
VOC	Cyclohexane
VOC	1,2-Dibromo-3-chloropropane
VOC	Dibromochloromethane
VOC	1,2-Dibromoethane
VOC	1,2-Dichlorobenzene
VOC	1,3-Dichlorobenzene
VOC	1,4-Dichlorobenzene
VOC	Dichlorodifluoromethane
VOC	1,1-Dichloroethane
VOC	1,2-Dichloroethane
VOC	1,1-Dichloroethene
VOC	cis-1,2-Dichloroethene
VOC	trans-1,2-Dichloroethene
VOC	1,2-Dichloropropane
VOC	1,3-Dichloropropene (summed)
VOC	Ethyl Benzene
VOC	2-Hexanone
VOC	Methyl Acetate
VOC	Methyl tert-butyl ether
VOC	4-Methyl-2-pentanone
VOC	Methylcyclohexane
VOC	Methylene Chloride
VOC	Styrene
VOC	1,1,2,2-Tetrachloroethane
VOC	Tetrachloroethene
VOC	Toluene
VOC	1,2,4-Trichlorobenzene
VOC	1,1,1-Trichloroethane
VOC	1,1,2-Trichloroethane
VOC	Trichloroethene
VOC	Trichlorofluoromethane
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane
VOC	Vinyl Chloride
VOC	Xylenes (total)



Analytical Laboratory Report

Report ID: S08114.01(01)
Generated on 10/18/2019

Report to

Attention: Colleen Barton
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-225-1909 FAX: 248-994-2241
Email: Colleen.barton@arcadis.com

Additional Contacts: Brad Saunders

Report produced by

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Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S08114.01-S08114.05
Project: RACER PNC
Collected Date(s): 10/08/2019
Submitted Date/Time: 10/09/2019 15:30
Sampled by: Christina Weaver
P.O. #: 30006882.00006

Table of Contents

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General Report Notes (Page 2)
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Method Summary (Page 4)
Sample Summary (Page 5)

Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

There is no additional narrative for this analytical report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
E200.8	EPA Method 200.8 Revision 5.4
E245.1	EPA Method 245.1 Revision 3.0
E608.3	EPA Method 608.3 December 2016
N/A	Not Applicable
SM2320B	Standard Method 2320 B 2011
SM2340C	Standard Method 2340 C 2011
SM2540C	Standard Method 2540 C 2011
SM2540D	Standard Method 2540 D 2011
SW3015A	SW 846 Method 3015A Revision 1 February 2007
SW5030C/8260C	SW 846 Method 8260C Revision 3 August 2006 / 5030C Revision 3 May 2003



Analytical Laboratory Report

Sample Summary (5 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S08114.01	MW-04-17_GW-100819	Groundwater	10/08/19 13:15
S08114.02	INJ-01-17_GW-100819	Groundwater	10/08/19 15:00
S08114.03	INJ-02-18_GW-100819	Groundwater	10/08/19 17:15
S08114.04	DUP-01	Groundwater	10/08/19 00:01
S08114.05	Trip Blank	Water	10/08/19 00:01



Analytical Laboratory Report

Lab Sample ID: S08114.01

Sample Tag: MW-04-17_GW-100819

Collected Date/Time: 10/08/2019 13:15

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.7	IR
1	125ml Plastic	HNO3	Yes	4.7	IR
2	1L Amber	None	Yes	4.7	IR
1	1L Plastic	None	Yes	4.7	IR
1	500ml Plastic	None	Yes	4.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/17/19 10:15	JRH	
pH check for VOCs*	<2	N/A	10/11/19 13:00	JML	
Metal Digestion	Completed	SW3015A	10/16/19 10:00	CCM	
Extraction, PCB*	Completed	E608.3	10/10/19 12:30	BPS	

Inorganics

Method: SM2320B, Run Date: 10/10/19 15:30, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	398	2		mg/L	2		

Method: SM2340C, Run Date: 10/15/19 15:54, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	230	2		mg/L	10		

Method: SM2540C, Run Date: 10/10/19 16:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	884	40		mg/L	4		

Method: SM2540D, Run Date: 10/11/19 14:30, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	12	3		mg/L	2		

Metals

Method: E200.8, Run Date: 10/14/19 11:45, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	84.1	2.5		mg/L	50	7440-70-2	
Magnesium	24.7	2.5		mg/L	50	7439-95-4	

Method: E200.8, Run Date: 10/16/19 12:27, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.007	0.002		mg/L	5	7440-38-2	
Barium	0.179	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	



Analytical Laboratory Report

Lab Sample ID: S08114.01 (continued)

Sample Tag: MW-04-17_GW-100819

Method: E200.8, Run Date: 10/16/19 12:27, Analyst: CCM (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	6.00	0.02		mg/L	5	7439-89-6	
Lead	Not detected	0.003		mg/L	5	7439-92-1	
Manganese	0.597	0.005		mg/L	5	7439-96-5	
Nickel	Not detected	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	Not detected	0.005		mg/L	5	7440-66-6	

Method: E245.1, Run Date: 10/17/19 13:13, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/11/19 18:42, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/11/19 00:22, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	



Analytical Laboratory Report

Lab Sample ID: S08114.01 (continued)

Sample Tag: MW-04-17_GW-100819

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/11/19 00:22, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S08114.02

Sample Tag: INJ-01-17_GW-100819

Collected Date/Time: 10/08/2019 15:00

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.7	IR
1	125ml Plastic	HNO3	Yes	4.7	IR
2	1L Amber	None	Yes	4.7	IR
1	1L Plastic	None	Yes	4.7	IR
1	500ml Plastic	None	Yes	4.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/17/19 10:15	JRH	
pH check for VOCs*	<2	N/A	10/11/19 13:00	JML	
Metal Digestion	Completed	SW3015A	10/16/19 10:00	CCM	
Extraction, PCB*	Completed	E608.3	10/10/19 12:30	BPS	

Inorganics

Method: SM2320B, Run Date: 10/10/19 15:32, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	394	2		mg/L	2		

Method: SM2340C, Run Date: 10/15/19 15:56, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	227	2		mg/L	10		

Method: SM2540C, Run Date: 10/10/19 16:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	844	40		mg/L	4		

Method: SM2540D, Run Date: 10/11/19 14:30, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	14	3		mg/L	2.5		

Metals

Method: E200.8, Run Date: 10/14/19 11:46, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	81.1	2.5		mg/L	50	7440-70-2	
Magnesium	24.1	2.5		mg/L	50	7439-95-4	

Method: E200.8, Run Date: 10/16/19 12:31, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.003	0.002		mg/L	5	7440-38-2	
Barium	0.168	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	



Analytical Laboratory Report

Lab Sample ID: S08114.02 (continued)

Sample Tag: INJ-01-17_GW-100819

Method: E200.8, Run Date: 10/16/19 12:31, Analyst: CCM (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	5.40	0.02		mg/L	5	7439-89-6	
Lead	Not detected	0.003		mg/L	5	7439-92-1	
Manganese	0.324	0.005		mg/L	5	7439-96-5	
Nickel	Not detected	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	0.007	0.005		mg/L	5	7440-66-6	

Method: E245.1, Run Date: 10/17/19 13:14, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/11/19 18:53, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/11/19 00:42, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	



Analytical Laboratory Report

Lab Sample ID: S08114.02 (continued)

Sample Tag: INJ-01-17_GW-100819

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/11/19 00:42, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S08114.03

Sample Tag: INJ-02-18_GW-100819

Collected Date/Time: 10/08/2019 17:15

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.7	IR
1	125ml Plastic	HNO3	Yes	4.7	IR
2	1L Amber	None	Yes	4.7	IR
1	1L Plastic	None	Yes	4.7	IR
1	500ml Plastic	None	Yes	4.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/17/19 10:15	JRH	
Mercury Digestion	Completed	E245.1	10/17/19 10:15	JRH	
pH check for VOCs*	<2	N/A	10/11/19 13:00	JML	
Metal Digestion	Completed	SW3015A	10/17/19 10:00	CCM	
Metal Digestion	Completed	SW3015A	10/16/19 10:00	CCM	
Extraction, PCB*	Completed	E608.3	10/10/19 12:30	BPS	

Inorganics

Method: SM2320B, Run Date: 10/10/19 15:34, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	392	2		mg/L	2		

Method: SM2340C, Run Date: 10/15/19 15:58, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	222	2		mg/L	10		

Method: SM2540C, Run Date: 10/10/19 16:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	903	40		mg/L	4		

Method: SM2540D, Run Date: 10/11/19 14:30, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	52	3		mg/L	13.3		

Metals

Method: E200.8, Run Date: 10/17/19 12:05, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	20.9	0.02		mg/L	5	7439-89-6	

Method: E200.8, Run Date: 10/14/19 11:47, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	85.6	2.5		mg/L	50	7440-70-2	
Magnesium	25.8	2.5		mg/L	50	7439-95-4	

Method: E200.8, Run Date: 10/16/19 12:36, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony, Dissolved	Not detected	0.005		mg/L	5	7440-36-0	f

f-Filtered and preserved in lab



Analytical Laboratory Report

Lab Sample ID: S08114.03 (continued)

Sample Tag: INJ-02-18_GW-100819

Method: E200.8, Run Date: 10/16/19 12:36, Analyst: CCM (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	Not detected	0.002		mg/L	5	7440-38-2	f
Barium, Dissolved	0.140	0.005		mg/L	5	7440-39-3	f
Beryllium, Dissolved	Not detected	0.001		mg/L	5	7440-41-7	f
Cadmium, Dissolved	Not detected	0.0005		mg/L	5	7440-43-9	f
Chromium, Dissolved	Not detected	0.005		mg/L	5	7440-47-3	f
Cobalt, Dissolved	Not detected	0.005		mg/L	5	7440-48-4	f
Copper, Dissolved	Not detected	0.005		mg/L	5	7440-50-8	f
Lead, Dissolved	Not detected	0.003		mg/L	5	7439-92-1	f
Manganese, Dissolved	0.356	0.005		mg/L	5	7439-96-5	f
Nickel, Dissolved	Not detected	0.005		mg/L	5	7440-02-0	f
Selenium, Dissolved	Not detected	0.005		mg/L	5	7782-49-2	f
Silver, Dissolved	Not detected	0.0005		mg/L	5	7440-22-4	f
Thallium, Dissolved	Not detected	0.002		mg/L	5	7440-28-0	f
Vanadium, Dissolved	Not detected	0.005		mg/L	5	7440-62-2	f
Zinc, Dissolved	Not detected	0.005		mg/L	5	7440-66-6	f

Method: E245.1, Run Date: 10/17/19 13:16, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury, Dissolved	Not detected	0.0002		mg/L	1	7439-97-6	f

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/11/19 19:04, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/11/19 01:01, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	

f-Filtered and preserved in lab



Analytical Laboratory Report

Lab Sample ID: S08114.03 (continued)

Sample Tag: INJ-02-18_GW-100819

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/11/19 01:01, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S08114.04

Sample Tag: DUP-01

Collected Date/Time: 10/08/2019 00:01

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.7	IR
1	125ml Plastic	HNO3	Yes	4.7	IR
2	1L Amber	None	Yes	4.7	IR
1	1L Plastic	None	Yes	4.7	IR
1	500ml Plastic	None	Yes	4.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/17/19 10:15	JRH	
pH check for VOCs*	<2	N/A	10/11/19 13:00	JML	
Metal Digestion	Completed	SW3015A	10/16/19 10:00	CCM	
Extraction, PCB*	Completed	E608.3	10/10/19 12:30	BPS	

Inorganics

Method: SM2320B, Run Date: 10/10/19 15:36, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	404	2		mg/L	2		

Method: SM2340C, Run Date: 10/15/19 16:00, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	231	2		mg/L	10		

Method: SM2540C, Run Date: 10/11/19 14:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	844	40		mg/L	4		

Method: SM2540D, Run Date: 10/11/19 14:30, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	14	3		mg/L	2.5		

Metals

Method: E200.8, Run Date: 10/14/19 11:48, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	84.6	2.5		mg/L	50	7440-70-2	
Magnesium	24.6	2.5		mg/L	50	7439-95-4	

Method: E200.8, Run Date: 10/16/19 12:39, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.003	0.002		mg/L	5	7440-38-2	
Barium	0.170	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	



Analytical Laboratory Report

Lab Sample ID: S08114.04 (continued)

Sample Tag: DUP-01

Method: E200.8, Run Date: 10/16/19 12:39, Analyst: CCM (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	5.40	0.02		mg/L	5	7439-89-6	
Lead	Not detected	0.003		mg/L	5	7439-92-1	
Manganese	0.331	0.005		mg/L	5	7439-96-5	
Nickel	Not detected	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	0.008	0.005		mg/L	5	7440-66-6	

Method: E245.1, Run Date: 10/17/19 13:18, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/11/19 19:15, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/11/19 01:20, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	



Analytical Laboratory Report

Lab Sample ID: S08114.04 (continued)

Sample Tag: DUP-01

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/11/19 01:20, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S08114.05

Sample Tag: Trip Blank

Collected Date/Time: 10/08/2019 00:01

Matrix: Water

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	HCL	Yes	4.7	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/11/19 13:00	JML	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 22:26, Analyst: JML

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	



Analytical Laboratory Report

Lab Sample ID: S08114.05 (continued)

Sample Tag: Trip Blank

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/10/19 22:26, Analyst: JML (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	

Merit Laboratories Login Checklist

Lab Set ID:S08114

Client:ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: RACER PNC

Submitted: 10/09/2019 15:30 Login User: SRS

Attention: Colleen Barton

Address: Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-225-1909

FAX: 248-994-2241

Email: Colleen.barton@arcadis.com

Selection	Description	Note
Sample Receiving		
01. ☒ Yes ☐ No ☐ N/A	Samples are received at 4C +/- 2C	Thermometer # IR 4.7
02. ☒ Yes ☐ No ☐ N/A	Received on ice/ cooling process begun	
03. ☐ Yes ☒ No ☐ N/A	Samples shipped	
04. ☐ Yes ☒ No ☐ N/A	Samples left in 24 hr. drop box	
05. ☐ Yes ☐ No ☒ N/A	Are there custody seals/tape or is the drop box locked	
Chain of Custody		
06. ☒ Yes ☐ No ☐ N/A	COC adequately filled out	
07. ☒ Yes ☐ No ☐ N/A	COC signed and relinquished to the lab	
08. ☒ Yes ☐ No ☐ N/A	Sample tag on bottles match COC	
09. ☐ Yes ☒ No ☐ N/A	Subcontracting needed? Subcontracted to:	
Preservation		
10. ☒ Yes ☐ No ☐ N/A	Do sample have correct chemical preservation	
11. ☒ Yes ☐ No ☐ N/A	Completed pH checks on preserved samples? (no VOAs)	
12. ☐ Yes ☒ No ☐ N/A	Did any samples need to be preserved in the lab?	
Bottle Conditions		
13. ☒ Yes ☐ No ☐ N/A	All bottles intact	
14. ☒ Yes ☐ No ☐ N/A	Appropriate analytical bottles are used	
15. ☒ Yes ☐ No ☐ N/A	Merit bottles used	
16. ☒ Yes ☐ No ☐ N/A	Sufficient sample volume received	
17. ☐ Yes ☒ No ☐ N/A	Samples require laboratory filtration	
18. ☒ Yes ☐ No ☐ N/A	Samples submitted within holding time	
19. ☐ Yes ☒ No ☐ N/A	Do water VOC or TOX bottles contain headspace	

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

Merit Laboratories Bottle Preservation Check

Lab Set ID: S08114 Initials: SRS

Client: ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: RACER PNC

Submitted: 10/09/2019 15:30 Login User:

Attention: Colleen Barton

Address: Arcadis

28550 Cabot Drive

Suite 500

Novi, MI 48377

Phone: 810-225-1909

FAX: 248-994-2241

Email: Colleen.barton@arcadis.com

Lab ID	125 ml Plastic HNO ₃	250 ml Plastic HNO ₃	1 L Plastic HNO ₃	250 ml Plastic H ₂ SO ₄	125 ml Amber H ₂ SO ₄	32 oz Glass HCl	125 ml Plastic NaOH	125 ml Amber PbCO ₃ NaOH	pH					Notes
									<2	>12	other	ml add	new pH	
S08114.01	X								X					
S08114.02	X								X					
S08114.03	X								X					
S08114.04	X								X					

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME Colleen Barton
COMPANY Arcadis
ADDRESS 28550 Cabot Drive #500
CITY Novi STATE MI ZIP CODE 48377
PHONE NO. 810.225.1909 FAX NO. P.O. NO. 30006882.00006
E-MAIL ADDRESS Colleen.Barton@arcadis.com; Brad.Saunders@arc QUOTE NO.

CONTACT NAME Accounts Payable ☐ SAME
COMPANY Arcadis
ADDRESS 630 Plaza Drive Suite 600
CITY Highlands Ranch STATE CO ZIP CODE 80129
PHONE NO. E-MAIL ADDRESS accountspayable.administration@arcadis-us.com

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME RACER PNC SAMPLER(S) - PLEASE PRINT/SIGN NAME Christina Weaver

TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER

DELIVERABLES REQUIRED ☐ STD ☒ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☒ EDD ☐ OTHER

MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID
SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIFE A=AIR W=WASTE

Containers & Preservatives

MERIT LAB NO.	YEAR	SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	NaOH	OTHER	* VOCs (8260)	1,4-dioxane (8260 SIMS)	Manganese	Lead	Antimony	Vanadium	* Montcalm Inorganics	* Montcalm Geochemistry	PCB	Arsenic	Certifications	Project Locations	Special Instructions
06114.01	10-8-19	1315 MW-04-17-GW-100019	GW	8	4	3	1					X						X	X	X		☐ OHIO VAP ☐ Drinking Water	☐ Detroit ☐ New York	*See attached VOC list
02	10-8-19	1500 INS-01-17-GW-100019	GW	8	4	3	1					X						X	X	X		☐ DoD ☐ NPDES	☒ Other Pontiac, MI	**See attached Montcalm inorganics/geochemistry lists (lab filtered)
03	10-8-19	1715 INS-02-18-GW-100019	GW	8	4	3	1					X						X	X	X				***RL for 1,4-dioxane must be <7.2 ppb
04	10-8-19	— DUP-01	GW	8	4	3	1					X						X	X	X				
05	—	— Trip Blank		1																				

RELINQUISHED BY: Signature/ORGANIZATION Christina Weaver/Arcadis DATE 10-8-19 TIME 1905
RECEIVED BY: Signature/ORGANIZATION Novis Cold Storage DATE 10-8-19 TIME 1905
RELINQUISHED BY: Signature/ORGANIZATION DATE 10-9-19 TIME 1500
RECEIVED BY: Signature/ORGANIZATION DATE 10-9-19 TIME 1500

RELINQUISHED BY: Signature/ORGANIZATION DATE 10-9-19 TIME 1500
RECEIVED BY: Signature/ORGANIZATION DATE 10-9-19 TIME 1500
SEAL NO. SEAL INTACT YES ☐ NO ☐ INITIALS
SEAL NO. SEAL INTACT YES ☐ NO ☐ INITIALS
NOTES: TEMP. ON ARRIVAL 4.7

Montcalm inorganics list

(Method 200.8)

antimony	
arsenic	
barium	
beryllium	
cadmium	
chromium	
cobalt	
copper	
lead	
manganese	
mercury	
nickel	
selenium	
silver	
thallium	
vanadium	
zinc	

Geochemical analytical list

calcium
iron
magnesium
alkalinity
hardness
dissolved and suspended solids

Table 4
Summary of Groundwater Analytical Results
RACER Trust Pontiac North Campus
Pontiac, Michigan

PNC VOC Analyte List - 8260C		
Volatile Organic Compounds		
VOC	Acetone	1
VOC	Benzene	1
VOC	Bromodichloromethane	1
VOC	Bromoform	1
VOC	Bromomethane	1
VOC	2-Butanone	1
VOC	Carbon Disulfide	1
VOC	Carbon Tetrachloride	1
VOC	Chlorobenzene	1
VOC	Chloroethane	1
VOC	Chloroform	1
VOC	Chloromethane	1
VOC	Cumene	1
VOC	Cyclohexane	1
VOC	1,2-Dibromo-3-chloropropane	1
VOC	Dibromochloromethane	1
VOC	1,2-Dibromoethane	1
VOC	1,2-Dichlorobenzene	1
VOC	1,3-Dichlorobenzene	1
VOC	1,4-Dichlorobenzene	1
VOC	Dichlorodifluoromethane	1
VOC	1,1-Dichloroethane	1
VOC	1,2-Dichloroethane	1
VOC	1,1-Dichloroethene	1
VOC	cis-1,2-Dichloroethene	1
VOC	trans-1,2-Dichloroethene	1
VOC	1,2-Dichloropropane	1
VOC	1,3-Dichloropropene (summed)	1
VOC	Ethyl Benzene	1
VOC	2-Hexanone	1
VOC	Methyl Acetate	1
VOC	Methyl tert-butyl ether	1
VOC	4-Methyl-2-pentanone	1
VOC	Methylcyclohexane	1
VOC	Methylene Chloride	1
VOC	Styrene	1
VOC	1,1,2,2-Tetrachloroethane	1
VOC	Tetrachloroethene	1
VOC	Toluene	1
VOC	1,2,4-Trichlorobenzene	1
VOC	1,1,1-Trichloroethane	1
VOC	1,1,2-Trichloroethane	1
VOC	Trichloroethene	1
VOC	Trichlorofluoromethane	1
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	1
VOC	Vinyl Chloride	1
VOC	Xylenes (total)	1



Analytical Laboratory Report

Report ID: S08147.01(01)
Generated on 10/23/2019

Report to

Attention: Colleen Barton
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-225-1909 FAX: 248-994-2241
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Report Summary

Lab Sample ID(s): S08147.01-S08147.05
Project: PNC Racer
Collected Date(s): 10/09/2019
Submitted Date/Time: 10/10/2019 14:15
Sampled by: Christina Weaver
P.O. #: 30006882.00006

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.
Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.
Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

There is no additional narrative for this analytical report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
E200.8	EPA Method 200.8 Revision 5.4
E245.1	EPA Method 245.1 Revision 3.0
E608.3	EPA Method 608.3 December 2016
N/A	Not Applicable
SM2320B	Standard Method 2320 B 2011
SM2340C	Standard Method 2340 C 2011
SM2540C	Standard Method 2540 C 2011
SM2540D	Standard Method 2540 D 2011
SW3015A	SW 846 Method 3015A Revision 1 February 2007
SW5030C/8260C	SW 846 Method 8260C Revision 3 August 2006 / 5030C Revision 3 May 2003
SW8260B - SIM	SW 846 Method 8260B Revision 2 December 1996 SIMs



Analytical Laboratory Report

Sample Summary (5 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S08147.01	DUP-03	Groundwater	10/09/19 00:01
S08147.02	MW-03-17_GW-100919	Groundwater	10/09/19 09:40
S08147.03	MWW5-01_GW-100919	Groundwater	10/09/19 11:25
S08147.04	TW-09-01_GW-100919	Groundwater	10/09/19 12:45
S08147.05	TW-10-02_GW-100919	Groundwater	10/09/19 15:05



Analytical Laboratory Report

Lab Sample ID: S08147.01

Sample Tag: DUP-03

Collected Date/Time: 10/09/2019 00:01

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/11/19 19:31, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	120	1		ug/L	1	123-91-1	



Analytical Laboratory Report

Lab Sample ID: S08147.02

Sample Tag: MW-03-17_GW-100919

Collected Date/Time: 10/09/2019 09:40

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	3.9	IR
1	125ml Plastic	HNO3	Yes	3.9	IR
2	1L Amber	None	Yes	3.9	IR
1	1L Plastic	None	Yes	3.9	IR
1	500ml Plastic	None	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/17/19 10:15	JRH	
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	
Metal Digestion	Completed	SW3015A	10/16/19 10:00	CCM	

Inorganics

Method: SM2320B, Run Date: 10/10/19 15:38, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	388	2		mg/L	2		

Method: SM2340C, Run Date: 10/15/19 16:02, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	247	2		mg/L	10		

Method: SM2540C, Run Date: 10/11/19 14:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	850	20		mg/L	2		

Method: SM2540D, Run Date: 10/15/19 19:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	Not detected	3		mg/L	1		

Metals

Method: E200.8, Run Date: 10/14/19 11:49, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	90.0	2.5		mg/L	50	7440-70-2	
Magnesium	24.0	2.5		mg/L	50	7439-95-4	

Method: E200.8, Run Date: 10/16/19 12:44, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	Not detected	0.002		mg/L	5	7440-38-2	
Barium	0.112	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	
Iron	0.42	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Lab Sample ID: S08147.02 (continued)

Sample Tag: MW-03-17_GW-100919

Method: E200.8, Run Date: 10/16/19 12:44, Analyst: CCM (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Lead	Not detected	0.003		mg/L	5	7439-92-1	
Manganese	0.840	0.005		mg/L	5	7439-96-5	
Nickel	Not detected	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	Not detected	0.005		mg/L	5	7440-66-6	

Method: E245.1, Run Date: 10/17/19 13:20, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 06:10, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	



Analytical Laboratory Report

Lab Sample ID: S08147.02 (continued)
Sample Tag: MW-03-17_GW-100919

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 06:10, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S08147.03

Sample Tag: MWW5-01_GW-100919

Collected Date/Time: 10/09/2019 11:25

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	125ml Plastic	HNO3	Yes	3.9	IR
1	500ml Plastic	None	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/17/19 10:15	JRH	
Metal Digestion	Completed	SW3015A	10/16/19 10:00	CCM	

Inorganics

Method: SM2320B, Run Date: 10/10/19 15:40, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	436	2		mg/L	2		

Method: SM2340C, Run Date: 10/15/19 16:04, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	594	2		mg/L	10		

Method: SM2540C, Run Date: 10/15/19 14:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	926	20		mg/L	2		

Metals

Method: E200.8, Run Date: 10/14/19 11:56, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	226	2.5		mg/L	50	7440-70-2	
Magnesium	30.6	2.5		mg/L	50	7439-95-4	

Method: E200.8, Run Date: 10/16/19 13:12, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.014	0.002		mg/L	5	7440-38-2	
Barium	0.190	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	0.0012	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	0.012	0.005		mg/L	5	7440-48-4	
Copper	0.078	0.005		mg/L	5	7440-50-8	
Iron	15.0	0.02		mg/L	5	7439-89-6	
Lead	0.007	0.003		mg/L	5	7439-92-1	
Manganese	4.27	0.005		mg/L	5	7439-96-5	
Nickel	0.014	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	0.014	0.005		mg/L	5	7440-62-2	
Zinc	0.140	0.005		mg/L	5	7440-66-6	



Analytical Laboratory Report

Lab Sample ID: S08147.03 (continued)
Sample Tag: MWW5-01_GW-100919

Method: E245.1, Run Date: 10/17/19 13:22, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	



Analytical Laboratory Report

Lab Sample ID: S08147.04

Sample Tag: TW-09-01_GW-100919

Collected Date/Time: 10/09/2019 12:45

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	3.9	IR
1	125ml Plastic	HNO3	Yes	3.9	IR
2	1L Amber	None	Yes	3.9	IR
1	1L Plastic	None	Yes	3.9	IR
1	500ml Plastic	None	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/17/19 10:15	JRH	
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	
Metal Digestion	Completed	SW3015A	10/16/19 10:00	CCM	
Extraction, PCB*	Completed	E608.3	10/15/19 12:30	BPS	

Inorganics

Method: SM2320B, Run Date: 10/10/19 15:42, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	520	2		mg/L	2		

Method: SM2340C, Run Date: 10/15/19 16:06, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	261	2		mg/L	10		

Method: SM2540C, Run Date: 10/11/19 14:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	1,230	40		mg/L	4		

Method: SM2540D, Run Date: 10/15/19 19:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	Not detected	3		mg/L	1.11		

Metals

Method: E200.8, Run Date: 10/14/19 11:58, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	101	2.5		mg/L	50	7440-70-2	
Magnesium	12.1	2.5		mg/L	50	7439-95-4	

Method: E200.8, Run Date: 10/16/19 13:19, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.017	0.002		mg/L	5	7440-38-2	
Barium	0.186	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	



Analytical Laboratory Report

Lab Sample ID: S08147.04 (continued)

Sample Tag: TW-09-01_GW-100919

Method: E200.8, Run Date: 10/16/19 13:19, Analyst: CCM (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	0.55	0.02		mg/L	5	7439-89-6	
Lead	Not detected	0.003		mg/L	5	7439-92-1	
Manganese	0.133	0.005		mg/L	5	7439-96-5	
Nickel	0.005	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	Not detected	0.005		mg/L	5	7440-66-6	

Method: E245.1, Run Date: 10/17/19 13:30, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/17/19 16:00, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 06:30, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	



Analytical Laboratory Report

Lab Sample ID: S08147.04 (continued)

Sample Tag: TW-09-01_GW-100919

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 06:30, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S08147.05
Sample Tag: TW-10-02_GW-100919
Collected Date/Time: 10/09/2019 15:05
Matrix: Groundwater
COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/11/19 19:52, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	90	1		ug/L	1	123-91-1	

Merit Laboratories Login Checklist

Lab Set ID:S08147

Client:ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: PNC Racer

Submitted: 10/10/2019 14:15 Login User: MMC

Attention: Colleen Barton

Address: Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-225-1909

FAX: 248-994-2241

Email: Colleen.barton@arcadis.com

Selection	Description	Note
Sample Receiving		
01. ☒ Yes ☐ No ☐ N/A	Samples are received at 4C +/- 2C Thermometer #	IR 3.9
02. ☒ Yes ☐ No ☐ N/A	Received on ice/ cooling process begun	
03. ☐ Yes ☒ No ☐ N/A	Samples shipped	
04. ☐ Yes ☒ No ☐ N/A	Samples left in 24 hr. drop box	
05. ☐ Yes ☐ No ☒ N/A	Are there custody seals/tape or is the drop box locked	
Chain of Custody		
06. ☒ Yes ☐ No ☐ N/A	COC adequately filled out	
07. ☒ Yes ☐ No ☐ N/A	COC signed and relinquished to the lab	
08. ☒ Yes ☐ No ☐ N/A	Sample tag on bottles match COC	
09. ☐ Yes ☒ No ☐ N/A	Subcontracting needed? Subcontracted to:	
Preservation		
10. ☒ Yes ☐ No ☐ N/A	Do sample have correct chemical preservation	
11. ☒ Yes ☐ No ☐ N/A	Completed pH checks on preserved samples? (no VOAs)	
12. ☐ Yes ☒ No ☐ N/A	Did any samples need to be preserved in the lab?	
Bottle Conditions		
13. ☒ Yes ☐ No ☐ N/A	All bottles intact	
14. ☒ Yes ☐ No ☐ N/A	Appropriate analytical bottles are used	
15. ☒ Yes ☐ No ☐ N/A	Merit bottles used	
16. ☐ Yes ☒ No ☐ N/A	Sufficient sample volume received	Only a 500mL non-preserved provided for sample .03
17. ☐ Yes ☒ No ☐ N/A	Samples require laboratory filtration	
18. ☒ Yes ☐ No ☐ N/A	Samples submitted within holding time	
19. ☐ Yes ☐ No ☒ N/A	Do water VOC or TOX bottles contain headspace	

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

Merit Laboratories Bottle Preservation Check

Lab Set ID: S08147 Initials: MMC

Client: ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: PNC Racer

Submitted: 10/10/2019 14:15 Login User:

Attention: Colleen Barton

Address: Arcadis

28550 Cabot Drive

Suite 500

Novi, MI 48377

Phone: 810-225-1909

FAX: 248-994-2241

Email: Colleen.barton@arcadis.com

Lab ID	125 ml Plastic HNO ₃	250 ml Plastic HNO ₃	1 L Plastic HNO ₃	250 ml Plastic H ₂ SO ₄	125 ml Amber H ₂ SO ₄	32 oz Glass HCl	125 ml Plastic NaOH	125 ml Amber PbCO ₃ NaOH	pH					Notes
									<2	>12	other	ml add	new pH	
S08147.02	X								X					
S08147.03	X								X					
S08147.04	X								X					

REPORT TO

CONTACT NAME Colleen Barton			
COMPANY Arcadis			
ADDRESS 28550 Cabot Drive #500			
CITY Novi			STATE MI ZIP CODE 48377
PHONE NO. 810.225.1909		FAX NO.	P.O. NO. B0064607.2017.
E-MAIL ADDRESS Colleen.Barton@arcadis.com; Brad Saunders@arc			QUOTE NO. 3000488.2000

CHAIN OF CUSTODY RECORD

CONTACT NAME		Accounts Payable		☐ SAME	
COMPANY		Arcadis			
ADDRESS		630 Plaza Drive Suite 600			
CITY		Highlands Ranch		STATE	CO
				ZIP CODE	80129
PHONE NO.		E-MAIL ADDRESS			
		accountspayable.administration@arcadis-us.com			

INVOICE TO

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME	PNC Racer	SAMPLER(S) - PLEASE PRINT/SIGN NAME	Christina Weaver 10/1/2011
TURNAROUND TIME REQUIRED	☐ 1 DAY	☐ 2 DAYS	☐ 3 DAYS ☒ STANDARD ☐ OTHER
DELIVERABLES REQUIRED	☐ STD	☒ LEVEL II	☐ LEVEL III ☐ LEVEL IV ☒ EDD ☐ OTHER

MATRIX	GW=GROUNDWATER	WW=WASTEWATER	S=SOIL	L=LIQUID	SD=SOLID
CODE:	SL=SLUDGE	DW=DRINKING WATER	O=OIL	WP=WIPE	A=AIR W=WASTE

		# Containers & Preservatives		* VOCs (8260)	1,4-dioxane (8260 SIMs)	Manganese	Lead	Antimony	Vanadium	**Montcalm Inorganics	**Montcalm Geochemistry	PCB	Certifications ☐ OHIO VAP ☐ Drinking Water ☐ DoD ☐ NPDES
WORK HCl HNO ₃ H ₂ SO ₄ NaOH NaOH OTHER													Project Locations ☐ Detroit ☐ New York ☒ Other <u>Pontiac, MI</u>
Special Instructions													

[illegible]

RELINQUISHED BY:	Signature: <i>Chesher Allen</i>	☒ Sampler	DATE	TIME
SIGNATURE/ORGANIZATION			10/9/19	1811
RECEIVED BY:	Signature: <i>Nani</i>		DATE	TIME
SIGNATURE/ORGANIZATION	Nani Cold Storage		10/9/19	1816
RELINQUISHED BY:	Signature: <i>Robert H. H.</i>		DATE	TIME
SIGNATURE/ORGANIZATION			10-10-19	1130
RECEIVED BY:	Signature: <i>Ms</i>		DATE	TIME
SIGNATURE/ORGANIZATION			10-10-19	1130

RELINQUISHED BY:			DATE	TIME
SIGNATURE/ORGANIZATION			10/10/19	1415
RECEIVED BY:			DATE	TIME
SIGNATURE/ORGANIZATION			10/10/19	1415
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS	NOTES: TEMP. ON ARRIVAL	
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS	3.9	

Table 4
Summary of Groundwater Analytical Results
RACER Trust Pontiac North Campus
Pontiac, Michigan

PNC VOC Analyte List - 8260C	
	Volatile Organic Compounds
VOC Acetone	1
VOC Benzene	1
VOC Bromodichloromethane	1
VOC Bromoform	1
VOC Bromomethane	1
VOC 2-Butanone	1
VOC Carbon Disulfide	1
VOC Carbon Tetrachloride	1
VOC Chlorobenzene	1
VOC Chloroethane	1
VOC Chloroform	1
VOC Chloromethane	1
VOC Cumene	1
VOC Cyclohexane	1
VOC 1,2-Dibromo-3-chloropropane	1
VOC Dibromochloromethane	1
VOC 1,2-Dibromoethane	1
VOC 1,2-Dichlorobenzene	1
VOC 1,3-Dichlorobenzene	1
VOC 1,4-Dichlorobenzene	1
VOC Dichlorodifluoromethane	1
VOC 1,1-Dichloroethane	1
VOC 1,2-Dichloroethane	1
VOC 1,1-Dichloroethene	1
VOC cis-1,2-Dichloroethene	1
VOC trans-1,2-Dichloroethene	1
VOC 1,2-Dichloropropane	1
VOC 1,3-Dichloropropene (summed)	1
VOC Ethyl Benzene	1
VOC 2-Hexanone	1
VOC Methyl Acetate	1
VOC Methyl tert-butyl ether	1
VOC 4-Methyl-2-pentanone	1
VOC Methylcyclohexane	1
VOC Methylene Chloride	1
VOC Styrene	1
VOC 1,1,2,2-Tetrachloroethane	1
VOC Tetrachloroethene	1
VOC Toluene	1
VOC 1,2,4-Trichlorobenzene	1
VOC 1,1,1-Trichloroethane	1
VOC 1,1,2-Trichloroethane	1
VOC Trichloroethene	1
VOC Trichlorofluoromethane	1
VOC 1,1,2-Trichloro-1,2,2-trifluoroethane	1
VOC Vinyl Chloride	1
VOC Xylenes (total)	1

Montcalm inorganics list
(Method 200.8)
antimony
arsenic
barium
beryllium
cadmium
chromium
cobalt
copper
lead
manganese
mercury
nickel
selenium
silver
thallium
vanadium
zinc

Geochemical analytical list
calcium
iron
magnesium
alkalinity
hardness
dissolved and suspended solids



Analytical Laboratory Report

Report ID: S08150.01(01)
Generated on 10/23/2019

Report to

Attention: Colleen Barton
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-225-1909 FAX: 248-994-2241
Email: Colleen.barton@arcadis.com

Additional Contacts: Brad Saunders

Report produced by

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2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S08150.01-S08150.07
Project: PNC Racer
Collected Date(s): 10/09/2019
Submitted Date/Time: 10/10/2019 14:15
Sampled by: C. Zilio
P.O. #: 30006882.00006

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Sample Summary (Page 5)

Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.
Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.
Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

There is no additional narrative for this analytical report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
E200.8	EPA Method 200.8 Revision 5.4
E245.1	EPA Method 245.1 Revision 3.0
E608.3	EPA Method 608.3 December 2016
N/A	Not Applicable
SM2320B	Standard Method 2320 B 2011
SM2340C	Standard Method 2340 C 2011
SM2540C	Standard Method 2540 C 2011
SM2540D	Standard Method 2540 D 2011
SW3015A	SW 846 Method 3015A Revision 1 February 2007
SW5030C/8260C	SW 846 Method 8260C Revision 3 August 2006 / 5030C Revision 3 May 2003
SW8260B - SIM	SW 846 Method 8260B Revision 2 December 1996 SIMs



Analytical Laboratory Report

Sample Summary (7 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S08150.01	TW-MD-04_GW-100919	Groundwater	10/09/19 09:55
S08150.02	TW-MD-05_GW-100919	Groundwater	10/09/19 11:05
S08150.03	TW-MD-06_GW-100919	Groundwater	10/09/19 12:10
S08150.04	TW-MD-07_GW-100919	Groundwater	10/09/19 13:15
S08150.05	MWW01-SEN04_GW-100919	Groundwater	10/09/19 14:55
S08150.06	MW-40-99_GW-100919	Groundwater	10/09/19 16:35
S08150.07	Trip Blank	Water	10/09/19 00:01



Analytical Laboratory Report

Lab Sample ID: S08150.01

Sample Tag: TW-MD-04_GW-100919

Collected Date/Time: 10/09/2019 09:55

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	3.9	IR
1	125ml Plastic	HNO3	Yes	3.9	IR
2	1L Amber	None	Yes	3.9	IR
1	1L Plastic	None	Yes	3.9	IR
1	500ml Plastic	None	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/17/19 10:15	JRH	
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	
Metal Digestion	Completed	SW3015A	10/16/19 10:00	CCM	
Extraction, PCB*	Completed	E608.3	10/14/19 15:30	BPS	

Inorganics

Method: SM2320B, Run Date: 10/18/19 11:08, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	372	2		mg/L	2		

Method: SM2340C, Run Date: 10/15/19 16:08, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	201	2		mg/L	10		

Method: SM2540C, Run Date: 10/11/19 14:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	792	40		mg/L	4		

Method: SM2540D, Run Date: 10/15/19 19:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	30	3		mg/L	3.33		

Metals

Method: E200.8, Run Date: 10/14/19 11:59, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	75.5	2.5		mg/L	50	7440-70-2	
Magnesium	20.7	2.5		mg/L	50	7439-95-4	

Method: E200.8, Run Date: 10/16/19 13:25, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.006	0.002		mg/L	5	7440-38-2	
Barium	0.136	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	



Analytical Laboratory Report

Lab Sample ID: S08150.01 (continued)

Sample Tag: TW-MD-04_GW-100919

Method: E200.8, Run Date: 10/16/19 13:25, Analyst: CCM (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	13.8	0.02		mg/L	5	7439-89-6	
Lead	Not detected	0.003		mg/L	5	7439-92-1	
Manganese	0.571	0.005		mg/L	5	7439-96-5	
Nickel	Not detected	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	Not detected	0.005		mg/L	5	7440-66-6	

Method: E245.1, Run Date: 10/17/19 13:32, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/15/19 19:43, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 10:22, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	



Analytical Laboratory Report

Lab Sample ID: S08150.01 (continued)

Sample Tag: TW-MD-04_GW-100919

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 10:22, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S08150.02

Sample Tag: TW-MD-05_GW-100919

Collected Date/Time: 10/09/2019 11:05

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	3.9	IR
1	125ml Plastic	HNO3	Yes	3.9	IR
2	1L Amber	None	Yes	3.9	IR
1	1L Plastic	None	Yes	3.9	IR
1	500ml Plastic	None	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/17/19 10:15	JRH	
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	
Metal Digestion	Completed	SW3015A	10/16/19 10:00	CCM	
Extraction, PCB*	Completed	E608.3	10/14/19 15:30	BPS	

Inorganics

Method: SM2320B, Run Date: 10/18/19 11:12, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	372	2		mg/L	2		

Method: SM2340C, Run Date: 10/15/19 16:10, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	156	2		mg/L	10		

Method: SM2540C, Run Date: 10/11/19 14:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	784	40		mg/L	4		

Method: SM2540D, Run Date: 10/15/19 19:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	28	3		mg/L	4		

Metals

Method: E200.8, Run Date: 10/14/19 12:00, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	58.4	2.5		mg/L	50	7440-70-2	
Magnesium	26.5	2.5		mg/L	50	7439-95-4	

Method: E200.8, Run Date: 10/16/19 13:31, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.005	0.002		mg/L	5	7440-38-2	
Barium	0.104	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	



Analytical Laboratory Report

Lab Sample ID: S08150.02 (continued)

Sample Tag: TW-MD-05_GW-100919

Method: E200.8, Run Date: 10/16/19 13:31, Analyst: CCM (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	13.0	0.02		mg/L	5	7439-89-6	
Lead	Not detected	0.003		mg/L	5	7439-92-1	
Manganese	0.400	0.005		mg/L	5	7439-96-5	
Nickel	Not detected	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	Not detected	0.005		mg/L	5	7440-66-6	

Method: E245.1, Run Date: 10/17/19 13:34, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/15/19 19:54, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 10:41, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	



Analytical Laboratory Report

Lab Sample ID: S08150.02 (continued)

Sample Tag: TW-MD-05_GW-100919

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 10:41, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S08150.03

Sample Tag: TW-MD-06_GW-100919

Collected Date/Time: 10/09/2019 12:10

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	3.9	IR
1	125ml Plastic	HNO3	Yes	3.9	IR
2	1L Amber	None	Yes	3.9	IR
1	1L Plastic	None	Yes	3.9	IR
1	500ml Plastic	None	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/17/19 10:15	JRH	
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	
Metal Digestion	Completed	SW3015A	10/16/19 10:00	CCM	
Extraction, PCB*	Completed	E608.3	10/14/19 15:30	BPS	

Inorganics

Method: SM2320B, Run Date: 10/18/19 11:16, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	384	2		mg/L	2		

Method: SM2340C, Run Date: 10/15/19 16:12, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	248	2		mg/L	10		

Method: SM2540C, Run Date: 10/11/19 14:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	884	40		mg/L	4		

Method: SM2540D, Run Date: 10/15/19 19:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	21	3		mg/L	2		

Metals

Method: E200.8, Run Date: 10/14/19 12:01, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	89.8	2.5		mg/L	50	7440-70-2	
Magnesium	27.3	2.5		mg/L	50	7439-95-4	

Method: E200.8, Run Date: 10/16/19 13:37, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.007	0.002		mg/L	5	7440-38-2	
Barium	0.117	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	



Analytical Laboratory Report

Lab Sample ID: S08150.03 (continued)

Sample Tag: TW-MD-06_GW-100919

Method: E200.8, Run Date: 10/16/19 13:37, Analyst: CCM (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	9.57	0.02		mg/L	5	7439-89-6	
Lead	Not detected	0.003		mg/L	5	7439-92-1	
Manganese	0.435	0.005		mg/L	5	7439-96-5	
Nickel	Not detected	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	Not detected	0.005		mg/L	5	7440-66-6	

Method: E245.1, Run Date: 10/17/19 13:36, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/15/19 20:05, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	0.2	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	0.2	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 11:00, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	



Analytical Laboratory Report

Lab Sample ID: S08150.03 (continued)

Sample Tag: TW-MD-06_GW-100919

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 11:00, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S08150.04

Sample Tag: TW-MD-07_GW-100919

Collected Date/Time: 10/09/2019 13:15

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	3.9	IR
1	125ml Plastic	HNO3	Yes	3.9	IR
2	1L Amber	None	Yes	3.9	IR
1	1L Plastic	None	Yes	3.9	IR
1	500ml Plastic	None	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/17/19 10:15	JRH	
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	
Metal Digestion	Completed	SW3015A	10/16/19 10:00	CCM	
Extraction, PCB*	Completed	E608.3	10/14/19 15:30	BPS	

Inorganics

Method: SM2320B, Run Date: 10/18/19 11:18, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	410	2		mg/L	2		

Method: SM2340C, Run Date: 10/15/19 16:14, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	225	2		mg/L	10		

Method: SM2540C, Run Date: 10/11/19 14:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	1,220	40		mg/L	4		

Method: SM2540D, Run Date: 10/15/19 19:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	21	3		mg/L	2		

Metals

Method: E200.8, Run Date: 10/14/19 12:02, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	86.5	2.5		mg/L	50	7440-70-2	
Magnesium	20.4	2.5		mg/L	50	7439-95-4	

Method: E200.8, Run Date: 10/16/19 13:43, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.004	0.002		mg/L	5	7440-38-2	
Barium	0.135	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	



Analytical Laboratory Report

Lab Sample ID: S08150.04 (continued)

Sample Tag: TW-MD-07_GW-100919

Method: E200.8, Run Date: 10/16/19 13:43, Analyst: CCM (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	10.0	0.02		mg/L	5	7439-89-6	
Lead	Not detected	0.003		mg/L	5	7439-92-1	
Manganese	0.378	0.005		mg/L	5	7439-96-5	
Nickel	Not detected	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	Not detected	0.005		mg/L	5	7440-66-6	

Method: E245.1, Run Date: 10/17/19 13:41, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/15/19 20:16, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/16/19 13:14, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	Not detected	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 11:20, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	



Analytical Laboratory Report

Lab Sample ID: S08150.04 (continued)

Sample Tag: TW-MD-07_GW-100919

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 11:20, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S08150.05

Sample Tag: MWW01-SEN04_GW-100919

Collected Date/Time: 10/09/2019 14:55

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	3.9	IR
1	125ml Plastic	HNO3	Yes	3.9	IR
2	1L Amber	None	Yes	3.9	IR
1	1L Plastic	None	Yes	3.9	IR
1	500ml Plastic	None	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/17/19 10:15	JRH	
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	
Metal Digestion	Completed	SW3015A	10/16/19 10:00	CCM	
Extraction, PCB*	Completed	E608.3	10/14/19 15:30	BPS	

Inorganics

Method: SM2320B, Run Date: 10/18/19 11:20, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	386	2		mg/L	2		

Method: SM2340C, Run Date: 10/15/19 16:16, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	278	2		mg/L	10		

Method: SM2540C, Run Date: 10/11/19 14:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	1,000	100		mg/L	10		

Method: SM2540D, Run Date: 10/15/19 19:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	2,140	3		mg/L	20		

Metals

Method: E200.8, Run Date: 10/16/19 14:04, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	100	1.0		mg/L	200	7439-89-6	

Method: E200.8, Run Date: 10/14/19 12:03, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	290	2.5		mg/L	50	7440-70-2	
Magnesium	39.4	2.5		mg/L	50	7439-95-4	

Method: E200.8, Run Date: 10/16/19 14:07, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	0.005	0.005		mg/L	5	7440-36-0	
Arsenic	0.020	0.002		mg/L	5	7440-38-2	
Barium	0.424	0.005		mg/L	5	7440-39-3	
Beryllium	0.002	0.001		mg/L	5	7440-41-7	



Analytical Laboratory Report

Lab Sample ID: S08150.05 (continued)

Sample Tag: MWW01-SEN04_GW-100919

Method: E200.8, Run Date: 10/16/19 14:07, Analyst: CCM (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Cadmium	0.0010	0.0005		mg/L	5	7440-43-9	
Chromium	0.190	0.005		mg/L	5	7440-47-3	
Cobalt	0.013	0.005		mg/L	5	7440-48-4	
Copper	0.174	0.005		mg/L	5	7440-50-8	
Lead	1.70	0.003		mg/L	5	7439-92-1	
Manganese	2.52	0.005		mg/L	5	7439-96-5	
Nickel	0.111	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	0.062	0.005		mg/L	5	7440-62-2	
Zinc	0.191	0.005		mg/L	5	7440-66-6	

Method: E245.1, Run Date: 10/17/19 13:58, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	0.0004	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/15/19 19:32, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	2		ug/L	20	12674-11-2	Y
PCB-1221	Not detected	2		ug/L	20	11104-28-2	Y
PCB-1232	Not detected	2		ug/L	20	11141-16-5	Y
PCB-1242	Not detected	2		ug/L	20	53469-21-9	Y
PCB-1248	15	2		ug/L	20	12672-29-6	Y
PCB-1254	Not detected	2		ug/L	20	11097-69-1	Y
PCB-1260	Not detected	2		ug/L	20	11096-82-5	Y
PCB, Total*	15	2		ug/L	20	1336-36-3	Y

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 11:39, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	

Y-Elevated reporting limit due to high target concentration



Analytical Laboratory Report

Lab Sample ID: S08150.05 (continued)

Sample Tag: MWW01-SEN04_GW-100919

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 11:39, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S08150.06

Sample Tag: MW-40-99_GW-100919

Collected Date/Time: 10/09/2019 16:35

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/11/19 20:34, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	11	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 11:59, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	



Analytical Laboratory Report

Lab Sample ID: S08150.06 (continued)
Sample Tag: MW-40-99_GW-100919

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 11:59, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Lab Sample ID: S08150.07

Sample Tag: Trip Blank

Collected Date/Time: 10/09/2019 00:01

Matrix: Water

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	HCL	Yes	3.9	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/11/19 14:56, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	Not detected	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/14/19 14:34, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	



Analytical Laboratory Report

Lab Sample ID: S08150.07 (continued)

Sample Tag: Trip Blank

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/14/19 14:34, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	

Merit Laboratories Login Checklist

Lab Set ID:S08150

Client:ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: PNC Racer

Submitted: 10/10/2019 14:15 Login User: MMC

Attention: Colleen Barton

Address: Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-225-1909

FAX: 248-994-2241

Email: Colleen.barton@arcadis.com

Selection	Description	Note
Sample Receiving		
01. ☒ Yes ☐ No ☐ N/A	Samples are received at 4C +/- 2C Thermometer #	IR 3.9
02. ☒ Yes ☐ No ☐ N/A	Received on ice/ cooling process begun	
03. ☐ Yes ☒ No ☐ N/A	Samples shipped	
04. ☐ Yes ☒ No ☐ N/A	Samples left in 24 hr. drop box	
05. ☐ Yes ☐ No ☒ N/A	Are there custody seals/tape or is the drop box locked	
Chain of Custody		
06. ☒ Yes ☐ No ☐ N/A	COC adequately filled out	
07. ☒ Yes ☐ No ☐ N/A	COC signed and relinquished to the lab	
08. ☒ Yes ☐ No ☐ N/A	Sample tag on bottles match COC	
09. ☐ Yes ☒ No ☐ N/A	Subcontracting needed? Subcontracted to:	
Preservation		
10. ☒ Yes ☐ No ☐ N/A	Do sample have correct chemical preservation	
11. ☒ Yes ☐ No ☐ N/A	Completed pH checks on preserved samples? (no VOAs)	
12. ☐ Yes ☒ No ☐ N/A	Did any samples need to be preserved in the lab?	
Bottle Conditions		
13. ☒ Yes ☐ No ☐ N/A	All bottles intact	
14. ☒ Yes ☐ No ☐ N/A	Appropriate analytical bottles are used	
15. ☒ Yes ☐ No ☐ N/A	Merit bottles used	
16. ☒ Yes ☐ No ☐ N/A	Sufficient sample volume received	
17. ☐ Yes ☒ No ☐ N/A	Samples require laboratory filtration	
18. ☒ Yes ☐ No ☐ N/A	Samples submitted within holding time	
19. ☐ Yes ☐ No ☒ N/A	Do water VOC or TOX bottles contain headspace	

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

Merit Laboratories Bottle Preservation Check

Lab Set ID: S08150 Initials: MMC

Client: ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: PNC Racer

Submitted: 10/10/2019 14:15 Login User:

Attention: Colleen Barton

Address: Arcadis

28550 Cabot Drive

Suite 500

Novi, MI 48377

Phone: 810-225-1909

FAX: 248-994-2241

Email: Colleen.barton@arcadis.com

Lab ID	125 ml Plastic HNO ₃	250 ml Plastic HNO ₃	1 L Plastic HNO ₃	250 ml Plastic H ₂ SO ₄	125 ml Amber H ₂ SO ₄	32 oz Glass HCl	125 ml Plastic NaOH	125 ml Amber PbCO ₃ NaOH	pH					Notes
									<2	>12	other	ml add	new pH	
S08150.01	X								X					
S08150.02	X								X					
S08150.03	X								X					
S08150.04	X								X					
S08150.05	X								X					



2680 East Lansing Dr., East Lansing, MI 48823
Phone (517) 332-0167 Fax (517) 332-4034
www.meritlabs.com

C.O.C. PAGE # 1 OF 1

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME Colleen Barton			
COMPANY Arcadis			
ADDRESS 28550 Cabot Drive #500			
CITY Novi			STATE MI ZIP CODE 48377
PHONE NO. 810.225.1909		FAX NO.	P.O. NO. B0064607.2017.
E-MAIL ADDRESS Colleen.Barton@arcadis.com; Brad Saunders@arc			QUOTE NO. ↑ 3006882.mdb

CONTACT NAME		Accounts Payable		☐ SAME	
COMPANY		Arcadis			
ADDRESS		630 Plaza Drive Suite 600			
CITY		Highlands Ranch		STATE	CO
				ZIP CODE	80129
PHONE NO.		E-MAIL ADDRESS			
		accountspayable.administration@arcadis-us.com			

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME	PNC Racer	SAMPLER(S) - PLEASE PRINT/SIGN NAME	<i>E. E. H. O.</i>
TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER			
DELIVERABLES REQUIRED ☐ STD ☒ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☒ EDD ☐ OTHER			

MATRIX	GW=GROUNDWATER	WW=WASTEWATER	S=SOIL	L=LIQUID	SD=SOLID
CODE:	SL=SLUDGE	DW=DRINKING WATER	O=OIL	WP=WPIE	A=AIR W=WASTE

[illegible]

RELINQUISHED BY:		☒ Sampler	DATE	TIME
SIGNATURE/ORGANIZATION	E. Z. L. O.		10.9.19	1816
RECEIVED BY:			DATE	TIME
SIGNATURE/ORGANIZATION	1.1.1.1 Cold Storage		10.9.14	1816
RELINQUISHED BY:			DATE	TIME
SIGNATURE/ORGANIZATION	K. A. V. O.		10.10.19	1136
RECEIVED BY:			DATE	TIME
SIGNATURE/ORGANIZATION	M. V. O.		10.10.19	1130

RELINQUISHED BY:		DATE		TIME	
SIGNATURE/ORGANIZATION		10/10/19		1415	
RECEIVED BY:		DATE		TIME	
SIGNATURE/ORGANIZATION		10/10/19		1415	
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS	NOTES: TEMP. ON ARRIVAL 3.9		
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS			

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

Rev. 5-18-12

Table 4
Summary of Groundwater Analytical Results
RACER Trust Pontiac North Campus
Pontiac, Michigan

PNC VOC Analyte List - 8260C		
	Volatile Organic Compounds	1
VOC	Acetone	1
VOC	Benzene	1
VOC	Bromodichloromethane	1
VOC	Bromoform	1
VOC	Bromomethane	1
VOC	2-Butanone	1
VOC	Carbon Disulfide	1
VOC	Carbon Tetrachloride	1
VOC	Chlorobenzene	1
VOC	Chloroethane	1
VOC	Chloroform	1
VOC	Chloromethane	1
VOC	Cumene	1
VOC	Cyclohexane	1
VOC	1,2-Dibromo-3-chloropropane	1
VOC	Dibromochloromethane	1
VOC	1,2-Dibromoethane	1
VOC	1,2-Dichlorobenzene	1
VOC	1,3-Dichlorobenzene	1
VOC	1,4-Dichlorobenzene	1
VOC	Dichlorodifluoromethane	1
VOC	1,1-Dichloroethane	1
VOC	1,2-Dichloroethane	1
VOC	1,1-Dichloroethene	1
VOC	cis-1,2-Dichloroethene	1
VOC	trans-1,2-Dichloroethene	1
VOC	1,2-Dichloropropane	1
VOC	1,3-Dichloropropene (summed)	1
VOC	Ethyl Benzene	1
VOC	2-Hexanone	1
VOC	Methyl Acetate	1
VOC	Methyl tert-butyl ether	1
VOC	4-Methyl-2-pentanone	1
VOC	Methylcyclohexane	1
VOC	Methylene Chloride	1
VOC	Styrene	1
VOC	1,1,2,2-Tetrachloroethane	1
VOC	Tetrachloroethene	1
VOC	Toluene	1
VOC	1,2,4-Trichlorobenzene	1
VOC	1,1,1-Trichloroethane	1
VOC	1,1,2-Trichloroethane	1
VOC	Trichloroethene	1
VOC	Trichlorofluoromethane	1
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	1
VOC	Vinyl Chloride	1
VOC	Xylenes (total)	1

Montcalm inorganics list	
(Method 200.8)	
antimony	
arsenic	
barium	
beryllium	
cadmium	
chromium	
cobalt	
copper	
lead	
manganese	
mercury	
nickel	
selenium	
silver	
thallium	
vanadium	
zinc	

Geochemical analytical list	
calcium	
iron	
magnesium	
alkalinity	
hardness	
dissolved and suspended solids	



Report ID: S08184.01(03)
Generated on 10/24/2019
Replaces report S08184.01(02) generated on 10/24/2019

Report to

Attention: Colleen Barton
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-225-1909 FAX: 248-994-2241
Email: Colleen.barton@arcadis.com

Additional Contacts: Brad Saunders

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S08184.01-S08184.08
Project: PNC Racer
Collected Date(s): 10/08/2019 - 10/10/2019
Submitted Date/Time: 10/11/2019 11:50
Sampled by: C. Zilio
P.O. #: 30006882.00006

Table of Contents

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Maya Murshak
Technical Director



General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

Sample .07 tag corrected

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Method Summary

Method	Version
E200.8	EPA Method 200.8 Revision 5.4
E245.1	EPA Method 245.1 Revision 3.0
E608.3	EPA Method 608.3 December 2016
N/A	Not Applicable
SM2320B	Standard Method 2320 B 2011
SM2340C	Standard Method 2340 C 2011
SM2540C	Standard Method 2540 C 2011
SM2540D	Standard Method 2540 D 2011
SW3015A	SW 846 Method 3015A Revision 1 February 2007
SW5030C/8260C	SW 846 Method 8260C Revision 3 August 2006 / 5030C Revision 3 May 2003
SW8260B - SIM	SW 846 Method 8260B Revision 2 December 1996 SIMs



Sample Summary (8 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S08184.01	MWW10-SEN02_GW-100819	Groundwater	10/08/19 16:45
S08184.02	MWW01-SEN03_GW-101019	Groundwater	10/10/19 09:45
S08184.03	SUMP_GW-101019	Groundwater	10/10/19 10:30
S08184.04	MWW10-03_GW-101019	Groundwater	10/10/19 12:30
S08184.05	MWM32-01_GW-101019	Groundwater	10/10/19 14:10
S08184.06	MWM16-37_GW-101019	Groundwater	10/10/19 15:45
S08184.07	MWM31-02_GW-101019	Groundwater	10/10/19 16:50
S08184.08	Trip Blank	Water	10/10/19 00:01



Analytical Laboratory Report

Revised Report

Lab Sample ID: S08184.01

Sample Tag: MWW10-SEN02_GW-100819

Collected Date/Time: 10/08/2019 16:45

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.0	IR
1	125ml Plastic	HNO3	Yes	5.0	IR
1	1L Amber	None	Yes	5.0	IR
1	500ml Plastic	None	Yes	5.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/18/19 12:15	JRH	
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	
Metal Digestion	Completed	SW3015A	10/16/19 10:00	CCM	
Extraction, PCB*	Completed	E608.3	10/15/19 12:30	BPS	

Inorganics

Method: SM2320B, Run Date: 10/18/19 11:22, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	696	2		mg/L	2		

Method: SM2340C, Run Date: 10/15/19 16:18, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	262	2		mg/L	10		

Method: SM2540C, Run Date: 10/15/19 14:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	1,280	40		mg/L	4		

Method: SM2540D, Run Date: 10/15/19 19:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	602	3		mg/L	20		

Metals

Method: E200.8, Run Date: 10/14/19 12:05, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	180	2.5		mg/L	50	7440-70-2	
Magnesium	38.6	2.5		mg/L	50	7439-95-4	

Method: E200.8, Run Date: 10/16/19 13:48, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.009	0.002		mg/L	5	7440-38-2	
Barium	0.137	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	0.096	0.005		mg/L	5	7440-47-3	
Cobalt	0.008	0.005		mg/L	5	7440-48-4	
Copper	0.058	0.005		mg/L	5	7440-50-8	
Iron	20.6	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Revised Report

Lab Sample ID: S08184.01 (continued)
Sample Tag: MWW10-SEN02_GW-100819

Method: E200.8, Run Date: 10/16/19 13:48, Analyst: CCM (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Lead	0.009	0.003		mg/L	5	7439-92-1	
Manganese	0.294	0.005		mg/L	5	7439-96-5	
Nickel	0.105	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	0.022	0.005		mg/L	5	7440-62-2	
Zinc	0.057	0.005		mg/L	5	7440-66-6	

Method: E245.1, Run Date: 10/18/19 15:38, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides**PCB, Method: E608.3, Run Date: 10/17/19 14:42, Analyst: JANB**

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles**Method: SW8260B - SIM, Run Date: 10/14/19 15:41, Analyst: KAG**

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	9	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 20:03, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	

Lab Sample ID: S08184.01 (continued)

Sample Tag: MWW10-SEN02_GW-100819

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 20:03, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Revised Report

Lab Sample ID: S08184.02

Sample Tag: MWW01-SEN03_GW-101019

Collected Date/Time: 10/10/2019 09:45

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.0	IR
1	125ml Plastic	HNO3	Yes	5.0	IR
2	1L Amber	None	Yes	5.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/18/19 12:15	JRH	
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	
Metal Digestion	Completed	SW3015A	10/16/19 10:00	CCM	
Extraction, PCB*	Completed	E608.3	10/15/19 12:30	BPS	

Inorganics

Method: SM2320B, Run Date: 10/18/19 11:24, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	416	2		mg/L	2		

Method: SM2340C, Run Date: 10/15/19 16:20, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	405	2		mg/L	10		

Method: SM2540C, Run Date: 10/15/19 14:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	704	20		mg/L	2		

Method: SM2540D, Run Date: 10/16/19 19:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	Not detected	3		mg/L	1.33		

Metals

Method: E200.8, Run Date: 10/14/19 12:06, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	147	2.5		mg/L	50	7440-70-2	
Magnesium	25.4	2.5		mg/L	50	7439-95-4	

Method: E200.8, Run Date: 10/16/19 13:54, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.002	0.002		mg/L	5	7440-38-2	
Barium	0.083	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	
Iron	1.02	0.02		mg/L	5	7439-89-6	
Lead	Not detected	0.003		mg/L	5	7439-92-1	



Analytical Laboratory Report

Revised Report

Lab Sample ID: S08184.02 (continued)
Sample Tag: MWW01-SEN03_GW-101019

Method: E200.8, Run Date: 10/16/19 13:54, Analyst: CCM (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Manganese	0.279	0.005		mg/L	5	7439-96-5	
Nickel	Not detected	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	Not detected	0.005		mg/L	5	7440-66-6	

Method: E245.1, Run Date: 10/18/19 15:40, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/17/19 14:53, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/14/19 16:03, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	Not detected	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 20:22, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	



Analytical Laboratory Report

Revised Report

Lab Sample ID: S08184.02 (continued)

Sample Tag: MWW01-SEN03_GW-101019

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 20:22, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Revised Report

Lab Sample ID: S08184.03

Sample Tag: SUMP_GW-101019

Collected Date/Time: 10/10/2019 10:30

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.0	IR
1	125ml Plastic	HNO3	Yes	5.0	IR
2	1L Amber	None	Yes	5.0	IR
1	1L Plastic	None	Yes	5.0	IR
1	500ml Plastic	None	Yes	5.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Mercury Digestion	Completed	E245.1	10/18/19 12:15	JRH	
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	
Metal Digestion	Completed	SW3015A	10/16/19 10:00	CCM	
Extraction, PCB*	Completed	E608.3	10/15/19 12:30	BPS	

Inorganics

Method: SM2320B, Run Date: 10/18/19 11:26, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Alkalinity as CaCO3	408	2		mg/L	2		

Method: SM2340C, Run Date: 10/15/19 16:22, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness as CaCO3	226	2		mg/L	10		

Method: SM2540C, Run Date: 10/15/19 14:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	868	40		mg/L	4		

Method: SM2540D, Run Date: 10/16/19 19:00, Analyst: DMK

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Suspended Solids	22	3		mg/L	3.33		

Metals

Method: E200.8, Run Date: 10/14/19 12:07, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Calcium*	83.2	2.5		mg/L	50	7440-70-2	
Magnesium	25.3	2.5		mg/L	50	7439-95-4	

Method: E200.8, Run Date: 10/16/19 13:59, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Antimony	Not detected	0.005		mg/L	5	7440-36-0	
Arsenic	0.004	0.002		mg/L	5	7440-38-2	
Barium	0.184	0.005		mg/L	5	7440-39-3	
Beryllium	Not detected	0.001		mg/L	5	7440-41-7	
Cadmium	Not detected	0.0005		mg/L	5	7440-43-9	
Chromium	Not detected	0.005		mg/L	5	7440-47-3	
Cobalt	Not detected	0.005		mg/L	5	7440-48-4	
Copper	Not detected	0.005		mg/L	5	7440-50-8	



Analytical Laboratory Report

Revised Report

Lab Sample ID: S08184.03 (continued)

Sample Tag: SUMP_GW-101019

Method: E200.8, Run Date: 10/16/19 13:59, Analyst: CCM (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	9.61	0.02		mg/L	5	7439-89-6	
Lead	Not detected	0.003		mg/L	5	7439-92-1	
Manganese	0.360	0.005		mg/L	5	7439-96-5	
Nickel	Not detected	0.005		mg/L	5	7440-02-0	
Selenium	Not detected	0.005		mg/L	5	7782-49-2	
Silver	Not detected	0.0005		mg/L	5	7440-22-4	
Thallium	Not detected	0.002		mg/L	5	7440-28-0	
Vanadium	Not detected	0.005		mg/L	5	7440-62-2	
Zinc	Not detected	0.005		mg/L	5	7440-66-6	

Method: E245.1, Run Date: 10/18/19 15:42, Analyst: JRH

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Mercury	Not detected	0.0002		mg/L	1	7439-97-6	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/17/19 15:04, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 20:41, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	

Lab Sample ID: S08184.03 (continued)

Sample Tag: SUMP_GW-101019

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 20:41, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Revised Report

Lab Sample ID: S08184.04

Sample Tag: MWW10-03_GW-101019

Collected Date/Time: 10/10/2019 12:30

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.0	IR
1	125ml Plastic	HNO3	Yes	5.0	IR
2	1L Amber	None	Yes	5.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	
Metal Digestion	Completed	SW3015A	10/17/19 10:00	CCM	
Extraction, PCB*	Completed	E608.3	10/15/19 12:30	BPS	

Metals**Method: E200.8, Run Date: 10/17/19 12:08, Analyst: CCM**

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Lead	0.011	0.003		mg/L	5	7439-92-1	
Manganese	0.408	0.005		mg/L	5	7439-96-5	

Organics - PCBs/Pesticides**PCB, Method: E608.3, Run Date: 10/17/19 15:16, Analyst: JANB**

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Organics - Volatiles**Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 21:01, Analyst: KAG**

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	

Lab Sample ID: S08184.04 (continued)

Sample Tag: MWW10-03_GW-101019

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 21:01, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Revised Report

Lab Sample ID: S08184.05

Sample Tag: MWM32-01_GW-101019

Collected Date/Time: 10/10/2019 14:10

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 21:20, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	

**Lab Sample ID: S08184.05 (continued)**

Sample Tag: MWM32-01_GW-101019

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 21:20, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Revised Report

Lab Sample ID: S08184.06

Sample Tag: MWM16-37_GW-101019

Collected Date/Time: 10/10/2019 15:45

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 21:39, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	2	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	



Lab Sample ID: S08184.06 (continued)

Sample Tag: MWM16-37_GW-101019

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 21:39, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Revised Report

Lab Sample ID: S08184.07

Sample Tag: MWM31-02_GW-101019

Collected Date/Time: 10/10/2019 16:50

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 21:59, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	



Lab Sample ID: S08184.07 (continued)

Sample Tag: MWM31-02_GW-101019

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 21:59, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Revised Report

Lab Sample ID: S08184.08

Sample Tag: Trip Blank

Collected Date/Time: 10/10/2019 00:01

Matrix: Water

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	HCL	Yes	5.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	

Organics - Volatiles

Method: SW8260B - SIM, Run Date: 10/11/19 15:17, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
1,4-Dioxane*	Not detected	1		ug/L	1	123-91-1	

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 19:05, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	



Lab Sample ID: S08184.08 (continued)

Sample Tag: Trip Blank

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 19:05, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	

Merit Laboratories Login Checklist

Lab Set ID:S08184

Client:ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: PNC Racer

Submitted: 10/11/2019 11:50 Login User: MMC

Attention: Colleen Barton

Address: Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-225-1909

FAX: 248-994-2241

Email: Colleen.barton@arcadis.com

Selection	Description	Note
Sample Receiving		
01.	☒ Yes ☐ No ☐ N/A	Samples are received at 4C +/- 2C Thermometer # IR 5.0
02.	☒ Yes ☐ No ☐ N/A	Received on ice/ cooling process begun
03.	☐ Yes ☒ No ☐ N/A	Samples shipped
04.	☐ Yes ☒ No ☐ N/A	Samples left in 24 hr. drop box
05.	☐ Yes ☐ No ☒ N/A	Are there custody seals/tape or is the drop box locked
Chain of Custody		
06.	☒ Yes ☐ No ☐ N/A	COC adequately filled out
07.	☒ Yes ☐ No ☐ N/A	COC signed and relinquished to the lab
08.	☒ Yes ☐ No ☐ N/A	Sample tag on bottles match COC
09.	☐ Yes ☒ No ☐ N/A	Subcontracting needed? Subcontacted to:
Preservation		
10.	☒ Yes ☐ No ☐ N/A	Do sample have correct chemical preservation
11.	☒ Yes ☐ No ☐ N/A	Completed pH checks on preserved samples? (no VOAs)
12.	☐ Yes ☒ No ☐ N/A	Did any samples need to be preserved in the lab?
Bottle Conditions		
13.	☒ Yes ☐ No ☐ N/A	All bottles intact
14.	☒ Yes ☐ No ☐ N/A	Appropriate analytical bottles are used
15.	☒ Yes ☐ No ☐ N/A	Merit bottles used
16.	☐ Yes ☒ No ☐ N/A	Sufficient sample volume received Samples .01/.02
17.	☐ Yes ☒ No ☐ N/A	Samples require laboratory filtration
18.	☒ Yes ☐ No ☐ N/A	Samples submitted within holding time
19.	☐ Yes ☐ No ☒ N/A	Do water VOC or TOX bottles contain headspace

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

Merit Laboratories Bottle Preservation Check

Lab Set ID: S08184 Initials: MMC

Attention: Colleen Barton
Address: Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Client: ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: PNC Racer

Submitted: 10/11/2019 11:50 Login User:

Phone: 810-225-1909 FAX: 248-994-2241
Email: Colleen.barton@arcadis.com

Lab ID	125 ml Plastic HNO ₃	250 ml Plastic HNO ₃	1 L Plastic HNO ₃	250 ml Plastic H ₂ SO ₄	125 ml Amber H ₂ SO ₄	32 oz Glass HCl	125 ml Plastic NaOH	125 ml Amber PbCO ₃ NaOH	pH					Notes
									<2	>12	other	ml add	new pH	
S08184.01	X								X					
S08184.02	X								X					
S08184.03	X								X					
S08184.04	X								X					



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Phone (517) 332-0187 Fax (517) 332-4034
www.meritlabs.com

C.O.C. PAGE # 1 OF 1

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME Colleen Barton
COMPANY Arcadis
ADDRESS 28550 Cabot Drive #500
CITY Novi STATE MI ZIP CODE 48377
PHONE NO. 810.225.1909 FAX NO. P.O. NO. B0064607.2017.
E-MAIL ADDRESS Colleen.Barton@arcadis.com; Brad.Saunders@arc

CONTACT NAME Accounts Payable ☐ SAME
COMPANY Arcadis
ADDRESS 630 Plaza Drive Suite 600
CITY Highlands Ranch STATE CO ZIP CODE 80129
PHONE NO. E-MAIL ADDRESS accountspayable.administration@arcadis-us.com

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME PNC Racer
TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER
DELIVERABLES REQUIRED ☐ STD ☒ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☒ EDD ☐ OTHER

MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID
SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIFE A=AIR W=WASTE

SAMPLER(S) - PLEASE PRINT/SIGN NAME C. 2.1.1.0
Containers & Preservatives
* VOCs (8260) 1,4-dioxane (8260 SIMs) Manganese Lead Antimony Vanadium **Montcalm Inorganics **Montcalm Geochemistry PCB
Certifications ☐ OHIO VAP ☐ Drinking Water ☐ DoD ☐ NPDES
Project Locations ☐ Detroit ☐ New York ☒ Other Pontiac, MI
Special Instructions

MERIT LAB NO. FOR LAB USE ONLY	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NONE	HCl	HNO ₃	H ₂ SO ₄	H ₂ CO ₃	H ₂ PO ₄	H ₂ PO ₃	H ₂ PO ₂	H ₂ PO ₁	OTHER	* VOCs (8260)	1,4-dioxane (8260 SIMs)	Manganese	Lead	Antimony	Vanadium	**Montcalm Inorganics	**Montcalm Geochemistry	PCB	Special Instructions
	DATE	TIME																							
08184.01	10-8-19	1645	mww10-SEN02-GW-100819	GW	6	2	3	1								X						X	X	X	*See attached VOC list
.02	10-10-19	0945	mww01-SEN03-GW-101019		8	4	3	1								X	X					X	X	X	**See attached Montcalm inorganics/geochemistry lists
.03		1030	SUMP-GW-101019		8	4	3	1								X						X	X	X	***RL for 1,4-dioxane must be <7.2 ppb
.04		1230	mww10-03-GW-101019		6	2	3	1								X		X	X					X	mww10-SEN02-GW-100819
.05		1410	mwm32-01-GW-101019		3	3										X									HAS LIMITED VOLUME
.06		1545	mwm16-37-GW-101019		3	3										X									
.07		1650	mwm31-02-GW-101019		3	3										X									
.08			TRIP BLANK		1	1										X	X								

RELINQUISHED BY: SIGNATURE/ORGANIZATION C. 2.1.1.0
RECEIVED BY: SIGNATURE/ORGANIZATION Novi Cold Storage
RELINQUISHED BY: SIGNATURE/ORGANIZATION
RECEIVED BY: SIGNATURE/ORGANIZATION

RELINQUISHED BY: SIGNATURE/ORGANIZATION
RECEIVED BY: SIGNATURE/ORGANIZATION
SEAL NO. SEAL INTACT YES ☐ NO ☐ INITIALS
SEAL NO. SEAL INTACT YES ☐ NO ☐ INITIALS
NOTES: TEMP. ON ARRIVAL 5.0

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

Table 4
Summary of Groundwater Analytical Results
RACER Trust Pontiac North Campus
Pontiac, Michigan



PNC VOC Analyte List - 8260C	
Volatile Organic Compounds	
VOC	Acetone
VOC	Benzene
VOC	Bromodichloromethane
VOC	Bromoform
VOC	Bromomethane
VOC	2-Butanone
VOC	Carbon Disulfide
VOC	Carbon Tetrachloride
VOC	Chlorobenzene
VOC	Chloroethane
VOC	Chloroform
VOC	Chloromethane
VOC	Cumene
VOC	Cyclohexane
VOC	1,2-Dibromo-3-chloropropane
VOC	Dibromochloromethane
VOC	1,2-Dibromoethane
VOC	1,2-Dichlorobenzene
VOC	1,3-Dichlorobenzene
VOC	1,4-Dichlorobenzene
VOC	Dichlorodifluoromethane
VOC	1,1-Dichloroethane
VOC	1,2-Dichloroethane
VOC	1,1-Dichloroethene
VOC	cis-1,2-Dichloroethene
VOC	trans-1,2-Dichloroethene
VOC	1,2-Dichloropropane
VOC	1,3-Dichloropropene (summed)
VOC	Ethyl Benzene
VOC	2-Hexanone
VOC	Methyl Acetate
VOC	Methyl tert-butyl ether
VOC	4-Methyl-2-pentanone
VOC	Methylcyclohexane
VOC	Methylene Chloride
VOC	Styrene
VOC	1,1,2,2-Tetrachloroethane
VOC	Tetrachloroethene
VOC	Toluene
VOC	1,2,4-Trichlorobenzene
VOC	1,1,1-Trichloroethane
VOC	1,1,2-Trichloroethane
VOC	Trichloroethene
VOC	Trichlorofluoromethane
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane
VOC	Vinyl Chloride
VOC	Xylenes (total)

Montcalm inorganics list
(Method 200.8)
antimony
arsenic
barium
beryllium
cadmium
chromium
cobalt
copper
lead
manganese
mercury
nickel
selenium
silver
thallium
vanadium
zinc

Geochemical analytical list
calcium
iron
magnesium
alkalinity
hardness
dissolved and suspended solids



Report ID: S08185.01(02)
Generated on 10/24/2019
Replaces report S08185.01(01) generated on 10/22/2019

Report to

Attention: Colleen Barton
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-225-1909 FAX: 248-994-2241
Email: Colleen.barton@arcadis.com

Additional Contacts: Brad Saunders

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Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S08185.01-S08185.06
Project: PNC Racer
Collected Date(s): 10/10/2019
Submitted Date/Time: 10/11/2019 11:50
Sampled by: Christina Weaver
P.O. #: 30006882.00006

Table of Contents

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Sample Summary (Page 5)

Maya Murshak
Technical Director



General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.

Methods may be modified for improved performance.

Results reported on a dry weight basis where applicable.

'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).

40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.

QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.

Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.

Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.

Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.

Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

Sample .01 tag corrected

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Method Summary

Method	Version
E200.8	EPA Method 200.8 Revision 5.4
N/A	Not Applicable
SW3015A	SW 846 Method 3015A Revision 1 February 2007
SW5030C/8260C	SW 846 Method 8260C Revision 3 August 2006 / 5030C Revision 3 May 2003



Sample Summary (6 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S08185.01	MWOS-05_GW-101019	Groundwater	10/10/19 09:30
S08185.02	MWM16-02_GW-101019	Groundwater	10/10/19 12:15
S08185.03	DUP-04	Groundwater	10/10/19 00:01
S08185.04	MWM16-31_GW-101019	Groundwater	10/10/19 13:30
S08185.05	MWM16-30_GW-101019	Groundwater	10/10/19 15:30
S08185.06	Trip Blank	Water	10/10/19 00:01



Analytical Laboratory Report

Revised Report

Lab Sample ID: S08185.01

Sample Tag: MWOS-05_GW-101019

Collected Date/Time: 10/10/2019 09:30

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
2	125ml Plastic	HNO3	Yes	5.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	10/14/19 09:50	CCM	
Metal Digestion	Completed	SW3015A	10/14/19 09:50	CCM	

Metals

Method: E200.8, Run Date: 10/14/19 11:28, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic, Dissolved	0.005	0.002		mg/L	5	7440-38-2	

Method: E200.8, Run Date: 10/14/19 11:26, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Arsenic	0.005	0.002		mg/L	5	7440-38-2	



Analytical Laboratory Report

Revised Report

Lab Sample ID: S08185.02

Sample Tag: MWM16-02_GW-101019

Collected Date/Time: 10/10/2019 12:15

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 22:18, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	1	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	



Lab Sample ID: S08185.02 (continued)

Sample Tag: MWM16-02_GW-101019

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 22:18, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Revised Report

Lab Sample ID: S08185.03

Sample Tag: DUP-04

Collected Date/Time: 10/10/2019 00:01

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 22:37, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	1	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	2	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	



Lab Sample ID: S08185.03 (continued)

Sample Tag: DUP-04

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 22:37, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Revised Report

Lab Sample ID: S08185.04

Sample Tag: MWM16-31_GW-101019

Collected Date/Time: 10/10/2019 13:30

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/17/19 00:56, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	1	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	2	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	

**Lab Sample ID: S08185.04 (continued)**

Sample Tag: MWM16-31_GW-101019

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/17/19 00:56, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Revised Report

Lab Sample ID: S08185.05

Sample Tag: MWM16-30_GW-101019

Collected Date/Time: 10/10/2019 15:30

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	5.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 23:16, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	6	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	17	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	



Lab Sample ID: S08185.05 (continued)

Sample Tag: MWM16-30_GW-101019

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 23:16, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	



Analytical Laboratory Report

Revised Report

Lab Sample ID: S08185.06

Sample Tag: Trip Blank

Collected Date/Time: 10/10/2019 00:01

Matrix: Water

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	HCL	Yes	5.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
pH check for VOCs*	<2	N/A	10/14/19 13:00	JML	

Organics - Volatiles

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 19:24, Analyst: KAG

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Acetone	Not detected	50		ug/L	1	67-64-1	
2-Butanone (MEK)	Not detected	25		ug/L	1	78-93-3	
Benzene	Not detected	1		ug/L	1	71-43-2	
Bromodichloromethane	Not detected	1		ug/L	1	75-27-4	
Bromoform	Not detected	1		ug/L	1	75-25-2	
Bromomethane	Not detected	5		ug/L	1	74-83-9	
Carbon disulfide	Not detected	5		ug/L	1	75-15-0	
Carbon tetrachloride	Not detected	1		ug/L	1	56-23-5	
Chlorobenzene	Not detected	1		ug/L	1	108-90-7	
Chloroethane	Not detected	5		ug/L	1	75-00-3	
Chloroform	Not detected	1		ug/L	1	67-66-3	
Chloromethane	Not detected	5		ug/L	1	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	5		ug/L	1	96-12-8	
1,2-Dichlorobenzene	Not detected	1		ug/L	1	95-50-1	
1,2-Dichloroethane	Not detected	1		ug/L	1	107-06-2	
1,2-Dichloropropane	Not detected	1		ug/L	1	78-87-5	
1,3-Dichlorobenzene	Not detected	1		ug/L	1	541-73-1	
1,4-Dichlorobenzene	Not detected	1		ug/L	1	106-46-7	
cis-1,2-Dichloroethene	Not detected	1		ug/L	1	156-59-2	
Dibromochloromethane	Not detected	5		ug/L	1	124-48-1	
Dichlorodifluoromethane	Not detected	5		ug/L	1	75-71-8	
trans-1,2-Dichloroethene	Not detected	1		ug/L	1	156-60-5	
Ethylbenzene	Not detected	1		ug/L	1	100-41-4	
2-Hexanone	Not detected	50		ug/L	1	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	50		ug/L	1	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	5		ug/L	1	1634-04-4	
Methylene chloride	Not detected	5		ug/L	1	75-09-2	
Styrene	Not detected	1		ug/L	1	100-42-5	
1,1,1-Trichloroethane	Not detected	1		ug/L	1	71-55-6	
1,1,2-Trichloroethane	Not detected	1		ug/L	1	79-00-5	
1,2,4-Trichlorobenzene	Not detected	5		ug/L	1	120-82-1	
Tetrachloroethene	Not detected	1		ug/L	1	127-18-4	
Toluene	Not detected	1		ug/L	1	108-88-3	
Trichloroethene	Not detected	1		ug/L	1	79-01-6	
Trichlorofluoromethane	Not detected	1		ug/L	1	75-69-4	
Vinyl chloride	Not detected	1		ug/L	1	75-01-4	
o-Xylene	Not detected	1		ug/L	1	95-47-6	



Lab Sample ID: S08185.06 (continued)

Sample Tag: Trip Blank

Volatile Organics - Arcadis, Method: SW5030C/8260C, Run Date: 10/12/19 19:24, Analyst: KAG (continued)

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
p,m-Xylene*	Not detected	2		ug/L	1		
Isopropylbenzene	Not detected	1		ug/L	1	98-82-8	
Cyclohexane	Not detected	1		ug/L	1	110-82-7	
1,1-Dichloroethane	Not detected	1		ug/L	1	75-34-3	
1,1-Dichloroethene	Not detected	1		ug/L	1	75-35-4	
Methyl Acetate	Not detected	10		ug/L	1	79-20-9	
Methyl cyclohexane	Not detected	1		ug/L	1	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	1		ug/L	1	76-13-1	
1,2-Dibromoethane	Not detected	1		ug/L	1	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	1		ug/L	1	79-34-5	
cis-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-01-5	
trans-1,3-Dichloropropene	Not detected	1		ug/L	1	10061-02-6	

Merit Laboratories Login Checklist

Lab Set ID:S08185

Client:ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: PNC Racer

Submitted: 10/11/2019 11:50 Login User: MMC

Attention: Colleen Barton

Address: Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-225-1909

FAX: 248-994-2241

Email: Colleen.barton@arcadis.com

Selection	Description	Note
Sample Receiving		
01.	☒ Yes ☐ No ☐ N/A	Samples are received at 4C +/- 2C Thermometer # IR 5.0
02.	☒ Yes ☐ No ☐ N/A	Received on ice/ cooling process begun
03.	☐ Yes ☒ No ☐ N/A	Samples shipped
04.	☐ Yes ☒ No ☐ N/A	Samples left in 24 hr. drop box
05.	☐ Yes ☐ No ☒ N/A	Are there custody seals/tape or is the drop box locked
Chain of Custody		
06.	☒ Yes ☐ No ☐ N/A	COC adequately filled out
07.	☒ Yes ☐ No ☐ N/A	COC signed and relinquished to the lab
08.	☒ Yes ☐ No ☐ N/A	Sample tag on bottles match COC
09.	☐ Yes ☒ No ☐ N/A	Subcontracting needed? Subcontacted to:
Preservation		
10.	☒ Yes ☐ No ☐ N/A	Do sample have correct chemical preservation
11.	☒ Yes ☐ No ☐ N/A	Completed pH checks on preserved samples? (no VOAs)
12.	☐ Yes ☒ No ☐ N/A	Did any samples need to be preserved in the lab?
Bottle Conditions		
13.	☒ Yes ☐ No ☐ N/A	All bottles intact
14.	☒ Yes ☐ No ☐ N/A	Appropriate analytical bottles are used
15.	☒ Yes ☐ No ☐ N/A	Merit bottles used
16.	☒ Yes ☐ No ☐ N/A	Sufficient sample volume received
17.	☐ Yes ☒ No ☐ N/A	Samples require laboratory filtration
18.	☒ Yes ☐ No ☐ N/A	Samples submitted within holding time
19.	☐ Yes ☐ No ☒ N/A	Do water VOC or TOX bottles contain headspace

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

Merit Laboratories Bottle Preservation Check

Lab Set ID: S08185 Initials: MMC

Attention: Colleen Barton
Address: Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Client: ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: PNC Racer

Submitted: 10/11/2019 11:50 Login User:

Phone: 810-225-1909 FAX: 248-994-2241
Email: Colleen.barton@arcadis.com

Lab ID	125 ml Plastic HNO ₃	250 ml Plastic HNO ₃	1 L Plastic HNO ₃	250 ml Plastic H ₂ SO ₄	125 ml Amber H ₂ SO ₄	32 oz Glass HCl	125 ml Plastic NaOH	125 ml Amber PbCO ₃ NaOH	pH					Notes
									<2	>12	other	ml add	new pH	
S08185.01	X								X					
S08185.01	X								X					



2680 East Lansing Dr., East Lansing, MI 48823
Phone (517) 332-0167 Fax (517) 332-4034
www.meritlabs.com

C.O.C. PAGE # 1 OF 1

INVOICE TO

CONTACT NAME Colleen Barton			
COMPANY Arcadis			
ADDRESS 28550 Cabot Drive #500			
CITY Novi			STATE MI ZIP CODE 48377
PHONE NO. 810.225.1909		FAX NO.	P.O. NO. 30006882.00006
E-MAIL ADDRESS Colleen.Barton@arcadis.com; Brad Saunders@arc			QUOTE NO.

CONTACT NAME		Accounts Payable		☐ SAME	
COMPANY		Arcadis			
ADDRESS		630 Plaza Drive Suite 600			
CITY		Highlands Ranch		STATE	CO ZIP CODE 80129
PHONE NO.		E-MAIL ADDRESS accounts payable.administration@arcadis-us.com			

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME **RACER PNC** SAMPLER(S) - PLEASE PRINT/SIGN NAME
Christina Weaver / Chris Wu

TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER _____

DELIVERABLES REQUIRED ☐ STD ☒ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☒ EDD ☐ OTHER _____

MATRIX	GW=GROUNDWATER	WW=WASTEWATER	S=SOIL	L=LIQUID	SD=SOLID	# Containers & Preservatives
CODE:	SL=SLUDGE	DW=DRINKING WATER	O=OIL	WP=WPIE	A=AIR W=WASTE	

[illegible]

RELINQUISHED BY: SIGNATURE/ORGANIZATION	<i>Christie Wilson</i>	☒ Sampler	DATE 10.10.19	TIME 1830
RECEIVED BY: SIGNATURE/ORGANIZATION	<i>P. New Cold Storage</i>		DATE 10.10.19	TIME 1830
RELINQUISHED BY: SIGNATURE/ORGANIZATION	<i>Robyn Voss</i>		DATE 10/11/19	TIME 955
RECEIVED BY: SIGNATURE/ORGANIZATION	<i>Don</i>		DATE 10/11/19	TIME 0825

RELINQUISHED BY: SIGNATURE/ORGANIZATION			DATE 10/11/19		TIME 1150	
RECEIVED BY: SIGNATURE/ORGANIZATION			DATE 10/11/19		TIME 1150	
SEA. NO.	SEAL INTACT YES ☐ NO ☐	INITIALS	NOTES:	TEMP. ON ARRIVAL	5.0	
SEA. NO.	SEAL INTACT YES ☐ NO ☐	INITIALS				

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

Table 4
Summary of Groundwater Analytical Results
RACER Trust Pontiac North Campus
Pontiac, Michigan

PNC VOC Analyte List - 8260C		
	Volatile Organic Compounds	1
VOC	Acetone	1
VOC	Benzene	1
VOC	Bromodichloromethane	1
VOC	Bromoform	1
VOC	Bromomethane	1
VOC	2-Butanone	1
VOC	Carbon Disulfide	1
VOC	Carbon Tetrachloride	1
VOC	Chlorobenzene	1
VOC	Chloroethane	1
VOC	Chloroform	1
VOC	Chloromethane	1
VOC	Cumene	1
VOC	Cyclohexane	1
VOC	1,2-Dibromo-3-chloropropane	1
VOC	Dibromochloromethane	1
VOC	1,2-Dibromoethane	1
VOC	1,2-Dichlorobenzene	1
VOC	1,3-Dichlorobenzene	1
VOC	1,4-Dichlorobenzene	1
VOC	Dichlorodifluoromethane	1
VOC	1,1-Dichloroethane	1
VOC	1,2-Dichloroethane	1
VOC	1,1-Dichloroethene	1
VOC	cis-1,2-Dichloroethene	1
VOC	trans-1,2-Dichloroethene	1
VOC	1,2-Dichloropropane	1
VOC	1,3-Dichloropropane (summed)	1
VOC	Ethyl Benzene	1
VOC	2-Hexanone	1
VOC	Methyl Acetate	1
VOC	Methyl tert-butyl ether	1
VOC	4-Methyl-2-pentanone	1
VOC	Methylcyclohexane	1
VOC	Methylene Chloride	1
VOC	Styrene	1
VOC	1,1,2,2-Tetrachloroethane	1
VOC	Tetrachloroethene	1
VOC	Toluene	1
VOC	1,2,4-Trichlorobenzene	1
VOC	1,1,1-Trichloroethane	1
VOC	1,1,2-Trichloroethane	1
VOC	Trichloroethene	1
VOC	Trichlorofluoromethane	1
VOC	1,1,2-Trichloro-1,2,2-trifluoroethane	1
VOC	Vinyl Chloride	1
VOC	Xylenes (total)	1



Analytical Laboratory Report

Report ID: S08251.01(01)
Generated on 10/17/2019

Report to

Attention: Colleen Barton
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-225-1909 FAX: 248-994-2241
Email: Colleen.barton@arcadis.com

Additional Contacts: Brad Saunders

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S08251.01
Project: PNC Racer
Collected Date(s): 10/11/2019
Submitted Date/Time: 10/14/2019 15:15
Sampled by: C. Zilio
P.O. #: 30006882.00006

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Maya Murshak
Technical Director



Analytical Laboratory Report

General Report Notes

Analytical results relate only to the samples tested, in the condition received by the laboratory.
Methods may be modified for improved performance.
Results reported on a dry weight basis where applicable.
'Not detected' indicates that parameter was not found at a level equal to or greater than the reporting limit (RL).
40 CFR Part 136 Table II Required Containers, Preservation Techniques and Holding Times for the Clean Water Act specify that samples for acrolein and acrylonitrile need to be preserved at a pH in the range of 4 to 5 or if not preserved, analyzed within 3 days of sampling.
QA/QC corresponding to this analytical report is a separate document with the same Merit ID reference and is available upon request.
Full accreditation certificates are available upon request. Starred (*) analytes are not NELAP accredited.
Samples are held by the lab for 30 days from the final report date unless a written request to hold longer is provided by the client.
Report shall not be reproduced except in full, without the written approval of Merit Laboratories, Inc.
Limits for drinking water samples, are listed as the MCL Limits (Maximum Contaminant Level Concentrations)

Report Narrative

There is no additional narrative for this analytical report

Laboratory Certifications

Authority	Certification ID
Michigan DEQ	#9956
DOD ELAP/ISO 17025	#69699
WBENC	#2005110032
Ohio VAP	#CL0002
Indiana DOH	#C-MI-07
New York NELAC	#11814
North Carolina DENR	#680
North Carolina DOH	#26702
Alaska CSLAP	#17-001

Qualifier Descriptions

Qualifier	Description
!	Result is outside of stated limit criteria
B	Compound also found in associated method blank
E	Concentration exceeds calibration range
F	Analysis run outside of holding time
G	Estimated result due to extraction run outside of holding time
H	Sample submitted and run outside of holding time
I	Matrix interference with internal standard
J	Estimated value less than reporting limit, but greater than MDL
L	Elevated reporting limit due to low sample amount
M	Result reported to MDL not RDL
O	Analysis performed by outside laboratory. See attached report.
R	Preliminary result
S	Surrogate recovery outside of control limits
T	No correction for total solids
X	Elevated reporting limit due to matrix interference
Y	Elevated reporting limit due to high target concentration
b	Value detected less than reporting limit, but greater than MDL
e	Reported value estimated due to interference
j	Analyte also found in associated method blank
p	Benzo(b)Fluoranthene and Benzo(k)Fluoranthene integrated as one peak.
x	Preserved from bulk sample

Glossary of Abbreviations

Abbreviation	Description
RL/RDL	Reporting Limit
MDL	Method Detection Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
E608.3	EPA Method 608.3 December 2016



Analytical Laboratory Report

Sample Summary (1 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S08251.01	MW-40-99_GW-101119	Groundwater	10/11/19 13:30



Analytical Laboratory Report

Lab Sample ID: S08251.01

Sample Tag: MW-40-99_GW-101119

Collected Date/Time: 10/11/2019 13:30

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
2	1L Amber	None	Yes	4.3	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Extraction, PCB*	Completed	E608.3	10/15/19 12:30	BPS	

Organics - PCBs/Pesticides

PCB, Method: E608.3, Run Date: 10/17/19 15:27, Analyst: JANB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
PCB-1016	Not detected	0.1		ug/L	1	12674-11-2	
PCB-1221	Not detected	0.1		ug/L	1	11104-28-2	
PCB-1232	Not detected	0.1		ug/L	1	11141-16-5	
PCB-1242	Not detected	0.1		ug/L	1	53469-21-9	
PCB-1248	Not detected	0.1		ug/L	1	12672-29-6	
PCB-1254	Not detected	0.1		ug/L	1	11097-69-1	
PCB-1260	Not detected	0.1		ug/L	1	11096-82-5	
PCB, Total*	Not detected	0.1		ug/L	1	1336-36-3	

Merit Laboratories Login Checklist

Lab Set ID:S08251

Client:ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: PNC Racer

Submitted: 10/14/2019 15:15 Login User: SRS

Attention: Colleen Barton

Address: Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-225-1909

FAX: 248-994-2241

Email: Colleen.barton@arcadis.com

Selection	Description	Note
Sample Receiving		
01.	☒ Yes ☐ No ☐ N/A	Samples are received at 4C +/- 2C Thermometer # IR 5.8
02.	☒ Yes ☐ No ☐ N/A	Received on ice/ cooling process begun
03.	☐ Yes ☒ No ☐ N/A	Samples shipped
04.	☐ Yes ☒ No ☐ N/A	Samples left in 24 hr. drop box
05.	☐ Yes ☐ No ☒ N/A	Are there custody seals/tape or is the drop box locked
Chain of Custody		
06.	☒ Yes ☐ No ☐ N/A	COC adequately filled out
07.	☒ Yes ☐ No ☐ N/A	COC signed and relinquished to the lab
08.	☒ Yes ☐ No ☐ N/A	Sample tag on bottles match COC
09.	☐ Yes ☒ No ☐ N/A	Subcontracting needed? Subcontracted to:
Preservation		
10.	☐ Yes ☐ No ☒ N/A	Do sample have correct chemical preservation
11.	☐ Yes ☐ No ☒ N/A	Completed pH checks on preserved samples? (no VOAs)
12.	☐ Yes ☒ No ☐ N/A	Did any samples need to be preserved in the lab?
Bottle Conditions		
13.	☒ Yes ☐ No ☐ N/A	All bottles intact
14.	☒ Yes ☐ No ☐ N/A	Appropriate analytical bottles are used
15.	☒ Yes ☐ No ☐ N/A	Merit bottles used
16.	☒ Yes ☐ No ☐ N/A	Sufficient sample volume received
17.	☐ Yes ☒ No ☐ N/A	Samples require laboratory filtration
18.	☒ Yes ☐ No ☐ N/A	Samples submitted within holding time
19.	☐ Yes ☐ No ☒ N/A	Do water VOC or TOX bottles contain headspace

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME Colleen Barton		CONTACT NAME Accounts Payable		☐ SAME	
COMPANY Arcadis		COMPANY Arcadis			
ADDRESS 28550 Cabot Drive #500		ADDRESS 630 Plaza Drive Suite 600			
CITY Novi	STATE MI	ZIP CODE 48377	CITY Highlands Ranch	STATE CO	ZIP CODE 80129
PHONE NO. 810.225.1909	FAX NO.	P.O. NO. B0064607.2017.	PHONE NO.	E-MAIL ADDRESS accountspayable.administration@arcadis-us.com	
E-MAIL ADDRESS Colleen.Barton@arcadis.com; Brad.Saunders@arc		QUOTE NO. 30006682		ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)	

[illegible]

RELINQUISHED BY:	DATE	TIME	RELINQUISHED BY:	DATE	TIME
SIGNATURE/ORGANIZATION	10/14/19	08:15	SIGNATURE/ORGANIZATION	10/14/19	08:15
RECEIVED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME
SIGNATURE/ORGANIZATION	10/14/19	08:15	SIGNATURE/ORGANIZATION	10/14/19	08:15
RELINQUISHED BY:	DATE	TIME	SEAL NO.	SEAL INTACT	INITIALS
SIGNATURE/ORGANIZATION	10/14/19	08:15		YES ☐ NO ☐	
RECEIVED BY:	DATE	TIME	SEAL NO.	SEAL INTACT	INITIALS
SIGNATURE/ORGANIZATION	10/14/19	08:15		YES ☐ NO ☐	
			NOTES: TEMP. ON ARRIVAL		
			4,3		

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE



Analytical Laboratory Report

Report ID: S13887.01(01)
Generated on 05/19/2020

Report to

Attention: Colleen Barton
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-225-1909 FAX: 248-994-2241
Email: Colleen.barton@arcadis.com

Additional Contacts: Brad Saunders

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S13887.01-S13887.03
Project: PNC Racer
Collected Date(s): 05/11/2020
Submitted Date/Time: 05/12/2020 15:45
Sampled by: Unknown
P.O. #: 30042811.00005

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Maya Murshak
Technical Director



Analytical Laboratory Report

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MSD	Matrix Spike Duplicate
SW	EPA SW 846 (Soil and Wastewater) Methods
E	EPA Methods
SM	Standard Methods
LN	Linear
BR	Branched



Analytical Laboratory Report

Method Summary

Method	Version
E200.8	EPA Method 200.8 Revision 5.4
SM2340C	Standard Method 2340 C 2011
SM2540C	Standard Method 2540 C 2011
SW3015A	SW 846 Method 3015A Revision 1 February 2007



Analytical Laboratory Report

Sample Summary (3 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S13887.01	SUMP_GW-051120	Groundwater	05/11/20 09:32
S13887.02	INJ-02-18_GW-051120	Groundwater	05/11/20 11:24
S13887.03	INJ-01-17_GW-051120	Groundwater	05/11/20 13:04



Analytical Laboratory Report

Lab Sample ID: S13887.01

Sample Tag: SUMP_GW-051120

Collected Date/Time: 05/11/2020 09:32

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	500ml Plastic	None	Yes	10.0	IR
1	125ml Plastic	HNO3	Yes	10.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	05/13/20 10:45	CCM	

Inorganics

Method: SM2340C, Run Date: 05/15/20 13:16, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	449	2		mg/L	10		

Method: SM2540C, Run Date: 05/14/20 19:30, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	1,230	20		mg/L	2		

Metals

Method: E200.8, Run Date: 05/13/20 12:09, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	19.1	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Lab Sample ID: S13887.02

Sample Tag: INJ-02-18_GW-051120

Collected Date/Time: 05/11/2020 11:24

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	500ml Plastic	None	Yes	10.0	IR
1	125ml Plastic	HNO3	Yes	10.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	05/13/20 10:45	CCM	

Inorganics

Method: SM2340C, Run Date: 05/15/20 13:18, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	472	2		mg/L	20		

Method: SM2540C, Run Date: 05/14/20 19:30, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	1,360	40		mg/L	4		

Metals

Method: E200.8, Run Date: 05/13/20 12:13, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	27.5	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Lab Sample ID: S13887.03

Sample Tag: INJ-01-17_GW-051120

Collected Date/Time: 05/11/2020 13:04

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	500ml Plastic	None	Yes	10.0	IR
1	125ml Plastic	HNO3	Yes	10.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	05/13/20 10:45	CCM	

Inorganics

Method: SM2340C, Run Date: 05/15/20 13:20, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	820	2		mg/L	100		

Method: SM2540C, Run Date: 05/14/20 19:30, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	1,600	200		mg/L	20		X

Metals

Method: E200.8, Run Date: 05/13/20 12:19, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	3,450	0.5		mg/L	125	7439-89-6	

X-Elevated reporting limit due to matrix interference

Merit Laboratories Login Checklist

Lab Set ID:S13887

Client:ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: PNC Racer

Submitted:05/12/2020 15:45 Login User: MMC

Attention: Colleen Barton

Address: Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-225-1909

FAX: 248-994-2241

Email: Colleen.barton@arcadis.com

Selection	Description	Note
Sample Receiving		
01. ☐ Yes ☒ No ☐ N/A	Samples are received at 4C +/- 2C	Thermometer # IR 10.0
02. ☒ Yes ☐ No ☐ N/A	Received on ice/ cooling process begun	
03. ☐ Yes ☒ No ☐ N/A	Samples shipped	
04. ☐ Yes ☒ No ☐ N/A	Samples left in 24 hr. drop box	
05. ☐ Yes ☐ No ☒ N/A	Are there custody seals/tape or is the drop box locked	
Chain of Custody		
06. ☒ Yes ☐ No ☐ N/A	COC adequately filled out	
07. ☒ Yes ☐ No ☐ N/A	COC signed and relinquished to the lab	
08. ☒ Yes ☐ No ☐ N/A	Sample tag on bottles match COC	
09. ☐ Yes ☒ No ☐ N/A	Subcontracting needed? Subcontacted to:	
Preservation		
10. ☒ Yes ☐ No ☐ N/A	Do sample have correct chemical preservation	
11. ☒ Yes ☐ No ☐ N/A	Completed pH checks on preserved samples? (no VOAs)	
12. ☐ Yes ☒ No ☐ N/A	Did any samples need to be preserved in the lab?	
Bottle Conditions		
13. ☒ Yes ☐ No ☐ N/A	All bottles intact	
14. ☒ Yes ☐ No ☐ N/A	Appropriate analytical bottles are used	
15. ☒ Yes ☐ No ☐ N/A	Merit bottles used	
16. ☒ Yes ☐ No ☐ N/A	Sufficient sample volume received	
17. ☐ Yes ☒ No ☐ N/A	Samples require laboratory filtration	
18. ☒ Yes ☐ No ☐ N/A	Samples submitted within holding time	
19. ☐ Yes ☐ No ☒ N/A	Do water VOC or TOX bottles contain headspace	

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

Merit Laboratories Bottle Preservation Check

Lab Set ID: S13887 Initials: MMC

Attention: Colleen Barton
Address: Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Client: ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: PNC Racer

Submitted: 05/12/2020 15:45 Login User:

Phone: 810-225-1909 FAX: 248-994-2241
Email: Colleen.barton@arcadis.com

Lab ID	125 ml Plastic HNO ₃	250 ml Plastic HNO ₃	1 L Plastic HNO ₃	250 ml Plastic H ₂ SO ₄	125 ml Amber H ₂ SO ₄	32 oz Glass HCl	125 ml Plastic NaOH	125 ml Amber PbCO ₃ NaOH	pH					Notes
									<2	>12	other	ml add	new pH	
S13887.01	X								X					
S13887.02	X								X					
S13887.03	X										5	0.5	<2	Lot# 237365

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME Colleen Barton				CONTACT NAME Accounts Payable ☐ SAME			
COMPANY Arcadis				COMPANY Arcadis			
ADDRESS 28550 Cabot Drive #500				ADDRESS 630 Plaza Drive Suite 600			
CITY Novi			STATE MI	ZIP CODE 48377			
PHONE NO. 330.515.5714		FAX NO.	P.O. NO. 30042811.00005		E-MAIL ADDRESS accountspayable.administration@arcadis-us.com		
E-MAIL ADDRESS Colleen.Barton@arcadis.com; Brad Saunders@arc			QUOTE NO.		ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)		

[illegible]

RELINQUISHED BY: SIGNATURE/ORGANIZATION	<i>Julie McElroy / Arcadis</i>	☒ Sampler	DATE 5/11/20	TIME 16:42	RELINQUISHED BY: SIGNATURE/ORGANIZATION	<i>Julie McElroy / Arcadis</i>	DATE 5/12/20	TIME 15:45
RECEIVED BY: SIGNATURE/ORGANIZATION	<i>Novi Cold Storage</i>		DATE 5/11/20	TIME 16:42	RECEIVED BY: SIGNATURE/ORGANIZATION	<i>M. Chilcot</i>	DATE 5/12/2020	TIME 15:45
RELINQUISHED BY: SIGNATURE/ORGANIZATION			DATE	TIME	SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS	NOTES
RECEIVED BY: SIGNATURE/ORGANIZATION			DATE	TIME	SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS	TEMP. ON ARRIVAL 10.0

PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

May 5 18 12



Analytical Laboratory Report

Report ID: S13888.01(01)
Generated on 05/19/2020

Report to

Attention: Colleen Barton
Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-225-1909 FAX: 248-994-2241
Email: Colleen.barton@arcadis.com

Additional Contacts: Brad Saunders

Report produced by

Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Phone: (517) 332-0167 FAX: (517) 332-6333

Contacts for report questions:
John Lavery (johnlavery@meritlabs.com)
Barbara Ball (bball@meritlabs.com)

Report Summary

Lab Sample ID(s): S13888.01-S13888.07
Project: PNC Racer
Collected Date(s): 05/12/2020
Submitted Date/Time: 05/12/2020 15:45
Sampled by: Unknown
P.O. #: 30042811.00005

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Technical Director



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SM	Standard Methods
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Analytical Laboratory Report

Method Summary

Method	Version
E200.8	EPA Method 200.8 Revision 5.4
SM2340C	Standard Method 2340 C 2011
SM2540C	Standard Method 2540 C 2011
SW3015A	SW 846 Method 3015A Revision 1 February 2007



Analytical Laboratory Report

Sample Summary (7 samples)

Sample ID	Sample Tag	Matrix	Collected Date/Time
S13888.01	MW-03-17_GW-051220	Groundwater	05/12/20 08:10
S13888.02	MW-03-17_GW-051220 MS	Groundwater	05/12/20 08:10
S13888.03	MW-03-17_GW-051220 MSD	Groundwater	05/12/20 08:10
S13888.04	MW-04-17_GW-051220	Groundwater	05/12/20 09:26
S13888.05	TW-09-01_GW-051220	Groundwater	05/12/20 11:14
S13888.06	MWW5-01_GW-051220	Groundwater	05/12/20 12:20
S13888.07	DUP-01_GW-051220	Groundwater	05/12/20 00:01



Analytical Laboratory Report

Lab Sample ID: S13888.01

Sample Tag: MW-03-17_GW-051220

Collected Date/Time: 05/12/2020 08:10

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	500ml Plastic	None	Yes	10.0	IR
1	125ml Plastic	HNO3	Yes	10.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	05/13/20 10:45	CCM	

Inorganics

Method: SM2340C, Run Date: 05/15/20 13:22, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	255	2		mg/L	10		

Method: SM2540C, Run Date: 05/14/20 19:30, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	590	20		mg/L	2		

Metals

Method: E200.8, Run Date: 05/13/20 12:32, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	0.34	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Lab Sample ID: S13888.02

Sample Tag: MW-03-17_GW-051220 MS

Collected Date/Time: 05/12/2020 08:10

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	500ml Plastic	None	Yes	10.0	IR
1	125ml Plastic	HNO3	Yes	10.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	05/13/20 10:45	CCM	

Inorganics

Method: SM2340C, Run Date: 05/15/20 13:24, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	459	2		mg/L	10		

Metals

Method: E200.8, Run Date: 05/13/20 13:04, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	0.64	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Lab Sample ID: S13888.03

Sample Tag: MW-03-17_GW-051220 MSD

Collected Date/Time: 05/12/2020 08:10

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	500ml Plastic	None	Yes	10.0	IR
1	125ml Plastic	HNO3	Yes	10.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	05/13/20 10:45	CCM	

Inorganics

Method: SM2340C, Run Date: 05/15/20 13:26, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	461	2		mg/L	10		

Metals

Method: E200.8, Run Date: 05/13/20 13:05, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	0.64	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Lab Sample ID: S13888.04

Sample Tag: MW-04-17_GW-051220

Collected Date/Time: 05/12/2020 09:26

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	500ml Plastic	None	Yes	10.0	IR
1	125ml Plastic	HNO3	Yes	10.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	05/13/20 10:45	CCM	

Inorganics

Method: SM2340C, Run Date: 05/15/20 13:28, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	487	2		mg/L	10		

Method: SM2540C, Run Date: 05/14/20 19:30, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	1,370	20		mg/L	2		

Metals

Method: E200.8, Run Date: 05/13/20 12:37, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	22.3	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Lab Sample ID: S13888.05

Sample Tag: TW-09-01_GW-051220

Collected Date/Time: 05/12/2020 11:14

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	500ml Plastic	None	Yes	10.0	IR
1	125ml Plastic	HNO3	Yes	10.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	05/13/20 10:45	CCM	

Inorganics

Method: SM2340C, Run Date: 05/15/20 13:30, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	344	2		mg/L	10		

Method: SM2540C, Run Date: 05/14/20 19:30, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	686	20		mg/L	2		

Metals

Method: E200.8, Run Date: 05/13/20 12:43, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	1.71	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Lab Sample ID: S13888.06

Sample Tag: MWW5-01_GW-051220

Collected Date/Time: 05/12/2020 12:20

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	500ml Plastic	None	Yes	10.0	IR
1	125ml Plastic	HNO3	Yes	10.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	05/13/20 10:45	CCM	

Inorganics

Method: SM2340C, Run Date: 05/15/20 13:32, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	96	2		mg/L	100		

Method: SM2540C, Run Date: 05/15/20 17:20, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	1,920	20		mg/L	2		

Metals

Method: E200.8, Run Date: 05/13/20 12:47, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	4.58	0.02		mg/L	5	7439-89-6	



Analytical Laboratory Report

Lab Sample ID: S13888.07

Sample Tag: DUP-01_GW-051220

Collected Date/Time: 05/12/2020 00:01

Matrix: Groundwater

COC Reference:

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	500ml Plastic	None	Yes	10.0	IR
1	125ml Plastic	HNO3	Yes	10.0	IR

Extraction / Prep.

Parameter	Result	Method	Run Date	Analyst	Flags
Metal Digestion	Completed	SW3015A	05/13/20 10:45	CCM	

Inorganics

Method: SM2340C, Run Date: 05/15/20 13:34, Analyst: JKB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Hardness	248	2		mg/L	20		

Method: SM2540C, Run Date: 05/15/20 17:20, Analyst: ASB

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Total Dissolved Solids	1,350	20		mg/L	2		

Metals

Method: E200.8, Run Date: 05/13/20 12:53, Analyst: CCM

Parameter	Result	RL	MDL	Units	Dilution	CAS#	Flags
Iron	21.8	0.02		mg/L	5	7439-89-6	

Merit Laboratories Login Checklist

Lab Set ID:S13888

Client:ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: PNC Racer

Submitted:05/12/2020 15:45 Login User: MMC

Attention: Colleen Barton

Address: Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Phone: 810-225-1909

FAX: 248-994-2241

Email: Colleen.barton@arcadis.com

Selection	Description	Note
Sample Receiving		
01.	☐ Yes ☒ No ☐ N/A	Samples are received at 4C +/- 2C Thermometer # IR 10.0
02.	☒ Yes ☐ No ☐ N/A	Received on ice/ cooling process begun
03.	☐ Yes ☒ No ☐ N/A	Samples shipped
04.	☐ Yes ☒ No ☐ N/A	Samples left in 24 hr. drop box
05.	☐ Yes ☐ No ☒ N/A	Are there custody seals/tape or is the drop box locked
Chain of Custody		
06.	☒ Yes ☐ No ☐ N/A	COC adequately filled out
07.	☒ Yes ☐ No ☐ N/A	COC signed and relinquished to the lab
08.	☒ Yes ☐ No ☐ N/A	Sample tag on bottles match COC
09.	☐ Yes ☒ No ☐ N/A	Subcontracting needed? Subcontacted to:
Preservation		
10.	☒ Yes ☐ No ☐ N/A	Do sample have correct chemical preservation
11.	☒ Yes ☐ No ☐ N/A	Completed pH checks on preserved samples? (no VOAs)
12.	☐ Yes ☒ No ☐ N/A	Did any samples need to be preserved in the lab?
Bottle Conditions		
13.	☒ Yes ☐ No ☐ N/A	All bottles intact
14.	☒ Yes ☐ No ☐ N/A	Appropriate analytical bottles are used
15.	☒ Yes ☐ No ☐ N/A	Merit bottles used
16.	☒ Yes ☐ No ☐ N/A	Sufficient sample volume received
17.	☐ Yes ☒ No ☐ N/A	Samples require laboratory filtration
18.	☒ Yes ☐ No ☐ N/A	Samples submitted within holding time
19.	☐ Yes ☐ No ☒ N/A	Do water VOC or TOX bottles contain headspace

Corrective action for all exceptions is to call the client and to notify the project manager.

Client Review By: _____ Date: _____

Merit Laboratories Bottle Preservation Check

Lab Set ID: S13888 Initials: MMC

Attention: Colleen Barton
Address: Arcadis
28550 Cabot Drive
Suite 500
Novi, MI 48377

Client: ARCADIS_NOVI (ARCADIS U.S., Inc.)

Project: PNC Racer

Submitted: 05/12/2020 15:45 Login User:

Phone: 810-225-1909 FAX: 248-994-2241
Email: Colleen.barton@arcadis.com

Lab ID	125 ml Plastic HNO ₃	250 ml Plastic HNO ₃	1 L Plastic HNO ₃	250 ml Plastic H ₂ SO ₄	125 ml Amber H ₂ SO ₄	32 oz Glass HCl	125 ml Plastic NaOH	125 ml Amber PbCO ₃ NaOH	pH					Notes
									<2	>12	other	ml add	new pH	
S13888.01	X								X					
S13888.02	X								X					
S13888.03	X								X					
S13888.04	X								X					
S13888.05	X								X					
S13888.06	X								X					
S13888.07	X								X					



2680 East Lansing Dr., East Lansing, MI 48823
Phone (517) 332-0167 Fax (517) 332-4034
www.meritlabs.com

C.O.C. PAGE # 1 OF 1

REPORT TO

CHAIN OF CUSTODY RECORD

INVOICE TO

CONTACT NAME Colleen Barton			
COMPANY Arcadis			
ADDRESS 28550 Cabot Drive #500			
CITY Novi		STATE MI	ZIP CODE 48377
PHONE NO. 330.515.5714	FAX NO.	P.O. NO. 30042811.00005	
E-MAIL ADDRESS Colleen.Barton@arcadis.com; Brad.Saunders@arc		QUOTE NO.	

CONTACT NAME Accounts Payable		☐ SAME	
COMPANY Arcadis			
ADDRESS 630 Plaza Drive Suite 600			
CITY Highlands Ranch		STATE CO	ZIP CODE 80129
PHONE NO.	E-MAIL ADDRESS accountspayable.administration@arcadis-us.com		

ANALYSIS (ATTACH LIST IF MORE SPACE IS REQUIRED)

PROJECT NO./NAME PNC Racer		SAMPLER(S) - PLEASE PRINT/SIGN NAME									
TURNAROUND TIME REQUIRED ☐ 1 DAY ☐ 2 DAYS ☐ 3 DAYS ☒ STANDARD ☐ OTHER											
DELIVERABLES REQUIRED ☐ STD ☒ LEVEL II ☐ LEVEL III ☐ LEVEL IV ☒ EDD ☐ OTHER											
MATRIX CODE: GW=GROUNDWATER WW=WASTEWATER S=SOIL L=LIQUID SD=SOLID SL=SLUDGE DW=DRINKING WATER O=OIL WP=WIFE A=AIR W=WASTE											
# Containers & Preservatives											
Iron Hardness total Dissolved Solids											
Certifications ☐ OHIO VAP ☐ Drinking Water ☐ DoD ☐ NPDES											
Project Locations ☐ Detroit ☐ New York ☒ Other Pontiac, MI											
Special Instructions											
Run MS/MSD											

MERIT LAB NO. FOR LAB USE ONLY	YEAR		SAMPLE TAG IDENTIFICATION-DESCRIPTION	MATRIX	# OF BOTTLES	NONE	HCl	HNO ₃	H ₂ SO ₄	NaOH	MeOH	OTHER	Iron	Hardness	total Dissolved Solids
	DATE	TIME													
01/02/03	5/12/20	0810	MW-03-17-GW-051220	GW	6	3		3					X	X	X
13888.04		0926	MW-04-17-GW-051220	GW	2	1		1					X	X	X
.05		1114	TW-09-01-GW-051220	GW	2	1		1					X	X	X
			MWW5-01-GW-051220	GW	2	1		1					X	X	X
.06		1220	MWW5-01-GW-051220	GW	2	1		1					X	X	X
.07			DUP-01-GW-051220	FW	2	1		1					X	X	X

RELINQUISHED BY: SIGNATURE/ORGANIZATION	DATE	TIME
RECEIVED BY: SIGNATURE/ORGANIZATION	DATE	TIME
RELINQUISHED BY: SIGNATURE/ORGANIZATION	DATE	TIME
RECEIVED BY: SIGNATURE/ORGANIZATION	DATE	TIME

RELINQUISHED BY: SIGNATURE/ORGANIZATION	DATE	TIME
RECEIVED BY: SIGNATURE/ORGANIZATION	DATE	TIME
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS
SEAL NO.	SEAL INTACT YES ☐ NO ☐	INITIALS
NOTES:		TEMP. ON ARRIVAL 10.0

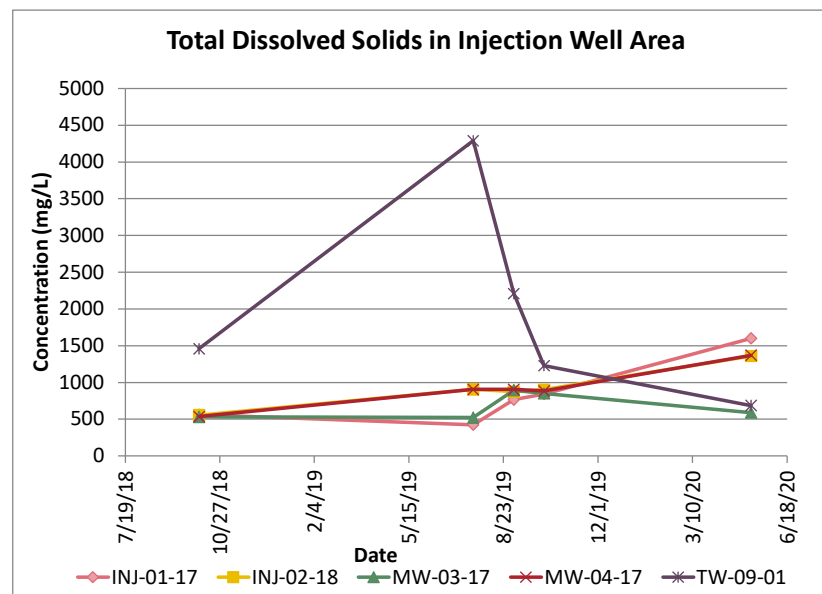
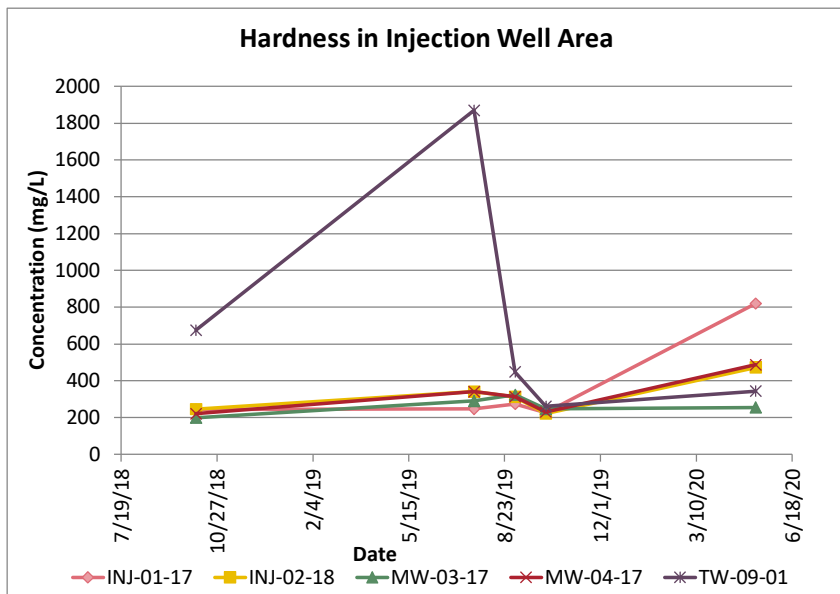
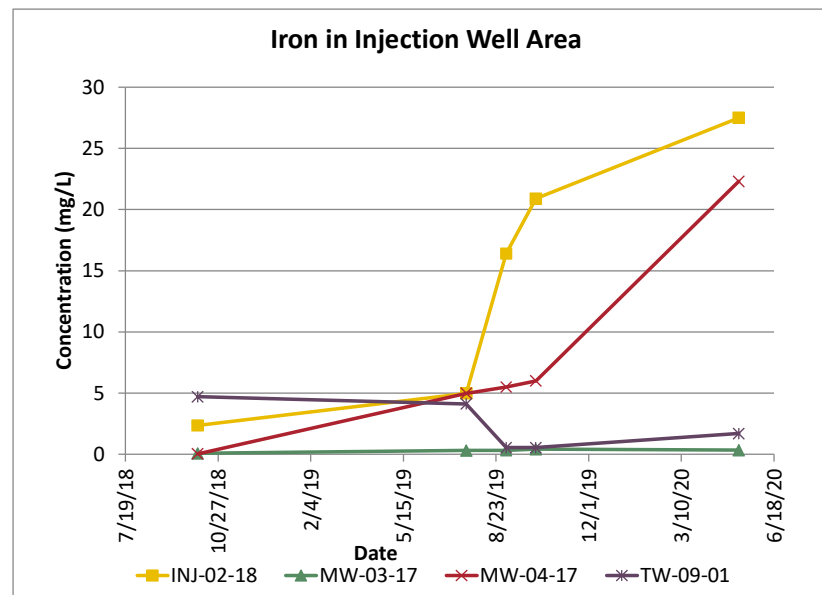
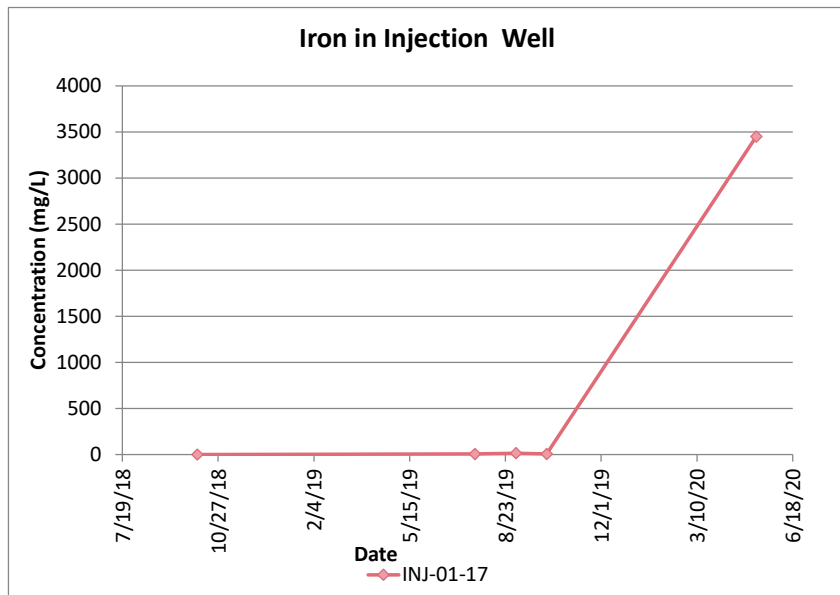
PLEASE NOTE: SIGNING ACKNOWLEDGES ADHERENCE TO MERIT'S SAMPLE ACCEPTANCE POLICY ON REVERSE SIDE

ATTACHMENT B

Monitoring Trends – Chemical Concentration Graphs



ATTACHMENT B
 RACER TRUST PONTIAC NORTH CAMPUS
 2020 MONTCALM SEEP REINJECTION SYSTEM INTERIM MEASURE MONITORING REPORT
 MONITORING TRENDS - CHEMICAL CONCENTRATION GRAPHS



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