

# MEMO

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Date:  
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Arcadis Project No.:  
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Subject:  
  
2016 Annual Groundwater Monitoring Report Addendum  
RACER Pontiac North Campus, Pontiac, Michigan

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## INTRODUCTION

Arcadis of Michigan, LLC (Arcadis) has prepared this Annual Groundwater Monitoring Report Addendum report on behalf of Revitalizing Auto Communities Environmental Response Trust (RACER) for the Pontiac North Campus Site (Site) located in Pontiac, Michigan.

During the annual September 2016 groundwater sampling event, the concentrations of vinyl chloride detected in monitoring wells MWM16-21 and MWM16-37 (3 and 9 µg/l, respectively) exceeded the 2013 Michigan Department of Environmental Quality (MDEQ) Part 201 Residential Drinking Water Criteria and Non-Residential Drinking Water Criteria of 2 µg/L. MWM16-21 was identified for re-sampling because it was the first time since the well was installed in 2004 that the concentration of vinyl chloride had exceeded applicable criteria. MWM16-37 was chosen as a replacement well during the 2016 annual event for MWM16-43, which had been damaged previously. It was the first year for sampling MWM16-37 since 2005, and it also exceeded applicable criteria for vinyl chloride for the first time since 2004. The monitoring well locations and historical groundwater analytical results are shown on **Figure 1**.

The sampling event commenced on April 25, 2017 and it was discovered that monitoring well MWM16-21 had been covered with concrete and was inaccessible. Water level and groundwater sample collection were conducted at monitoring well MWM16-37 following the same groundwater sampling procedures

outlined in the *2016 Annual Groundwater Monitoring Report* submitted on December 29, 2016. A summary of water levels and groundwater elevations is presented in **Table 1**.

## **ANALYTICAL RESULTS**

The groundwater data were compared to applicable 2013 MDEQ Part 201 Generic Clean Up Criteria including residential drinking water (RDW) and non-residential drinking water (NRDW), groundwater surface water interface criteria (GSI), non-residential health based drinking water values (NRHBDW), and volatilization to indoor air inhalation criteria. These analytical results are presented in **Table 2**.

The concentration of vinyl chloride detected in monitoring well MWM16-37 (3 µg/l) exceeds the RDWC and NRDWC of 2 µg/L.

## **CONCLUSIONS AND RECOMMENDATIONS**

Although the concentration of vinyl chloride in MWM16-37 has decreased from September 2016 to April 2017, it still exceeds RDW and NRDW criteria. However, the existing Environmental Easement and Use Restriction, as well as the declaration of restrictive covenant being planned as a corrective measure for this portion of the Site restrict the use of groundwater for drinking purposes. MWM16-37 will continue to be monitored to allow for evaluation of any concentration trends. Existing wells in the vicinity of MWM16-37 will be evaluated for future monitoring to allow for evaluation of any vinyl chloride in that area of the Site.

### **Tables**

- 1 Groundwater Elevation Summary, April 2017
- 2 Summary of Groundwater Analytical Results, April 2017

### **Figures**

- 1 Groundwater Analytical Summary, September 2016

### **Attachments**

- 1 Laboratory Analytical Report

# TABLES



**Table 1**  
**Groundwater Elevation Summary, April 2017**  
**2016 Annual Groundwater Monitoring Report Addendum**  
**RACER Trust Pontiac North Campus**

Well ID	Date	Well Elevation <sup>1</sup>	Depth to Water (ft)	Depth to LNAPL (ft)	Groundwater Elevation	LNAPL Thickness (ft)	Equivalent Groundwater Elevation <sup>2</sup>	Comments
<b>MFD</b>								
<b>M-16</b>								
MWM16-21	4/25/2017	980.81	NA		NA	--	--	Concrete/paved over
MWM16-37	4/25/2017	980.37	24.31		956.06	---	---	

**Abbreviations:**

ft = feet

LNAPL = light non-aqueous phase liquid

NA = not applicable

**Footnotes:**

<sup>1</sup> - Top of Casing Elevation is in feet National Vertical Geodetic Datum (1988)

<sup>2</sup> - The equivalent groundwater (GW) elevation is calculated where LNAPL is present using the LNAPL surface elevation, the thickness of LNAPL and the approximate specific density of the LNAPL (0.8). The calculation is as

**Table 2**  
**Summary of Groundwater Analytical Results**  
**2016 Annual Groundwater Monitoring Report Addendum**  
**RACER Trust Pontiac North Campus**

Location ID: Date Collected: Sample Name:	Groundwater Surface Water Interface	Residential Drinking Water	Non-Residential Drinking Water	Non-Residential Health Based Drinking Water Value	Res GW Volatilization to Indoor Air Inhalation	Non-Res GW Volatilization to Indoor Air Inhalation	MWM16-37 09/20/16 MW16-37_092016	MWM16-37 04/25/17 MWM16-37_GW-042517
<b>Volatile Organics</b>								
1,2,3-Trimethylbenzene	--	--	--	--	--	--	1 U	NA
2-Methylnaphthalene	19	260	750	--	--	--	5 U	NA
Acrylonitrile	2	2.6	11	--	--	--	2 U	NA
Hexachloroethane	6.7	7.3	21	--	--	--	5 U	NA
Iodomethane	--	--	--	--	--	--	1 U	NA
m&p-Xylene	--	--	--	--	--	--	2 U	2 U
Tetrahydrofuran	11,000	95	270	--	--	--	90 U	NA
trans-1,4-Dichloro-2-butene	--	--	--	--	--	--	1 U	NA
Acetone	1,700	730	2,100	--	1,000,000,000	1,000,000,000	50 U	50 U
Benzene	200	5	5	--	5,600	35,000	1 U	1 U
Bromobenzene	--	18	50	--	--	--	1 U	NA
Bromodichloromethane	--	80	80	--	4,800	37,000	1 U	1 U
Bromoform	--	80	80	--	470,000	3,100,000	1 U	1 U
Bromomethane	35	10	29	--	4,000	9,000	5 U	5 U
2-Butanone	2,200	13,000	38,000	--	240,000,000	240,000,000	25 U	25 U
n-Butylbenzene	--	80	230	--	--	--	1 U	NA
sec-Butylbenzene	--	80	230	--	--	--	1 U	NA
tert-Butylbenzene	--	80	230	--	--	--	1 U	NA
Carbon Disulfide	--	800	2,300	--	250,000	550,000	5 U	5 U
Carbon Tetrachloride	45	5	5	--	370	2,400	1 U	1 U
CFC-11	--	2,600	7,300	--	1,100,000	1,100,000	1 U	1 U
CFC-12	--	1,700	4,800	--	220,000	300,000	5 U	5 U
Chlorobenzene	25	100	100	--	210,000	470,000	1 U	1 U
Chlorobromomethane	--	--	--	--	--	--	1 U	NA
Chlorodibromomethane	--	80	80	--	14,000	110,000	5 U	5 U
Chloroethane	1,100	430	1,700	--	5,700,000	5,700,000	5 U	5 U
Chloroform	350	80	80	--	28,000	180,000	1 U	1 U
Chloromethane	--	260	1,100	--	8,600	45,000	5 U	5 U
Cyclohexane	--	--	--	--	--	--	NA	1 U
Cymene	--	--	--	--	--	--	5 U	NA
1,2-Dibromo-3-chloropropane	--	0.2	0.2	--	220	1,200	5 U	5 U
1,2-Dibromoethane	5.7	0.05	0.05	--	2,400	15,000	1 U	1 U
Dibromomethane	--	80	230	--	--	--	5 U	NA
1,2-Dichlorobenzene	13	600	600	--	160,000	160,000	1 U	1 U
1,3-Dichlorobenzene	28	6.6	19	--	18,000	41,000	1 U	1 U
1,4-Dichlorobenzene	17	75	75	--	16,000	74,000	1 U	1 U
1,1-Dichloroethane	740	880	2,500	--	1,000,000	2,300,000	1 U	1 U
1,2-Dichloroethane	360	5	5	--	9,600	59,000	1 U	1 U
1,1-Dichloroethene	130	7	7	--	200	1,300	1 U	1 U
cis-1,2-Dichloroethene	620	70	70	--	93,000	210,000	1 U	1 U
trans-1,2-Dichloroethene	1,500	100	100	--	85,000	200,000	1 U	1 U

See Notes on last page.

**Table 2**  
**Summary of Groundwater Analytical Results**  
**2016 Annual Groundwater Monitoring Report Addendum**  
**RACER Trust Pontiac North Campus**

Location ID: Date Collected: Sample Name:	Groundwater Surface Water Interface	Residential Drinking Water	Non-Residential Drinking Water	Non-Residential Health Based Drinking Water Value	Res GW Volatilization to Indoor Air Inhalation	Non-Res GW Volatilization to Indoor Air Inhalation	MWM16-37 09/20/16 MW16-37_092016	MWM16-37 04/25/17 MWM16-37_GW-042517
Dichloromethane	1,500	5	5	--	220,000	1,400,000	5 U	5 U
1,2-Dichloropropane	230	5	5	--	16,000	36,000	1 U	1 U
cis-1,3-Dichloropropene	--	--	--	--	--	--	1 U	1 U
trans-1,3-Dichloropropene	--	--	--	--	--	--	1 U	1 U
Diethyl Ether	--	10	10	--	--	--	10 U	NA
1,4-Dioxane	2,800	85	350	--	--	--	NA	3 U
Ethylbenzene	18	74	74	<b>700</b>	110,000	170,000	1 U	1 U
Isopropylbenzene	28	800	2,300	--	56,000	56,000	5 U	1 U
Methyl acetate	--	--	--	--	--	--	NA	10 U
Methyl N-Butyl Ketone	--	1,000	2,900	--	4,200,000	8,700,000	50 U	50 U
Methylcyclohexane	--	--	--	--	--	--	NA	1 U
4-Methyl-2-pentanone	--	1,800	5,200	--	20,000,000	20,000,000	50 U	50 U
Methyl tert-butyl ether	7,100	40	40	<b>690</b>	47,000,000	47,000,000	5 U	5 U
Naphthalene	11	520	1,500	--	--	--	5 U	NA
n-Propylbenzene	--	80	230	--	--	--	1 U	NA
Styrene	80	100	100	--	170,000	310,000	1 U	1 U
1,1,1,2-Tetrachloroethane	--	77	320	--	--	--	1 U	NA
1,1,2,2-Tetrachloroethane	78	8.5	35	--	12,000	77,000	1 U	1 U
Tetrachloroethene	60	5	5	--	25,000	170,000	1 U	1 U
Toluene	270	790	790	<b>1,000</b>	530,000	530,000	1 U	1 U
1,2,3-Trichlorobenzene	--	--	--	--	--	--	5 U	NA
1,2,4-Trichlorobenzene	99	70	70	--	300,000	300,000	5 U	5 U
1,1,1-Trichloroethane	89	200	200	--	660,000	1,300,000	1 U	1 U
1,1,2-Trichloroethane	330	5	5	--	17,000	110,000	1 U	1 U
Trichloroethene	200	5	5	--	2,200	4,900	1 U	1 U
1,2,3-Trichloropropane	--	42	120	--	--	--	1 U	NA
1,1,2-trichloro-1,2,2-trifluoroethane	32	170,000	170,000	--	170,000	170,000	NA	1 U
1,2,4-Trimethylbenzene	17	63	63	--	--	--	1 U	NA
1,3,5-Trimethylbenzene	45	72	72	--	--	--	1 U	NA
Vinyl Chloride	13	2	2	--	1,100	13,000	9	3
o-Xylene	--	--	--	--	--	--	1 U	1 U

**Notes:**

All units measured in micrograms per liter (µg/L).

"U" indicates the compound was analyzed for but not detected. The associated value is the compound quantitation limit.

"NA" indicates that the compound was not analyzed.

All criteria listed are from Michigan Department of Environmental Quality Operational Memorandum #1, Attachment #1, dated December 30, 2013.

Shaded values exceed Michigan Groundwater Surface Water Interface.

Yellow highlighted values exceed Michigan Residential Drinking Water.

Orange highlighted values exceed Non-Residential Drinking Water.

Bold values exceed Non-Residential Health Based Drinking Water Value.

Values in italics exceed Residential Groundwater Volatilization to Indoor Air Inhalation.

Values in red type exceed Non-Residential Groundwater Volatilization to Indoor Air Inhalation.

# FIGURES



CITY: SYRACUSE DIM/GROUP: INDV DB: AFOX.G.STOWELL PM: (Read) LYR: (Optional) OFF: REF: C:\ENVCAD\SYRACUSE\ACT\B0064607\2016\00006\DWG\SITE-WIDE\DWG\01.DWG LAYOUT: 3 SAVED: 12/23/2016 8:53 AM ACADVER: 19.1 (LWS TECH) PAGES: 19.1 (LWS TECH) PLOTSTYLE: PLT\FULL.CTB PLOTTED: 12/23/2016 8:53 AM BY: STOWELL, GARY

MWM16-21						
Date	9/23/2011	10/2/2012	12/5/2013	9/19/2014	9/22/2015	9/20/2016
Field Parameters						
pH Field	7.16	6.99	7.77	7.1	7.58	7.21
VOCs						
1,1,1-Trichloroethane	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
1,1,2-Trichloroethane	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
1,1-Dichloroethane	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
1,2-Dichloroethane	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Acetone	ND(0.025)	ND(0.025)	ND(0.025)	ND(0.025)	ND(0.025)	ND(0.050)
Benzene	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
cis-1,2-Dichloroethane	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Ethylbenzene	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Methylene chloride	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)
Tetrachloroethane	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Toluene	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Trichloroethane	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Vinyl Chloride	ND(0.001)	ND(0.001)	ND(0.001)	0.0034 J	0.0011	0.003 (RDW, NRDW)

MWM16-37	
Date	9/20/2016
Field Parameters	
pH Field	7.06
VOCs	
1,1,1-Trichloroethane	ND(0.001)
1,1,2-Trichloroethane	ND(0.001)
1,1-Dichloroethane	ND(0.001)
1,2-Dichloroethane	ND(0.001)
Acetone	ND(0.050)
Benzene	ND(0.001)
cis-1,2-Dichloroethane	ND(0.001)
Ethylbenzene	ND(0.001)
Methylene chloride	ND(0.005)
Tetrachloroethane	ND(0.001)
Toluene	ND(0.001)
Trichloroethane	ND(0.001)
Vinyl Chloride	0.009 (RDW, NRDW)

MWM16-43		
Date	9/23/2011	10/2/2012
Field Parameters		
pH Field	6.96	6.83
VOCs		
1,1,1-Trichloroethane	ND(0.001)	ND(0.001)
1,1,2-Trichloroethane	ND(0.001)	ND(0.001)
1,1-Dichloroethane	ND(0.001)	ND(0.001)
1,2-Dichloroethane	ND(0.001)	ND(0.001)
Acetone	ND(0.025)	ND(0.025)
Benzene	ND(0.001)	ND(0.001)
cis-1,2-Dichloroethane	ND(0.001)	ND(0.001)
Ethylbenzene	ND(0.001)	ND(0.001)
Methylene chloride	ND(0.005)	ND(0.005)
Tetrachloroethane	ND(0.001)	ND(0.001)
Toluene	ND(0.001)	ND(0.001)
Trichloroethane	ND(0.001)	ND(0.001)
Vinyl Chloride	ND(0.001)	ND(0.001)

MWF8-01	
Date	9/21/2016
Field Parameters	
pH Field	6.99
VOCs	
1,1,1-Trichloroethane	ND(0.001)
1,1,2-Trichloroethane	ND(0.001)
1,1-Dichloroethane	ND(0.001)
1,2-Dichloroethane	ND(0.001)
Acetone	ND(0.050)
Benzene	ND(0.001)
cis-1,2-Dichloroethane	ND(0.001)
Ethylbenzene	ND(0.001)
Methylene chloride	ND(0.005)
Tetrachloroethane	ND(0.001)
Toluene	ND(0.001)
Trichloroethane	ND(0.001)
Vinyl Chloride	ND(0.001)

MWF7-01					
Date	10/3/2012	12/4/2013	9/19/2014	9/22/2015	9/22/2016
Field Parameters					
pH Field	6.99	7.64	7.08	7.13	7.16
VOCs					
1,1,1-Trichloroethane	0.0075	0.0073	0.014 [0.014]	0.035	0.009
1,1,2-Trichloroethane	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
1,1-Dichloroethane	0.0032	0.0019	0.0049 J [0.0072 J]	0.012	0.002
1,2-Dichloroethane	0.0073	0.0041 J	0.0013 [0.0017]	0.0038	ND(0.001)
Acetone	ND(0.001)	ND(0.025)	ND(0.025)	ND(0.025)	ND(0.050)
Benzene	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
cis-1,2-Dichloroethane	0.0004	ND(0.001)	0.00045 J [0.00081 J]	0.0019	ND(0.001)
Ethylbenzene	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Methylene chloride	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)
Tetrachloroethane	0.0007	0.00074 J	0.00091 J [0.00099 J]	0.0024	ND(0.001)
Toluene	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Trichloroethane	ND(0.001)	ND(0.001)	0.00016 J [0.0002 J]	0.00066 J	ND(0.001)
Vinyl Chloride	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)

MWF1R						
Date	9/22/2011	10/2/2012	12/4/2013	9/19/2014	9/22/2015	9/20/2016
Field Parameters						
pH Field	6.83	7.19	7.66	7.22	7.07	7.03
VOCs						
1,1,1-Trichloroethane	0.00053 J	ND(0.001)	ND(0.001)	ND(0.001)	0.00067 J	ND(0.001)
1,1,2-Trichloroethane	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
1,1-Dichloroethane	0.00095 J	ND(0.001)	ND(0.001)	0.00028 J	0.00061 J	ND(0.001)
1,2-Dichloroethane	0.00022 J	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Acetone	ND(0.025)	ND(0.025)	ND(0.025)	ND(0.025)	ND(0.025)	ND(0.050)
Benzene	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
cis-1,2-Dichloroethane	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Ethylbenzene	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Methylene chloride	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)
Tetrachloroethane	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Toluene	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Trichloroethane	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Vinyl Chloride	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)

MWW1-04						
Date	9/25/2011	10/3/2012	12/4/2013	9/23/2014	9/23/2015	9/21/2016
Field Parameters						
pH Field	11.77	11.27	9.78	11.84	9.77	11.69
Inorganics						
Antimony	0.0046	0.0042	< 0.0031 B	0.003 [0.0031]	0.0032	ND 0.005 [ND 0.005]
Vanadium	0.025 (RDW)	0.014	0.02 (RDW)	0.013 (RDW) [0.014 (RDW)]	0.02 (RDW)	0.013 (RDW) [0.013 (RDW)]
Pests/PCBs						
Total PCBs	0.0003	0.00043	0.00052 (RDW, NRDW)	0.000348 [ND (0.0010)]	0.00025	0.001 [0.001]

MW-40-99						
Date	9/25/2011	10/3/2012	12/3/2013	9/18/2014	9/22/2015	9/20/2016
Field Parameters						
pH Field	7.19	7.23	7.15	7.25	7.5	7
VOCs						
1,1,1-Trichloroethane	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
1,1,2-Trichloroethane	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
1,1-Dichloroethane	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
1,2-Dichloroethane	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Acetone	0.0063 J	0.0016 J	ND(0.025) B	0.031	ND(0.025)	ND(0.050)
Benzene	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
cis-1,2-Dichloroethane	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Ethylbenzene	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Methylene chloride	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)
Tetrachloroethane	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Toluene	ND(0.001)	0.00016 J	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Trichloroethane	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Vinyl Chloride	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)

MWF12-01						
Date	9/22/2011	10/3/2012	12/4/2013	9/19/2014	9/22/2015	9/21/2016
Field Parameters						
pH Field	6.93	7.21	7.51	7.1	7.47 [7.47]	7.19
Inorganics						
Manganese	0.9	3.2 (RDW, NRDW)	5.2 (RDW, NRDW)	2.4 (RDW, NRDW)	2.8 (RDW, NRDW) [2.6 (RDW, NRDW)]	2.25 (RDW, NRDW) [5.29 (RDW, NRDW, NRHBDW)]
VOCs						
1,1,1-Trichloroethane	0.015	0.009	0.026	0.025	0.022 [0.018]	0.016 [0.017]
1,1,2-Trichloroethane	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
1,1-Dichloroethane	0.0024	0.0011	0.0041	0.0046	0.0039 [0.0041]	0.003 [0.004]
1,2-Dichloroethane	0.001	0.00045	0.0014	0.0022	0.0012 [0.0012]	ND(0.001)
Acetone	ND(0.025)	ND(0.025)	ND(0.025)	ND(0.025)	ND(0.025)	ND(0.050)
Benzene	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
cis-1,2-Dichloroethane	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Ethylbenzene	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Methylene chloride	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)	ND(0.005)
Tetrachloroethane	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Toluene	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Trichloroethane	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)
Vinyl Chloride	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)	ND(0.001)

	Units	Non-Residential Drinking Water Criteria	Residential Drinking Water Criteria
<b>Pests/PCBs</b>			
Total PCBs	mg/L	0.0005	0.0005
<b>VOCs</b>			
1,1,1-Trichloroethane	mg/L	0.2	0.2
1,1,2-Trichloroethane	mg/L	0.005	0.005
1,1-Dichloroethane	mg/L	2.5	0.88
1,2-Dichloroethane	mg/L	0.007	0.007
Acetone	mg/L	0.005	0.005
Benzene	mg/L	2.1	0.73
cis-1,2-Dichloroethane	mg/L	0.005	0.005
Ethylbenzene	mg/L	0.07	0.07
Dichloromethane (Methylene Chloride)	mg/L	0.004	0.004
Tetrachloroethane	mg/L	0.005	0.005
Toluene	mg/L	0.79	0.79
Trichloroethane	mg/L	0.005	0.005
Vinyl Chloride	mg/L	0.002	0.002
<b>Inorganics</b>			
Antimony	mg/L	0.006	0.006
Lead	mg/L	0.004	0.004
Manganese	mg/L	0.05	0.05
Vanadium	mg/L	0.062	0.0045

MWF12-02	
Date	9/21/2016
Field Parameters	
pH Field	7.52
VOCs	
1,1,1-Trichloroethane	0.004
1,1,2-Trichloroethane	ND(0.001)
1,1-Dichloroethane	0.002
1,2-Dichloroethane	ND(0.001)
Acetone	ND(0.050)
Benzene	ND(0

# ATTACHMENT 1

Laboratory Analytical Report





# Analytical Laboratory Report

Report ID: S80840.01(01)  
Generated on 05/03/2017

Report to

Attention: Theresa Olechiw  
Arcadis  
28550 Cabot Drive  
Suite 500  
Novi, MI 48377

Phone: NA FAX: 248-994-2241  
Email: [theresa.olechiw@arcadis-us.com](mailto:theresa.olechiw@arcadis-us.com)

Report produced by

Merit Laboratories, Inc.  
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John Lavery ([johnlavery@meritlabs.com](mailto:johnlavery@meritlabs.com))  
Barbara Ball ([bball@meritlabs.com](mailto:bball@meritlabs.com))

Report Summary

Lab Sample ID(s): S80840.01-S80840.05  
Project: RACER PNC  
Collected Date: 04/25/2017 - 04/26/2017  
Submitted Date/Time: 04/26/2017 15:35  
Sampled by: Kaitlyn Voet  
P.O. #: B0064607.2017

Table of Contents

- Cover Page (Page 1)
- General Report Notes (Page 2)
- Report Narrative (Page 2)
- Laboratory Certifications (Page 3)
- Qualifier Descriptions (Page 3)
- Glossary of Abbreviations (Page 3)
- Method Summary (Page 4)
- Sample Summary (Page 5)

Maya Murshak  
Technical Director



# Analytical Laboratory Report

## **General Report Notes**

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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.

## **Report Narrative**

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There is no additional narrative for this analytical report



# Analytical Laboratory 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

## 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



# Analytical Laboratory Report

## Method Summary

Method	Version
N/A	Not Applicable
SW3550C	SW 846 Method 3550C Revision 3 February 2007
SW5030C/8260C	SW 846 Method 8260C Revision 3 August 2006 / 5030C Revision 3 May 2003
SW8082A	SW 846 Method 8082A Revision 1 February 2007
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
S80840.01	TW-M2-03_LNAPL-042517	Oil	04/25/17 13:45
S80840.02	MWM16-37_GW-042517	Groundwater	04/25/17 16:30
S80840.03	MWW10-SEN02_GW-042617	Groundwater	04/26/17 09:40
S80840.04	MW-01-17_GW-042617	Groundwater	04/26/17 11:50
S80840.05	TB	Liquid	04/26/17 00:01



# Analytical Laboratory Report

Lab Sample ID: S80840.01  
 Sample Tag: TW-M2-03\_LNAPL-042517  
 Collected Date/Time: 04/25/2017 13:45  
 Matrix: Oil  
 COC Reference: 75623

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	4oz Glass	None	Yes	4.7	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
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**Extraction / Prep.**

Extraction, PCB*	Completed			SW3550C	04/27/17 18:00	PLB		
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**Organics - PCBs/Pesticides**

**PCB List**

PCB-1016*	Not detected	ug/kg	300,000	SW8082A	05/01/17 13:59	JAN	12674-11-2	Y
PCB-1242*	1,523,000	ug/kg	300,000	SW8082A	05/01/17 13:59	JAN	53469-21-9	Y
PCB-1221*	Not detected	ug/kg	300,000	SW8082A	05/01/17 13:59	JAN	11104-28-2	Y
PCB-1232*	Not detected	ug/kg	300,000	SW8082A	05/01/17 13:59	JAN	11141-16-5	Y
PCB-1248*	Not detected	ug/kg	300,000	SW8082A	05/01/17 13:59	JAN	12672-29-6	Y
PCB-1254*	Not detected	ug/kg	300,000	SW8082A	05/01/17 13:59	JAN	11097-69-1	Y
PCB-1260*	Not detected	ug/kg	300,000	SW8082A	05/01/17 13:59	JAN	11096-82-5	Y

Y-Elevated reporting limit due to high target concentration



# Analytical Laboratory Report

Lab Sample ID: S80840.02  
 Sample Tag: MWM16-37\_GW-042517  
 Collected Date/Time: 04/25/2017 16:30  
 Matrix: Groundwater  
 COC Reference: 75623

## Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.7	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
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### Extraction / Prep.

pH check for VOCs*	<2	STD Units		N/A	04/28/17 13:30	KCV		
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### Organics - Volatiles

1,4-Dioxane*	Not detected	ug/L	3	SW8260B - SIM	05/01/17 16:25	JML	123-91-1	
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### Volatile Organics - Arcadis

Acetone	Not detected	ug/L	50	SW5030C/8260C	04/27/17 16:17	JML	67-64-1	
2-Butanone (MEK)	Not detected	ug/L	25	SW5030C/8260C	04/27/17 16:17	JML	78-93-3	
Benzene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	71-43-2	
Bromodichloromethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	75-27-4	
Bromoform	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	75-25-2	
Bromomethane	Not detected	ug/L	5	SW5030C/8260C	04/27/17 16:17	JML	74-83-9	
Carbon disulfide	Not detected	ug/L	5	SW5030C/8260C	04/27/17 16:17	JML	75-15-0	
Carbon tetrachloride	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	56-23-5	
Chlorobenzene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	108-90-7	
Chloroethane	Not detected	ug/L	5	SW5030C/8260C	04/27/17 16:17	JML	75-00-3	
Chloroform	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	67-66-3	
Chloromethane	Not detected	ug/L	5	SW5030C/8260C	04/27/17 16:17	JML	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	ug/L	5	SW5030C/8260C	04/27/17 16:17	JML	96-12-8	
1,2-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	95-50-1	
1,2-Dichloroethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	107-06-2	
1,2-Dichloropropane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	78-87-5	
1,3-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	541-73-1	
1,4-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	106-46-7	
cis-1,2-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	156-59-2	
Dibromochloromethane	Not detected	ug/L	5	SW5030C/8260C	04/27/17 16:17	JML	124-48-1	
Dichlorodifluoromethane	Not detected	ug/L	5	SW5030C/8260C	04/27/17 16:17	JML	75-71-8	
trans-1,2-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	156-60-5	
Ethylbenzene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	100-41-4	
2-Hexanone	Not detected	ug/L	50	SW5030C/8260C	04/27/17 16:17	JML	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	ug/L	50	SW5030C/8260C	04/27/17 16:17	JML	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	ug/L	5	SW5030C/8260C	04/27/17 16:17	JML	1634-04-4	
Methylene chloride	Not detected	ug/L	5	SW5030C/8260C	04/27/17 16:17	JML	75-09-2	
Styrene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	100-42-5	
1,1,1-Trichloroethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	71-55-6	
1,1,2-Trichloroethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	79-00-5	
1,2,4-Trichlorobenzene	Not detected	ug/L	5	SW5030C/8260C	04/27/17 16:17	JML	120-82-1	
Tetrachloroethene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	127-18-4	
Toluene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	108-88-3	
Trichloroethene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	79-01-6	
Trichlorofluoromethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	75-69-4	
Vinyl chloride	3	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	75-01-4	
o-Xylene*	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	95-47-6	



# Analytical Laboratory Report

Lab Sample ID: S80840.02 (continued)

Sample Tag: MWM16-37\_GW-042517

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
<b>Organics - Volatiles (continued)</b>								
<b>Volatile Organics - Arcadis (continued)</b>								
p,m-Xylene*	Not detected	ug/L	2	SW5030C/8260C	04/27/17 16:17	JML		
Isopropylbenzene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	98-82-8	
Cyclohexane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	110-82-7	
1,1-Dichloroethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	75-34-3	
1,1-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	75-35-4	
Methyl Acetate	Not detected	ug/L	10	SW5030C/8260C	04/27/17 16:17	JML	79-20-9	
Methyl cyclohexane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	76-13-1	
1,2-Dibromoethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	79-34-5	
cis-1,3-Dichloropropene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	10061-01-5	
trans-1,3-Dichloropropene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:17	JML	10061-02-6	



# Analytical Laboratory Report

Lab Sample ID: S80840.03  
 Sample Tag: MWW10-SEN02\_GW-042617  
 Collected Date/Time: 04/26/2017 09:40  
 Matrix: Groundwater  
 COC Reference: 75623

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.7	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
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**Extraction / Prep.**

pH check for VOCs*	<2	STD Units		N/A	04/28/17 13:30	KCV		
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**Organics - Volatiles**

1,4-Dioxane*	16	ug/L	3	SW8260B - SIM	05/01/17 16:43	JML	123-91-1	
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**Volatile Organics - Arcadis**

Acetone	Not detected	ug/L	50	SW5030C/8260C	04/27/17 16:48	JML	67-64-1	
2-Butanone (MEK)	Not detected	ug/L	25	SW5030C/8260C	04/27/17 16:48	JML	78-93-3	
Benzene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	71-43-2	
Bromodichloromethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	75-27-4	
Bromoform	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	75-25-2	
Bromomethane	Not detected	ug/L	5	SW5030C/8260C	04/27/17 16:48	JML	74-83-9	
Carbon disulfide	Not detected	ug/L	5	SW5030C/8260C	04/27/17 16:48	JML	75-15-0	
Carbon tetrachloride	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	56-23-5	
Chlorobenzene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	108-90-7	
Chloroethane	Not detected	ug/L	5	SW5030C/8260C	04/27/17 16:48	JML	75-00-3	
Chloroform	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	67-66-3	
Chloromethane	Not detected	ug/L	5	SW5030C/8260C	04/27/17 16:48	JML	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	ug/L	5	SW5030C/8260C	04/27/17 16:48	JML	96-12-8	
1,2-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	95-50-1	
1,2-Dichloroethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	107-06-2	
1,2-Dichloropropane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	78-87-5	
1,3-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	541-73-1	
1,4-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	106-46-7	
cis-1,2-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	156-59-2	
Dibromochloromethane	Not detected	ug/L	5	SW5030C/8260C	04/27/17 16:48	JML	124-48-1	
Dichlorodifluoromethane	Not detected	ug/L	5	SW5030C/8260C	04/27/17 16:48	JML	75-71-8	
trans-1,2-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	156-60-5	
Ethylbenzene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	100-41-4	
2-Hexanone	Not detected	ug/L	50	SW5030C/8260C	04/27/17 16:48	JML	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	ug/L	50	SW5030C/8260C	04/27/17 16:48	JML	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	ug/L	5	SW5030C/8260C	04/27/17 16:48	JML	1634-04-4	
Methylene chloride	Not detected	ug/L	5	SW5030C/8260C	04/27/17 16:48	JML	75-09-2	
Styrene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	100-42-5	
1,1,1-Trichloroethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	71-55-6	
1,1,2-Trichloroethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	79-00-5	
1,2,4-Trichlorobenzene	Not detected	ug/L	5	SW5030C/8260C	04/27/17 16:48	JML	120-82-1	
Tetrachloroethene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	127-18-4	
Toluene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	108-88-3	
Trichloroethene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	79-01-6	
Trichlorofluoromethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	75-69-4	
Vinyl chloride	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	75-01-4	
o-Xylene*	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	95-47-6	



# Analytical Laboratory Report

Lab Sample ID: S80840.03 (continued)

Sample Tag: MWW10-SEN02\_GW-042617

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
<b>Organics - Volatiles (continued)</b>								
<b>Volatile Organics - Arcadis (continued)</b>								
p,m-Xylene*	Not detected	ug/L	2	SW5030C/8260C	04/27/17 16:48	JML		
Isopropylbenzene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	98-82-8	
Cyclohexane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	110-82-7	
1,1-Dichloroethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	75-34-3	
1,1-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	75-35-4	
Methyl Acetate	Not detected	ug/L	10	SW5030C/8260C	04/27/17 16:48	JML	79-20-9	
Methyl cyclohexane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	76-13-1	
1,2-Dibromoethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	79-34-5	
cis-1,3-Dichloropropene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	10061-01-5	
trans-1,3-Dichloropropene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 16:48	JML	10061-02-6	



# Analytical Laboratory Report

Lab Sample ID: S80840.04  
 Sample Tag: MW-01-17\_GW-042617  
 Collected Date/Time: 04/26/2017 11:50  
 Matrix: Groundwater  
 COC Reference: 75623

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
3	40ml Glass	HCL	Yes	4.7	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
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**Extraction / Prep.**

pH check for VOCs*	<2	STD Units		N/A	04/28/17 13:30	KCV		
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**Organics - Volatiles**

1,4-Dioxane*	Not detected	ug/L	3	SW8260B - SIM	05/01/17 17:01	JML	123-91-1	
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**Volatile Organics - Arcadis**

Acetone	Not detected	ug/L	50	SW5030C/8260C	04/27/17 17:09	JML	67-64-1	
2-Butanone (MEK)	Not detected	ug/L	25	SW5030C/8260C	04/27/17 17:09	JML	78-93-3	
Benzene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	71-43-2	
Bromodichloromethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	75-27-4	
Bromoform	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	75-25-2	
Bromomethane	Not detected	ug/L	5	SW5030C/8260C	04/27/17 17:09	JML	74-83-9	
Carbon disulfide	Not detected	ug/L	5	SW5030C/8260C	04/27/17 17:09	JML	75-15-0	
Carbon tetrachloride	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	56-23-5	
Chlorobenzene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	108-90-7	
Chloroethane	Not detected	ug/L	5	SW5030C/8260C	04/27/17 17:09	JML	75-00-3	
Chloroform	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	67-66-3	
Chloromethane	Not detected	ug/L	5	SW5030C/8260C	04/27/17 17:09	JML	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	ug/L	5	SW5030C/8260C	04/27/17 17:09	JML	96-12-8	
1,2-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	95-50-1	
1,2-Dichloroethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	107-06-2	
1,2-Dichloropropane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	78-87-5	
1,3-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	541-73-1	
1,4-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	106-46-7	
cis-1,2-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	156-59-2	
Dibromochloromethane	Not detected	ug/L	5	SW5030C/8260C	04/27/17 17:09	JML	124-48-1	
Dichlorodifluoromethane	Not detected	ug/L	5	SW5030C/8260C	04/27/17 17:09	JML	75-71-8	
trans-1,2-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	156-60-5	
Ethylbenzene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	100-41-4	
2-Hexanone	Not detected	ug/L	50	SW5030C/8260C	04/27/17 17:09	JML	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	ug/L	50	SW5030C/8260C	04/27/17 17:09	JML	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	ug/L	5	SW5030C/8260C	04/27/17 17:09	JML	1634-04-4	
Methylene chloride	Not detected	ug/L	5	SW5030C/8260C	04/27/17 17:09	JML	75-09-2	
Styrene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	100-42-5	
1,1,1-Trichloroethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	71-55-6	
1,1,2-Trichloroethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	79-00-5	
1,2,4-Trichlorobenzene	Not detected	ug/L	5	SW5030C/8260C	04/27/17 17:09	JML	120-82-1	
Tetrachloroethene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	127-18-4	
Toluene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	108-88-3	
Trichloroethene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	79-01-6	
Trichlorofluoromethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	75-69-4	
Vinyl chloride	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	75-01-4	
o-Xylene*	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	95-47-6	



# Analytical Laboratory Report

Lab Sample ID: S80840.04 (continued)

Sample Tag: MW-01-17\_GW-042617

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
<b>Organics - Volatiles (continued)</b>								
<b>Volatile Organics - Arcadis (continued)</b>								
p,m-Xylene*	Not detected	ug/L	2	SW5030C/8260C	04/27/17 17:09	JML		
Isopropylbenzene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	98-82-8	
Cyclohexane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	110-82-7	
1,1-Dichloroethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	75-34-3	
1,1-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	75-35-4	
Methyl Acetate	Not detected	ug/L	10	SW5030C/8260C	04/27/17 17:09	JML	79-20-9	
Methyl cyclohexane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	76-13-1	
1,2-Dibromoethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	79-34-5	
cis-1,3-Dichloropropene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	10061-01-5	
trans-1,3-Dichloropropene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 17:09	JML	10061-02-6	



# Analytical Laboratory Report

Lab Sample ID: S80840.05  
 Sample Tag: TB  
 Collected Date/Time: 04/26/2017 00:01  
 Matrix: Liquid  
 COC Reference: 75623

Sample Containers

#	Type	Preservative(s)	Refrigerated?	Arrival Temp. (C)	Thermometer #
1	40ml Glass	HCL	Yes	4.7	IR

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
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**Extraction / Prep.**

pH check for VOCs*	<2	STD Units		N/A	04/28/17 13:30	KCV		
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**Organics - Volatiles**

1,4-Dioxane*	Not detected	ug/L	3	SW8260B - SIM	05/01/17 13:24	JML	123-91-1	
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**Volatile Organics - Arcadis**

Acetone	Not detected	ug/L	50	SW5030C/8260C	04/27/17 13:09	JML	67-64-1	
2-Butanone (MEK)	Not detected	ug/L	25	SW5030C/8260C	04/27/17 13:09	JML	78-93-3	
Benzene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	71-43-2	
Bromodichloromethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	75-27-4	
Bromoform	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	75-25-2	
Bromomethane	Not detected	ug/L	5	SW5030C/8260C	04/27/17 13:09	JML	74-83-9	
Carbon disulfide	Not detected	ug/L	5	SW5030C/8260C	04/27/17 13:09	JML	75-15-0	
Carbon tetrachloride	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	56-23-5	
Chlorobenzene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	108-90-7	
Chloroethane	Not detected	ug/L	5	SW5030C/8260C	04/27/17 13:09	JML	75-00-3	
Chloroform	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	67-66-3	
Chloromethane	Not detected	ug/L	5	SW5030C/8260C	04/27/17 13:09	JML	74-87-3	
1,2-Dibromo-3-chloropropane	Not detected	ug/L	5	SW5030C/8260C	04/27/17 13:09	JML	96-12-8	
1,2-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	95-50-1	
1,2-Dichloroethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	107-06-2	
1,2-Dichloropropane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	78-87-5	
1,3-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	541-73-1	
1,4-Dichlorobenzene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	106-46-7	
cis-1,2-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	156-59-2	
Dibromochloromethane	Not detected	ug/L	5	SW5030C/8260C	04/27/17 13:09	JML	124-48-1	
Dichlorodifluoromethane	Not detected	ug/L	5	SW5030C/8260C	04/27/17 13:09	JML	75-71-8	
trans-1,2-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	156-60-5	
Ethylbenzene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	100-41-4	
2-Hexanone	Not detected	ug/L	50	SW5030C/8260C	04/27/17 13:09	JML	591-78-6	
4-Methyl-2-pentanone (MIBK)	Not detected	ug/L	50	SW5030C/8260C	04/27/17 13:09	JML	108-10-1	
tert-Methyl butyl ether (MTBE)	Not detected	ug/L	5	SW5030C/8260C	04/27/17 13:09	JML	1634-04-4	
Methylene chloride	Not detected	ug/L	5	SW5030C/8260C	04/27/17 13:09	JML	75-09-2	
Styrene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	100-42-5	
1,1,1-Trichloroethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	71-55-6	
1,1,2-Trichloroethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	79-00-5	
1,2,4-Trichlorobenzene	Not detected	ug/L	5	SW5030C/8260C	04/27/17 13:09	JML	120-82-1	
Tetrachloroethene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	127-18-4	
Toluene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	108-88-3	
Trichloroethene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	79-01-6	
Trichlorofluoromethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	75-69-4	
Vinyl chloride	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	75-01-4	
o-Xylene*	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	95-47-6	



# Analytical Laboratory Report

Lab Sample ID: S80840.05 (continued)

Sample Tag: TB

Analysis	Results	Units	RL	Method	Run Date/Time	Tech	CAS #	Flags
<b>Organics - Volatiles (continued)</b>								
<b>Volatile Organics - Arcadis (continued)</b>								
p,m-Xylene*	Not detected	ug/L	2	SW5030C/8260C	04/27/17 13:09	JML		
Isopropylbenzene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	98-82-8	
Cyclohexane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	110-82-7	
1,1-Dichloroethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	75-34-3	
1,1-Dichloroethene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	75-35-4	
Methyl Acetate	Not detected	ug/L	10	SW5030C/8260C	04/27/17 13:09	JML	79-20-9	
Methyl cyclohexane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	108-87-2	
1,1,2-Trichloro-1,2,2-trifluoroethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	76-13-1	
1,2-Dibromoethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	106-93-4	
1,1,2,2-Tetrachloroethane	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	79-34-5	
cis-1,3-Dichloropropene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	10061-01-5	
trans-1,3-Dichloropropene	Not detected	ug/L	1	SW5030C/8260C	04/27/17 13:09	JML	10061-02-6	

