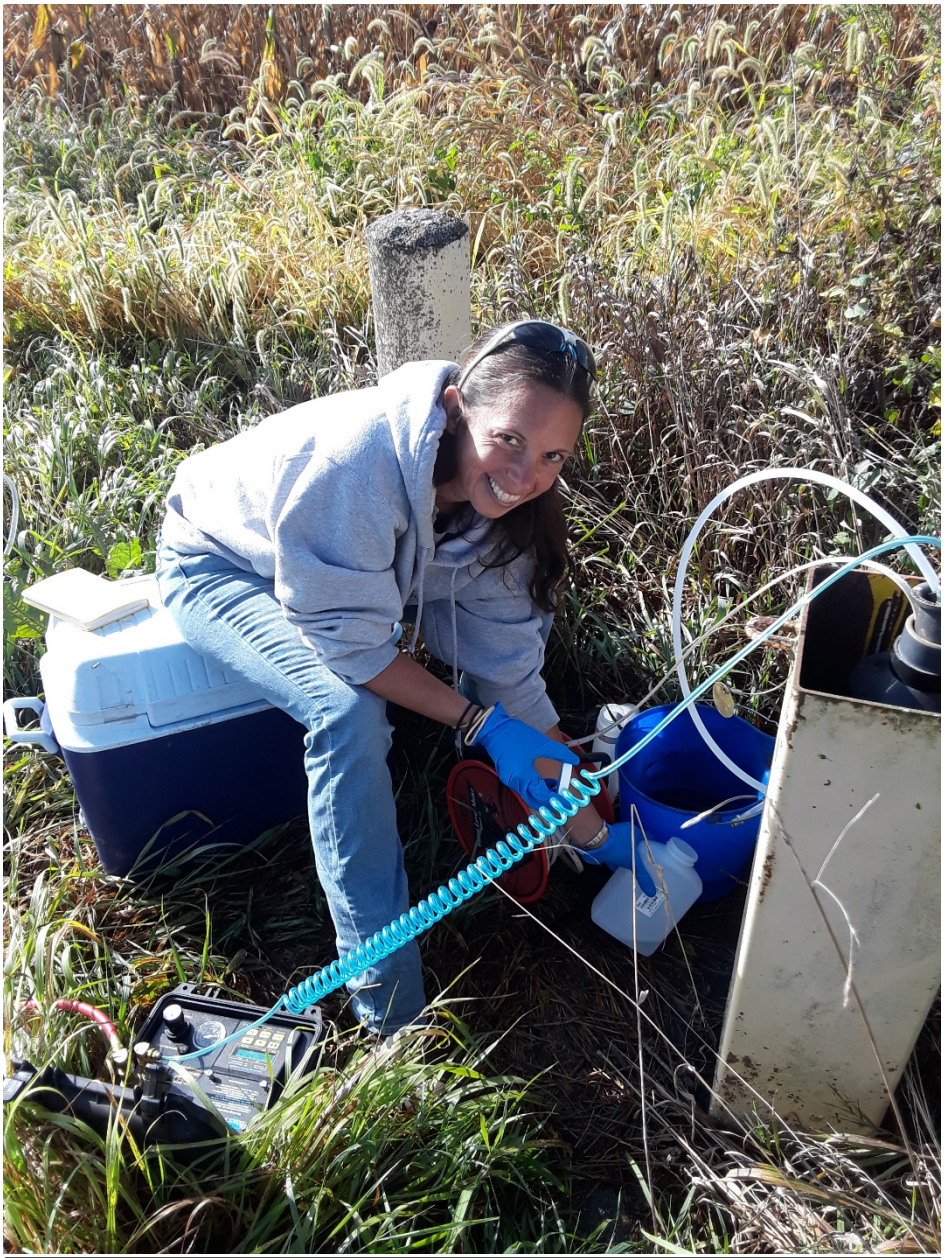
MCD
MIAMI CONSERVANCY DISTRICT

2020 Groundwater Quality Survey and Contaminant Trends Study Report



MCD's Krystal Lacy collecting a groundwater sample from monitoring well CLA10018 in Clark County, Ohio on September 29, 2020

Executive Summary

MCD staff collected water samples from 12 monitoring wells installed in the buried valley aquifer system of the Great Miami River Watershed during the spring and fall of 2020. This is part of an ongoing groundwater quality characterization program started in 2014. The goal of the program is to provide a better understanding of human impact on and to identify trends. The samples were analyzed for the presence of 1, 4-dioxane, *E. coli*, major ions, metals, nutrients, semivolatile and volatile organic compounds, and a list of 19 pharmaceutically active compounds.

Overall, the results show that groundwater in the sampled wells has a calcium-magnesium-bicarbonate composition. All samples collected in this study had measured water hardness in the very hard range.

Levels of constituents in groundwater met all applicable human-health benchmarks in the samples collected from 6 of the 12 monitoring wells. Parameters that equaled or exceeded a human-health benchmark in at least one groundwater sample included 1, 4-dioxane, arsenic, benzo(a)pyrene, bis(2-ethylhexyl) phthalate, cyanide, *E. coli*, and manganese. Parameters that exceeded secondary drinking water standards in at least one groundwater sample included iron, manganese, and total dissolved solids.

Parameters detected in one or more groundwater samples that may be indicative of anthropogenic (human) sources of contamination included 1, 4-dioxane, acesulfame K, benz(a)anthracene, benzo(a)pyrene, bis(2-ethylhexyl) phthalate, chloroform, cyanide, nitrate, sucralose, trichloroethene, and the ions chloride and sodium. Naturally occurring contaminants detected include arsenic, iron, hardness, manganese, total dissolved solids, and radon.

Trend analysis of anthropogenic contaminants show levels of trichloroethene in the one monitoring well where the compound was detected declined from previous sampling results. Nitrate concentrations in groundwater samples vary widely between monitoring wells. Monitoring wells with a history of elevated nitrate concentrations show seasonal as well as temporal fluctuations in nitrate. Concentrations of chloride and sodium also vary widely and show fluctuations in wells with a history of elevated concentrations. With the exception of one monitoring well, concentrations of naturally occurring contaminants such as arsenic, iron, and manganese, did not show strong evidence of increasing or decreasing trends.

The results of this study are consistent with the results of previous rounds of sampling as well as other studies which show that low levels of anthropogenic contaminants are common in sensitive, shallow sand and gravel aquifer settings. This emphasizes the need for groundwater protection strategies to manage the quality of buried valley aquifer resources in southwest Ohio.

Introduction

Since 2014, MCD has conducted an ongoing groundwater monitoring program in the Great Miami River Watershed. The purpose of the program is to provide a better understanding of human activities on groundwater quality. In 2020, MCD staff collected samples from 12 groundwater monitoring wells to survey groundwater quality in the buried valley aquifer (see Figure 1). All of the wells chosen for the study are surrounded by land uses with the potential to release contaminants into the aquifer.

The wells selected for the study are installed in unconfined sand and gravel aquifers with permeable soils at the surface. Five of the wells (CLA10011, MON00022, MON10016, WAR10003, and WAR10004) are situated within 400 feet of a riverbank and a comparison of static water level measurements for those wells with nearby stream gage data suggests hydraulic interactions occur between the aquifer and the river. Seven of the wells are screened at shallow (< 50 feet) depths. Table 1 summarizes depths and screened intervals for all of the monitoring wells in this survey.

MCD equipped each monitoring well with a bladder pump installed within the screened interval of the well. The bladder pumps allow low-flow purging techniques to be used (Puls and Barcelona, 1996).

Samples were collected twice in 2020; once between June 15 and 25 (spring) and once between September 15 and October 5 (fall). The water was analyzed for a range of parameters including 1, 4-dioxane, *Escherichia coli (E. coli)*, major ions, metals, nutrients, semivolatile and volatile organic compounds, and a list of 19 pharmaceutically active compounds.

Table 1 – Construction details for groundwater quality monitoring wells

Monitoring Well ID	Casing Diameter (in)	Well Depth (ft)	Screened Interval (ft)	Aquifer Screened	Distance to Riverbank (ft)
BUT10014	2	40	35 - 40	Sand and Gravel	3,880
BUT10016	2	65	60 - 65	Sand and Gravel	3,770
BUT10017	2	39	34 - 39	Sand and Gravel	3,770
CLA10011	2	60	55 - 60	Sand and Gravel	135
CLA10018	2	16	11 - 16	Sand and Gravel	2,810
MIA00205	2	24	19 - 24	Sand and Gravel	1,130

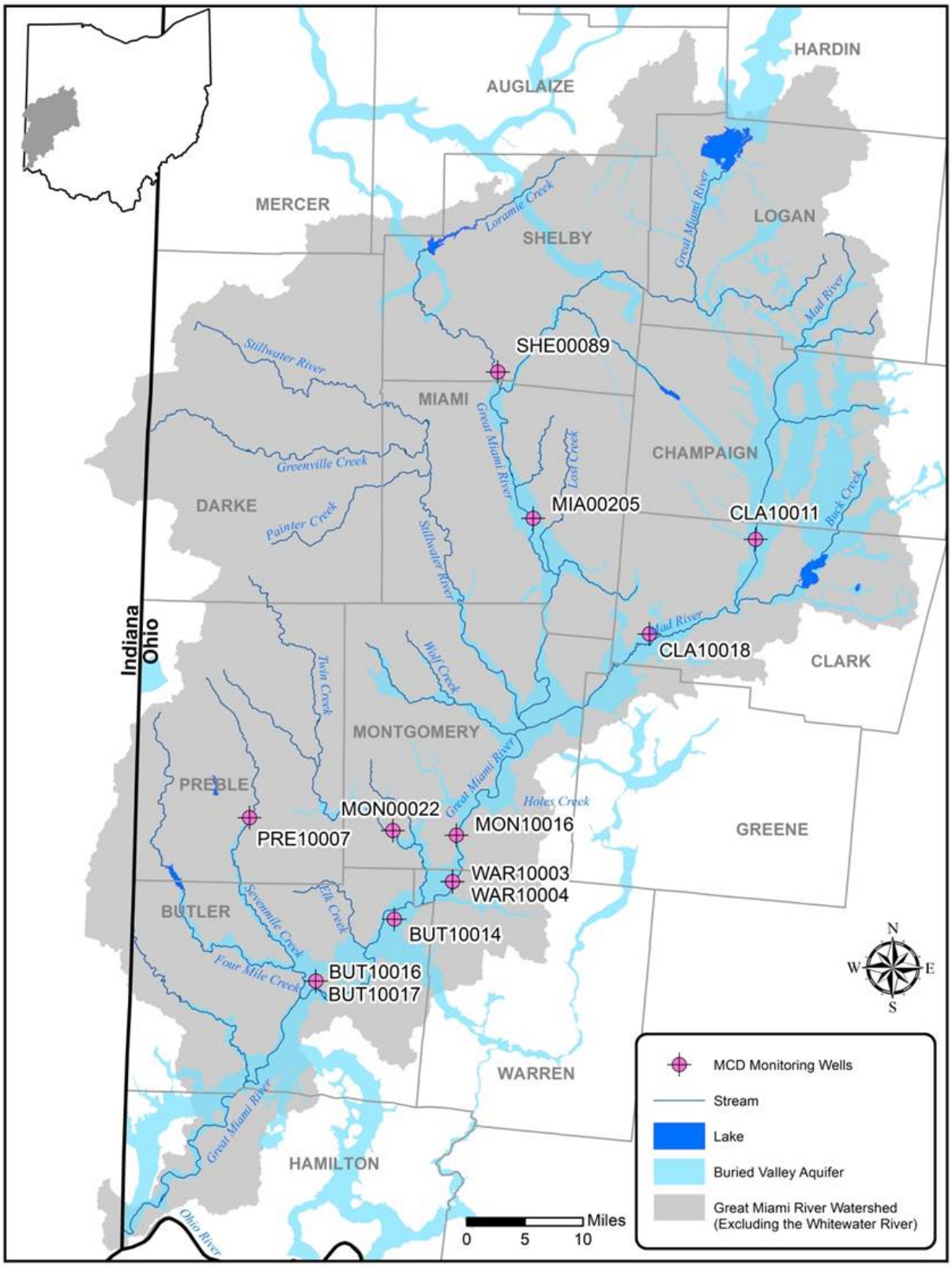
Monitoring Well ID	Casing Diameter (in)	Well Depth (ft)	Screened Interval (ft)	Aquifer Screened	Distance to Riverbank (ft)
MON00022	2	15	10 - 15	Sand and Gravel	110
MON10016	2	108	88 - 108	Sand and Gravel	355
PRE10007	2	60	40 - 60	Sand and Gravel	960
SHE00089	2	43	38 - 43	Sand and Gravel	600
WAR10003	2	67	62 - 67	Sand and Gravel	85
WAR10004	2	32.5	27.5 – 32.5	Sand and Gravel	90

MCD staff collected duplicate samples from one monitoring well during each sampling event to evaluate laboratory precision. Field blanks were also collected to assess potential contamination from field conditions during sampling.

MCD staff compared the results of this study with federal drinking water standards and human health-based screening levels. Drinking water standards are generally more stringent than other water standards, so when groundwater meets drinking water standards it should be suitable for other uses.

National Primary Drinking Water Regulations for parameters are legally enforceable standards set by the U.S. EPA that apply to public water systems. Primary standards set maximum contaminant levels (MCLs) that help protect public health by limiting the contaminant levels in drinking water. National Secondary Drinking Water Standards are advisable guidelines addressing secondary maximum contaminant levels (SMCLs) that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water. The U.S. EPA recommends, but does not require, that public water systems incorporate secondary standards. The U.S. EPA Office of Water also publishes non enforceable health-based screening levels (HBSLs) for some constituents which may pose potential human-health concerns but do not yet have an enforceable standard. HBSLs are used as a supplement for evaluating contaminants in drinking water in a human-health context. For the purpose of this study MCD refers to all MCLs and HBSLs as human-health benchmarks to be used for interpreting analytical results.

Figure 1 – Locations of monitoring wells



2020 Results

Sampling results for 2020 are generally consistent with results from previous years. Analysis of major ions (cations and anions) in groundwater samples show the dominant cation is calcium with significant quantities of magnesium and sodium also present. The average calcium concentration of groundwater samples was 93 mg/L. The dominant anion was bicarbonate with lesser amounts of chloride and sulfate. The bicarbonate content was estimated using alkalinity and pH measurements for each sample. The average bicarbonate concentration in groundwater samples was 362 mg/L. A piper diagram of major cations and anions shows the groundwater has a calcium-magnesium-bicarbonate composition (see Figure 2). Calcium-magnesium-bicarbonate groundwater tends to be present in areas where carbonate rocks comprise a significant amount of the aquifer matrix.

Groundwater samples collected at monitoring wells BUT10014, CLA10011, CLA10018, MIA00205, MON00022, and MON10016 met all human-health benchmarks including MCLs and HBSLs for both sampling events (see Table 2). See Appendix A for a complete list of all analytical parameters, analytical methods, and results.

Parameters Exceeding Human-Health Benchmarks

At least one parameter occurred at a concentration exceeding human-health benchmarks in 5 out of the 12 monitoring wells for the spring and fall sampling events. The parameters 1, 4-dioxane, arsenic, benzo(a)pyrene, bis(2-ethylhexyl) phthalate, cyanide, *E. coli*, manganese, and nitrate were detected in at least one sample at concentrations exceeding human health based benchmarks in 2020. Arsenic, *E. coli*, total cyanide, and nitrate have MCLs while 1, 4-dioxane and manganese have HBSLs. Manganese also has a SMCL.

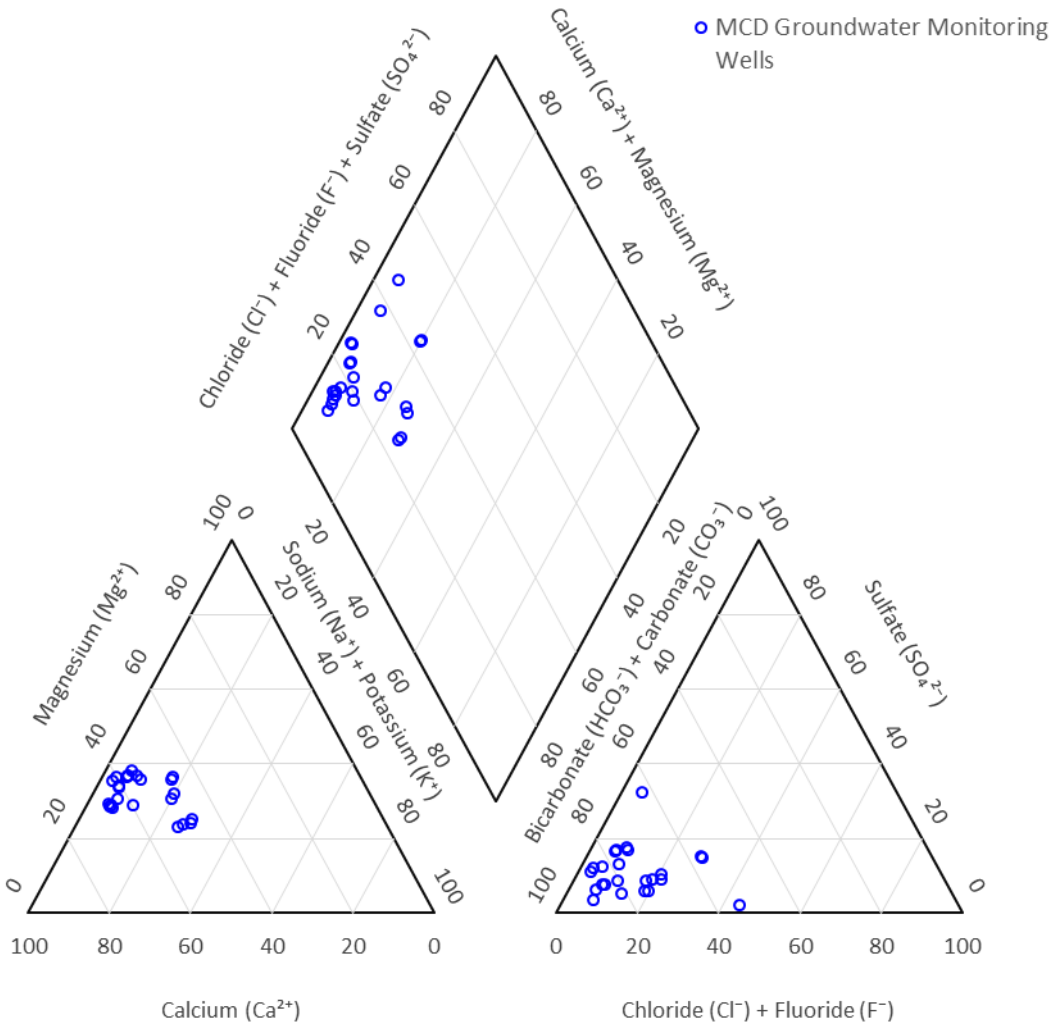
- The compound 1, 4-dioxane was detected in groundwater samples collected from monitoring well WAR10003. The spring groundwater sample had a concentration of 0.60 µg/L and the fall sample had a concentration of 0.56 µg/L. Both concentrations were above the HBSL of 0.35 µg/L.

- The arsenic concentration (14.8 µg/L) in the spring groundwater sample collected from monitoring well PRE10007 exceeded the MCL of 10 µg/L, but the concentration (5.7 µg/L) measured in the fall sample fell below this level.

- The compound benzo(a)pyrene was detected at a concentration (0.25 µg/L) exceeding the MCL of 0.2 µg/L in the fall groundwater sample collected from monitoring well SHE00089.

- Bis(2-ethylhexyl) phthalate was detected at concentrations above the MCL of 6 µg/L in the spring groundwater samples collected from monitoring wells BUT10017 (555 µg/L) and WAR10004 (6.3 µg/L).

Figure 2 – Piper diagram showing dominant cations, anions, and water type of samples



- Cyanide (reported as total) was detected in the fall groundwater sample collected from monitoring well BUT10017 at a concentration of 0.78 mg/L, exceeding the MCL of 0.2 mg/L. However, cyanide was not detected in the spring sample.

- *E. coli* was present at 1 MPN/100mL in the fall groundwater sample collected from monitoring well WAR10004. The MCL for E. coli is 0 MPN/100 mL.

- Manganese exceeded the HBSL of 0.3 mg/L in both the spring (0.444 mg/L) and fall (0.384 mg/L) groundwater samples collected from monitoring well BUT10016.

- Nitrate was detected at a concentration of 10.6 mg/L in the groundwater sample collected from monitoring well BUT10017 during the spring sampling event. This concentration is

Table 2 – Summary of significant detections of constituents in groundwater

Spring 2020		**Benchmark**		**Sample Sites**					
Parameter	**Units**	**Type**	**Value**	**BUT10014**	**BUT10016**	**BUT10017**	**CLA10011**	**CLA10018**	**MIA00205**
1, 4-Dioxane	µg/L	HBSL	0.35						
Acesulfame K	µg/L	-	-	0.07		0.07			
Bis(2ethylhexyl)phthalate	µg/L	MCL	6			**555**			
Chloride	mg/L	SMCL	250	76.2				176.0	
Chloroform	µg/L	MCL	80	1.6					
Nitrogen, Nitrate	mg/L	MCL	10			**10.6**		6.3	4.2
Sodium	mg/L	-	-	56.6					
Sucralose	µg/L	-	-						
Trichloroethene	µg/L	MCL	5	1.1					
Arsenic	µg/L	MCL	10		5.1		6.1		
Iron	mg/L	SMCL	0.3		**1.820**		**3.070**		
Manganese	mg/L	HBSL, SMCL	0.3, 0.05		**0.444**		**0.061**		**0.070**
Total Dissolved Solids	mg/L	SMCL	500	**532**					
Total Hardness	mg/L	-	-	357	332	373	438	353	376
Parameter	**Units**	**Type**	**Value**	**MON00022**	**MON10016**	**PRE10007**	**SHE00089**	**WAR10003**	**WAR10004**
1, 4-Dioxane	µg/L	HBSL	0.35					**0.60**	
Acesulfame K	µg/L	-	-	0.06	0.06	0.02		0.16	0.03
Bis(2ethylhexyl)phthalate	µg/L	MCL	6						**6.3**
Chloride	mg/L	SMCL	250		76.2			109.0	
Chloroform	µg/L	MCL	80						
Nitrogen, Nitrate	mg/L	MCL	10						
Sodium	mg/L	-	-		51.5			46.4	
Sucralose		-	-	0.031	0.041				
Trichloroethene	µg/L	MCL	5						
Arsenic	µg/L	MCL	10			**14.8**		2.1	
Iron	mg/L	SMCL	0.3		**0.310**	**4.690**		**1.980**	
Manganese	mg/L	HBSL, SMCL	0.3, 0.05		**0.072**		**0.295**	**0.058**	
Total Dissolved Solids	mg/L	SMCL	500					**540**	
Total Hardness	mg/L	-	-	415	300	378	400	416	261

Table 2 – Summary of significant detections of constituents in groundwater continued

Fall 2020		**Benchmark**		**Sample Sites**					
Parameter	**Units**	**Type**	**Value**	**BUT10014**	**BUT10016**	**BUT10017**	**CLA10011**	**CLA10018**	**MIA00205**
1, 4-Dioxane	µg/L	HBSL	0.35						
Acesulfame K	µg/L	-	-	0.05		0.07			
Benz(a)anthracene	µg/L	-	-						
Benzo(a)pyrene	µg/L	MCL	0.2						
Chloride	mg/L	SMCL	250	73.6					
Chloroform	µg/L	MCL	80	1.2					
Cyanide, Total	mg/L	MCL	0.2			**0.78**			
Nitrogen, Nitrate	mg/L	MCL	10			8.1		7.2	4.6
Sodium	mg/L	-	-	59.0					
Sucralose	µg/L	-	-			0.118			
Trichloroethene	µg/L	MCL	5	1.6					
Arsenic	µg/L	MCL	10		5.3		5.5		
Iron	mg/L	SMCL	0.3		**1.560**		**2.640**		
Manganese	mg/L	HBSL, SMCL	0.3, 0.05		**0.384**		**0.055**		**0.069**
Total Dissolved Solids	mg/L	SMCL	500	**726**					
Total Hardness	mg/L	-	-	398	296	316	371	284	359
Parameter	**Units**	**Type**	**Value**	**MON00022**	**MON10016**	**PRE10007**	**SHE00089**	**WAR10003**	**WAR10004**
1, 4-Dioxane	µg/L	HBSL	0.35					**0.56**	
Acesulfame K	µg/L	-	-		0.06	0.02		0.11	0.02
Benz(a)anthracene	µg/L	-	-				0.24		
Benzo(a)pyrene	µg/L	MCL	0.2				**0.25**		
Chloride	mg/L	SMCL	250		81.4			111.0	
Chloroform	µg/L	MCL	80						
Cyanide, Total	mg/L	MCL	0.2				0.018		
Nitrogen, Nitrate	mg/L	MCL	10						
Sodium	mg/L	-	-		54.2			42.0	
Sucralose	µg/L	-	-	0.037	0.062	0.182			
Trichloroethene	µg/L	MCL	5						
Arsenic	µg/L	MCL	10			5.7			
Iron	mg/L	SMCL	0.3		**0.372**	**2.680**		**1.850**	
Manganese	mg/L	HBSL, SMCL	0.3, 0.05		**0.079**		**0.276**	**0.054**	
Total Dissolved Solids	mg/L	SMCL	500	**686**	**584**			**700**	**534**
Total Hardness	mg/L	-	-	61	312	339	364	382	249

above the MCL (10 mg/L). Nitrate was also present in the fall groundwater sample at a concentration of 8.1 µg/L dipping below the MCL.

There were no other detections of parameters exceeding human-health benchmarks in groundwater samples collected during 2020.

Parameters Exceeding Secondary Drinking Water Standards

At least one parameter exceeded an SMCL in samples collected from 8 of the 12 monitoring wells for the spring event and 10 of the 12 wells for the fall event (see Table 2). Parameters present at concentrations exceeding SMCLs included iron, manganese, and total dissolved solids.

- Iron was detected at concentrations above the SMCL (0.3 mg/L) in fall and spring groundwater samples collected from monitoring wells BUT10016, CLA10011, MON10016, PRE10007, and WAR10003.

- The SMCL for Manganese is 0.05 mg/L. Measured concentrations of manganese in groundwater samples collected from monitoring wells BUT10016, CLA10011, MIA00205, MON10016, SHE00089, and WAR10003 exceeded this standard for both sampling events.

- Total dissolved solids measured in groundwater samples collected from monitoring wells BUT10014 and WAR10003 exceeded the SMCL of 500 mg/L for both sampling events. Fall groundwater samples collected from monitoring wells MON00022, MON10016, and WAR10004 also exceeded this standard.

Parameters Indicative of Anthropogenic Sources of Contaminants

Some of the parameters exceeding human health based benchmarks in at least one groundwater sample have clear anthropogenic origins. Parameters such as 1, 4-dioxane and bis(2-ethylhexyl) phthalate are manufactured compounds that do not exist in nature. Their presence in natural waters is a clear indication of impact from anthropogenic activities. There were also detections of compounds that don't have drinking water standards but the presence of which is an indication of human impact. Acesulfame K and sucralose are two examples of such compounds. Both constituents are manufactured compounds that do not occur naturally.

Other parameters can be present at concentrations that are below regulatory standards yet may still reflect anthropogenic sources. These contaminants include chloride, sodium, and nitrate. Chloride and sodium are present in groundwater naturally, but human activities can elevate their concentration well above background levels. Likewise, nitrogen in the form of nitrate can be naturally present in groundwater, but anthropogenic sources of nitrogen can elevate nitrate concentrations above levels that would be present in the absence of human activities. A discussion of parameters detected in at least one groundwater sample and believed to reflect anthropogenic sources of contaminants follows.

1, 4-Dioxane
1, 4-Dioxane is a solvent used for a variety of purposes in the laboratory and as a stabilizer for the transport of chlorinated hydrocarbons in aluminum containers. The compound is on the list of contaminants for the third Unregulated Contaminant Monitoring Rule (UCMR3). 1, 4-Dioxane was detected in both the spring and fall groundwater samples collected from monitoring well WAR10003.

The source of the 1, 4-Dioxane detected in WAR10003 is unknown. However, 1, 4-dioxane is present at low concentrations in the Great Miami River. The Hamilton to New Baltimore Groundwater Consortium sampled the Great Miami River at six sites for 1, 4-dioxane in Butler County in 2019. 1, 4-Dioxane was detected in samples from all six sites at concentrations ranging from 0.1 to 0.34 µg/L (Stuck, 2019a). Given the close proximity (85 feet) of WAR10003 to the Great Miami River, the river should be regarded as a potential source of 1, 4-dioxane to WAR10003.

Acesulfame K
Acesulfame K is an artificial sweetener. The compound was detected at concentrations ranging from 0.02 to 0.16 µg/L in the spring and fall groundwater samples collected from monitoring wells BUT10014, BUT10017, MON10016, PRE10007, WAR10003, and WAR10004.

Recent sampling conducted by the Hamilton to New Baltimore Groundwater Consortium in Butler County during 2019 reported detections of acesulfame K in samples collected at two locations in the Great Miami River and from three monitoring wells installed in buried valley aquifers (Stuck, 2019b). Concentrations of acesulfame K ranged from 0.031 to 0.370 µg/L, similar to the range of concentrations measured in this study.

Acesulfame K is often associated with domestic and municipal wastewater (Buerge et al, 2009 and Scheurer et al, 2009). Potential sources of acesulfame K include septic systems and municipal wastewater treatment plants which discharge into the Great Miami River and its tributaries. Potential transport pathways for acesulfame K to MCD monitoring wells include groundwater transport from upgradient septic systems and movement of acesulfame K from rivers and streams into the aquifer system.

Bis(2-ethylhexyl) phthalate
Bis(2-ethylhexyl) phthalate is a semivolatile organic compound and a member of a class of compounds known as phthalates which are used as plasticizers in manufacturing. The compound was detected in the spring groundwater samples collected from monitoring wells BUT10017 and WAR10004. However, the compound was not detected in groundwater samples collected during the fall sampling event.

Determining sources of bis(2-ethylhexyl) phthalate in groundwater samples can be problematic because of the presence of this compound in laboratory equipment and reagents as well as sampling equipment. For the 2020 results, MCD notes a relatively high concentration of 555 µg/L (approximately 90 times the MCL) of bis(2-ethylhexyl) phthalate in the spring groundwater sample for monitoring well BUT10017.

Benz(a)anthracene and benzo(a)pyrene
The compounds benz(a)anthracene and benzo(a)pyrene are semivolatile organic compounds as well as polycyclic aromatic hydrocarbons (PAHs) produced during incomplete combustion of organic material including fossil fuels. Both compounds were detected in the fall groundwater sample collected from monitoring well SHE00089. The concentration of benzo(a)pyrene (0.25 µg/L) exceeded the MCL of 0.2 µg/L. PAHs are ubiquitous in the environment and typically derived from anthropogenic activities. The largest amount of PAHs enter the environment via the atmosphere from incomplete combustion processes including processing of coal, crude oil, steel production, power generation, and vehicle traffic (World Health Organization, 1998). The source of PAHs detected in monitoring well SHE00089 is unknown.

Chloroform
Chloroform is a volatile organic compound often used in the manufacturing process for refrigerants. The compound is a trihalomethane (THM) and can be produced during chlorination of water as a disinfection byproduct. The MCL for chloroform is 80 µg/L. Chloroform was detected in the spring and fall groundwater samples collected from monitoring well BUT10014 at concentrations of 1.6 and 1.2 µg/L respectively. Chloroform was detected in both groundwater samples collected from BUT10014 in 2019 at similar concentrations. Its source is unknown.

Chloride and Sodium
Chloride has an SMCL of 250 mg/L. There are no human health based benchmarks for sodium in drinking water. Background levels of chloride in the buried valley aquifer system typically do not exceed 50 mg/L (Spieker, 1968), and (Debrewer et al, 2000). Kunz and Sroka (2004) reported mean background concentrations of chloride ranging from 13 to 23 mg/L in shallow unconsolidated aquifers in Champaign, Clark, and Pickaway counties in Ohio. Chloride concentrations above 70 mg/L and sodium concentrations above 43 mg/L in local sand and gravel aquifers likely reflect anthropogenic sources (Kunz and Sroka, 2004, Ohio EPA, 2015). These concentrations are higher than what is typically measured in groundwater samples collected from sand and gravel aquifers in Ohio (Ohio EPA, 2015).

Chloride concentrations measured in groundwater samples from monitoring wells BUT10014, CLA10018, MON10016 and WAR10003 exceeded 70 mg/L in at least one sampling event in 2020 and likely reflect anthropogenic sources. Sodium concentrations in groundwater samples from monitoring wells BUT10014, MON10016, and WAR10003 exceeded 43 mg/L for at least one sampling event and also likely reflect anthropogenic sources. Anthropogenic sources of chloride and sodium include road salt applications for deicing and private and municipal wastewater from homes with water softeners.

Cyanide
According to the U.S. EPA, anthropogenic sources of cyanide to water include discharges from metal-finishing industries, iron and steel mills, and organic chemical industries (USEPA, 1981). The MCL for total cyanide is 0.2 mg/L. Cyanide was detected in the fall groundwater samples collected from monitoring wells BUT10017 and SHE00089. The cyanide concentration in the sample collected from BUT10017 exceeded the MCL while the concentration in the sample collected from SHE00089 did not. The source of the cyanide in groundwater is unknown. These

were the first detections of cyanide in groundwater samples since the monitoring program began in 2014.

Nitrate

According to Madison and Brunett (1985), nitrate concentrations in excess of 3.0 mg/L in groundwater are often indicative of anthropogenic sources. Nitrate concentrations measured in groundwater samples during the spring sampling event from monitoring wells BUT10017, CLA10018, and MIA00205 exceeded 3.0 mg/L. Nitrate concentrations above 3.0 mg/L also occurred in the fall samples collected from the same three monitoring wells. Common sources of nitrates in groundwater include fertilizers, domestic or municipal wastewater, and animal waste or manure applied as fertilizer.

Analysis of nitrogen and oxygen isotopes measured in groundwater samples collected from BUT10017 and CLA10018 in 2017 and 2018 suggested an inorganic fertilizer source for the nitrate present in those wells (Bedaso and Ekberg, 2019).

Sucralose

Like acesulfame K, sucralose is an artificial sweetener. The compound was detected at concentrations ranging from 0.031 to 0.182 µg/L in at least one of the groundwater samples collected from BUT10017, MON00022, MON10016, and PRE10007.

Recent sampling conducted by the Hamilton to New Baltimore Groundwater Consortium in Butler County during 2019 reported detections of sucralose in samples collected at two locations in the Great Miami River and from three monitoring wells installed in buried valley aquifers. Concentrations of sucralose ranged from 0.094 to 0.950 µg/L (Stuck, 2019b).

Sucralose is often associated with domestic and municipal wastewater (Buerge et al, 2009 and Scheurer et al, 2009). Potential sources of sucralose include septic systems and municipal wastewater treatment plants which discharge into the Great Miami River and its tributaries. Potential transport pathways for sucralose to MCD monitoring wells include groundwater transport from upgradient septic systems and movement of sucralose from rivers and streams into the aquifer system.

Trichloroethene (TCE)

TCE is a volatile organic compound used primarily to remove grease from fabricated metal parts. The MCL for trichloroethene is 5 µg/L. TCE was detected in the spring groundwater sample collected from monitoring well BUT10014 at a concentration of 1.1 µg/L. It was also detected in the fall groundwater sample at a concentration of 1.6 µg/L. Well BUT10014 is located at Smith Park in Middletown close to the former Aeronca Air Products site, a site which underwent environmental cleanup activities (Robinson and Richter, 2012). A TCE contaminant plume is present in the aquifer south of the site including the area in which BUT10014 is located. The City of Middletown and Ohio EPA have been tracking the extent of the TCE contamination in recent years (Joe Smindak, Ohio Environmental Protection Agency, personal communication, September 8, 2017).

Naturally Occurring Contaminants

Arsenic

Arsenic occurs naturally in regional groundwater and concentrations of arsenic are largely controlled by redox conditions. The dominant mechanism for moving arsenic into groundwater is thought to be the release of arsenic from iron oxides in the aquifer under reducing conditions (Thomas et al, 2008). The MCL for arsenic is 10 µg/L. Spring and fall groundwater samples collected from monitoring wells BUT10016, CLA10011, and PRE10007 had detectable concentrations of arsenic. The concentration of arsenic measured in the spring groundwater sample collected from monitoring well PRE10007 exceeded the MCL. It should be noted that groundwater samples from all three of these wells had elevated levels of iron and low levels of dissolved oxygen, which indicates reducing conditions present in the aquifer zone in which the wells were screened.

Nuisance Contaminants

Hardness, iron, manganese, and total dissolved solids are generally considered to be "nuisance" contaminants. These contaminants are present naturally in groundwater from the buried valley aquifer system. Their presence does not typically pose a health threat. Nevertheless, they can have adverse aesthetic impacts that cause water to appear cloudy or colored. They can also adversely impact plumbing fixtures, stain laundry, and cause taste and odor issues. At high enough concentrations manganese may pose health concerns. In 2004, U.S. EPA issued a lifetime health advisory level of 0.3mg/L for manganese in drinking water.

Hardness is a measure of the amount of dissolved calcium and magnesium in a water sample. When the hardness value exceeds 180 mg/L the water is considered to be very hard. With only one exception, all groundwater samples collected in 2020 had hardness values exceeding 180 mg/L. There is no SMCL for water hardness.

The SMCL for Iron is 0.3 mg/L. Iron concentrations measured in samples collected from monitoring wells BUT10016, CLA10011, MON10016, PRE10007, and WAR10003 exceeded this standard in both sampling events.

The SMCL for manganese is 0.05 mg/L. Manganese concentrations in groundwater samples collected from monitoring wells BUT10016, CLA10011, MIA00205, MON10016, SHE00089, and WAR10003 exceeded this standard during both sampling events. Manganese also has a lifetime health advisory level of 0.3 mg/L. Both groundwater samples collected from well BUT10016 in 2020 exceeded this standard.

Total dissolved solids (TDS) are comprised of inorganic salts (principally calcium, magnesium, potassium, sodium, bicarbonates, chlorides, and sulfates). TDS is the sum of cations and anions in a water sample. The SMCL for TDS is 500 mg/L. Groundwater samples collected from wells BUT10014, MON00022, MON10016, and WAR10003 exceeded this standard in at least one of the two sampling events.

Contaminant Trends

Groundwater quality data collected from MCD's network of 12 monitoring wells was examined for trends in contaminant concentrations. Groundwater quality monitoring has been conducted by MCD staff twice per year since 2014 at monitoring wells BUT10014, BUT10016, CLA10018, and MON10016. The other eight monitoring wells have been sampled since 2015 or 2016. MCD selected the chemical parameters TCE, nitrate, chloride, and sodium as parameters indicative of anthropogenic sources. The parameters arsenic, iron, and manganese were selected to examine trends in naturally occurring contaminant concentrations.

Contaminants Indicative of Anthropogenic Sources

Chloride and Sodium
Chloride concentrations measured in samples collected from monitoring wells BUT10014, MON10016 and WAR10003 are consistently higher than 70 mg/L and above the concentrations measured in samples from the other monitoring wells (see figure 3). Chloride concentrations in samples show fluctuations from sampling event to sampling event. Likewise, sodium concentrations measured in the three wells (BUT10014, MON10016, and WAR10003) were above concentrations measured at other monitoring wells (see figure 4). Sodium concentrations show similar fluctuations as chloride. Seasonal fluctuations in chloride and sodium are often more pronounced in wells with the highest concentrations of those parameters. These fluctuations may reflect infiltration of saline water from snow melt and rainfall events after seasonal applications of road salt.

The chloride concentration measured in the spring groundwater sample collected from monitoring well CLA10018 was abnormally high and may be the result of a laboratory error. The chloride concentration measured in the fall groundwater sample returned to levels detected previously in groundwater samples collected from that well. Furthermore, there was not a similar increase in the sodium concentration measured in the spring groundwater sample.

Nitrate
Nitrate concentrations measured at monitoring wells BUT10017, CLA10018 and MIA00205 consistently exceed 3 mg/L and likely reflect anthropogenic sources of nitrate to the aquifer screened by those wells (see figure 5). Concentrations of nitrate in groundwater samples from monitoring well CLA10018 continue to show a downward trend from those measured in 2017. Concentrations of nitrate in groundwater samples collected from monitoring well BUT10017 fluctuate from year to year. Nitrate concentrations measured in groundwater samples from monitoring well MIA00205 have been above 3 mg/L for the past five sampling events suggesting anthropogenic sources of nitrate are impacting the aquifer at that well location.

Trichloroethene (TCE)
Since 2014, concentrations of TCE in groundwater samples from monitoring well BUT10014 have declined (see figure 5). TCE in the fall 2018 sample was below the detection limit of 1 µg/L and also below the MCL for the first time since sampling began. Groundwater concentrations measured in 2019 and 2020 were above the laboratory reporting limit but remained below the MCL.

Figure 3 – Chloride concentrations in monitoring wells

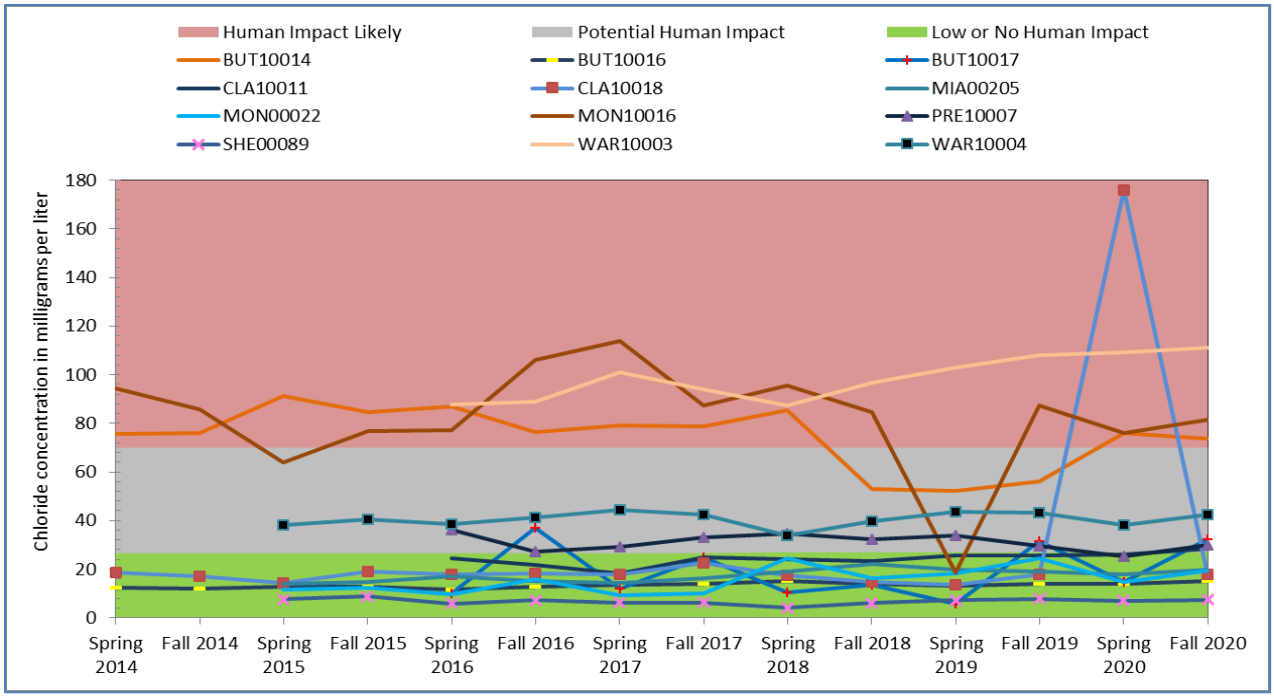
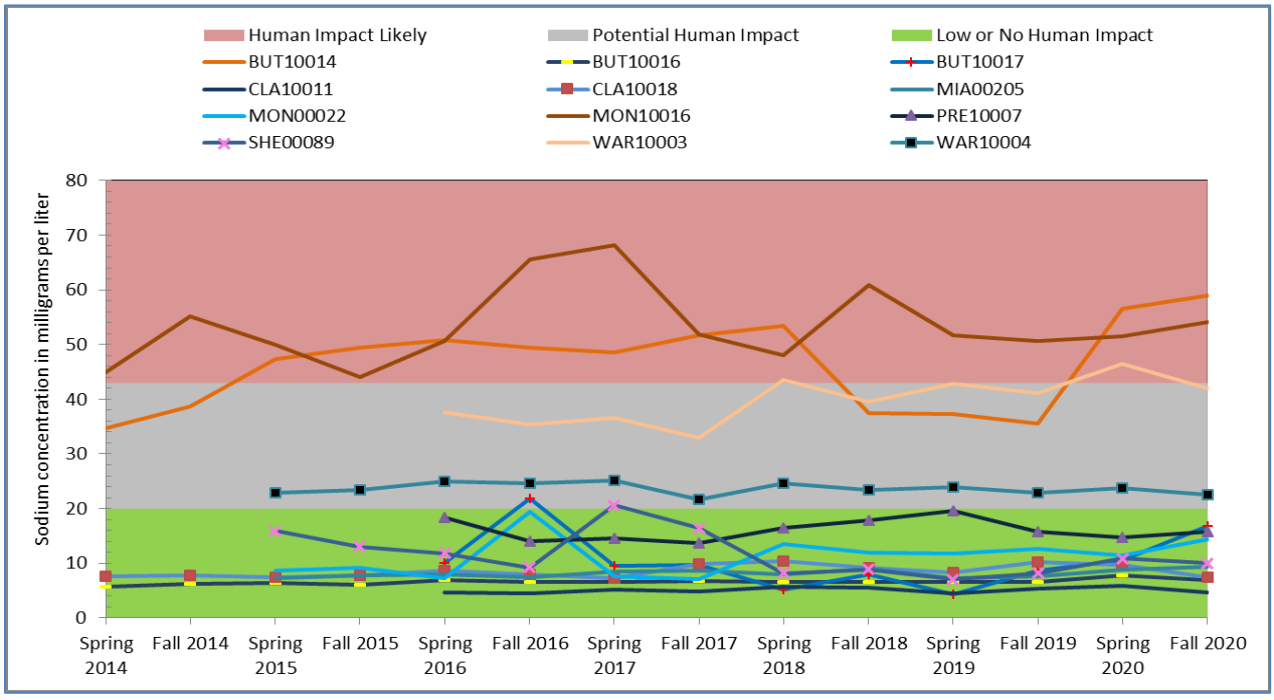


Figure 4 – Sodium concentrations in monitoring wells



Naturally Occurring Contaminants

Arsenic

Arsenic was detected in groundwater samples collected from monitoring wells BUT10016, CLA10011, and PRE10007 (see figure 7). The arsenic concentration (14.8 µg/L) measured during the spring sampling event from monitoring well PRE10007 exceeded the drinking water MCL of 10 µg/L. The arsenic concentration in the fall groundwater sample from PRE10007 fell sharply to 5.7 µg/L. Over all, arsenic concentrations in samples collected from PRE10007 seem to be trending downward since the spring 2019 sampling event. Arsenic concentrations measured in monitoring wells BUT10016 and CLA10011 fluctuated between 4 and 7 µg/L but showed no overall upward or downward trends.

Iron

There was a sudden and large increase in the iron concentration collected from monitoring well PRE10007 in the spring 2019 sampling event compared to previous sampling events. Since that time, arsenic and iron concentrations in that well have fallen. This sudden increase and decrease in arsenic and iron concentrations may indicate biofouling of the well screen and a need to redevelop this well. MCD staff noted fluctuating dissolved oxygen levels in the well during the fall sampling event as nearby production wells turned on and off. This suggests fluctuating redox conditions at the well. There does not appear to be any upward or downward trend in iron concentrations in the other monitoring wells.

Concentrations of dissolved iron greater than 0.1 mg/L in groundwater are often associated with the presence of arsenic in the glacial aquifer system of the northern United States (Thomas, 2007). When compared with previous studies, iron concentrations in groundwater samples collected from monitoring wells BUT10016, CLA10011, MON10016, PRE10007, and WAR10003 consistently exceed the drinking water SMCL of 0.3 mg/L (see figure 8). Groundwater samples from all five of those monitoring wells consistently have detectable concentrations of arsenic.

Manganese

Manganese concentrations in groundwater samples collected from monitoring wells BUT10016, CLA10011, MIA00205, MON10016, SHE00089, and WAR10003 consistently exceed the SMCL of 0.05 mg/L (see figure 9). Manganese concentrations measured in groundwater samples from monitoring well BUT10016 were the highest of all the monitoring wells in 2020 and previous sampling events consistently exceeding the HBSL of 0.3 mg/L. There does not appear to be a strong upward or downward trend in manganese concentration for any of the monitoring wells. Manganese concentrations appear to be fairly consistent from sampling event to sampling event.

Figure 5 – TCE concentration in monitoring well BUT10014

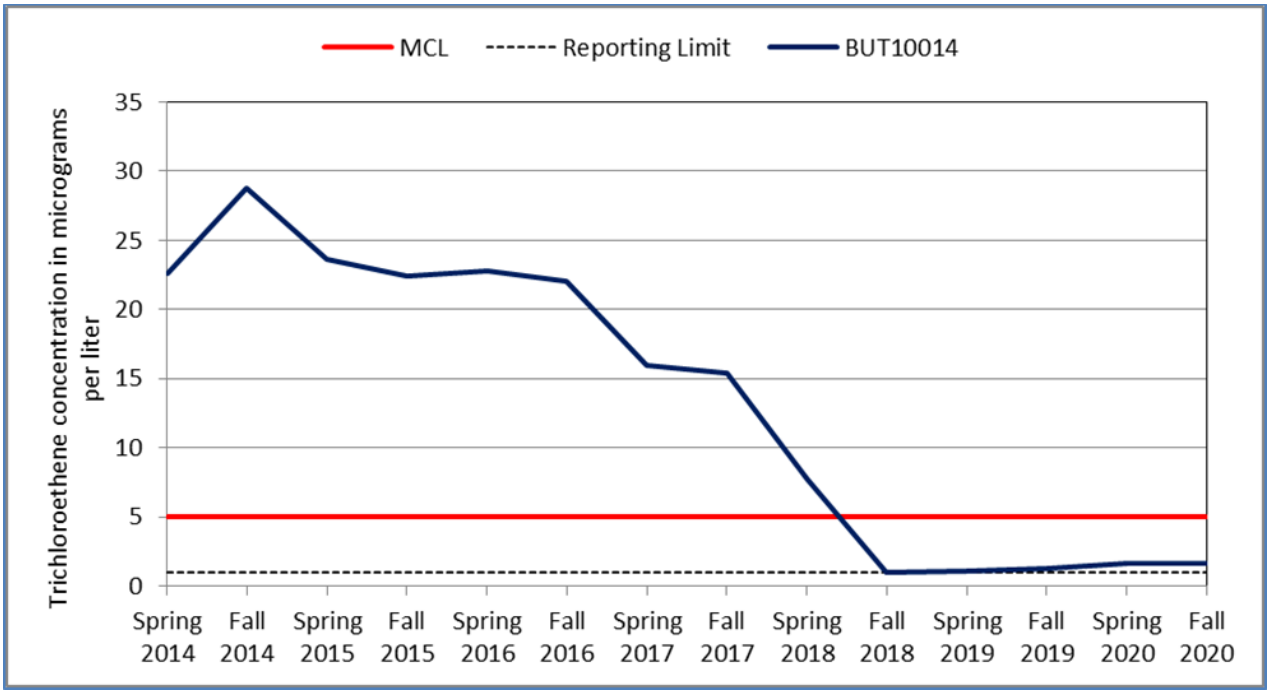


Figure 6 – Nitrate concentrations in monitoring wells

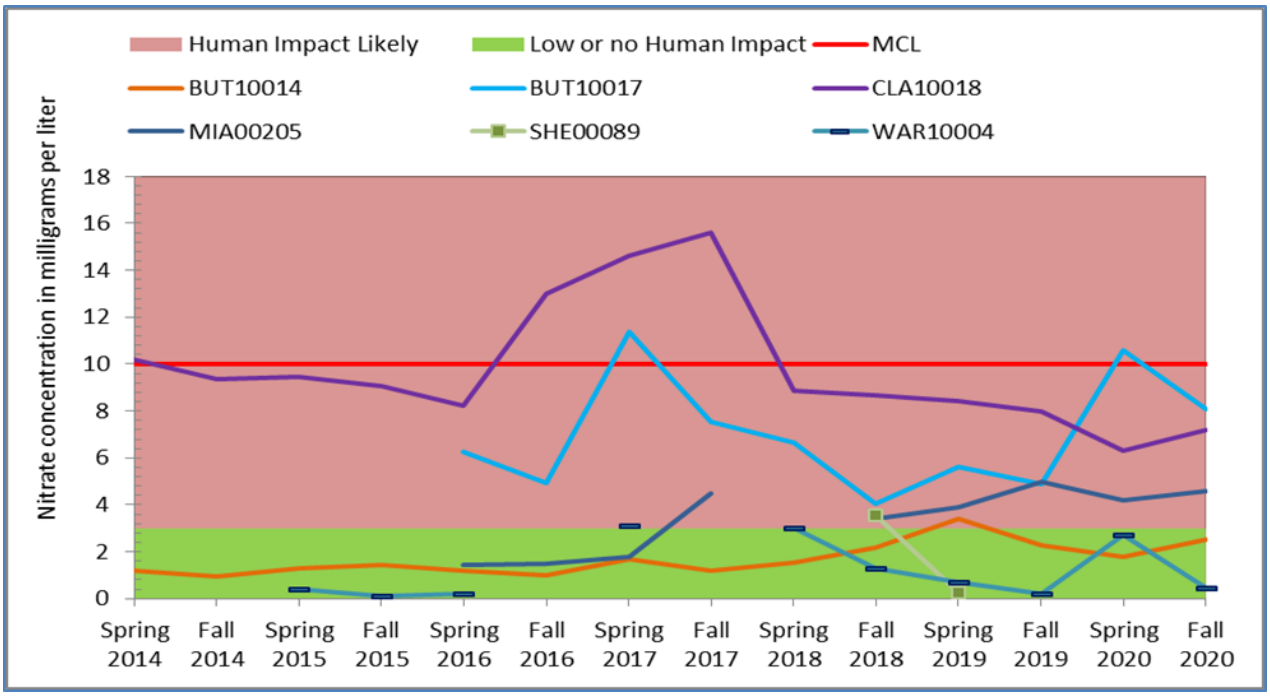


Figure 7 – Arsenic concentrations in monitoring wells

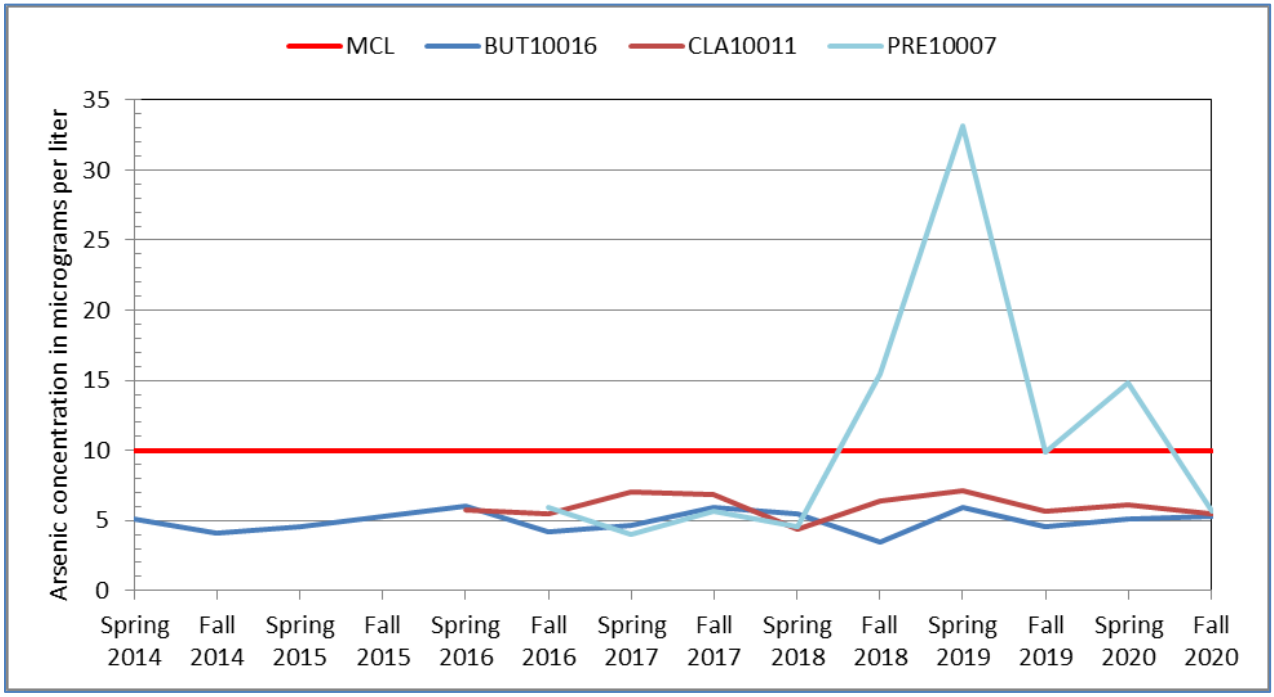


Figure 8 – Iron concentrations in monitoring wells

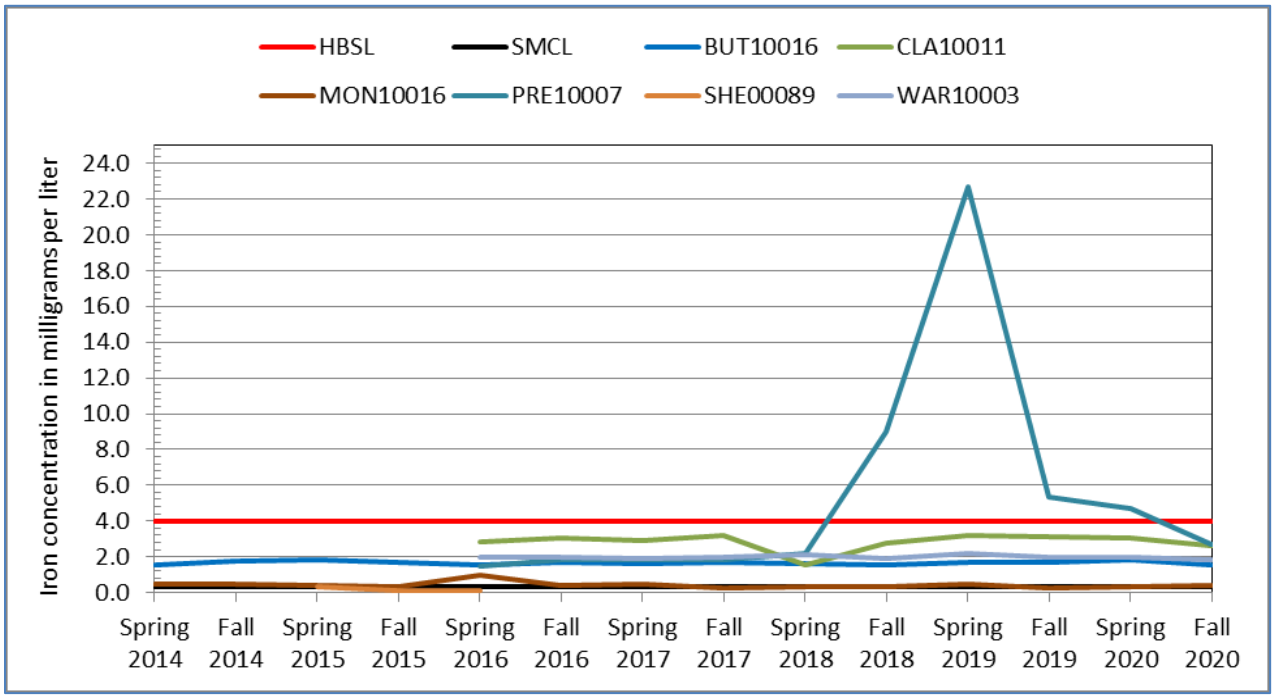
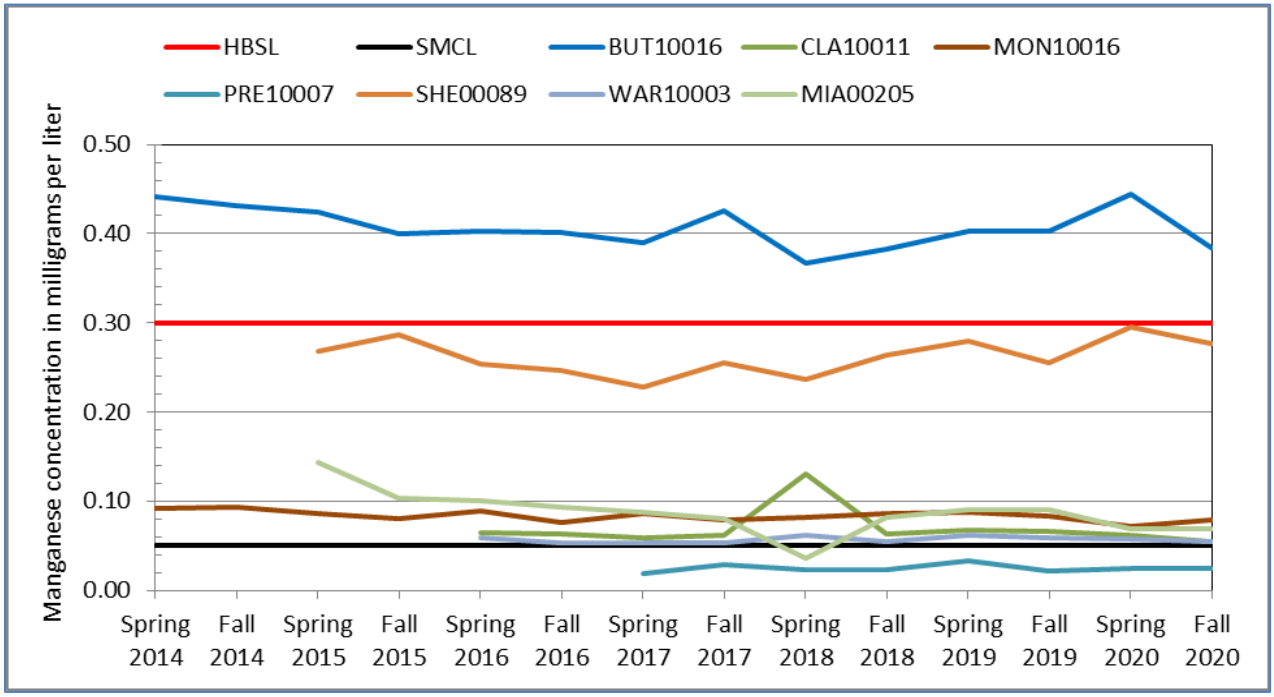


Figure 9 – Manganese concentrations in monitoring wells



Conclusions for 2020

The sample set of the groundwater monitoring program is insufficient in size and scope to characterize in detail the health of the entire buried valley aquifer system. Yet, the results can be used to better understand which contaminants are likely to impact groundwater quality in the buried valley aquifer in southwest Ohio. Furthermore, when the 2020 results are compared with previous rounds of sampling and other studies, some themes related to groundwater quality in the aquifer begin to emerge.

Contaminants originating from anthropogenic sources such as nitrate, chloride and sodium, VOCs, and artificial sweeteners are sometimes present in groundwater samples from sensitive aquifer settings such as shallow unconfined sand and gravel aquifers. This conclusion is supported by other studies which collected groundwater samples from shallow zones in the buried valley aquifer and found similar results (Ohio Environmental Protection Agency, 2015), (Rowe et al, 2004), and (Stuck, 2019a and 2019b).

Naturally occurring contaminants including arsenic and nuisance contaminants are also commonly present in groundwater samples collected from the buried valley aquifer system. This conclusion is supported by this study and other similar studies such as those mentioned above. Arsenic is a naturally occurring contaminant and may be present in groundwater at concentrations exceeding the MCL. Nuisance contaminants such as hardness, iron, and manganese are present in groundwater at concentrations exceeding secondary drinking water standards and in some cases health-based screening levels. Water softening as well as iron and manganese removal may be necessary to deliver the desired water quality.

These findings emphasize the importance of managing land use over the buried valley aquifer to preserve the quality of the water. They also highlight the interconnected nature of the Great Miami River and the underlying buried valley aquifer system. Anthropogenic constituents present in rivers and streams can also be found in buried valley aquifers. Proactive groundwater protection strategies are critical to ensure the quality of groundwater in our region.

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Appendix A

Spring 2020				Benchmark		Sample Sites			Sample Sites		
Parameter	**Units**	**Method**	**Report Limit**	**Type**	**Value**	**BUT10014**	**BUT10016**	**BUT10017**	**CLA10011**	**CLA10018**	**MIA00205**
Dissolved Oxygen	mg/L	YSI sonde		—	—	5.86	0.00	9.18	0.00	6.80	0.14
pH	S.U.	YSI sonde		SMCL	6.5 - 8.5	7.09	7.35	7.16	7.07	7.15	7.15
Specific Conductance	mS/cm	YSI sonde		—	—	752	474	527	609	597	530
Temperature	°C	YSI sonde		—	—	13.1	12.7	12.5	12.0	12.5	11.6
Ammonia	mg/L	EPA 350.1	0.10	—	—	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chloride	mg/L	SM 4500-CL-E	2	SMCL	250	**76.2**	14.0	14.9	26.2	**176.0**	18.0
Fluoride	mg/L	SM 4500 F-C	0.20	MCL	4	0.20	< 0.20	< 0.20	0.22	< 0.20	< 0.20
Nitrite Nitrogen as NO2-N	mg/L	SM 4500 NO3-F	0.10	MCL	1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Nitrogen, Nitrate-Nitrite	mg/L	SM 4500 NO3-F	0.50	MCL	10	1.8	< 0.50	**10.6**	< 0.50	**6.3**	**4.2**
Nitrogen, Total Kjeldahl	mg/L	EPA 351.2	0.50	—	—	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Silica	µg/L	EPA 200.7	100	—	—	9980	15600	12000	15800	10200	10800
Sulfate	mg/L	EPA 375.4 Modified	5.0	SMCL	250	43.4	53.1	19.6	73.3	12.3	26.1
Total Hardness	µg/L	EPA 200.7	2000	—	—	357000	332000	373000	438000	353000	376000
Total Orthophosphate	mg/L	EPA 365.1	0.10	—	—	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aluminum	µg/L	EPA 200.7	100	HBSL, SMCL	6000, 200	100	100	< 100	< 100	< 100	< 100
Antimony	µg/L	EPA 200.8	0.50	MCL	6	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Arsenic	µg/L	EPA 200.8	2.0	MCL	10	< 2.0	5.1	< 2.0	6.1	< 2.0	< 2.0
Barium	µg/L	EPA 200.7	5.0	MCL	2000	185	247	50.3	55.8	77.4	120
Beryllium	µg/L	EPA 200.7	0.5	MCL	4	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Boron	µg/L	EPA 200.7	200	HBSL	5000	< 200	< 200	< 200	< 200	< 200	< 200
Cadmium	µg/L	EPA 200.8	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Calcium	µg/L	EPA 200.7	500	—	—	96800	84900	100000	109000	83800	104000
Chromium, Hexavalent	mg/L	SM 3500 CR6 B	0.0040	HBSL	0.02	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040
Cobalt	µg/L	EPA 200.7	5.0	—	—	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Copper	µg/L	EPA 200.7	5.0	MCL	1300	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Iron	µg/L	EPA 200.7	100	SMCL	300	< 100	**1820**	< 100	**3070**	< 100	< 100
Lead	µg/L	EPA 200.8	0.50	MCL	15	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Lithium	µg/L	EPA 200.7	5.0	HBSL	10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Magnesium	µg/L	EPA 200.7	100	—	—	27900	29200	29800	40300	35000	28300
Manganese	µg/L	EPA 200.7	5.0	HBSL, SMCL	300, 50	< 5.0	**444**	< 5.0	**61.4**	< 5.0	**69.5**
Molybdenum	µg/L	EPA 200.7	10.0	HBSL	30	< 10.0	< 10.0	< 10.0	15.4	< 10.0	< 10.0
Nickel	µg/L	EPA 200.7	5.0	HBSL	10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	5.1
Phosphorus	µg/L	EPA 200.7	100	—	—	< 100	127	< 100	< 100	< 100	< 100
Potassium	µg/L	EPA 200.7	1000	—	—	3580	1420	2790	2790	2280	1280
Silver	µg/L	EPA 200.7	2.0	HBSL	100	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Sodium	µg/L	EPA 200.7	2000	—	—	**56600**	7800	10600	5870	9620	8780
Strontium	µg/L	EPA 200.7	5.0	HBSL	4000	585	475	198	333	2220	394
Thallium	µg/L	EPA 200.8	0.50	MCL	2	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Vanadium	µg/L	EPA 200.7	5.0	—	—	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Zinc	µg/L	EPA 200.7	15.0	HBSL	2000	< 15.0	< 15.0	< 15.0	< 15.0	< 15.0	< 15.0
Alkalinity, Total (As CaCO3)	mg/L	SM 2320B	5.0	—	—	346	252	276	317	300	296
Biochemical Oxygen Demand	mg/L	SM 5210B	2.0	—	—	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbonaceous Biological Oxyg	mg/L	EPA 405.1/SM 5210	2.0	—	—	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Chemical Oxygen Demand	mg/L	HACH 8000	5.0	—	—	< 2.0	< 2.0	< 5.0	< 5.0	< 5.0	18.8
Cyanide, Total	mg/L	EPA 335.4	0.010	MCL	0.2	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Phenolics, Total Recoverable	µg/L	EPA 420.4	20	—	—	< 20	< 20	< 20	< 20	< 20	< 20
Total Dissolved Solids	mg/L	SM 2540C	10.0	SMCL	500	**532**	344	350	394	318	388
Total Organic Carbon	mg/L	SM 5310C	1.0	—	—	< 1.0	< 1.0	< 1.0	1.3	< 1.0	< 1.0
E. coli	MPN/100 ml	Colilert	1.00	MCL	0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Appendix A

Spring 2020				Benchmark		Sample Sites			Sample Sites		
Parameter	**Units**	**Method**	**Report Limit**	**Type**	**Value**	**BUT10014**	**BUT10016**	**BUT10017**	**CLA10011**	**CLA10018**	**MIA00205**
2,4,5-T	µg/L	SW 8151	0.12	HBSL	70	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
2,4,5-TP (Silvex)	µg/L	SW 8151	0.12	MCL	50	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
2,4-D	µg/L	SW 8151	0.12	MCL	70	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
2,4-DB	µg/L	SW 8151	0.12	HHBP	210	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
4,4´-DDD	µg/L	SW 8081	0.050	HBSL	1	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4,4´-DDE	µg/L	SW 8081	0.050	HBSL	0.1	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4,4´-DDT	µg/L	SW 8081	0.050	HBSL	0.001	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Aldrin	µg/L	SW 8081	0.050	HBSL	0.002	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
alpha-BHC	µg/L	SW 8081	0.050	HBSL	0.006	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
alpha-Chlordane	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
beta-BHC	µg/L	SW 8081	0.050	HBSL	0.02	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Chlordane (Technical)	µg/L	SW 8081	0.50	MCL	2	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Dalapon	µg/L	SW 8151	0.25	MCL	200	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
delta-BHC	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Dicamba	µg/L	SW 8151	0.12	HBSL	3000	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
Dichloroprop	µg/L	SW 8151	0.12	HBSL	300	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
Dieldrin	µg/L	SW 8081	0.050	HBSL	0.002	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Dinoseb	µg/L	SW 8151	0.12	MCL	7	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
Endosulfan I	µg/L	SW 8081	0.050	HHBP	42	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Endosulfan II	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Endosulfan sulfate	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Endrin	µg/L	SW 8081	0.050	MCL	2	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Endrin aldehyde	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Endrin ketone	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
gamma-BHC	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
gamma-Chlordane	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Heptachlor	µg/L	SW 8081	0.050	MCL	0.4	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Heptachlor epoxide	µg/L	SW 8081	0.050	MCL	0.2	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MCPA	µg/L	SW 8151	0.25	HBSL	140	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
MCPP	µg/L	SW 8151	0.25	—	—	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Methoxychlor	µg/L	SW 8081	0.050	MCL	40	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Toxaphene	µg/L	SW 8081	0.50	MCL	3	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Radon	pCi/L	SM 7500-Rn-B	100.0	AMCL	4000	503	442	586	380	967	372
Uranium, Total	µg/L	ASTM D5174-97	2.00	MCL	30	0.899	0.128	0.318	0.463	0.474	2.31
1,2,4,5-Tetrachlorobenzene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/L	SW 8270C	1.0	MCL	70	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/L	SW 8270C	1.0	MCL	600	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Diphenylhydrazine	µg/L	SW 8270C	1.0	HBSL	0.04	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trinitrobenzene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/L	SW 8270C	1.0	HBSL	600	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/L	SW 8270C	1.0	MCL	75	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1-Methylnaphthalene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,3,4,6-Tetrachlorophenol	µg/L	SW 8270C	2.0	—	—	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
2,4,5-Trichlorophenol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4,6-Trichlorophenol	µg/L	SW 8270C	1.0	HBSL	2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dichlorophenol	µg/L	SW 8270C	1.0	HBSL	20	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dimethylphenol	µg/L	SW 8270C	1.0	HBSL	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dinitrophenol	µg/L	SW 8270C	2.0	HBSL	10	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0

Appendix A

Spring 2020				Benchmark		Sample Sites			Sample Sites		
Parameter	**Units**	**Method**	**Report Limit**	**Type**	**Value**	**BUT10014**	**BUT10016**	**BUT10017**	**CLA10011**	**CLA10018**	**MIA00205**
2,4-Dinitrotoluene	µg/L	SW 8270C	1.0	HBSL	0.05	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,6-Dichlorophenol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,6-Dinitrotoluene	µg/L	SW 8270C	1.0	HBSL	0.05	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chloronaphthalene	µg/L	SW 8270C	1.0	HBSL	600	< .10	< .10	< .10	< .10	< .10	< .10
2-Chlorophenol	µg/L	SW 8270C	1.0	HBSL	40	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Methylnaphthalene	µg/L	SW 8270C	0.20	HBSL	30	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
2-Methylphenol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Nitrophenol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
3 & 4-Methylphenol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4,6-Dinitro-2-methylphenol	µg/L	SW 8270C	2.0	—	—	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
4-Bromophenyl phenyl ether	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chloro-3-methylphenol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorophenyl phenyl ether	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Nitrophenol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Acenaphthene	µg/L	SW 8270C	0.20	HBSL	400	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Acenaphthylene	µg/L	SW 8270C	0.20	—	—	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Acetophenone	µg/L	SW 8270C	1.0	HBSL	700	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aniline	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Anthracene	µg/L	SW 8270C	1.0	HBSL	2000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benz(a)anthracene	µg/L	SW 8270C	0.20	—	—	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Benzidine	µg/L	SW 8270C	2.0	HBSL	0.0002	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Benzo(a)pyrene	µg/L	SW 8270C	0.20	MCL	0.2	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Benzo(b)fluoranthene	µg/L	SW 8270C	0.50	—	—	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Benzo(g,h,i)perylene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzo(k)fluoranthene	µg/L	SW 8270C	0.50	—	—	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Benzyl Alcohol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-chloroethoxy)methane	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
bis-(2-Chloroethyl)ether	µg/L	SW 8270C	1.0	HBSL	0.03	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)phthalate	µg/L	SW 8270C	5.0	MCL	6	< 5.0	< 5.0	**555**	< 5.0	< 5.0	< 5.0
Butyl benzyl phthalate	µg/L	SW 8270C	1.0	HBSL	1000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chrysene	µg/L	SW 8270C	0.20	—	—	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Dibenz(a,h)anthracene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibenzofuran	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Diethyl phthalate	µg/L	SW 8270C	1.0	HBSL	6000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dimethyl phthalate	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Di-n-butyl phthalate	µg/L	SW 8270C	1.0	HBSL	700	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Di-n-octyl phthalate	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Fluoranthene	µg/L	SW 8270C	0.20	HBSL	300	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Fluorene	µg/L	SW 8270C	0.20	HBSL	300	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Hexachlorobenzene	µg/L	SW 8270C	1.0	MCL	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/L	SW 8270C	1.0	HBSL	0.9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorocyclopentadiene	µg/L	SW 8270C	1.0	MCL	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachloroethane	µg/L	SW 8270C	1.0	HBSL	0.9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachloropropene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Indeno(1,2,3-cd)pyrene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isophorone	µg/L	SW 8270C	1.0	HBSL	60	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Naphthalene	µg/L	SW 8270C	0.20	HBSL	100	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Nitrobenzene	µg/L	SW 8270C	1.0	HBSL	10	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Appendix A

Spring 2020				Benchmark		Sample Sites			Sample Sites		
Parameter	**Units**	**Method**	**Report Limit**	**Type**	**Value**	**BUT10014**	**BUT10016**	**BUT10017**	**CLA10011**	**CLA10018**	**MIA00205**
N-Nitrosodimethylamine	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Nitroso-di-n-butylamine	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Nitrosodi-n-propylamine	µg/L	SW 8270C	1.0	HBSL	0.005	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Nitrosodiphenylamine	µg/L	SW 8270C	1.0	HBSL	7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Pentachlorobenzene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Pentachloronitrobenzene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Pentachlorophenol	µg/L	SW 8270C	1.00	MCL	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Phenanthrene	µg/L	SW 8270C	0.20	—	—	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Phenol	µg/L	SW 8270C	1.0	HBSL	2000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Pyrene	µg/L	SW 8270C	0.20	HBSL	200	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Pyridine	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/L	SW 8260B	1.0	HBSL	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/L	SW 8260B	1.0	MCL	200	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/L	SW 8260B	1.0	HBSL	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	µg/L	SW 8260B	1.0	MCL	7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	µg/L	SW 8260B	1.0	HBSL	30	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/L	SW 8260B	1.0	MCL	70	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/L	SW 8260B	5.0	MCL	0.2	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
1,2-Dibromoethane	µg/L	SW 8260B	1.0	MCL	0.05	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/L	SW 8260B	1.0	MCL	600	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/L	SW 8260B	1.0	HBSL	600	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/L	SW 8260B	1.0	MCL	75	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone	µg/L	SW 8260B	10.0	—	—	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
2-Chlorotoluene	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Hexanone	µg/L	SW 8260B	10.0	HBSL	40	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
4-Chlorotoluene	µg/L	SW 8260B	1.0	HBSL	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Methyl-2-pentanone	µg/L	SW 8260B	10.0	—	—	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
Acetone	µg/L	SW 8260B	10.0	HBSL	6000	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
Acetonitrile	µg/L	SW 8260B	10.0	—	—	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
Benzene	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	µg/L	SW 8260B	1.0	HBSL	60	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromochloromethane	µg/L	SW 8260B	1.0	HBSL	90	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/L	SW 8260B	1.0	MCL	80	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	µg/L	SW 8260B	1.0	MCL	80	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	µg/L	SW 8260B	1.0	HHBP	140	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Carbon Disulfide	µg/L	SW 8260B	1.0	HBSL	700	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Carbon Tetrachloride	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/L	SW 8260B	1.0	MCL	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	µg/L	SW 8260B	1.0	MCL	80	**1.3**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Appendix A

Spring 2020				Benchmark		Sample Sites			Sample Sites		
Parameter	**Units**	**Method**	**Report Limit**	**Type**	**Value**	**BUT10014**	**BUT10016**	**BUT10017**	**CLA10011**	**CLA10018**	**MIA00205**
Chloromethane	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	µg/L	SW 8260B	1.0	MCL	70	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene	µg/L	SW 8260B	1.0	HBSL	0.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/L	SW 8260B	1.0	MCL	80	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dichlorodifluoromethane	µg/L	SW 8260B	1.0	HBSL	1000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethyl acetate	µg/L	SW 8260B	1.0			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/L	SW 8260B	1.0	MCL	700	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/L	SW 8260B	1.0	HBSL	0.9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m,p-Xylene	µg/L	SW 8260B	1.0	MCL	10000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl tert-Butyl Ether	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Naphthalene	µg/L	SW 8260B	1.0	HBSL	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	µg/L	SW 8260B	1.0	MCL	10000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p-Isopropyltoluene	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	µg/L	SW 8260B	1.0	MCL	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/L	SW 8260B	1.0	MCL	1000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene	µg/L	SW 8260B	1.0	MCL	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene	µg/L	SW 8260B	1.0	HBSL	0.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/L	SW 8260B	1.0	MCL	5	**1.6**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/L	SW 8260B	1.0	HBSL	2000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl acetate	µg/L	SW 8260B	5.0	—	—	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride	µg/L	SW 8260B	1.0	MCL	2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene (Total)	µg/L	SW 8260B	1.0	MCL	10000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dioxane	µg/L	EPA 522	0.07	HBSL	0.35	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07
Acesulfame-K	µg/L	L221	0.01	—	—	**0.07**	< 0.01	**0.07**	< 0.01	< 0.01	< 0.01
Bezafibrate	µg/L	L221	0.0005	—	—	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Chloramphenicol	µg/L	L221	0.005	—	—	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Chlorotetracycline	µg/L	L221	0.05	—	—	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Clofibric acid	µg/L	L221	0.0005	—	—	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Diclofenac	µg/L	L221	0.0005	—	—	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dilantin	µg/L	L221	0.002	—	—	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Gemfibrozil	µg/L	L221	0.0005	—	—	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Ibuprofen	µg/L	L221	0.05	—	—	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Levothyroxine (Synthroid)	µg/L	L221	0.002	—	—	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Naproxen	µg/L	L221	0.002	—	—	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Penicillin G	µg/L	L221	0.002	—	—	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Penicillin V	µg/L	L221	0.002	—	—	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Prednisone	µg/L	L221	0.002	—	—	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Salicylic Acid	µg/L	L221	0.05	—	—	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Sucralose	µg/L	L221	0.025	—	—	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025	< 0.025
Theophylline	µg/L	L221	0.005	—	—	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Triclocarban	µg/L	L221	0.0005	—	—	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Triclosan	µg/L	L221	0.05	HHBP	2000	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Appendix A

Spring 2020				Benchmark		Sample Sites			Sample Sites		
Parameter	**Units**	**Method**	**Report Limit**	**Type**	**Value**	**MON00022**	**MON10016**	**PRE10007**	**SHE00089**	**WAR10003**	**WAR10004**
Dissolved Oxygen	mg/L	YSI sonde		—	—	0.00	0.21	0.86	0.00	0.00	3.29
pH	S.U.	YSI sonde		SMCL	6.5 - 8.5	6.97	8.81	7.21	7.16	7.29	7.37
Specific Conductance	mS/cm	YSI sonde		—	—	625	635	577	539	841	497
Temperature	°C	YSI sonde		—	—	13.8	12,4	12.9	12.3	14.4	14.1
Ammonia	mg/L	EPA 350.1	0.10	—	—	< 0.10	< 0.10	< 0.10	< 0.10	0.20	< 0.10
Chloride	mg/L	SM 4500-CL-E	2	SMCL	250	14.9	**76.2**	25.4	7.1	**109.0**	38.2
Fluoride	mg/L	SM 4500 F-C	0.20	MCL	4	< 0.20	< 0.20	0.21	0.34	0.21	0.20
Nitrite Nitrogen as NO2-N	mg/L	SM 4500 NO3-F	0.10	MCL	1	<0.10	<0.10	<0.10	<0.10	<0.10	< 0.10
Nitrogen, Nitrate-Nitrite	mg/L	SM 4500 NO3-F	0.50	MCL	10	<0.50	<0.50	<0.50	<0.50	<0.50	2.7
Nitrogen, Total Kjeldahl	mg/L	EPA 351.2	0.50	—	—	<0.50	<0.50	<0.50	<0.50	<0.50	< 0.50
Silica	µg/L	EPA 200.7	100	—	—	9630	9310	13500	12900	14000	8700
Sulfate	mg/L	EPA 375.4 Modified	5.0	SMCL	250	51.2	32.1	50.6	39.3	80.1	25.3
Total Hardness	µg/L	EPA 200.7	2000	—	—	415000	300000	378000	400000	416000	261000
Total Orthophosphate	mg/L	EPA 365.1	0.10	—	—	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Aluminum	µg/L	EPA 200.7	100	HBSL, SMCL	6000, 200	<100	<100	<100	<100	<100	<100
Antimony	µg/L	EPA 200.8	0.50	MCL	6	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Arsenic	µg/L	EPA 200.8	2.0	MCL	10	< 2.0	< 2.0	**14.8**	< 2.0	< 2.0	< 2.0
Barium	µg/L	EPA 200.7	5.0	MCL	2000	78.2	97.4	224	158	192	58.6
Beryllium	µg/L	EPA 200.7	0.5	MCL	4	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Boron	µg/L	EPA 200.7	200	HBSL	5000	< 200	< 200	< 200	< 200	212	< 200
Cadmium	µg/L	EPA 200.8	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Calcium	µg/L	EPA 200.7	500	—	—	116000	78100	90600	97400	100000	58600
Chromium, Hexavalent	mg/L	SM 3500 CR6 B	0.0040	HBSL	0.02	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040
Cobalt	µg/L	EPA 200.7	5.0	—	—	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Copper	µg/L	EPA 200.7	5.0	MCL	1300	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Iron	µg/L	EPA 200.7	100	SMCL	300	< 100	**310**	**4690**	< 100	**1980**	< 100
Lead	µg/L	EPA 200.8	0.50	MCL	15	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Lithium	µg/L	EPA 200.7	5.0	HBSL	10	6.5	< 5.0	< 5.0	< 5.0	5.5	< 5.0
Magnesium	µg/L	EPA 200.7	100	—	—	30600	25500	36800	38100	40300	27900
Manganese	µg/L	EPA 200.7	5.0	HBSL, SMCL	300, 50	7.3	**71.7**	25.4	**295**	**57.9**	< 5.0
Molybdenum	µg/L	EPA 200.7	10.0	HBSL	30	< 10.0	22.8	< 10.0	10.8	19.5	10.8
Nickel	µg/L	EPA 200.7	5.0	HBSL	10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Phosphorus	µg/L	EPA 200.7	100	—	—	< 100	< 100	< 100	< 100	< 100	< 100
Potassium	µg/L	EPA 200.7	1000	—	—	3820	2600	1930	1320	2460	2460
Silver	µg/L	EPA 200.7	2.0	HBSL	100	<2.0	< 2.0	<2.0	< 2.0	< 2.0	< 2.0
Sodium	µg/L	EPA 200.7	2000	—	—	11400	**51500**	14800	10900	**46400**	23800
Strontium	µg/L	EPA 200.7	5.0	HBSL	4000	351	433	1240	612	1040	434
Thallium	µg/L	EPA 200.8	0.50	MCL	2	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Vanadium	µg/L	EPA 200.7	5.0	—	—	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Zinc	µg/L	EPA 200.7	15.0	HBSL	2000	< 15.0	< 15.0	< 15.0	< 15.0	< 15.0	< 15.0
Alkalinity, Total (As CaCO3)	mg/L	SM 2320B	5.0	—	—	350	288	311	317	307	221
Biochemical Oxygen Demand	mg/L	SM 5210B	2.0	—	—	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbonaceous Biological Oxyg	mg/L	EPA 405.1/SM 5210	2.0	—	—	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Chemical Oxygen Demand	mg/L	HACH 8000	5.0	—	—	134	< 5.0	50.1	75.5	15.1	9.3
Cyanide, Total	mg/L	EPA 335.4	0.010	MCL	0.2	< 0.010	< 0.010	< 0.010	< 0.10	< 0.10	< 0.10
Phenolics, Total Recoverable	µg/L	EPA 420.4	20	—	—	< 20	< 20	< 20	< 20	< 20	< 20
Total Dissolved Solids	mg/L	SM 2540C	10.0	SMCL	500	398	384	408	382	**540**	308
Total Organic Carbon	mg/L	SM 5310C	1.0	—	—	2.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
E. coli	MPN/100 ml	Colilert	1.00	MCL	0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Appendix A

Spring 2020				Benchmark		Sample Sites			Sample Sites		
Parameter	**Units**	**Method**	**Report Limit**	**Type**	**Value**	**MON00022**	**MON10016**	**PRE10007**	**SHE00089**	**WAR10003**	**WAR10004**
2,4,5-T	µg/L	SW 8151	0.12	HBSL	70	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
2,4,5-TP (Silvex)	µg/L	SW 8151	0.12	MCL	50	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
2,4-D	µg/L	SW 8151	0.12	MCL	70	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
2,4-DB	µg/L	SW 8151	0.12	HHBP	210	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
4,4´-DDD	µg/L	SW 8081	0.050	HBSL	1	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4,4´-DDE	µg/L	SW 8081	0.050	HBSL	0.1	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4,4´-DDT	µg/L	SW 8081	0.050	HBSL	0.001	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Aldrin	µg/L	SW 8081	0.050	HBSL	0.002	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
alpha-BHC	µg/L	SW 8081	0.050	HBSL	0.006	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
alpha-Chlordane	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
beta-BHC	µg/L	SW 8081	0.050	HBSL	0.02	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Chlordane (Technical)	µg/L	SW 8081	0.50	MCL	2	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Dalapon	µg/L	SW 8151	0.25	MCL	200	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
delta-BHC	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Dicamba	µg/L	SW 8151	0.12	HBSL	3000	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
Dichloroprop	µg/L	SW 8151	0.12	HBSL	300	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
Dieldrin	µg/L	SW 8081	0.050	HBSL	0.002	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Dinoseb	µg/L	SW 8151	0.12	MCL	7	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
Endosulfan I	µg/L	SW 8081	0.050	HHBP	42	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Endosulfan II	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Endosulfan sulfate	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Endrin	µg/L	SW 8081	0.050	MCL	2	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Endrin aldehyde	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Endrin ketone	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
gamma-BHC	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
gamma-Chlordane	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Heptachlor	µg/L	SW 8081	0.050	MCL	0.4	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Heptachlor epoxide	µg/L	SW 8081	0.050	MCL	0.2	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MCPA	µg/L	SW 8151	0.25	HBSL	140	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
MCPP	µg/L	SW 8151	0.25	—	—	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Methoxychlor	µg/L	SW 8081	0.050	MCL	40	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Toxaphene	µg/L	SW 8081	0.50	MCL	3	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Radon	pCi/L	SM 7500-Rn-B	100.0	AMCL	4000	631	163	101	366	198.7	416.9
Uranium, Total	µg/L	ASTM D5174-97	2.00	MCL	30	1.39	1.22	0.785	1.21	0.567	0.622
1,2,4,5-Tetrachlorobenzene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/L	SW 8270C	1.0	MCL	70	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/L	SW 8270C	1.0	MCL	600	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Diphenylhydrazine	µg/L	SW 8270C	1.0	HBSL	0.04	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trinitrobenzene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/L	SW 8270C	1.0	HBSL	600	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/L	SW 8270C	1.0	MCL	75	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1-Methylnaphthalene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,3,4,6-Tetrachlorophenol	µg/L	SW 8270C	2.0	—	—	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
2,4,5-Trichlorophenol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4,6-Trichlorophenol	µg/L	SW 8270C	1.0	HBSL	2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dichlorophenol	µg/L	SW 8270C	1.0	HBSL	20	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dimethylphenol	µg/L	SW 8270C	1.0	HBSL	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dinitrophenol	µg/L	SW 8270C	2.0	HBSL	10	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0

Appendix A

Spring 2020				Benchmark		Sample Sites			Sample Sites		
Parameter	**Units**	**Method**	**Report Limit**	**Type**	**Value**	**MON00022**	**MON10016**	**PRE10007**	**SHE00089**	**WAR10003**	**WAR10004**
2,4-Dinitrotoluene	µg/L	SW 8270C	1.0	HBSL	0.05	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,6-Dichlorophenol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,6-Dinitrotoluene	µg/L	SW 8270C	1.0	HBSL	0.05	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chloronaphthalene	µg/L	SW 8270C	1.0	HBSL	600	< .10	< .10	< .10	< .10	< .10	< .10
2-Chlorophenol	µg/L	SW 8270C	1.0	HBSL	40	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Methylnaphthalene	µg/L	SW 8270C	0.20	HBSL	30	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
2-Methylphenol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Nitrophenol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
3 & 4-Methylphenol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4,6-Dinitro-2-methylphenol	µg/L	SW 8270C	2.0	—	—	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
4-Bromophenyl phenyl ether	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chloro-3-methylphenol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorophenyl phenyl ether	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Nitrophenol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Acenaphthene	µg/L	SW 8270C	0.20	HBSL	400	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Acenaphthylene	µg/L	SW 8270C	0.20	—	—	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Acetophenone	µg/L	SW 8270C	1.0	HBSL	700	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aniline	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Anthracene	µg/L	SW 8270C	1.0	HBSL	2000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benz(a)anthracene	µg/L	SW 8270C	0.20	—	—	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Benzidine	µg/L	SW 8270C	2.0	HBSL	0.0002	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Benzo(a)pyrene	µg/L	SW 8270C	0.20	MCL	0.2	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Benzo(b)fluoranthene	µg/L	SW 8270C	0.50	—	—	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Benzo(g,h,i)perylene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzo(k)fluoranthene	µg/L	SW 8270C	0.50	—	—	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Benzyl Alcohol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-chloroethoxy)methane	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
bis-(2-Chloroethyl)ether	µg/L	SW 8270C	1.0	HBSL	0.03	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)phthalate	µg/L	SW 8270C	5.0	MCL	6	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	**6.3**
Butyl benzyl phthalate	µg/L	SW 8270C	1.0	HBSL	1000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chrysene	µg/L	SW 8270C	0.20	—	—	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Dibenz(a,h)anthracene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibenzofuran	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Diethyl phthalate	µg/L	SW 8270C	1.0	HBSL	6000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dimethyl phthalate	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Di-n-butyl phthalate	µg/L	SW 8270C	1.0	HBSL	700	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Di-n-octyl phthalate	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Fluoranthene	µg/L	SW 8270C	0.20	HBSL	300	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Fluorene	µg/L	SW 8270C	0.20	HBSL	300	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Hexachlorobenzene	µg/L	SW 8270C	1.0	MCL	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/L	SW 8270C	1.0	HBSL	0.9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorocyclopentadiene	µg/L	SW 8270C	1.0	MCL	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachloroethane	µg/L	SW 8270C	1.0	HBSL	0.9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachloropropene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Indeno(1,2,3-cd)pyrene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isophorone	µg/L	SW 8270C	1.0	HBSL	60	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Naphthalene	µg/L	SW 8270C	0.20	HBSL	100	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Nitrobenzene	µg/L	SW 8270C	1.0	HBSL	10	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Appendix A

Spring 2020				Benchmark		Sample Sites			Sample Sites		
Parameter	**Units**	**Method**	**Report Limit**	**Type**	**Value**	**MON00022**	**MON10016**	**PRE10007**	**SHE00089**	**WAR10003**	**WAR10004**
N-Nitrosodimethylamine	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Nitroso-di-n-butylamine	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Nitrosodi-n-propylamine	µg/L	SW 8270C	1.0	HBSL	0.005	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Nitrosodiphenylamine	µg/L	SW 8270C	1.0	HBSL	7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Pentachlorobenzene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Pentachloronitrobenzene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Pentachlorophenol	µg/L	SW 8270C	1.00	MCL	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Phenanthrene	µg/L	SW 8270C	0.20	—	—	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Phenol	µg/L	SW 8270C	1.0	HBSL	2000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Pyrene	µg/L	SW 8270C	0.20	HBSL	200	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Pyridine	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/L	SW 8260B	1.0	HBSL	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/L	SW 8260B	1.0	MCL	200	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/L	SW 8260B	1.0	HBSL	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	µg/L	SW 8260B	1.0	MCL	7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	µg/L	SW 8260B	1.0	HBSL	30	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/L	SW 8260B	1.0	MCL	70	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/L	SW 8260B	5.0	MCL	0.2	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
1,2-Dibromoethane	µg/L	SW 8260B	1.0	MCL	0.05	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/L	SW 8260B	1.0	MCL	600	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/L	SW 8260B	1.0	HBSL	600	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/L	SW 8260B	1.0	MCL	75	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone	µg/L	SW 8260B	10.0	—	—	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
2-Chlorotoluene	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Hexanone	µg/L	SW 8260B	10.0	HBSL	40	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
4-Chlorotoluene	µg/L	SW 8260B	1.0	HBSL	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Methyl-2-pentanone	µg/L	SW 8260B	10.0	—	—	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
Acetone	µg/L	SW 8260B	10.0	HBSL	6000	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
Acetonitrile	µg/L	SW 8260B	10.0	—	—	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
Benzene	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	µg/L	SW 8260B	1.0	HBSL	60	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromochloromethane	µg/L	SW 8260B	1.0	HBSL	90	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/L	SW 8260B	1.0	MCL	80	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	µg/L	SW 8260B	1.0	MCL	80	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	µg/L	SW 8260B	1.0	HHBP	140	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Carbon Disulfide	µg/L	SW 8260B	1.0	HBSL	700	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Carbon Tetrachloride	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/L	SW 8260B	1.0	MCL	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	µg/L	SW 8260B	1.0	MCL	80	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Appendix A

Spring 2020				Benchmark		Sample Sites			Sample Sites		
Parameter	**Units**	**Method**	**Report Limit**	**Type**	**Value**	**MON00022**	**MON10016**	**PRE10007**	**SHE00089**	**WAR10003**	**WAR10004**
Chloromethane	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	µg/L	SW 8260B	1.0	MCL	70	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene	µg/L	SW 8260B	1.0	HBSL	0.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/L	SW 8260B	1.0	MCL	80	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dichlorodifluoromethane	µg/L	SW 8260B	1.0	HBSL	1000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethyl acetate	µg/L	SW 8260B	1.0			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/L	SW 8260B	1.0	MCL	700	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/L	SW 8260B	1.0	HBSL	0.9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m,p-Xylene	µg/L	SW 8260B	1.0	MCL	10000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl tert-Butyl Ether	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Naphthalene	µg/L	SW 8260B	1.0	HBSL	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	µg/L	SW 8260B	1.0	MCL	10000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p-Isopropyltoluene	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	µg/L	SW 8260B	1.0	MCL	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/L	SW 8260B	1.0	MCL	1000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene	µg/L	SW 8260B	1.0	MCL	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene	µg/L	SW 8260B	1.0	HBSL	0.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/L	SW 8260B	1.0	HBSL	2000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl acetate	µg/L	SW 8260B	5.0	—	—	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride	µg/L	SW 8260B	1.0	MCL	2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene (Total)	µg/L	SW 8260B	1.0	MCL	10000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dioxane	µg/L	EPA 522	0.07	HBSL	0.35	< 0.07	< 0.07	< 0.07	< 0.07	**0.60**	< 0.07
Acesulfame-K	µg/L	L221	0.01	—	—	**0.06**	**0.06**	**0.02**	< 0.01	**0.16**	**0.03**
Bezafibrate	µg/L	L221	0.0005	—	—	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Chloramphenicol	µg/L	L221	0.005	—	—	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Chlorotetracycline	µg/L	L221	0.05	—	—	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Clofibric acid	µg/L	L221	0.0005	—	—	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Diclofenac	µg/L	L221	0.0005	—	—	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dilantin	µg/L	L221	0.002	—	—	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Gemfibrozil	µg/L	L221	0.0005	—	—	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Ibuprofen	µg/L	L221	0.05	—	—	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Levothyroxine (Synthroid)	µg/L	L221	0.002	—	—	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Naproxen	µg/L	L221	0.002	—	—	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Penicillin G	µg/L	L221	0.002	—	—	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Penicillin V	µg/L	L221	0.002	—	—	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Prednisone	µg/L	L221	0.002	—	—	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Salicylic Acid	µg/L	L221	0.05	—	—	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Sucralose	µg/L	L221	0.025	—	—	**0.031**	**0.041**	< 0.025	< 0.025	< 0.025	< 0.025
Theophylline	µg/L	L221	0.005	—	—	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Triclocarban	µg/L	L221	0.0005	—	—	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Triclosan	µg/L	L221	0.05	HHBP	2000	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Appendix A

Fall 2020				Benchmark		Sample Sites			Sample Sites		
Parameter	**Units**	**Method**	**Report Limit**	**Type**	**Value**	**BUT10014**	**BUT10016**	**BUT10017**	**CLA10011**	**CLA10018**	**MIA00205**
Dissolved Oxygen	mg/L	YSI sonde		—	—	4.88	0.00	8.50	0.00	5.44	0.00
pH	S.U.	YSI sonde		SMCL	6.5 - 8.5	6.90	7.19	6.98	7.10	7.16	7.21
Specific Conductance	mS/cm	YSI sonde		—	—	932	586	690	760	637	669
Temperature	°C	YSI sonde		—	—	13.7	12.5	12.5	12.2	16.5	12.7
Ammonia	mg/L	EPA 350.1	0.10	—	—	< 0.10	0.13	< 0.10	< 0.10	< 0.10	< 0.10
Chloride	mg/L	SM 4500-CL-E	2	SMCL	250	**73.6**	15.0	32.2	28.2	17.7	19.9
Fluoride	mg/L	SM 4500 F-C	0.20	MCL	4	0.21	0.23	< 0.20	0.24	0.24	< 0.20
Nitrite Nitrogen as NO2-N	mg/L	SM 4500 NO3-F	0.10	MCL	1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Nitrogen, Nitrate-Nitrite	mg/L	SM 4500 NO3-F	0.50	MCL	10	2.5	< 0.50	**8.1**	< 0.10	**7.2**	**4.6**
Nitrogen, Total Kjeldahl	mg/L	EPA 351.2	0.50	—	—	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Silica	µg/L	EPA 200.7	100	—	—	11100	13500	9890	14200	9170	21700
Sulfate	mg/L	EPA 375.4 Modified	5.0	SMCL	250	50.0	53.9	17.5	69.8	11.7	26.3
Total Hardness	µg/L	EPA 200.7	2000	—	—	398000	296000	316000	371000	284000	359000
Total Orthophosphate	mg/L	EPA 365.1	0.10	—	—	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aluminum	µg/L	EPA 200.7	100	HBSL, SMCL	6000, 200	< 100	< 100	< 100	< 100	< 100	< 100
Antimony	µg/L	EPA 200.8	0.50	MCL	6	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Arsenic	µg/L	EPA 200.8	2.0	MCL	10	< 2.0	5.3	< 2.0	5.5	< 2.0	< 2.0
Barium	µg/L	EPA 200.7	5.0	MCL	2000	223	233	48.8	51.1	73.2	127
Beryllium	µg/L	EPA 200.7	0.5	MCL	4	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Boron	µg/L	EPA 200.7	200	HBSL	5000	< 200	< 200	< 200	< 200	< 200	< 200
Cadmium	µg/L	EPA 200.8	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Calcium	µg/L	EPA 200.7	500	—	—	110000	76200	85500	94200	69100	99800
Chromium, Hexavalent	mg/L	SM 3500 CR6 B	0.0040	HBSL	0.02	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040
Cobalt	µg/L	EPA 200.7	5.0	—	—	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Copper	µg/L	EPA 200.7	5.0	MCL	1300	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Iron	µg/L	EPA 200.7	100	SMCL	300	< 100	**1560**	< 100	**2640**	< 100	< 100
Lead	µg/L	EPA 200.8	0.50	MCL	15	< 0.50	< 0.50	0.79	< 0.50	< 0.50	< 0.50
Lithium	µg/L	EPA 200.7	5.0	—	—	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Magnesium	µg/L	EPA 200.7	100	—	—	30000	25600	25000	32900	27100	26600
Manganese	µg/L	EPA 200.7	5.0	HBSL, SMCL	300, 50	< 5.0	**384**	< 5.0	**55.3**	< 5.0	**68.6**
Molybdenum	µg/L	EPA 200.7	10.0	HBSL	30	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	20.2
Nickel	µg/L	EPA 200.7	5.0	HBSL	10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Phosphorus	µg/L	EPA 200.7	100	—	—	< 100	107	< 100	< 100	< 100	< 100
Potassium	µg/L	EPA 200.7	1000	—	—	4550	1390	2970	< 1000	2420	1450
Silver	µg/L	EPA 200.7	2.0	HBSL	100	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Sodium	µg/L	EPA 200.7	2000	—	—	**59000**	6920	16800	4670	7360	9400
Strontium	µg/L	EPA 200.7	5.0	HBSL	4000	663	423	169	292	1960	375
Thallium	µg/L	EPA 200.8	0.50	MCL	2	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Vanadium	µg/L	EPA 200.7	5.0	—	—	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Zinc	µg/L	EPA 200.7	15.0	HBSL	2000	< 15.0	< 15.0	< 15.0	< 15.0	< 15.0	< 15.0
Alkalinity, Total (As CaCO3)	mg/L	SM 2320B	5.0	—	—	324	232	272	302	285	297
Biochemical Oxygen Demand	mg/L	SM 5210B	2.0	—	—	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbonaceous Biological Oxyg	mg/L	EPA 405.1/SM 5210	2.0	—	—	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Chemical Oxygen Demand	mg/L	HACH 8000	5.0	—	—	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
Cyanide, Total	mg/L	EPA 335.4	0.010	MCL	0.2	< 0.010	< 0.010	**0.78**	< 0.010	< 0.010	< 0.010
Phenolics, Total Recoverable	µg/L	EPA 420.4	20	—	—	2.2	< 2.0	< 2.0	< 2.0	3.0	4.5
Total Dissolved Solids	mg/L	SM 2540C	10.0	SMCL	500	**726**	404	412	408	366	356
Total Organic Carbon	mg/L	SM 5310C	0.500	—	—	0.659	0.519	0.658	1.070	0.632	1.280
E. coli	MPN/100 ml	Colilert	1.00	MCL	0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Appendix A

Fall 2020				Benchmark		Sample Sites			Sample Sites		
Parameter	**Units**	**Method**	**Report Limit**	**Type**	**Value**	**BUT10014**	**BUT10016**	**BUT10017**	**CLA10011**	**CLA10018**	**MIA00205**
2,4,5-T	µg/L	SW 8151	0.12	HBSL	70	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
2,4,5-TP (Silvex)	µg/L	SW 8151	0.12	MCL	50	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
2,4-D	µg/L	SW 8151	0.12	MCL	70	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
2,4-DB	µg/L	SW 8151	0.12	HHBP	210	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
4,4´-DDD	µg/L	SW 8081	0.050	HBSL	1	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4,4´-DDE	µg/L	SW 8081	0.050	HBSL	0.1	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4,4´-DDT	µg/L	SW 8081	0.050	HBSL	0.001	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Aldrin	µg/L	SW 8081	0.05	HBSL	0.002	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
alpha-BHC	µg/L	SW 8081	0.050	HBSL	0.006	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
alpha-Chlordane	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
beta-BHC	µg/L	SW 8081	0.050	HBSL	0.02	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Chlordane (Technical)	µg/L	SW 8081	0.50	MCL	2	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Dalapon	µg/L	SW 8151	0.25	MCL	200	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
delta-BHC	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Dicamba	µg/L	SW 8151	0.12	HBSL	3000	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
Dichloroprop	µg/L	SW 8151	0.12	HBSL	300	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
Dieldrin	µg/L	SW 8081	0.050	HBSL	0.002	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Dinoseb	µg/L	SW 8151	0.12	MCL	7	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
Endosulfan I	µg/L	SW 8081	0.050	HHBP	42	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Endosulfan II	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Endosulfan sulfate	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Endrin	µg/L	SW 8081	0.050	MCL	2	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Endrin aldehyde	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Endrin ketone	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
gamma-BHC	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
gamma-Chlordane	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Heptachlor	µg/L	SW 8081	0.050	MCL	0.4	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Heptachlor epoxide	µg/L	SW 8081	0.050	MCL	0.2	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MCPA	µg/L	SW 8151	25.0	HBSL	140	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
MCPP	µg/L	SW 8151	25.0	—	—	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
Methoxychlor	µg/L	SW 8081	0.050	MCL	40	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Toxaphene	µg/L	SW 8081	1.7	MCL	3	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Radon	pCi/L	SM 7500-Rn-B	100.0	AMCL	4000	433.2	533.0	397.1	219.4	442	145
Uranium, Total	µg/L	ASTM D5174-97	0.010	MCL	30	0.846	0.181	0.323	0.360	0.562	2.24
1,2,4,5-Tetrachlorobenzene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/L	SW 8270C	1.0	MCL	70	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/L	SW 8270C	1.0	MCL	600	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Diphenylhydrazine	µg/L	SW 8270C	1.0	HBSL	0.04	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trinitrobenzene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/L	SW 8270C	1.0	HBSL	600	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/L	SW 8270C	1.0	MCL	75	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1-Methylnaphthalene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,3,4,6-Tetrachlorophenol	µg/L	SW 8270C	2.0	—	—	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
2,4,5-Trichlorophenol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4,6-Trichlorophenol	µg/L	SW 8270C	1.0	HBSL	2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dichlorophenol	µg/L	SW 8270C	1.0	HBSL	20	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dimethylphenol	µg/L	SW 8270C	1.0	HBSL	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dinitrophenol	µg/L	SW 8270C	2.0	HBSL	10	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0

Appendix A

Fall 2020				Benchmark		Sample Sites			Sample Sites		
Parameter	**Units**	**Method**	**Report Limit**	**Type**	**Value**	**BUT10014**	**BUT10016**	**BUT10017**	**CLA10011**	**CLA10018**	**MIA00205**
2,4-Dinitrotoluene	µg/L	SW 8270C	1.0	HBSL	0.05	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,6-Dichlorophenol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,6-Dinitrotoluene	µg/L	SW 8270C	1.0	HBSL	0.05	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chloronaphthalene	µg/L	SW 8270C	1.0	HBSL	600	< .10	< .10	< .10	< .10	< .10	< .10
2-Chlorophenol	µg/L	SW 8270C	1.0	HBSL	40	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Methylnaphthalene	µg/L	SW 8270C	0.20	HBSL	30	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
2-Methylphenol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Nitrophenol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
3 & 4-Methylphenol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4,6-Dinitro-2-methylphenol	µg/L	SW 8270C	2.0	—	—	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
4-Bromophenyl phenyl ether	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chloro-3-methylphenol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorophenyl phenyl ether	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Nitrophenol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Acenaphthene	µg/L	SW 8270C	0.20	HBSL	400	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Acenaphthylene	µg/L	SW 8270C	0.20	—	—	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Acetophenone	µg/L	SW 8270C	1.0	HBSL	700	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aniline	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Anthracene	µg/L	SW 8270C	1.0	HBSL	2000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benz(a)anthracene	µg/L	SW 8270C	0.20	—	—	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Benzidine	µg/L	SW 8270C	2.0	HBSL	0.0002	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Benzo(a)pyrene	µg/L	SW 8270C	0.20	MCL	0.2	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Benzo(b)fluoranthene	µg/L	SW 8270C	0.50	—	—	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Benzo(g,h,i)perylene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzo(k)fluoranthene	µg/L	SW 8270C	0.50	—	—	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Benzyl Alcohol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-chloroethoxy)methane	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis-(2-Chloroethyl)ether	µg/L	SW 8270C	1.0	HBSL	0.03	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl) phthalate	µg/L	SW 8270C	5.0	MCL	6	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Butyl benzyl phthalate	µg/L	SW 8270C	1.0	HBSL	1000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chrysene	µg/L	SW 8270C	0.20	—	—	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Dibenz(a,h)anthracene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibenzofuran	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Diethyl phthalate	µg/L	SW 8270C	1.0	HBSL	6000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dimethyl phthalate	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Di-n-butyl phthalate	µg/L	SW 8270C	1.0	HBSL	700	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Di-n-octyl phthalate	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Fluoranthene	µg/L	SW 8270C	0.20	HBSL	300	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Fluorene	µg/L	SW 8270C	0.20	HBSL	300	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Hexachlorobenzene	µg/L	SW 8270C	1.0	MCL	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/L	SW 8270C	1.0	HBSL	0.9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorocyclopentadiene	µg/L	SW 8270C	1.0	MCL	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachloroethane	µg/L	SW 8270C	1.0	HBSL	0.9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachloropropene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Indeno(1,2,3-cd)pyrene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isophorone	µg/L	SW 8270C	1.0	HBSL	60	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Naphthalene	µg/L	SW 8270C	0.20	HBSL	100	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Nitrobenzene	µg/L	SW 8270C	1.0	HBSL	10	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Appendix A

Fall 2020				Benchmark		Sample Sites			Sample Sites		
Parameter	**Units**	**Method**	**Report Limit**	**Type**	**Value**	**BUT10014**	**BUT10016**	**BUT10017**	**CLA10011**	**CLA10018**	**MIA00205**
N-Nitrosodimethylamine	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Nitroso-di-n-butylamine	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Nitrosodi-n-propylamine	µg/L	SW 8270C	1.0	HBSL	0.005	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Nitrosodiphenylamine	µg/L	SW 8270C	1.0	HBSL	7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Pentachlorobenzene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Pentachloronitrobenzene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Pentachlorophenol	µg/L	SW 8270C	1.00	MCL	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Phenanthrene	µg/L	SW 8270C	0.20	—	—	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Phenol	µg/L	SW 8270C	1.0	HBSL	2000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Pyrene	µg/L	SW 8270C	0.20	HBSL	200	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Pyridine	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/L	SW 8260B	1.0	HBSL	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/L	SW 8260B	1.0	MCL	200	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/L	SW 8260B	1.0	HBSL	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	µg/L	SW 8260B	1.0	MCL	7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	µg/L	SW 8260B	1.0	HBSL	30	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/L	SW 8260B	1.0	MCL	70	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/L	SW 8260B	5.0	MCL	0.2	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
1,2-Dibromoethane	µg/L	SW 8260B	1.0	MCL	0.05	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/L	SW 8260B	1.0	MCL	600	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/L	SW 8260B	1.0	HBSL	600	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/L	SW 8260B	1.0	MCL	75	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone	µg/L	SW 8260B	10.0	—	—	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
2-Chlorotoluene	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Hexanone	µg/L	SW 8260B	10.0	HBSL	40	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
4-Chlorotoluene	µg/L	SW 8260B	1.0	HBSL	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Methyl-2-pentanone	µg/L	SW 8260B	10.0	—	—	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
Acetone	µg/L	SW 8260B	10.0	HBSL	6000	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
Acetonitrile	µg/L	SW 8260B	10.0	—	—	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
Benzene	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	µg/L	SW 8260B	1.0	HBSL	60	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromochloromethane	µg/L	SW 8260B	1.0	HBSL	90	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/L	SW 8260B	1.0	MCL	80	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	µg/L	SW 8260B	1.0	MCL	80	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	µg/L	SW 8260B	1.0	HHBP	140	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Carbon Disulfide	µg/L	SW 8260B	1.0	HBSL	700	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Carbon Tetrachloride	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/L	SW 8260B	1.0	MCL	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	µg/L	SW 8260B	1.0	MCL	80	**1.2**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Appendix A

Fall 2020				Benchmark		Sample Sites			Sample Sites		
Parameter	**Units**	**Method**	**Report Limit**	**Type**	**Value**	**BUT10014**	**BUT10016**	**BUT10017**	**CLA10011**	**CLA10018**	**MIA00205**
Chloromethane	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	µg/L	SW 8260B	1.0	MCL	70	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene	µg/L	SW 8260B	1.0	HBSL	0.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/L	SW 8260B	1.0	MCL	80	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dichlorodifluoromethane	µg/L	SW 8260B	1.0	HBSL	1000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethyl acetate	µg/L	SW 8260B	1.0			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/L	SW 8260B	1.0	MCL	700	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/L	SW 8260B	1.0	HBSL	0.9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m,p-Xylene	µg/L	SW 8260B	1.0	MCL	10000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl tert-Butyl Ether	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Naphthalene	µg/L	SW 8260B	1.0	HBSL	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	µg/L	SW 8260B	1.0	MCL	10000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p-Isopropyltoluene	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	µg/L	SW 8260B	1.0	MCL	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/L	SW 8260B	1.0	MCL	1000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene	µg/L	SW 8260B	1.0	MCL	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene	µg/L	SW 8260B	1.0	HBSL	0.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/L	SW 8260B	1.0	MCL	5	**1.6**	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/L	SW 8260B	1.0	HBSL	2000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl acetate	µg/L	SW 8260B	5.0	—	—	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride	µg/L	SW 8260B	1.0	MCL	2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene (Total)	µg/L	SW 8260B	1.0	MCL	10000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dioxane	µg/L	EPA 522	0.07	HBSL	0.35	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07	< 0.07
Acesulfame-K	µg/L	L221	0.01	—	—	**0.05**	< 0.01	**0.07**	< 0.01	< 0.01	< 0.01
Bezafibrate	µg/L	L221	0.0005	—	—	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Chloramphenicol	µg/L	L221	0.005	—	—	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Chlorotetracycline	µg/L	L221	0.05	—	—	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Clofibric acid	µg/L	L221	0.0005	—	—	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Diclofenac	µg/L	L221	0.0005	—	—	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dilantin	µg/L	L221	0.002	—	—	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Gemfibrozil	µg/L	L221	0.0005	—	—	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Ibuprofen	µg/L	L221	0.05	—	—	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Levothyroxine (Synthroid)	µg/L	L221	0.002	—	—	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Naproxen	µg/L	L221	0.002	—	—	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Penicillin G	µg/L	L221	0.002	—	—	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Penicillin V	µg/L	L221	0.002	—	—	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Prednisone	µg/L	L221	0.002	—	—	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Salicylic Acid	µg/L	L221	0.05	—	—	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Sucralose	µg/L	L221	0.025	—	—	< 0.025	< 0.025	**0.118**	< 0.025	< 0.025	< 0.025
Theophylline	µg/L	L221	0.005	—	—	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Triclocarban	µg/L	L221	0.0005	—	—	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Triclosan	µg/L	L221	0.05	HHBP	2000	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Appendix A

Fall 2020				Benchmark		Sample Sites			Sample Sites		
Parameter	**Units**	**Method**	**Report Limit**	**Type**	**Value**	**MON00022**	**MON10016**	**PRE10007**	**SHE00089**	**WAR10003**	**WAR10004**
Dissolved Oxygen	mg/L	YSI sonde		—	—	0.00	0.00	0.06	0.00	0.00	0.64
pH	S.U.	YSI sonde		SMCL	6.5 - 8.5	6.80	7.10	7.26	7.17	7.28	7.39
Specific Conductance	mS/cm	YSI sonde		—	—	1042	803	698	668	990	596
Temperature	°C	YSI sonde		—	—	16.9	12.3	12.4	11.7	14.4	14.5
Ammonia	mg/L	EPA 350.1	0.10	—	—	< 0.10	< 0.10	< 0.10	< 0.10	0.15	< 0.10
Chloride	mg/L	SM 4500-CL-E	2	SMCL	250	19.4	**81.4**	29.8	7.4	**111.0**	42.4
Fluoride	mg/L	SM 4500 F-C	0.20	MCL	4	0.21	< 0.20	0.20	0.38	0.22	0.24
Nitrite Nitrogen as NO2-N	mg/L	SM 4500 NO3-F	0.10	MCL	1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Nitrogen, Nitrate-Nitrite	mg/L	SM 4500 NO3-F	0.50	MCL	10	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	0.47
Nitrogen, Total Kjeldahl	mg/L	EPA 351.2	0.50	—	—	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Silica	µg/L	EPA 200.7	100	—	—	10200	9620	11100	11500	13300	8370
Sulfate	mg/L	EPA 375.4 Modified	5.0	SMCL	250	176	32.5	60.1	43.8	79.6	27.6
Total Hardness	µg/L	EPA 200.7	2000	—	—	60600	312000	339000	364000	382000	249000
Total Orthophosphate	mg/L	EPA 365.1	0.10	—	—	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Aluminum	µg/L	EPA 200.7	100	HBSL, SMCL	6000, 200	< 100	< 100	< 100	< 100	< 100	< 100
Antimony	µg/L	EPA 200.8	0.50	MCL	6	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Arsenic	µg/L	EPA 200.8	2.0	MCL	10	< 2.0	< 2.0	5.7	< 2.0	< 2.0	< 2.0
Barium	µg/L	EPA 200.7	5.0	MCL	2000	133	109	254	152	197	59.4
Beryllium	µg/L	EPA 200.7	0.5	MCL	4	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Boron	µg/L	EPA 200.7	200	HBSL	5000	< 200	< 200	< 200	< 200	215	< 200
Cadmium	µg/L	EPA 200.8	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Calcium	µg/L	EPA 200.7	500	—	—	168000	82900	82000	89100	94300	56600
Chromium, Hexavalent	mg/L	SM 3500 CR6 B	0.0040	HBSL	0.02	< 0.0040	< 0.0040	< 00.40	< 00.40	< 0.0040	< 0.0040
Cobalt	µg/L	EPA 200.7	5.0	—	—	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Copper	µg/L	EPA 200.7	5.0	MCL	1300	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Iron	µg/L	EPA 200.7	100	SMCL	300	< 100	**372**	**2680**	117	**1850**	< 100
Lead	µg/L	EPA 200.8	0.50	MCL	15	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Lithium	µg/L	EPA 200.7	5.0	—	—	**10**	< 5.0	< 5.0	< 5.0	5.3	< 5.0
Magnesium	µg/L	EPA 200.7	100	—	—	45500	25600	32700	34300	35600	26200
Manganese	µg/L	EPA 200.7	5.0	HBSL, SMCL	300, 50	35.1	**79.1**	23.6	**276**	**53.8**	< 5.0
Molybdenum	µg/L	EPA 200.7	10.0	HBSL	30	< 10.0	13.1	< 10.0	< 10.0	< 10.0	< 10.0
Nickel	µg/L	EPA 200.7	5.0	HBSL	10	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Phosphorus	µg/L	EPA 200.7	100	—	—	< 100	< 100	< 100	< 100	< 100	< 100
Potassium	µg/L	EPA 200.7	1000	—	—	5170	2950	2190	1360	2800	2750
Silver	µg/L	EPA 200.7	2.0	HBSL	100	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Sodium	µg/L	EPA 200.7	2000	—	—	14400	**54200**	15700	10000	**42000**	22600
Strontium	µg/L	EPA 200.7	5.0	HBSL	4000	564	529	872	551	977	415
Thallium	µg/L	EPA 200.8	0.50	MCL	2	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Vanadium	µg/L	EPA 200.7	5.0	—	—	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Zinc	µg/L	EPA 200.7	15.0	HBSL	2000	< 15.0	< 15.0	< 15.0	< 15.0	< 15.0	< 15.0
Alkalinity, Total (As CaCO3)	mg/L	SM 2320B	5.0	—	—	402	276	288	328	292	236
Biochemical Oxygen Demand	mg/L	SM 5210B	2.0	—	—	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Carbonaceous Biological Oxyg	mg/L	EPA 405.1/SM 5210	2.0	—	—	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Chemical Oxygen Demand	mg/L	HACH 8000	5.0	—	—	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0	< 20.0
Cyanide, Total	mg/L	EPA 335.4	0.010	MCL	0.2	< 0.010	< 0.010	< 0.010	**0.018**	< 0.010	< 0.010
Phenolics, Total Recoverable	µg/L	EPA 420.4	20	—	—	2.1	< 2.0	< 2.0	< 2.0	4.6	3.1
Total Dissolved Solids	mg/L	SM 2540C	10.0	SMCL	500	**686**	**584**	382	392	**700**	**534**
Total Organic Carbon	mg/L	SM 5310C	0.500	—	—	1.410	0.766	0.731	0.680	0.604	< 0.500
E. coli	MPN/100 ml	Colilert	1.00	MCL	0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	**1.0**

Appendix A

Fall 2020				Benchmark		Sample Sites			Sample Sites		
Parameter	**Units**	**Method**	**Report Limit**	**Type**	**Value**	**MON00022**	**MON10016**	**PRE10007**	**SHE00089**	**WAR10003**	**WAR10004**
2,4,5-T	µg/L	SW 8151	0.12	HBSL	70	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
2,4,5-TP (Silvex)	µg/L	SW 8151	0.12	MCL	50	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
2,4-D	µg/L	SW 8151	0.12	MCL	70	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
2,4-DB	µg/L	SW 8151	0.12	HHBP	210	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
4,4´-DDD	µg/L	SW 8081	0.050	HBSL	1	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4,4´-DDE	µg/L	SW 8081	0.050	HBSL	0.1	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
4,4´-DDT	µg/L	SW 8081	0.050	HBSL	0.001	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Aldrin	µg/L	SW 8081	0.05	HBSL	0.002	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
alpha-BHC	µg/L	SW 8081	0.050	HBSL	0.006	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
alpha-Chlordane	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
beta-BHC	µg/L	SW 8081	0.050	HBSL	0.02	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Chlordane (Technical)	µg/L	SW 8081	0.50	MCL	2	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Dalapon	µg/L	SW 8151	0.25	MCL	200	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
delta-BHC	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Dicamba	µg/L	SW 8151	0.12	HBSL	3000	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
Dichloroprop	µg/L	SW 8151	0.12	HBSL	300	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
Dieldrin	µg/L	SW 8081	0.050	HBSL	0.002	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Dinoseb	µg/L	SW 8151	0.12	MCL	7	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12	< 0.12
Endosulfan I	µg/L	SW 8081	0.050	HHBP	42	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Endosulfan II	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Endosulfan sulfate	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Endrin	µg/L	SW 8081	0.050	MCL	2	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Endrin aldehyde	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Endrin ketone	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
gamma-BHC	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
gamma-Chlordane	µg/L	SW 8081	0.050	—	—	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Heptachlor	µg/L	SW 8081	0.050	MCL	0.4	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Heptachlor epoxide	µg/L	SW 8081	0.050	MCL	0.2	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
MCPA	µg/L	SW 8151	25.0	HBSL	140	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
MCPP	µg/L	SW 8151	25.0	—	—	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0	< 25.0
Methoxychlor	µg/L	SW 8081	0.050	MCL	40	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Toxaphene	µg/L	SW 8081	1.7	MCL	3	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Radon	pCi/L	SM 7500-Rn-B	100.0	AMCL	4000	394.3	119.2	164.2	360.7	61	404
Uranium, Total	µg/L	ASTM D5174-97	0.010	MCL	30	1.91	1.40	0.733	1.26	0.513	0.586
1,2,4,5-Tetrachlorobenzene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/L	SW 8270C	1.0	MCL	70	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/L	SW 8270C	1.0	MCL	600	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Diphenylhydrazine	µg/L	SW 8270C	1.0	HBSL	0.04	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3,5-Trinitrobenzene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/L	SW 8270C	1.0	HBSL	600	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/L	SW 8270C	1.0	MCL	75	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1-Methylnaphthalene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,3,4,6-Tetrachlorophenol	µg/L	SW 8270C	2.0	—	—	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
2,4,5-Trichlorophenol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4,6-Trichlorophenol	µg/L	SW 8270C	1.0	HBSL	2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dichlorophenol	µg/L	SW 8270C	1.0	HBSL	20	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dimethylphenol	µg/L	SW 8270C	1.0	HBSL	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dinitrophenol	µg/L	SW 8270C	2.0	HBSL	10	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0

Appendix A

Fall 2020				Benchmark		Sample Sites			Sample Sites		
Parameter	**Units**	**Method**	**Report Limit**	**Type**	**Value**	**MON00022**	**MON10016**	**PRE10007**	**SHE00089**	**WAR10003**	**WAR10004**
2,4-Dinitrotoluene	µg/L	SW 8270C	1.0	HBSL	0.05	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,6-Dichlorophenol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,6-Dinitrotoluene	µg/L	SW 8270C	1.0	HBSL	0.05	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chloronaphthalene	µg/L	SW 8270C	1.0	HBSL	600	< .10	< .10	< .10	< .10	< .10	< .10
2-Chlorophenol	µg/L	SW 8270C	1.0	HBSL	40	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Methylnaphthalene	µg/L	SW 8270C	0.20	HBSL	30	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
2-Methylphenol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Nitrophenol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
3 & 4-Methylphenol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4,6-Dinitro-2-methylphenol	µg/L	SW 8270C	2.0	—	—	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
4-Bromophenyl phenyl ether	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chloro-3-methylphenol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorophenyl phenyl ether	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Nitrophenol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Acenaphthene	µg/L	SW 8270C	0.20	HBSL	400	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Acenaphthylene	µg/L	SW 8270C	0.20	—	—	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Acetophenone	µg/L	SW 8270C	1.0	HBSL	700	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aniline	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Anthracene	µg/L	SW 8270C	1.0	HBSL	2000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benz(a)anthracene	µg/L	SW 8270C	0.20	—	—	< 0.20	< 0.20	< 0.20	**0.24**	< 0.20	< 0.20
Benzidine	µg/L	SW 8270C	2.0	HBSL	0.0002	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Benzo(a)pyrene	µg/L	SW 8270C	0.20	MCL	0.2	< 0.20	< 0.20	< 0.20	**0.25**	< 0.20	< 0.20
Benzo(b)fluoranthene	µg/L	SW 8270C	0.50	—	—	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Benzo(g,h,i)perylene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzo(k)fluoranthene	µg/L	SW 8270C	0.50	—	—	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Benzyl Alcohol	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-chloroethoxy)methane	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis-(2-Chloroethyl)ether	µg/L	SW 8270C	1.0	HBSL	0.03	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl) phthalate	µg/L	SW 8270C	5.0	MCL	6	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Butyl benzyl phthalate	µg/L	SW 8270C	1.0	HBSL	1000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chrysene	µg/L	SW 8270C	0.20	—	—	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Dibenz(a,h)anthracene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibenzofuran	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Diethyl phthalate	µg/L	SW 8270C	1.0	HBSL	6000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dimethyl phthalate	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Di-n-butyl phthalate	µg/L	SW 8270C	1.0	HBSL	700	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Di-n-octyl phthalate	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Fluoranthene	µg/L	SW 8270C	0.20	HBSL	300	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Fluorene	µg/L	SW 8270C	0.20	HBSL	300	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Hexachlorobenzene	µg/L	SW 8270C	1.0	MCL	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/L	SW 8270C	1.0	HBSL	0.9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorocyclopentadiene	µg/L	SW 8270C	1.0	MCL	50	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachloroethane	µg/L	SW 8270C	1.0	HBSL	0.9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachloropropene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Indeno(1,2,3-cd)pyrene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Isophorone	µg/L	SW 8270C	1.0	HBSL	60	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Naphthalene	µg/L	SW 8270C	0.20	HBSL	100	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Nitrobenzene	µg/L	SW 8270C	1.0	HBSL	10	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Appendix A

Fall 2020				Benchmark		Sample Sites			Sample Sites		
Parameter	**Units**	**Method**	**Report Limit**	**Type**	**Value**	**MON00022**	**MON10016**	**PRE10007**	**SHE00089**	**WAR10003**	**WAR10004**
N-Nitrosodimethylamine	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Nitroso-di-n-butylamine	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Nitrosodi-n-propylamine	µg/L	SW 8270C	1.0	HBSL	0.005	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
N-Nitrosodiphenylamine	µg/L	SW 8270C	1.0	HBSL	7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Pentachlorobenzene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Pentachloronitrobenzene	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Pentachlorophenol	µg/L	SW 8270C	1.00	MCL	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Phenanthrene	µg/L	SW 8270C	0.20	—	—	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Phenol	µg/L	SW 8270C	1.0	HBSL	2000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Pyrene	µg/L	SW 8270C	0.20	HBSL	200	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Pyridine	µg/L	SW 8270C	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/L	SW 8260B	1.0	HBSL	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/L	SW 8260B	1.0	MCL	200	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/L	SW 8260B	1.0	HBSL	1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	µg/L	SW 8260B	1.0	MCL	7	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichlorobenzene	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,3-Trichloropropane	µg/L	SW 8260B	1.0	HBSL	30	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	µg/L	SW 8260B	1.0	MCL	70	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/L	SW 8260B	5.0	MCL	0.2	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
1,2-Dibromoethane	µg/L	SW 8260B	1.0	MCL	0.05	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/L	SW 8260B	1.0	MCL	600	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/L	SW 8260B	1.0	HBSL	600	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/L	SW 8260B	1.0	MCL	75	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Butanone	µg/L	SW 8260B	10.0	—	—	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
2-Chlorotoluene	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Hexanone	µg/L	SW 8260B	10.0	HBSL	40	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
4-Chlorotoluene	µg/L	SW 8260B	1.0	HBSL	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Methyl-2-pentanone	µg/L	SW 8260B	10.0	—	—	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
Acetone	µg/L	SW 8260B	10.0	HBSL	6000	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
Acetonitrile	µg/L	SW 8260B	10.0	—	—	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0
Benzene	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromobenzene	µg/L	SW 8260B	1.0	HBSL	60	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromochloromethane	µg/L	SW 8260B	1.0	HBSL	90	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/L	SW 8260B	1.0	MCL	80	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromoform	µg/L	SW 8260B	1.0	MCL	80	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bromomethane	µg/L	SW 8260B	1.0	HHBP	140	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Carbon Disulfide	µg/L	SW 8260B	1.0	HBSL	700	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Carbon Tetrachloride	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/L	SW 8260B	1.0	MCL	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroethane	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chloroform	µg/L	SW 8260B	1.0	MCL	80	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Appendix A

Fall 2020				Benchmark		Sample Sites			Sample Sites		
Parameter	**Units**	**Method**	**Report Limit**	**Type**	**Value**	**MON00022**	**MON10016**	**PRE10007**	**SHE00089**	**WAR10003**	**WAR10004**
Chloromethane	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,2-Dichloroethene	µg/L	SW 8260B	1.0	MCL	70	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
cis-1,3-Dichloropropene	µg/L	SW 8260B	1.0	HBSL	0.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/L	SW 8260B	1.0	MCL	80	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dibromomethane	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dichlorodifluoromethane	µg/L	SW 8260B	1.0	HBSL	1000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethyl acetate	µg/L	SW 8260B	1.0			< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/L	SW 8260B	1.0	MCL	700	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobutadiene	µg/L	SW 8260B	1.0	HBSL	0.9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m,p-Xylene	µg/L	SW 8260B	1.0	MCL	10000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl tert-Butyl Ether	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methylene Chloride	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Naphthalene	µg/L	SW 8260B	1.0	HBSL	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	µg/L	SW 8260B	1.0	MCL	10000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
p-Isopropyltoluene	µg/L	SW 8260B	1.0	—	—	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Styrene	µg/L	SW 8260B	1.0	MCL	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	µg/L	SW 8260B	1.0	MCL	1000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,2-Dichloroethene	µg/L	SW 8260B	1.0	MCL	100	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
trans-1,3-Dichloropropene	µg/L	SW 8260B	1.0	HBSL	0.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichloroethene	µg/L	SW 8260B	1.0	MCL	5	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/L	SW 8260B	1.0	HBSL	2000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Vinyl acetate	µg/L	SW 8260B	5.0	—	—	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Vinyl Chloride	µg/L	SW 8260B	1.0	MCL	2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene (Total)	µg/L	SW 8260B	1.0	MCL	10000	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dioxane	µg/L	EPA 522	0.07	HBSL	0.35	< 0.07	< 0.07	< 0.07	< 0.07	**0.56**	< 0.07
Acesulfame-K	µg/L	L221	0.01	—	—	< 0.01	**0.06**	**0.04**	< 0.01	**0.11**	**0.02**
Bezafibrate	µg/L	L221	0.0005	—	—	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Chloramphenicol	µg/L	L221	0.005	—	—	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Chlorotetracycline	µg/L	L221	0.05	—	—	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Clofibric acid	µg/L	L221	0.0005	—	—	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Diclofenac	µg/L	L221	0.0005	—	—	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Dilantin	µg/L	L221	0.002	—	—	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Gemfibrozil	µg/L	L221	0.0005	—	—	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Ibuprofen	µg/L	L221	0.05	—	—	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Levothyroxine (Synthroid)	µg/L	L221	0.002	—	—	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Naproxen	µg/L	L221	0.002	—	—	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Penicillin G	µg/L	L221	0.002	—	—	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Penicillin V	µg/L	L221	0.002	—	—	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Prednisone	µg/L	L221	0.002	—	—	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002
Salicylic Acid	µg/L	L221	0.05	—	—	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Sucralose	µg/L	L221	0.025	—	—	**0.037**	**0.062**	**0.182**	< 0.025	< 0.025	< 0.025
Theophylline	µg/L	L221	0.005	—	—	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Triclocarban	µg/L	L221	0.0005	—	—	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005
Triclosan	µg/L	L221	0.05	HHBP	2000	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

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