WATER OPERATING SERVICES
WATER QUALITY
10100 EAST JEFFERSON AVENUE
DETROIT, MICHIGAN 48214
PHONE: 313-926-8102 / 313-926-8127

GLWA Water Treatment Plants' - Mineral Reports

		Sample Dates:	01/14/2020	01/14/2020	01/14/2020	01/14/2020	01/14/2020	01/14/2020	01/14/2020	01/14/2020			
			Lake Huron		Southwest		Belle Isle	Water Works Park	Northeast	Springwells			
Parameter	**Formula**	**Units**	**Raw**	**Tap**	**Raw**	**Tap**	**Raw**	**Tap**	**Tap**	**Tap**	**MCL**	**Sec.Std**	**RL/MDL**
Turbidity		NTU	0.25	0.05	3.60	0.28	3.20	0.08	0.07	0.04	0.3/95% (1)		
Total Solids		mg/L	57	74	116	46	123	89	111	76		500	10
Total Dissolved Solids		mg/L	69	56	90	119	80	83	130	99		500	10
Aluminum	Al	mg/L	*AE*	*AE*	*AE*	*AE*	*AE*	*AE*	*AE*	*AE*		0.05-0.2	0.005
Iron	Fe	mg/L	< 0.1	< 0.1	0.117	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		0.3	0.005
Copper	Cu	mg/L	0.012	< 0.005	*AE*	< 0.005	*AE*	< 0.005	< 0.005	< 0.005	1.3 (AL)	1.0	0.005
Magnesium	Mg	mg/L	6.85	6.88	7.15	7.15	7.00	6.78	7.30	7.10			0.5
Calcium	Ca	mg/L	*AE*	*AE*	*AE*	*AE*	*AE*	*AE*	*AE*	*AE*			0.1
Sodium	Na	mg/L	4.52	4.66	*AE*	5.25	*AE*	5.02	5.24	4.88		20 (2)	0.1
Potassium	K	mg/L	0.97	0.99	1.08	1.00	1.06	1.00	0.99	1.01			0.1
Manganese	Mn	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002		0.05	0.002
Lead	Pb	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.015 (AL)		0.001
Zinc	Zn	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		5	0.1
Silica	SiO_2	mg/L	2.0	2.2	2.1	2.2	2.1	2.1	2.0	1.9			0.4
Sulfate	SO_4^{2-}	mg/L	17.8	22.8	18.7	26.1	18.2	22.6	27.2	27.5		250	
Chloride	Cl^-	mg/L	6.9	8.9	7.9	9.4	7.4	9.7	9.4	9.4		250	5
Phosphorus	P	mg/L	< 0.05	0.38	< 0.05	0.36	< 0.05	0.37	0.43	0.39			0.05
Free Carbon Dioxide	CO_2	mg/L	1.3	5.7	1.5	8.3	10.0	8.7	8.9	10.2			
Total Hardness (3), (4), (5)		mg/L	100	96	98	104	98	98	100	98			
Total Alkalinity (3)		mg/L	82	72	84	72	86	74	72	72			
Carbonate Alkalinity (3)		mg/L	0	0	0	0	0	0	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	81	72	83	72	85	74	72	72			
Non-Carbonate Hardness (3)		mg/L	18	24	14	32	12	24	28	26			
Chemical Oxygen Demand		mg/L	< 2	< 2	4.3	2.4	2.7	< 2	< 2	< 2			2
Dissolved Oxygen		mg/L	11.7	12.1	11.6	11.7	13.6	15.3	12.3	12.3			
Nitrite Nitrogen	NO_2^- - N	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO_3^- - N	mg/L	0.27	0.26	0.31	0.28	0.27	0.28	0.28	0.29	10		0.1
Fluoride	F^-	mg/L	0.07	0.63	0.07	0.72	0.07	0.59	0.49	0.57	4.0	2.0	0.5
pH			8.10	7.40	8.04	7.24	8.07	7.23	7.21	7.15		6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	216	220	224	228	221	225	230	229			
Temperature		°C	13.1	7.8	6.0	3.4	7.5	9.0	5.2	4.3			

Legend	**Notes:**
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of samples in any month and always be < 1 NTU
Sec.Std: Secondary Standard	(2) EPA Guidance Level
NTU: Nephelometric Turbidity Unit	(3) As Calcium Carbonate
mg/L: Milligram Per Liter	mg/L is equivalent to part per million (ppm)
AL: Action Level	
MDL: Method Detection Limit	(4) By Titration
< : Less than	(5) Hardness in Grains per Gallon = 0.058 × (Hardness in mg/L)
AE: Analytical Error	(6) Reported results are below the low calibration standard but above the instrument
IV: Invalid Sample	detection limit.

Reporting: Water Quality Laboratory — Chemist
Reviewed By: **Williford** — Management Professional - Operations

Great Lakes Water Authority

Revised: 08/13/2018

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GLWA Water Treatment Plants' - Mineral Reports

		Sample Dates:	02/11/2020	02/11/2020	02/11/2020	02/11/2020	02/11/2020	02/11/2020	02/11/2020	02/11/2020			
			Lake Huron		Southwest		Belle Isle	Water Works Park	Northeast	Springwells			
Parameter	**Formula**	**Units**	**Raw**	**Tap**	**Raw**	**Tap**	**Raw**	**Tap**	**Tap**	**Tap**	**MCL**	**Sec.Std**	**RL/MDL**
Turbidity		NTU	2.10	0.06	7.20	0.50	1.80	0.13	0.08	0.03	0.3/95% (1)		
Total Solids		mg/L	132	53	142	161	136	127	150	117		500	10
Total Dissolved Solids		mg/L	92	118	109	162	105	77	145	124		500	10
Aluminum	Al	mg/L	*AE*	*AE*	*AE*	*AE*	*AE*	*AE*	*AE*	*AE*		0.05-0.2	0.005
Iron	Fe	mg/L	< 0.1	< 0.1	0.252	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		0.3	0.005
Copper	Cu	mg/L	0.006	< 0.005	*AE*	< 0.005	*AE*	< 0.005	< 0.005	< 0.005	1.3 (AL)	1.0	0.005
Magnesium	Mg	mg/L	7.83	7.28	6.68	7.08	7.43	6.85	6.93	7.05			0.5
Calcium	Ca	mg/L	30.4	30.6	*AE*	34.8	*AE*	29.6	30.0	29.8			0.1
Sodium	Na	mg/L	5.89	5.94	*AE*	7.78	*AE*	5.29	5.27	5.26		20 (2)	0.1
Potassium	K	mg/L	1.13	1.11	1.29	1.31	1.06	0.99	0.98	0.98			0.1
Manganese	Mn	mg/L	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002		0.05	0.002
Lead	Pb	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.015 (AL)		0.002
Zinc	Zn	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		5	0.1
Silica	SiO_2	mg/L	2.3	2.4	2.3	2.7	2.1	2.4	2.3	< 0.5			0.4
Sulfate	SO_4^{2-}	mg/L	18.9	24.3	19.8	37.5	18.6	22.6	27.2	28.3		250	
Chloride	Cl^-	mg/L	6.9	9.4	7.4	9.4	6.9	8.9	9.4	9.4		250	5
Phosphorus	P	mg/L	< 0.05	1.23	< 0.05	1.24	< 0.05	1.11	1.40	1.17			0.05
Free Carbon Dioxide	CO_2	mg/L	1.4	8.2	1.6	16.7	8.5	7.8	8.6	10.0			
Total Hardness (3), (4), (5)		mg/L	108	106	112	118	100	102	101	105			
Total Alkalinity (3)		mg/L	92	82	96	78	86	78	70	66			
Carbonate Alkalinity (3)		mg/L	0	0	0	0	0	0	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	91	82	95	78	85	78	70	66			
Non-Carbonate Hardness (3)		mg/L	16	24	16	40	14	24	31	39			
Chemical Oxygen Demand		mg/L	*AE*	*AE*	*AE*	*AE*	*AE*	*AE*	*AE*	*AE*			2
Dissolved Oxygen		mg/L	12.5	13.0	12.3	12.6	13.5	15.0	13.0	12.9			
Nitrite Nitrogen	NO_2^- - N	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO_3^- - N	mg/L	0.54	0.53	0.92	1.18	0.42	0.39	0.45	0.41	10		0.1
Fluoride	F^-	mg/L	0.08	0.64	0.07	0.56	0.08	0.74	0.52	0.51	4.0	2.0	0.5
pH			8.10	7.30	8.08	6.97	8.12	7.30	7.21	7.12		6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	235	243	247	274	227	225	229	227			
Temperature		°C	7.7	5.5	3.1	1.8	6.0	7.0	2.5	3.5			

Legend	**Notes:**
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of samples in any month and always be < 1 NTU
Sec.Std: Secondary Standard	(2) EPA Guidance Level
NTU: Nephelometric Turbidity Unit	(3) As Calcium Carbonate
mg/L: Milligram Per Liter	mg/L is equivalent to part per million (ppm)
AL: Action Level	
MDL: Method Detection Limit	(4) By Titration
< : Less than	(5) Hardness in Grains per Gallon = 0.058 × (Hardness in mg/L)
AE: Analytical Error	(6) Reported results are below the low calibration standard but above the instrument
IV: Invalid Sample	detection limit.

Reporting: Water Quality Laboratory — Chemist
Reviewed By: **Williford** — Management Professional - Operations

Great Lakes Water Authority

Revised: 08/13/2018

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GLWA Water Treatment Plants' - Mineral Reports

		Sample Dates:	03/10/2020	03/10/2020	03/10/2020	03/10/2020	03/10/2020	03/10/2020	03/10/2020	03/10/2020			
			Lake Huron		Southwest		Belle Isle	Water Works Park	Northeast	Springwells			
Parameter	**Formula**	**Units**	**Raw**	**Tap**	**Raw**	**Tap**	**Raw**	**Tap**	**Tap**	**Tap**	**MCL**	**Sec.Std**	**RL/MDL**
Turbidity		NTU	0.91	0.05	2.50	0.33	2.20	0.70	0.08	0.04	0.3/95% (1)		
Total Solids		mg/L	119	117	114	150	130	135	126	131		500	10
Total Dissolved Solids		mg/L	116	115	125	145	127	133	130	139		500	10
Aluminum	Al	mg/L	AE	AE	AE	AE	AE	AE	AE	AE		0.05-0.2	0.005
Iron	Fe	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		0.3	0.005
Copper	Cu	mg/L	0.005	< 0.005	AE	< 0.005	AE	< 0.005	< 0.005	< 0.005	1.3 (AL)	1.0	0.005
Magnesium	Mg	mg/L	6.08	7.13	7.45	7.78	7.68	6.68	7.20	7.23			0.5
Calcium	Ca	mg/L	29.3	29.4	AE	34.1	AE	30.0	30.9	30.5			0.1
Sodium	Na	mg/L	4.90	4.91	AE	6.81	AE	5.87	5.92	5.37		20 (2)	0.1
Potassium	K	mg/L	0.94	0.94	1.10	1.19	1.07	1.03	1.03	1.06			0.1
Manganese	Mn	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002		0.05	0.002
Lead	Pb	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.015 (AL)		0.001
Zinc	Zn	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		5	0.1
Silica	SiO_2	mg/L	1.9	2.1	2.0	2.2	2.1	2.2	2.0	2.0			0.4
Sulfate	SO_4^{2-}	mg/L	18.6	23.2	20.2	31.5	20.5	27.9	30.9	31.8		250	
Chloride	Cl^-	mg/L	11.9	11.9	10.1	13.9	10.1	10.9	11.9	11.6		250	5
Phosphorus	P	mg/L	AE	1.20	AE	1.16	AE	1.09	1.24	1.17			0.05
Free Carbon Dioxide	CO_2	mg/L	1.3	5.9	1.6	9.1	1.2	6.5	10.4	10.4			
Total Hardness (3), (4), (5)		mg/L	98	96	105	115	108	106	107	102			
Total Alkalinity (3)		mg/L	81	74	87	77	90	76	70	70			
Carbonate Alkalinity (3)		mg/L	0	0	0	0	0	0	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	80	74	86	77	89	76	70	70			
Non-Carbonate Hardness (3)		mg/L	17	22	18	38	18	30	37	32			
Chemical Oxygen Demand		mg/L	AE	AE	AE	AE	AE	AE	AE	AE			2
Dissolved Oxygen		mg/L	12.6	12.0	12.5	12.5	15.6	17.0	13.4	13.8			
Nitrite Nitrogen	NO_2^- - N	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO_3^- - N	mg/L	0.30	0.30	0.40	0.61	0.39	0.39	0.36	0.37	10		0.1
Fluoride	F^-	mg/L	0.08	0.72	0.01	0.71	0.08	0.71	0.80	0.63	4.0	2.0	0.5
pH			8.10	7.40	8.04	7.23	8.18	7.37	7.13	7.13		6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	212	217	232	261	233	236	237	235			
Temperature		°C	8.3	7.0	4.3	6.7	7.3	5.5	10.2	7.7			

Legend	**Notes:**
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of samples in any month and always be < 1 NTU
Sec.Std: Secondary Standard	(2) EPA Guidance Level
NTU: Nephelometric Turbidity Unit	(3) As Calcium Carbonate
mg/L: Milligram Per Liter	mg/L is equivalent to part per million (ppm)
AL: Action Level	
MDL: Method Detection Limit	(4) By Titration
< : Less than	(5) Hardness in Grains per Gallon = 0.058 × (Hardness in mg/L)
AE: Analytical Error	(6) Reported results are below the low calibration standard but above the instrument
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Reviewed By: **Williford** — Management Professional - Operations

Great Lakes Water Authority

Revised: 08/13/2018

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GLWA Water Treatment Plants' - Mineral Reports

		Sample Dates:	04/14/2020	04/14/2020	04/14/2020	04/14/2020	04/14/2020	04/14/2020	04/14/2020	04/14/2020			
			Lake Huron		Southwest		Belle Isle	Water Works Park	Northeast	Springwells			
Parameter	**Formula**	**Units**	**Raw**	**Tap**	**Raw**	**Tap**	**Raw**	**Tap**	**Tap**	**Tap**	**MCL**	**Sec.Std**	**RL/MDL**
Turbidity		NTU	0.76	0.05	1.10	0.10	2.95	0.09	0.05	0.11	0.3/95% (1)		
Total Solids		mg/L	126	130	133	143	135	142	149	142		500	10
Total Dissolved Solids		mg/L	139	138	129	132	134	135	126	133		500	10
Aluminum	Al	mg/L	AE	AE	AE	AE	AE	AE	AE	AE		0.05-0.2	0.005
Iron	Fe	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		0.3	0.005
Copper	Cu	mg/L	0.006	< 0.005	0.053	< 0.005	AE	< 0.005	< 0.005	< 0.005	1.3 (AL)	1.0	0.005
Magnesium	Mg	mg/L	7.05	7.03	6.90	6.88	7.33	6.85	6.83	5.93			0.5
Calcium	Ca	mg/L	27.3	28.8	31.9	31.2	AE	30.2	30.6	31.2			0.1
Sodium	Na	mg/L	5.15	4.93	5.27	4.65	AE	6.18	5.93	5.94		20 (2)	0.1
Potassium	K	mg/L	0.93	0.91	1.00	0.96	1.01	1.01	0.99	0.99			0.1
Manganese	Mn	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002		0.05	0.002
Lead	Pb	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.015 (AL)		0.001
Zinc	Zn	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		5	0.1
Silica	SiO_2	mg/L	1.9	2.1	2.7	2.1	1.9	19.5	2.1	2.0			0.4
Sulfate	SO_4^{2-}	mg/L	AE	19.2	AE	37.1	AE	14.5	43.0	26.4		250	
Chloride	Cl^-	mg/L	6.7	7.9	7.6	8.8	8.1	9.9	9.4	10.3		250	5
Phosphorus	P	mg/L	< 0.05	0.48	< 0.05	0.34	< 0.05	0.38	0.43	0.34			0.05
Free Carbon Dioxide	CO_2	mg/L	1.1	5.4	1.2	6.5	4.0	7.0	10.9	8.3			
Total Hardness (3), (4), (5)		mg/L	98	98	98	95	102	102	101	100			
Total Alkalinity (3)		mg/L	80	70	84	70	84	72	72	72			
Carbonate Alkalinity (3)		mg/L	0	0	0	0	0	0	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	79	70	83	70	84	72	72	72			
Non-Carbonate Hardness (3)		mg/L	18	28	14	25	18	30	29	28			
Chemical Oxygen Demand		mg/L	AE	AE	AE	AE	AE	AE	AE	AE			2
Dissolved Oxygen		mg/L	10.7	11.1	11.7	12.2	12.1	14.5	10.3	12.1			
Nitrite Nitrogen	NO_2^- - N	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO_3^- - N	mg/L	0.41	0.42	0.42	0.42	0.43	0.42	0.43	0.43	10		0.1
Fluoride	F^-	mg/L	0.10	0.60	AE	0.64	0.07	0.58	0.57	0.56	4.0	2.0	0.5
pH			8.17	7.41	8.14	7.33	7.62	7.31	7.12	7.24		6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	AE	201	AE	250	217	212	210	243			
Temperature		°C	9.7	8.4	7.6	7.2	11.0	9.5	8.6	9.3			

Legend	**Notes:**
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of samples in any month and always be < 1 NTU
Sec.Std: Secondary Standard	(2) EPA Guidance Level
NTU: Nephelometric Turbidity Unit	(3) As Calcium Carbonate
mg/L: Milligram Per Liter	mg/L is equivalent to part per million (ppm)
AL: Action Level	
MDL: Method Detection Limit	(4) By Titration
< : Less than	(5) Hardness in Grains per Gallon = 0.058 × (Hardness in mg/L)
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Reviewed By: **Williford** — Management Professional - Operations

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GLWA Water Treatment Plants' - Mineral Reports

		Sample Dates:	05/12/2020	05/12/2020	05/12/2020	05/12/2020	05/12/2020	05/12/2020	05/12/2020	05/12/2020			
			Lake Huron		Southwest		Belle Isle	Water Works Park	Northeast	Springwells			
Parameter	**Formula**	**Units**	**Raw**	**Tap**	**Raw**	**Tap**	**Raw**	**Tap**	**Tap**	**Tap**	**MCL**	**Sec.Std**	**RL/MDL**
Turbidity		NTU	0.90	0.09	1.50	0.14	1.70	0.05	0.06	0.05	0.3/95% (1)		
Total Solids		mg/L	154	150	137	143	129	139	146	147		500	10
Total Dissolved Solids		mg/L	129	123	117	134	112	125	131	134		500	10
Aluminum	Al	mg/L	0.090	0.242	*AE*	0.172	*AE*	0.197	0.128	0.106		0.05-0.2	0.005
Iron	Fe	mg/L	0.208	0.192	0.251	0.183	0.244	0.176	0.181	0.177		0.3	0.005
Copper	Cu	mg/L	0.007	< 0.005	0.080	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	1.3 (AL)	1.0	0.005
Magnesium	Mg	mg/L	7.88	8.06	7.50	7.69	7.31	7.39	7.60	7.57			0.5
Calcium	Ca	mg/L	27.5	28.0	26.0	26.9	25.7	26.0	26.5	26.7			0.1
Sodium	Na	mg/L	5.34	4.85	4.77	4.98	4.57	4.65	4.78	4.75		20 (2)	0.1
Potassium	K	mg/L	1.06	1.08	1.00	1.02	0.99	0.97	0.99	0.98			0.1
Manganese	Mn	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002		0.05	0.002
Lead	Pb	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.015 (AL)		0.001
Zinc	Zn	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		5	0.1
Silica	SiO_2	mg/L	1.4	1.7	1.4	1.6	1.2	1.2	1.4	1.4			0.4
Sulfate	SO_4^{2-}	mg/L	17.0	18.9	15.2	19.7	15.4	21.3	21.9	24.0		250	
Chloride	Cl^-	mg/L	8.5	10.3	6.5	8.8	7.2	8.5	9.0	8.5		250	5
Phosphorus	P	mg/L	< 0.05	0.39	< 0.05	0.39	< 0.05	0.38	0.43	0.41			0.05
Free Carbon Dioxide	CO_2	mg/L	1.0	4.2	1.2	6.0	1.0	6.2	8.9	6.0			
Total Hardness (3), (4), (5)		mg/L	104	106	100	102	100	102	104	102			
Total Alkalinity (3)		mg/L	90	78	84	74	84	78	74	70			
Carbonate Alkalinity (3)		mg/L	0	0	0	0	0	0	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	89	78	83	74	83	78	74	70			
Non-Carbonate Hardness (3)		mg/L	14	28	16	28	16	24	30	32			
Chemical Oxygen Demand		mg/L	*AE*	*AE*	*AE*	*AE*	*AE*	*AE*	*AE*	*AE*			2
Dissolved Oxygen		mg/L	10.9	11.2	10.5	10.6	11.6	12.6	10.9	10.7			
Nitrite Nitrogen	NO_2^- - N	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO_3^- - N	mg/L	0.47	0.44	0.37	0.39	0.38	0.40	0.39	0.39	10		0.1
Fluoride	F^-	mg/L	0.07	0.63	0.07	0.61	0.06	0.52	0.56	0.49	4.0	2.0	0.5
pH			8.23	7.57	8.15	7.39	8.22	7.40	7.22	7.37		6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	230	232	217	225	212	219	224	224			
Temperature		°C	12.0	10.6	10.5	9.7	12.0	10.0	15.1	10.1			

Legend
MCL: Maximum Contaminant Level
Sec.Std: Secondary Standard
NTU: Nephelometric Turbidity Unit
mg/L: Milligram Per Liter
AL: Action Level
MDL: Method Detection Limit
< : Less than
AE: Analytical Error
IV: Invalid Sample

Notes:
(1) Turbidity must not exceed 0.3 NTU in 95% of samples in any month and always be < 1 NTU
(2) EPA Guidance Level
(3) As Calcium Carbonate
mg/L is equivalent to part per million (ppm)

(4) By Titration
(5) Hardness in Grains per Gallon = 0.058 × (Hardness in mg/L)
(6) Reported results are below the low calibration standard but above the instrument detection limit.

Reporting: Water Quality Laboratory — Chemist
Reviewed By: **Williford** — Management Professional - Operations

Great Lakes Water Authority

Revised: 08/13/2018

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WATER QUALITY
10100 EAST JEFFERSON AVENUE
DETROIT, MICHIGAN 48214
PHONE: 313-926-8102 / 313-926-8127

GLWA Water Treatment Plants' - Mineral Reports

		Sample Dates:	06/16/2020	06/16/2020	06/16/2020	06/16/2020	06/16/2020	06/16/2020	06/16/2020	06/16/2020			
			Lake Huron		Southwest		Belle Isle	Water Works Park	Northeast	Springwells			
Parameter	**Formula**	**Units**	**Raw**	**Tap**	**Raw**	**Tap**	**Raw**	**Tap**	**Tap**	**Tap**	**MCL**	**Sec.Std**	**RL/MDL**
Turbidity		NTU	0.37	0.10	1.40	0.10	2.40	0.06	0.10	0.08	0.3/95% (1)		
Total Solids		mg/L	135	145	135	157	130	160	148	160		500	10
Total Dissolved Solids		mg/L	130	133	141	138	137	131	145	140		500	10
Aluminum	Al	mg/L	0.011	0.057	0.075	0.051	*AE*	0.067	0.037	0.047		0.05-0.2	0.005
Iron	Fe	mg/L	0.188	0.168	0.242	0.182	0.366	0.182	0.178	0.177		0.3	0.005
Copper	Cu	mg/L	0.008	< 0.005	0.091	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	1.3 (AL)	1.0	0.005
Magnesium	Mg	mg/L	7.64	7.51	7.89	7.94	8.03	7.95	7.83	7.82			0.5
Calcium	Ca	mg/L	26.0	25.7	27.4	27.7	27.6	27.9	27.4	27.3			0.1
Sodium	Na	mg/L	4.81	4.74	5.17	5.17	5.62	5.47	5.30	5.32		20 (2)	0.1
Potassium	K	mg/L	0.99	0.97	1.05	1.04	1.06	1.03	1.01	1.01			0.1
Manganese	Mn	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	0.005	< 0.002	< 0.002	< 0.002		0.05	0.002
Lead	Pb	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.015 (AL)		0.001
Zinc	Zn	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		5	0.1
Silica	SiO_2	mg/L	1.9	2.2	1.6	1.9	1.6	1.9	1.9	2.1			0.4
Sulfate	SO_4^{2-}	mg/L	15.8	18.2	16.9	22.7	16.2	23.1	24.0	23.8		250	
Chloride	Cl^-	mg/L	7.9	9.9	8.4	9.9	9.4	10.4	10.4	10.4		250	5
Phosphorus	P	mg/L	< 0.05	0.39	< 0.05	0.37	< 0.05	0.36	0.37	0.38			0.05
Free Carbon Dioxide	CO_2	mg/L	1.1	4.3	0.9	6.2	0.9	7.6	8.7	5.7			
Total Hardness (3), (4), (5)		mg/L	94	100	104	110	102	102	108	108			
Total Alkalinity (3)		mg/L	90	76	82	74	84	80	76	74			
Carbonate Alkalinity (3)		mg/L	0	0	0	0	0	0	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	89	76	81	74	82	80	76	74			
Non-Carbonate Hardness (3)		mg/L	4	24	22	36	18	22	32	34			
Chemical Oxygen Demand		mg/L	*AE*	*AE*	*AE*	*AE*	*AE*	*AE*	*AE*	*AE*			2
Dissolved Oxygen		mg/L	9.4	9.7	8.4	8.6	9.1	10.7	8.9	9.4			
Nitrite Nitrogen	NO_2^- - N	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO_3^- - N	mg/L	0.40	0.38	0.46	0.46	0.41	0.40	0.42	0.41	10		0.1
Fluoride	F^-	mg/L	0.07	0.73	0.07	0.76	0.08	0.61	0.69	0.70	4.0	2.0	0.5
pH			8.21	7.55	8.24	7.38	8.26	7.32	7.24	7.41		6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	206	202	213	222	215	218	226	213			
Temperature		°C	16.8	16.9	19.2	18.6	20.0	18.5	19.9	19.1			

Legend	**Notes:**
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of samples in any month and always be < 1 NTU
Sec.Std: Secondary Standard	(2) EPA Guidance Level
NTU: Nephelometric Turbidity Unit	(3) As Calcium Carbonate
mg/L: Milligram Per Liter	mg/L is equivalent to part per million (ppm)
AL: Action Level	
MDL: Method Detection Limit	(4) By Titration
< : Less than	(5) Hardness in Grains per Gallon = 0.058 × (Hardness in mg/L)
AE: Analytical Error	(6) Reported results are below the low calibration standard but above the instrument
IV: Invalid Sample	detection limit.

Reporting: Water Quality Laboratory Chemist
Reviewed By: **Williford** Management Professional - Operations

Great Lakes Water Authority

Revised: 08/13/2018

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WATER QUALITY
10100 EAST JEFFERSON AVENUE
DETROIT, MICHIGAN 48214
PHONE: 313-926-8102 / 313-926-8127

GLWA Water Treatment Plants' - Mineral Reports

		Sample Dates:	07/14/2020	07/14/2020	07/14/2020	07/14/2020	07/14/2020	07/14/2020	07/14/2020	07/14/2020			
			Lake Huron		Southwest		Belle Isle	Water Works Park	Northeast	Springwells			
Parameter	**Formula**	**Units**	**Raw**	**Tap**	**Raw**	**Tap**	**Raw**	**Tap**	**Tap**	**Tap**	**MCL**	**Sec.Std**	**RL/MDL**
Turbidity		NTU	0.44	0.08	1.03	0.12	1.90	0.08	0.06	0.05	0.3/95% (1)		
Total Solids		mg/L	145	156	159	167	144	151	165	165		500	10
Total Dissolved Solids		mg/L	124	131	127	123	119	129	137	140		500	10
Aluminum	Al	mg/L	0.011	0.176	0.042	0.095	0.043	0.173	0.049	0.043		0.05-0.2	0.005
Iron	Fe	mg/L	0.183	0.172	0.209	0.162	0.228	0.167	0.166	0.165		0.3	0.005
Copper	Cu	mg/L	0.008	< 0.005	0.046	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	1.3 (AL)	1.0	0.005
Magnesium	Mg	mg/L	7.54	7.66	7.78	7.54	7.60	7.60	7.73	7.75			0.5
Calcium	Ca	mg/L	25.8	26.3	25.9	25.4	25.7	25.8	26.1	26.1			0.1
Sodium	Na	mg/L	4.80	4.85	4.90	4.78	4.76	4.93	4.93	4.94		20 (2)	0.1
Potassium	K	mg/L	0.97	0.99	0.98	0.95	0.95	0.94	0.95	0.96			0.1
Manganese	Mn	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	0.003	< 0.002	< 0.002	< 0.002		0.05	0.002
Lead	Pb	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.015 (AL)		0.001
Zinc	Zn	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		5	0.1
Silica	SiO_2	mg/L	1.6	2.0	1.6	1.7	1.7	2.0	1.8	1.9			0.4
Sulfate	SO_4^{2-}	mg/L	16.9	19.8	15.6	19.9	16.1	20.9	22.5	21.9		250	
Chloride	Cl^-	mg/L	8.2	9.4	8.4	10.6	8.4	10.4	9.9	10.4		250	5
Phosphorus	P	mg/L	< 0.05	0.12	< 0.05	0.12	< 0.05	0.13	0.11	0.16			0.05
Free Carbon Dioxide	CO_2	mg/L	0.8	4.8	0.6	6.4	0.6	7.3	7.2	5.9			
Total Hardness (3), (4), (5)		mg/L	102	100	98	100	104	98	104	104			
Total Alkalinity (3)		mg/L	82	76	84	74	82	70	72	66			
Carbonate Alkalinity (3)		mg/L	0	0	0	0	0	0	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	80	76	82	74	80	70	72	66			
Non-Carbonate Hardness (3)		mg/L	20	24	14	26	22	28	32	38			
Chemical Oxygen Demand		mg/L	3.8	< 2	10.0	6.0	< 2	2.5	2.5	13.5			2
Dissolved Oxygen		mg/L	8.4	8.7	8.2	8.2	9.0	11.3	8.2	9.3			
Nitrite Nitrogen	NO_2^- - N	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO_3^- - N	mg/L	0.38	0.38	0.31	0.31	0.32	0.35	0.30	0.31	10		0.1
Fluoride	F^-	mg/L	0.06	0.64	0.05	0.58	0.06	0.61	0.59	0.52	4.0	2.0	0.5
pH			8.30	7.50	8.46	7.36	8.42	7.28	7.30	7.35		6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	208	217	209	213	204	195	210	214			
Temperature		°C	22.2	21.6	24.2	24.0	24.5	23.0	25.8	24.6			

Legend	**Notes:**
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of samples in any month and always be < 1 NTU
Sec.Std: Secondary Standard	(2) EPA Guidance Level
NTU: Nephelometric Turbidity Unit	(3) As Calcium Carbonate
mg/L: Milligram Per Liter	mg/L is equivalent to part per million (ppm)
AL: Action Level	
MDL: Method Detection Limit	(4) By Titration
< : Less than	(5) Hardness in Grains per Gallon = 0.058 × (Hardness in mg/L)
AE: Analytical Error	(6) Reported results are below the low calibration standard but above the instrument
IV: Invalid Sample	detection limit.

Reporting: Water Quality Laboratory — Chemist
Reviewed By: **Williford** — Management Professional - Operations

Great Lakes Water Authority

Revised: 08/13/2018

WATER OPERATING SERVICES
WATER QUALITY
10100 EAST JEFFERSON AVENUE
DETROIT, MICHIGAN 48214
PHONE: 313-926-8102 / 313-926-8127

GLWA Water Treatment Plants' - Mineral Reports

		Sample Dates:	08/10/2020	08/10/2020	08/10/2020	08/10/2020	08/10/2020	08/10/2020	08/10/2020	08/10/2020			
			Lake Huron		Southwest		Belle Isle	Water Works Park	Northeast	Springwells			
Parameter	**Formula**	**Units**	**Raw**	**Tap**	**Raw**	**Tap**	**Raw**	**Tap**	**Tap**	**Tap**	**MCL**	**Sec.Std**	**RL/MDL**
Turbidity		NTU	0.46	0.10	1.50	0.10	1.70	0.06	0.06	0.19	0.3/95% (1)		
Total Solids		mg/L	137	149	156	152	143	165	153	163		500	10
Total Dissolved Solids		mg/L	93	124	135	137	110	102	120	108		500	10
Aluminum	Al	mg/L	0.006	0.103	*AE*	0.084	0.034	0.131	0.064	0.070		0.05-0.2	0.005
Iron	Fe	mg/L	0.175	0.172	0.232	0.176	0.207	0.161	0.161	0.164		0.3	0.005
Copper	Cu	mg/L	0.010	< 0.005	0.033	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	1.3 (AL)	1.0	0.005
Magnesium	Mg	mg/L	7.78	7.86	7.79	8.36	7.63	7.50	7.59	7.60			0.5
Calcium	Ca	mg/L	26.6	27.0	25.4	27.4	25.9	25.5	25.9	26.0			0.1
Sodium	Na	mg/L	4.89	4.96	5.37	5.74	4.83	4.91	4.87	4.87		20 (2)	0.1
Potassium	K	mg/L	1.01	1.01	1.00	1.07	0.97	0.95	0.96	0.97			0.1
Manganese	Mn	mg/L	< 0.002	< 0.002	0.004	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002		0.05	0.002
Lead	Pb	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.015 (AL)		0.001
Zinc	Zn	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		5	0.1
Silica	SiO_2	mg/L	1.9	2.0	1.6	1.7	1.7	1.8	1.8	1.8			0.4
Sulfate	SO_4^{2-}	mg/L	15.8	18.7	15.8	26.3	16.4	23.2	23.8	26.3		250	
Chloride	Cl^-	mg/L	7.8	9.4	8.9	10.2	7.6	9.4	9.6	9.9		250	5
Phosphorus	P	mg/L	< 0.05	0.36	< 0.05	0.35	< 0.05	0.39	0.41	0.51			0.05
Free Carbon Dioxide	CO_2	mg/L	1.0	4.8	0.4	8.1	0.5	6.9	7.9	6.5			
Total Hardness (3), (4), (5)		mg/L	104	100	100	100	100	100	96	100			
Total Alkalinity (3)		mg/L	82	76	82	66	82	72	70	70			
Carbonate Alkalinity (3)		mg/L	0	0	0	0	0	0	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	81	76	79	66	80	72	70	70			
Non-Carbonate Hardness (3)		mg/L	22	24	18	34	18	28	26	30			
Chemical Oxygen Demand		mg/L	2.7	4.1	7.3	4.4	4.4	2.4	4.4	3.2			2
Dissolved Oxygen		mg/L	7.9	8.5	8.3	8.7	8.8	10.4	8.8	9.4			
Nitrite Nitrogen	NO_2^- - N	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO_3^- - N	mg/L	0.35	0.34	0.22	0.21	0.28	0.37	0.26	0.27	10		0.1
Fluoride	F^-	mg/L	0.08	0.77	0.08	0.72	0.07	0.67	0.77	0.77	4.0	2.0	0.5
pH			8.20	7.50	8.61	7.21	8.49	7.32	7.25	7.33		6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	217	265	215	226	290	228	231	224			
Temperature		°C	24.2	23.9	24.4	24.1	25.5	23.5	24.7	23.8			

Legend	**Notes:**
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of samples in any month and always be < 1 NTU
Sec.Std: Secondary Standard	(2) EPA Guidance Level
NTU: Nephelometric Turbidity Unit	(3) As Calcium Carbonate
mg/L: Milligram Per Liter	mg/L is equivalent to part per million (ppm)
AL: Action Level	
MDL: Method Detection Limit	(4) By Titration
< : Less than	(5) Hardness in Grains per Gallon = 0.058 × (Hardness in mg/L)
AE: Analytical Error	(6) Reported results are below the low calibration standard but above the instrument
IV: Invalid Sample	detection limit.

Reporting: Water Quality Laboratory Chemist
Reviewed By: **Williford** Management Professional - Operations

Great Lakes Water Authority

Revised: 08/13/2018

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10100 EAST JEFFERSON AVENUE
DETROIT, MICHIGAN 48214
PHONE: 313-926-8102 / 313-926-8127

GLWA Water Treatment Plants' - Mineral Reports

		Sample Dates:	09/08/2020	09/08/2020	09/08/2020	09/08/2020	09/08/2020	09/08/2020	09/08/2020	09/08/2020			
			Lake Huron		Southwest		Belle Isle	Water Works Park	Northeast	Springwells			
Parameter	**Formula**	**Units**	**Raw**	**Tap**	**Raw**	**Tap**	**Raw**	**Tap**	**Tap**	**Tap**	**MCL**	**Sec.Std**	**RL/MDL**
Turbidity		NTU	2.93	0.11	1.50	0.16	2.10	0.08	0.06	0.04	0.3/95% (1)		
Total Solids		mg/L	141	164	146	165	137	87	159	151		500	10
Total Dissolved Solids		mg/L	119	113	120	132	99	125	148	120		500	10
Aluminum	Al	mg/L	0.005	0.089	*AE*	0.061	*AE*	0.102	0.149	0.033		0.05-0.2	0.005
Iron	Fe	mg/L	0.173	0.164	0.234	0.169	0.268	0.173	0.175	0.170		0.3	0.005
Copper	Cu	mg/L	0.009	< 0.005	0.046	< 0.005	< 0.005	< 0.005	< 0.005	0.008	1.3 (AL)	1.0	0.005
Magnesium	Mg	mg/L	7.56	7.57	7.63	7.81	7.53	7.92	7.84	7.76			0.5
Calcium	Ca	mg/L	26.0	26.0	26.3	27.1	26.3	27.7	27.5	27.2			0.1
Sodium	Na	mg/L	4.69	4.74	5.00	4.98	4.78	5.04	4.98	4.89		20 (2)	0.1
Potassium	K	mg/L	0.97	0.97	1.01	1.01	1.02	1.03	1.03	1.01			0.1
Manganese	Mn	mg/L	< 0.002	< 0.002	0.002	< 0.002	0.003	< 0.002	< 0.002	< 0.002		0.05	0.002
Lead	Pb	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.015 (AL)		0.001
Zinc	Zn	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		5	0.1
Silica	SiO_2	mg/L	1.7	1.9	1.8	1.8	1.8	2.0	2.0	1.8			0.4
Sulfate	SO_4^{2-}	mg/L	16.2	18.5	16.7	24.9	15.9	23.0	23.5	26.7		250	
Chloride	Cl^-	mg/L	6.7	8.5	7.6	8.5	7.2	9.0	9.0	8.8		250	5
Phosphorus	P	mg/L	< 0.05	0.38	< 0.05	0.34	< 0.05	0.37	0.34	0.49			0.05
Free Carbon Dioxide	CO_2	mg/L	0.9	5.2	0.9	8.0	1.1	7.0	7.2	5.7			
Total Hardness (3), (4), (5)		mg/L	96	96	98	100	100	100	100	104			
Total Alkalinity (3)		mg/L	80	72	80	70	80	72	72	70			
Carbonate Alkalinity (3)		mg/L	0	0	0	0	0	0	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	79	72	79	70	79	72	72	70			
Non-Carbonate Hardness (3)		mg/L	16	24	18	30	20	28	28	34			
Chemical Oxygen Demand		mg/L	2.8	< 2	3.5	< 2	4.6	2.5	< 2	< 2			2
Dissolved Oxygen		mg/L	7.7	8.2	7.6	7.8	7.5	9.2	8.5	8.8			
Nitrite Nitrogen	NO_2^- - N	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO_3^- - N	mg/L	0.41	0.38	0.38	0.35	0.42	0.39	0.38	0.38	10		0.1
Fluoride	F^-	mg/L	0.10	0.79	0.10	0.75	0.11	0.67	0.68	0.65	4.0	2.0	0.5
pH			8.22	7.44	8.26	7.24	8.14	7.31	7.30	7.39		6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	207	212	214	217	207	217	223	221			
Temperature		°C	21.8	22.0	21.3	21.3	23.0	21.5	21.5	21.8			

Legend	**Notes:**
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of samples in any month and always be < 1 NTU
Sec.Std: Secondary Standard	(2) EPA Guidance Level
NTU: Nephelometric Turbidity Unit	(3) As Calcium Carbonate
mg/L: Milligram Per Liter	mg/L is equivalent to part per million (ppm)
AL: Action Level	
MDL: Method Detection Limit	(4) By Titration
< : Less than	(5) Hardness in Grains per Gallon = 0.058 × (Hardness in mg/L)
AE: Analytical Error	(6) Reported results are below the low calibration standard but above the instrument
IV: Invalid Sample	detection limit.

Reporting: Water Quality Laboratory — Chemist
Reviewed By: **Williford** — Management Professional - Operations

Great Lakes Water Authority

Revised: 08/13/2018

WATER OPERATING SERVICES
WATER QUALITY
10100 EAST JEFFERSON AVENUE
DETROIT, MICHIGAN 48214
PHONE: 313-926-8102 / 313-926-8127

GLWA Water Treatment Plants' - Mineral Reports

		Sample Dates:	10/12/2020	10/12/2020	10/12/2020	10/12/2020	10/12/2020	10/12/2020	10/12/2020	10/12/2020			
			Lake Huron		Southwest		Belle Isle	Water Works Park	Northeast	Springwells			
Parameter	**Formula**	**Units**	**Raw**	**Tap**	**Raw**	**Tap**	**Raw**	**Tap**	**Tap**	**Tap**	**MCL**	**Sec.Std**	**RL/MDL**
Turbidity		NTU	0.30	0.08	3.00	0.04	4.80	0.07	0.07	0.14	0.3/95% (1)		
Total Solids		mg/L	107	134	159	162	128	153	133	159		500	10
Total Dissolved Solids		mg/L	112	129	127	97	97	124	134	107		500	10
Aluminum	Al	mg/L	0.008	0.060	0.098	0.040	0.129	0.066	0.046	0.029		0.05-0.2	0.005
Iron	Fe	mg/L	0.183	0.164	0.293	0.171	0.416	0.165	0.178	0.168		0.3	0.005
Copper	Cu	mg/L	0.010	< 0.005	0.050	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	1.3 (AL)	1.0	0.005
Magnesium	Mg	mg/L	7.88	7.61	7.81	7.79	7.90	7.66	8.11	7.74			0.5
Calcium	Ca	mg/L	27.1	26.0	27.2	27.6	27.4	26.8	28.6	26.9			0.1
Sodium	Na	mg/L	4.88	4.69	4.98	4.91	4.79	4.89	5.11	4.82		20 (2)	0.1
Potassium	K	mg/L	1.01	0.97	1.05	1.03	1.05	1.00	1.06	1.01			0.1
Manganese	Mn	mg/L	< 0.002	< 0.002	0.004	< 0.002	0.007	< 0.002	< 0.002	< 0.002		0.05	0.002
Lead	Pb	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.015 (AL)		0.001
Zinc	Zn	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1		5	0.1
Silica	SiO_2	mg/L	1.8	2.0	1.9	2.0	2.0	2.0	2.1	2.0			0.4
Sulfate	SO_4^{2-}	mg/L	15.9	17.9	15.7	24.0	16.4	22.7	22.1	23.9		250	
Chloride	Cl^-	mg/L	6.8	8.7	7.1	8.5	6.8	8.7	9.2	9.4		250	5
Phosphorus	P	mg/L	< 0.05	0.39	< 0.05	0.33	< 0.05	0.38	0.47	0.38			0.05
Free Carbon Dioxide	CO_2	mg/L	1.0	4.8	1.0	7.8	1.3	8.0	8.7	7.7			
Total Hardness (3), (4), (5)		mg/L	100	100	104	102	100	104	100	98			
Total Alkalinity (3)		mg/L	84	76	84	74	88	76	76	72			
Carbonate Alkalinity (3)		mg/L	0	0	0	0	0	0	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	83	76	83	74	87	76	76	72			
Non-Carbonate Hardness (3)		mg/L	16	24	20	28	12	28	24	26			
Chemical Oxygen Demand		mg/L	3.0	3.0	5.9	3.0	5.9	4.4	3.0	< 2			2
Dissolved Oxygen		mg/L	9.1	9.6	9.2	9.4	9.0	10.7	9.6	10.2			
Nitrite Nitrogen	NO_2^- - N	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO_3^- - N	mg/L	0.38	0.36	0.35	0.35	0.39	0.38	0.35	0.33	10		0.1
Fluoride	F^-	mg/L	0.11	0.78	0.10	0.72	0.10	0.81	0.70	0.71	4.0	2.0	0.5
pH			8.20	7.50	8.23	7.28	8.12	7.28	7.24	7.27		6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	205	208	211	214	202	212	218	218			
Temperature		°C	19.1	17.4	16.5	16.0	18.0	16.5	17.2	16.5			

Legend	**Notes:**
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of samples in any month and always be < 1 NTU
Sec.Std: Secondary Standard	(2) EPA Guidance Level
NTU: Nephelometric Turbidity Unit	(3) As Calcium Carbonate
mg/L: Milligram Per Liter	mg/L is equivalent to part per million (ppm)
AL: Action Level	
MDL: Method Detection Limit	(4) By Titration
< : Less than	(5) Hardness in Grains per Gallon = 0.058 × (Hardness in mg/L)
AE: Analytical Error	(6) Reported results are below the low calibration standard but above the instrument
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Reporting: Water Quality Laboratory — Chemist
Reviewed By: **Williford** — Management Professional - Operations

Great Lakes Water Authority

Revised: 08/13/2018

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WATER QUALITY
10100 EAST JEFFERSON AVENUE
DETROIT, MICHIGAN 48214
PHONE: 313-926-8102 / 313-926-8127

GLWA Water Treatment Plants' - Mineral Reports

		Sample Dates:	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020	11/09/2020			
			Lake Huron		Southwest		Belle Isle	Water Works Park	Northeast	Springwells			
Parameter	**Formula**	**Units**	**Raw**	**Tap**	**Raw**	**Tap**	**Raw**	**Tap**	**Tap**	**Tap**	**MCL**	**Sec.Std**	**RL/MDL**
Turbidity		NTU	0.47	0.06	1.60	0.04	2.28	0.05	0.05	0.10	0.3/95% (1)		
Total Solids		mg/L	134	137	154	167	126	121	147	130		500	10
Total Dissolved Solids		mg/L	98	110	136	111	109	114	103	113		500	10
Aluminum	Al	mg/L	< 0.005	0.032	*AE*	0.055	*AE*	0.044	0.024	0.022		0.05-0.2	0.005
Iron	Fe	mg/L	0.167	0.159	0.242	0.171	0.248	0.166	0.167	0.162		0.3	0.005
Copper	Cu	mg/L	0.008	< 0.005	0.047	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	1.3 (AL)	1.0	0.005
Magnesium	Mg	mg/L	7.19	7.23	7.46	7.34	7.12	7.21	7.44	7.35			0.5
Calcium	Ca	mg/L	24.8	24.7	26.4	25.8	24.2	25.0	25.7	25.4			0.1
Sodium	Na	mg/L	4.38	4.39	4.60	4.59	4.43	4.49	4.67	4.57		20 (2)	0.1
Potassium	K	mg/L	0.93	0.93	1.06	0.99	0.96	0.94	0.97	0.95			0.1
Manganese	Mn	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	0.002	< 0.002	< 0.002	< 0.002		0.05	0.002
Lead	Pb	mg/L	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.015 (AL)		0.001
Zinc	Zn	mg/L	0.00	0.00	< 0.01	< 0.001	< 0.01	0.00	< 0.001	< 0.001		5	0.1
Silica	SiO_2	mg/L	2.0	2.2	1.9	2.1	1.9	2.0	2.2	2.1			0.4
Sulfate	SO_4^{2-}	mg/L	15.0	18.5	15.7	22.7	14.9	21.8	24.3	26.6		250	
Chloride	Cl^-	mg/L	6.9	8.3	7.6	8.3	6.7	8.1	8.6	9.0		250	5
Phosphorus	P	mg/L	< 0.05	0.40	< 0.05	0.45	< 0.05	0.41	0.35	0.50			0.05
Free Carbon Dioxide	CO_2	mg/L	1.5	6.0	1.5	9.9	1.4	8.5	9.5	5.9			
Total Hardness (3), (4), (5)		mg/L	96	96	100	98	100	98	100	102			
Total Alkalinity (3)		mg/L	82	72	86	72	84	72	66	66			
Carbonate Alkalinity (3)		mg/L	0	0	0	0	0	0	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	81	72	85	72	83	72	66	66			
Non-Carbonate Hardness (3)		mg/L	14	24	14	26	16	26	34	36			
Chemical Oxygen Demand		mg/L	4.8	3.4	5.5	3.1	5.7	3.4	3.4	2.6			2
Dissolved Oxygen		mg/L	10.4	10.7	10.7	10.5	10.2	11.6	11.0	12.1			
Nitrite Nitrogen	NO_2^- - N	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO_3^- - N	mg/L	0.36	0.36	0.36	0.35	0.34	0.34	0.34	0.35	10		0.1
Fluoride	F^-	mg/L	0.11	0.78	0.11	0.69	0.12	0.72	0.70	0.63	4.0	2.0	0.5
pH			8.03	7.38	8.06	7.16	8.07	7.23	7.14	7.35		6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	208	211	214	220	205	214	223	223			
Temperature		°C	15.2	15.4	11.9	11.3	12.5	14.0	18.8	11.8			

Legend
MCL: Maximum Contaminant Level
Sec.Std: Secondary Standard
NTU: Nephelometric Turbidity Unit
mg/L: Milligram Per Liter
AL: Action Level
MDL: Method Detection Limit
< : Less than
AE: Analytical Error
IV: Invalid Sample

Notes:
(1) Turbidity must not exceed 0.3 NTU in 95% of samples in any month and always be < 1 NTU
(2) EPA Guidance Level
(3) As Calcium Carbonate
mg/L is equivalent to part per million (ppm)

(4) By Titration
(5) Hardness in Grains per Gallon = 0.058 × (Hardness in mg/L)
(6) Reported results are below the low calibration standard but above the instrument detection limit.

Reporting: Water Quality Laboratory — Chemist
Reviewed By: **Williford** — Management Professional - Operations

Great Lakes Water Authority

Revised: 08/13/2018

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WATER QUALITY
10100 EAST JEFFERSON AVENUE
DETROIT, MICHIGAN 48214
PHONE: 313-926-8102 / 313-926-8127

GLWA Water Treatment Plants' - Mineral Reports

		Sample Dates:	12/15/2020	12/15/2020	12/15/2020	12/15/2020	12/15/2020	12/15/2020	12/15/2020	12/15/2020			
			Lake Huron		Southwest		Belle Isle	Water Works Park	Northeast	Springwells			
Parameter	**Formula**	**Units**	**Raw**	**Tap**	**Raw**	**Tap**	**Raw**	**Tap**	**Tap**	**Tap**	**MCL**	**Sec.Std**	**RL/MDL**
Turbidity		NTU	1.51	0.08	1.40	0.10	2.23	0.05	0.08	0.09	0.3/95% (1)		
Total Solids		mg/L	142	123	105	86	103	100	109	91		500	10
Total Dissolved Solids		mg/L	101	112	80	89	101	94	87	98		500	10
Aluminum	Al	mg/L	0.035	0.033	*AE*	0.022	*AE*	0.023	0.024	0.014		0.05-0.2	0.005
Iron	Fe	mg/L	0.195	0.157	0.219	0.155	0.262	0.156	0.153	0.141		0.3	0.005
Copper	Cu	mg/L	0.007	< 0.001	0.052	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	1.3 (AL)	1.0	0.005
Magnesium	Mg	mg/L	7.37	8.22	7.14	7.17	7.21	7.12	7.10	6.96			0.5
Calcium	Ca	mg/L	24.6	27.5	24.6	24.6	24.5	24.2	24.3	23.5			0.1
Sodium	Na	mg/L	4.73	5.42	4.72	4.51	4.48	4.43	4.46	4.51		20 (2)	0.1
Potassium	K	mg/L	0.95	1.08	1.00	0.93	0.95	0.91	0.91	0.89			0.1
Manganese	Mn	mg/L	0.002	< 0.001	0.001	< 0.001	0.003	< 0.001	< 0.001	< 0.001		0.05	0.002
Lead	Pb	mg/L	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.015 (AL)		0.001
Zinc	Zn	mg/L	< 0.001	0.00	< 0.01	< 0.001	< 0.01	< 0.001	< 0.001	0.00		5	0.1
Silica	SiO_2	mg/L	2.1	2.4	2.2	2.4	2.2	2.4	2.4	2.4			0.4
Sulfate	SO_4^{2-}	mg/L	15.1	18.9	16.0	20.7	14.7	22.9	24.1	23.2		250	
Chloride	Cl^-	mg/L	8.9	9.9	8.9	9.4	7.9	9.9	9.9	9.9		250	5
Phosphorus	P	mg/L	< 0.05	0.37	< 0.05	0.34	< 0.05	0.33	0.39	0.47			0.05
Free Carbon Dioxide	CO_2	mg/L	1.3	6.6	1.2	9.8	1.0	6.3	8.5	6.9			
Total Hardness (3), (4), (5)		mg/L	108	106	110	108	104	106	106	106			
Total Alkalinity (3)		mg/L	84	76	84	74	82	74	72	72			
Carbonate Alkalinity (3)		mg/L	0	0	0	0	0	0	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	83	76	83	74	81	74	72	72			
Non-Carbonate Hardness (3)		mg/L	24	30	26	34	22	32	34	34			
Chemical Oxygen Demand		mg/L	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2			2
Dissolved Oxygen		mg/L	10.8	11.3	11.1	11.3	13.9	12.8	11.3	12.2			
Nitrite Nitrogen	NO_2^- - N	mg/L	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO_3^- - N	mg/L	0.34	0.33	0.37	0.39	0.36	0.38	0.35	0.35	10		0.1
Fluoride	F^-	mg/L	0.09	0.87	0.08	0.69	0.09	0.65	0.62	0.65	4.0	2.0	0.5
pH			8.11	7.36	8.15	7.18	8.22	7.37	7.23	7.32		6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	212	221	215	219	208	215	221	220			
Temperature		°C	11.2	10.7	8.5	6.6	4.1	6.0	13.0	8.1			

Legend	**Notes:**
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of samples in any month and always be < 1 NTU
Sec.Std: Secondary Standard	(2) EPA Guidance Level
NTU: Nephelometric Turbidity Unit	(3) As Calcium Carbonate
mg/L: Milligram Per Liter	mg/L is equivalent to part per million (ppm)
AL: Action Level	
MDL: Method Detection Limit	(4) By Titration
< : Less than	(5) Hardness in Grains per Gallon = 0.058 × (Hardness in mg/L)
AE: Analytical Error	(6) Reported results are below the low calibration standard but above the instrument
IV: Invalid Sample	detection limit.

Reporting: Water Quality Laboratory Chemist
Reviewed By: **Williford** Management Professional - Operations

Great Lakes Water Authority

Revised: 08/13/2018

GLWA
Great Lakes Water Authority

Water: RAW
Year: 2020

Plant Name: Lake Huron (LH)

WATER QUALITY DEPARTMENT
10100 EAST JEFFERSON AVENUE
DETROIT, MICHIGAN 48214
PHONE: 313-926-8102 / 313-926-8127

		Yearly Summary			Monthly Mineral Analyses Annual Averages															
					01/14/2020	02/11/2020	03/10/2020	04/14/2020	05/12/2020	06/16/2020	07/14/2020	08/10/2020	09/08/2020	10/12/2020	11/09/2020	12/15/2020	← Sample Dates			
Parameter	**Units**	**Max.**	**Min.**	**Avg.**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	***MCL***	***Sec.Std***	***MDL***	***STDEV***
Turbidity	N.T.U.	2.93	0.25	**0.95**	0.25	2.10	0.91	0.76	0.90	0.37	0.44	0.46	2.93	0.30	0.47	1.51	*0.3/95% (1)*			**0.83**
Total Solids	mg/L	154	57	**127**	57	132	119	126	154	135	145	137	141	107	134	142		*500*	*10*	**25**
Total Dissolved Solids	mg/L	139	69	**110**	69	92	116	139	129	130	124	93	119	112	98	101		*500*	*10*	**20**
Aluminum	mg/L	0.090	ND	**0.021**	AE	AE	AE	AE	0.090	0.011	0.011	0.006	0.005	0.008	< 0.005	0.035		*0.05-0.2*	*0.005*	**0.031**
Iron	mg/L	0.208	ND	**0.123**	< 0.1	< 0.1	< 0.1	< 0.1	0.208	0.188	0.183	0.175	0.173	0.183	0.167	0.195		*0.3*	*0.005*	**0.013**
Copper	mg/L	0.012	0.005	**0.008**	0.012	0.006	0.005	0.006	0.007	0.008	0.008	0.010	0.009	0.010	0.008	0.007	*1.3 (AL)*		*0.002*	**0.002**
Magnesium	mg/L	7.88	6.08	**7.39**	6.85	7.83	6.08	7.05	7.88	7.64	7.54	7.78	7.56	7.88	7.19	7.37			*0.5*	**0.53**
Calcium	mg/L	30.4	24.6	**26.9**	AE	30.4	29.3	27.3	27.5	26.0	25.8	26.6	26.0	27.1	24.8	24.6			*0.1*	**1.8**
Sodium	mg/L	5.89	4.38	**4.91**	4.52	5.89	4.90	5.15	5.34	4.81	4.80	4.89	4.69	4.88	4.38	4.73		*20 (2)*	*0.1*	**0.40**
Potassium	mg/L	1.13	0.93	**0.99**	0.97	1.13	0.94	0.93	1.06	0.99	0.97	1.01	0.97	1.01	0.93	0.95			*0.1*	**0.06**
Manganese	mg/L	0.002	ND	**0.000**	< 0.002	0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.002		*0.05*	*0.002*	**0.000**
Lead	mg/L	ND	ND	**0.000**	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	*0.015 (AL)*		*0.002*	
Zinc	mg/L	0.00	ND	**0.00**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.00	< 0.001		*5*	*0.1*	
Silica	mg/L	2.3	1.4	**1.9**	2.0	2.3	1.9	1.9	1.4	1.9	1.6	1.9	1.7	1.8	2.0	2.1			*0.4*	**0.2**
Sulfate	mg/L	18.9	15.0	**16.6**	17.8	18.9	18.6	AE	17.0	15.8	16.9	15.8	16.2	15.9	15.0	15.1				**1.3**
Chloride	mg/L	11.9	6.7	**7.9**	6.9	6.9	11.9	6.7	8.5	7.9	8.2	7.8	6.7	6.8	6.9	8.9		*250*	*5*	**1.5**
Phosphorus	mg/L	ND	ND	**0.00**	< 0.05	< 0.05	AE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05			*0.05*	
Free Carbon Dioxide	mg/L	1.5	0.8	**1.2**	1.3	1.4	1.3	1.1	1.0	1.1	0.8	1.0	0.9	1.0	1.5	1.3				**0.2**
Total Hardness (3), (4), (5)	mg/L	108	94	**101**	100	108	98	98	104	94	102	104	96	100	96	108				**5**
Total Alkalinity (3)	mg/L	92	80	**84**	82	92	81	80	90	90	82	82	80	84	82	84				**4**
Carbonate Alkalinity (3)	mg/L	0	0	**0**	0	0	0	0	0	0	0	0	0	0	0	0				**0**
Bi-Carbonate Alkalinity (3)	mg/L	91	79	**83**	81	91	80	79	89	89	80	81	79	83	81	83				**4**
Non-Carbonate Hardness (3)	mg/L	24	4	**17**	18	16	17	18	14	4	20	22	16	16	14	24				**5**
Chemical Oxygen Demand	mg/L	4.8	ND	**2.4**	< 2	AE	AE	AE	AE	AE	3.8	2.7	2.8	3.0	4.8	< 2			*2*	**0.9**
Dissolved Oxygen	mg/L	12.6	7.7	**10.2**	11.7	12.5	12.6	10.7	10.9	9.4	8.4	7.9	7.7	9.1	10.4	10.8				**1.7**
Nitrite Nitrogen	mg/L	ND	ND	**0.0**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	*1*		*0.1*	
Nitrate Nitrogen	mg/L	0.54	0.27	**0.38**	0.27	0.54	0.30	0.41	0.47	0.40	0.38	0.35	0.41	0.38	0.36	0.34	*10*	*10*	*0.1*	**0.07**
Fluoride	mg/L	0.11	0.06	**0.08**	0.07	0.08	0.08	0.10	0.07	0.07	0.06	0.08	0.10	0.11	0.11	0.09	*4*		*0.5*	**0.02**
pH		8.30	8.03	**8.16**	8.10	8.10	8.10	8.17	8.23	8.21	8.30	8.20	8.22	8.20	8.03	8.11	*6.5-8.5*	*6.5-8.5*		**0.08**
Specific Conductance @ 25 °C.	µmhos	235	205	**214**	216	235	212	AE	230	206	208	217	207	205	208	212				**10**
Temperature	°C	24.2	7.7	**15.1**	13.1	7.7	8.3	9.7	12.0	16.8	22.2	24.2	21.8	19.1	15.2	11.2				**5.7**

Legend	Notes:
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of daily samples in any month
Sec.Std: Secondary Standard	(2) EPA Guidance Level
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mg/L: Milligram Per Liter	mg/L is equivalent to part per million (ppm)
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Maximum	Minimum	Average	
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Modified: 02/10/2021, 09:11

Chemist II: Patrick Williford

GLWA
Great Lakes Water Authority

Water: TAP
Year: 2020

Plant Name: Lake Huron (LH)

WATER OPERATING SERVICES
WATER QUALITY
10100 EAST JEFFERSON AVENUE
DETROIT, MICHIGAN 48214
PHONE: 313-926-8102 / 313-926-8127

		Yearly Summary			Monthly Mineral Analyses Annual Averages															
					01/14/2020	02/11/2020	03/10/2020	04/14/2020	05/12/2020	06/16/2020	07/14/2020	08/10/2020	09/08/2020	10/12/2020	11/09/2020	12/15/2020	← Sample Dates			
Parameter	**Units**	**Max.**	**Min.**	**Avg.**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	***MCL***	***Sec.Std***	***MDL***	***STDEV***
Turbidity	N.T.U.	0.11	0.05	**0.07**	0.05	0.06	0.05	0.05	0.09	0.10	0.08	0.10	0.11	0.08	0.06	0.08	*0.3/95% (1)*			**0.02**
Total Solids	mg/L	164	53	**128**	74	53	117	130	150	145	156	149	164	134	137	123		*500*	*10*	**33**
Total Dissolved Solids	mg/L	138	56	**117**	56	118	115	138	123	133	131	124	113	129	110	112		*500*	*10*	**21**
Aluminum	mg/L	0.242	0.057	**0.182**	AE	AE	AE	AE	0.242	0.057	0.176	0.103	0.089	0.060				*0.05-0.2*	*0.005*	**0.073**
Iron	mg/L	0.192	ND	**0.112**	< 0.1	< 0.1	< 0.1	< 0.1	0.192	0.168	0.172	0.172	0.164	0.164	0.159	0.157		*0.3*	*0.005*	**0.011**
Copper	mg/L	ND	ND	**0.000**	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.001	*1.3 (AL)*		*0.002*	
Magnesium	mg/L	8.22	6.88	**7.50**	6.88	7.28	7.13	7.03	8.06	7.51	7.66	7.86	7.57	7.61	7.23	8.22			*0.5*	**0.41**
Calcium	mg/L	30.6	24.7	**27.3**	AE	30.6	29.4	28.8	28.0	25.7	26.3	27.0	26.0	26.0	24.7	27.5			*0.1*	**1.8**
Sodium	mg/L	5.94	4.39	**4.92**	4.66	5.94	4.91	4.93	4.85	4.74	4.85	4.96	4.74	4.69	4.39	5.42		*20 (2)*	*0.1*	**0.40**
Potassium	mg/L	1.11	0.91	**1.00**	0.99	1.11	0.94	0.91	1.08	0.97	0.99	1.01	0.97	0.97	0.93	1.08			*0.1*	**0.06**
Manganese	mg/L	ND	ND	**0.000**	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001		*0.05*	*0.002*	
Lead	mg/L	ND	ND	**0.000**	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	*0.015 (AL)*		*0.002*	
Zinc	mg/L	0.00	ND	**0.00**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.00	0.00		*5*	*0.1*	**0.00**
Silica	mg/L	2.4	1.7	**2.1**	2.2	2.4	2.1	2.1	1.7	2.2	2.0	2.0	1.9	2.0	2.2	2.4			*0.4*	**0.2**
Sulfate	mg/L	24.3	17.9	**19.9**	22.8	24.3	23.2	19.2	18.9	18.2	19.8	18.7	18.5	17.9	18.5	18.9				**2.2**
Chloride	mg/L	11.9	7.9	**9.4**	8.9	9.4	11.9	7.9	10.3	9.9	9.4	9.4	8.5	8.7	8.3	9.9		*250*	*5*	**1.1**
Phosphorus	mg/L	1.23	0.12	**0.51**	0.38	1.23	1.20	0.48	0.39	0.39	0.12	0.36	0.38	0.39	0.40	0.37			*0.05*	**0.34**
Free Carbon Dioxide	mg/L	8.2	4.2	**5.5**	5.7	8.2	5.9	5.4	4.2	4.3	4.8	4.8	5.2	4.8	6.0	6.6				**1.1**
Total Hardness (3), (4), (5)	mg/L	106	96	**100**	96	106	96	98	106	100	100	100	96	100	96	106				**4**
Total Alkalinity (3)	mg/L	82	70	**75**	72	82	74	70	78	76	76	76	72	76	72	76				**3**
Carbonate Alkalinity (3)	mg/L	0	0	**0**	0	0	0	0	0	0	0	0	0	0	0	0				**0**
Bi-Carbonate Alkalinity (3)	mg/L	82	70	**75**	72	82	74	70	78	76	76	76	72	76	72	76				**3**
Non-Carbonate Hardness (3)	mg/L	30	22	**25**	24	24	22	28	28	24	24	24	24	24	24	30				**2**
Chemical Oxygen Demand	mg/L	4.1	ND	**1.5**	< 2	AE	AE	AE	AE	AE	< 2	4.1	< 2	3.0	3.4	< 2			*2*	**0.6**
Dissolved Oxygen	mg/L	13.0	8.2	**10.5**	12.1	13.0	12.0	11.1	11.2	9.7	8.7	8.5	8.2	9.6	10.7	11.3				**1.5**
Nitrite Nitrogen	mg/L	ND	ND	**0.0**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	*1*		*0.1*	
Nitrate Nitrogen	mg/L	0.53	0.26	**0.37**	0.26	0.53	0.30	0.42	0.44	0.38	0.38	0.34	0.38	0.36	0.36	0.33	*10*	*10*	*0.1*	**0.07**
Fluoride	mg/L	0.87	0.60	**0.71**	0.63	0.64	0.72	0.60	0.63	0.73	0.64	0.77	0.79	0.78	0.78	0.87	*4*		*0.5*	**0.09**
pH		7.57	7.30	**7.44**	7.40	7.30	7.40	7.41	7.57	7.55	7.50	7.50	7.44	7.50	7.38	7.36	*6.5-8.5*	*6.5-8.5*		**0.08**
Specific Conductance @ 25 °C.	µmhos	265	201	**221**	220	243	217	201	232	202	217	265	212	208	211	221				**18**
Temperature	°C	23.9	5.5	**13.9**	7.8	5.5	7.0	8.4	10.6	16.9	21.6	23.9	22.0	17.4	15.4	10.7				**6.4**

Legend	Notes:
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mg/L: Milligram Per Liter	mg/L is equivalent to part per million (ppm)
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Maximum	Minimum	Average	
6.1	5.6	5.8	GPG

Modified: 02/10/2021, 09:11

Chemist II: Patrick Williford

GLWA
Great Lakes Water Authority

Water: RAW
Year: 2020

Plant Name: **Southwest (SW)**

WATER OPERATING SERVICES
WATER QUALITY
10100 EAST JEFFERSON AVENUE
DETROIT, MICHIGAN 48214
PHONE: 313-926-8102 / 313-926-8127

Yearly Summary / Monthly Mineral Analyses Annual Averages

Parameter	Units	Max.	Min.	Avg.	Jan (01/14/2020)	Feb (02/11/2020)	Mar (03/10/2020)	Apr (04/14/2020)	May (05/12/2020)	Jun (06/16/2020)	Jul (07/14/2020)	Aug (08/10/2020)	Sep (09/08/2020)	Oct (10/12/2020)	Nov (11/09/2020)	Dec (12/15/2020)	MCL	Sec.Std	MDL	STDEV
Turbidity	N.T.U.	7.20	1.03	**2.28**	3.60	7.20	2.50	1.10	1.50	1.40	1.03	1.50	1.50	3.00	1.60	1.40	*0.3/95% (1)*			**1.74**
Total Solids	mg/L	159	105	**138**	116	142	114	133	137	135	159	156	146	159	154	105		*500*	*10*	**18**
Total Dissolved Solids	mg/L	141	80	**120**	90	109	125	129	117	141	127	135	120	127	136	80		*500*	*10*	**18**
Aluminum	mg/L	0.098	0.042	**0.072**	AE	AE	AE	AE	AE	0.075	0.042	AE	AE	0.098	AE	AE		*0.05-0.2*	*0.005*	**0.028**
Iron	mg/L	0.293	ND	**0.191**	0.117	0.252	< 0.1	< 0.1	0.251	0.242	0.209	0.232	0.234	0.293	0.242	0.219	*12.000*	*0.3*	*0.005*	**0.045**
Copper	mg/L	0.091	0.033	**0.055**	AE	AE	AE	0.053	0.080	0.091	0.046	0.033	0.046	0.050	0.047	0.052	*1.3 (AL)*		*0.002*	**0.018**
Magnesium	mg/L	7.89	6.68	**7.43**	7.15	6.68	7.45	6.90	7.50	7.89	7.78	7.79	7.63	7.81	7.46	7.14			*0.5*	**0.39**
Calcium	mg/L	31.9	24.6	**26.8**	AE	AE	AE	31.9	26.0	27.4	25.9	25.4	26.3	27.2	26.4	24.6			*0.1*	**2.1**
Sodium	mg/L	5.37	4.60	**4.98**	AE	AE	AE	5.27	4.77	5.17	4.90	5.37	5.00	4.98	4.60	4.72		*20 (2)*	*0.1*	**0.26**
Potassium	mg/L	1.29	0.98	**1.05**	1.08	1.29	1.10	1.00	1.00	1.05	0.98	1.00	1.01	1.05	1.06	1.00			*0.1*	**0.08**
Manganese	mg/L	0.004	ND	**0.001**	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.004	0.002	0.004	< 0.002	0.001		*0.05*	*0.002*	**0.001**
Lead	mg/L	ND	ND	**0.000**	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	*0.015 (AL)*		*0.002*	
Zinc	mg/L	ND	ND	**0.00**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.01		*5*	*0.1*	
Silica	mg/L	2.7	1.4	**1.9**	2.1	2.3	2.0	2.7	1.4	1.6	1.6	1.6	1.8	1.9	1.9	2.2			*0.4*	**0.4**
Sulfate	mg/L	20.2	15.2	**16.9**	18.7	19.8	20.2	AE	15.2	16.9	15.6	15.8	16.7	15.7	15.7	16.0				**1.8**
Chloride	mg/L	10.1	6.5	**8.0**	7.9	7.4	10.1	7.6	6.5	8.4	8.4	8.9	7.6	7.1	7.6	8.9		*250*	*5*	**1.0**
Phosphorus	mg/L	ND	ND	**0.00**	< 0.05	< 0.05	AE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05			*0.05*	
Free Carbon Dioxide	mg/L	1.6	0.4	**1.1**	1.5	1.6	1.6	1.2	1.2	0.9	0.6	0.4	0.9	1.0	1.5	1.2				**0.4**
Total Hardness (3), (4), (5)	mg/L	112	98	**102**	98	112	105	98	100	104	98	100	98	104	100	110				**5**
Total Alkalinity (3)	mg/L	96	80	**85**	84	96	87	84	84	82	84	82	80	84	86	84				**4**
Carbonate Alkalinity (3)	mg/L	0	0	**0**	0	0	0	0	0	0	0	0	0	0	0	0				**0**
Bi-Carbonate Alkalinity (3)	mg/L	95	79	**83**	83	95	86	83	83	81	82	79	79	83	85	83				**4**
Non-Carbonate Hardness (3)	mg/L	26	14	**18**	14	16	18	14	16	22	14	18	18	20	14	26				**4**
Chemical Oxygen Demand	mg/L	10.0	ND	**5.2**	4.3	AE	AE	AE	AE	AE	10.0	7.3	3.5	5.9	5.5	< 2			*2*	**2.3**
Dissolved Oxygen	mg/L	12.5	7.6	**10.2**	11.6	12.3	12.5	11.7	10.5	8.4	8.2	8.3	7.6	9.2	10.7	11.1				**1.7**
Nitrite Nitrogen	mg/L	ND	ND	**0.0**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	*1*		*0.1*	
Nitrate Nitrogen	mg/L	0.92	0.22	**0.41**	0.31	0.92	0.40	0.42	0.37	0.46	0.31	0.22	0.38	0.35	0.36	0.37	*10*	*10*	*0.1*	**0.17**
Fluoride	mg/L	0.11	0.01	**0.07**	0.07	0.07	0.01	AE	0.07	0.07	0.05	0.08	0.10	0.10	0.11	0.08	*4*		*0.5*	**0.03**
pH		8.61	8.04	**8.21**	8.04	8.08	8.04	8.14	8.15	8.24	8.46	8.61	8.26	8.23	8.06	8.15	*6.5-8.5*	*6.5-8.5*		**0.17**
Specific Conductance @ 25 °C.	µmhos	247	209	**219**	224	247	232	AE	217	213	209	215	214	211	214	215				**11**
Temperature	°C	24.4	3.1	**13.1**	6.0	3.1	4.3	7.6	10.5	19.2	24.2	24.4	21.3	16.5	11.9	8.5				**7.7**

← *Sample Dates*

Legend	Notes:
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Chemist II: Patrick Williford

GLWA
Great Lakes Water Authority

Water: TAP
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Plant Name: **Southwest (SW)**

WATER OPERATING SERVICES
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					01/14/2020	02/11/2020	03/10/2020	04/14/2020	05/12/2020	06/16/2020	07/14/2020	08/10/2020	09/08/2020	10/12/2020	11/09/2020	12/15/2020	← Sample Dates			
Parameter	**Units**	**Max.**	**Min.**	**Avg.**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	***MCL***	***Sec.Std***	***MDL***	***STDEV***
Turbidity	N.T.U.	0.50	0.04	**0.17**	0.28	0.50	0.33	0.10	0.14	0.10	0.12	0.10	0.16	0.04	0.04	0.10	*0.3/95% (1)*			**0.14**
Total Solids	mg/L	167	46	**142**	46	161	150	143	143	157	167	152	165	162	167	86		*500*	*10*	**37**
Total Dissolved Solids	mg/L	162	89	**127**	119	162	145	132	134	138	123	137	132	97	111	89		*500*	*10*	**20**
Aluminum	mg/L	0.172	0.022	**0.072**	AE	AE	AE	AE	0.172	0.051	0.095	0.084	0.061	0.040	0.055	0.022		*0.05-0.2*	*0.005*	**0.046**
Iron	mg/L	0.183	ND	**0.114**	< 0.1	< 0.1	< 0.1	< 0.1	0.183	0.182	0.162	0.176	0.169	0.171	0.171	0.155		*0.3*	*0.005*	**0.009**
Copper	mg/L	ND	ND	**0.000**	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.001	*1.3 (AL)*		*0.002*	
Magnesium	mg/L	8.36	6.88	**7.54**	7.15	7.08	7.78	6.88	7.69	7.94	7.54	8.36	7.81	7.79	7.34	7.17			*0.5*	**0.43**
Calcium	mg/L	34.8	24.6	**28.4**	AE	34.8	34.1	31.2	26.9	27.7	25.4	27.4	27.1	27.6	25.8	24.6			*0.1*	**3.4**
Sodium	mg/L	7.78	4.51	**5.35**	5.25	7.78	6.81	4.65	4.98	5.17	4.78	5.74	4.98	4.91	4.59	4.51		*20 (2)*	*0.1*	**0.99**
Potassium	mg/L	1.31	0.93	**1.04**	1.00	1.31	1.19	0.96	1.02	1.04	0.95	1.07	1.01	1.03	0.99	0.93			*0.1*	**0.11**
Manganese	mg/L	ND	ND	**0.000**	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001		*0.05*	*0.002*	
Lead	mg/L	ND	ND	**0.000**	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	*0.015 (AL)*		*0.002*	
Zinc	mg/L	ND	ND	**0.00**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.001	< 0.001		*5*	*0.1*	
Silica	mg/L	2.7	1.6	**2.0**	2.2	2.7	2.2	2.1	1.6	1.9	1.7	1.7	1.8	2.0	2.1	2.4			*0.4*	**0.3**
Sulfate	mg/L	37.5	19.7	**26.1**	26.1	37.5	31.5	37.1	19.7	22.7	19.9	26.3	24.9	24.0	22.7	20.7				**6.2**
Chloride	mg/L	13.9	8.3	**9.6**	9.4	9.4	13.9	8.8	8.8	9.9	10.6	10.2	8.5	8.5	8.3	9.4		*250*	*5*	**1.5**
Phosphorus	mg/L	1.24	0.12	**0.48**	0.36	1.24	1.16	0.34	0.39	0.37	0.12	0.35	0.34	0.33	0.45	0.34			*0.05*	**0.34**
Free Carbon Dioxide	mg/L	16.7	6.0	**8.6**	8.3	16.7	9.1	6.5	6.0	6.2	6.4	8.1	8.0	7.8	9.9	9.8				**2.9**
Total Hardness (3), (4), (5)	mg/L	118	95	**104**	104	118	115	95	102	110	100	100	100	102	98	108				**7**
Total Alkalinity (3)	mg/L	78	66	**73**	72	78	77	70	74	74	74	66	70	74	72	74				**3**
Carbonate Alkalinity (3)	mg/L	0	0	**0**	0	0	0	0	0	0	0	0	0	0	0	0				**0**
Bi-Carbonate Alkalinity (3)	mg/L	78	66	**73**	72	78	77	70	74	74	74	66	70	74	72	74				**3**
Non-Carbonate Hardness (3)	mg/L	40	25	**31**	32	40	38	25	28	36	26	34	30	28	26	34				**5**
Chemical Oxygen Demand	mg/L	6.0	ND	**2.7**	2.4	AE	AE	AE	AE	AE	6.0	4.4	< 2	3.0	3.1	< 2			*2*	**1.4**
Dissolved Oxygen	mg/L	12.6	7.8	**10.3**	11.7	12.6	12.5	12.2	10.6	8.6	8.2	8.7	7.8	9.4	10.5	11.3				**1.7**
Nitrite Nitrogen	mg/L	ND	ND	**0.0**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	*1*		*0.1*	
Nitrate Nitrogen	mg/L	1.18	0.21	**0.44**	0.28	1.18	0.61	0.42	0.39	0.46	0.31	0.21	0.35	0.35	0.35	0.39	*10*	*10*	*0.1*	**0.25**
Fluoride	mg/L	0.76	0.56	**0.68**	0.72	0.56	0.71	0.64	0.61	0.76	0.58	0.72	0.75	0.72	0.69	0.69	*4*		*0.5*	**0.07**
pH		7.39	6.97	**7.25**	7.24	6.97	7.23	7.33	7.39	7.38	7.36	7.21	7.24	7.28	7.16	7.18	*6.5-8.5*	*6.5-8.5*		**0.12**
Specific Conductance @ 25 °C.	µmhos	274	213	**231**	228	274	261	250	225	222	213	226	217	214	220	219				**20**
Temperature	°C	24.1	1.8	**12.6**	3.4	1.8	6.7	7.2	9.7	18.6	24.0	24.1	21.3	16.0	11.3	6.6				**8.0**

Legend	Notes:
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of daily samples in any month
Sec.Std: Secondary Standard	(2) EPA Guidance Level
NTU: Nephelometric Turbidity Unit	(3) As Calcium Carbonate
mg/L: Milligram Per Liter	mg/L is equivalent to part per million (ppm)
µg/L: Microgram Per Liter	µg/L is equivalent to part per billion (ppb)
MDL: Method Detection Limit	(4) By Titration
< : Less than	(5) Tap Water Hardnessin in Grains per Gallon multiply value by 0.058 (Grains/Gallon)/(mg/L) -->
AE: Analytical Error	(6) Reported results are below the low calibration standard but above the instrument detection limit.
IV: Invalid Sample	ND = Not detected above the reporting limit
Below dertection limit	Blue text indicates value was less than the detection limit and is considered zero for calculation purposes.

Maximum	Minimum	Average	
6.8	5.5	6.1	GPG

Modified: 02/10/2021, 09:11

Chemist II: Patrick Williford

WATER OPERATING SERVICES
WATER QUALITY
10100 EAST JEFFERSON AVENUE
DETROIT, MICHIGAN 48214
PHONE: 313-926-8102 / 313-926-8127

GLWA
Great Lakes Water Authority

Water: RAW
Year: 2020

Plant Name: **Belle Isle (WWP-SPW-NE)**

		Yearly Summary			Monthly Mineral Analyses Annual Averages															
					01/14/2020	02/11/2020	03/10/2020	04/14/2020	05/12/2020	06/16/2020	07/14/2020	08/10/2020	09/08/2020	10/12/2020	11/09/2020	12/15/2020	← Sample Dates			
Parameter	**Units**	**Max.**	**Min.**	**Avg.**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	***MCL***	***Sec.Std***	***MDL***	***STDEV***
Turbidity	N.T.U.	4.80	1.70	**2.44**	3.20	1.80	2.20	2.95	1.70	2.40	1.90	1.70	2.10	4.80	2.28	2.23	*0.3/95% (1)*			**0.88**
Total Solids	mg/L	144	103	**130**	123	136	130	135	129	130	144	143	137	128	126	103		*500*	*10*	**11**
Total Dissolved Solids	mg/L	137	80	**111**	80	105	127	134	112	137	119	110	99	97	109	101		*500*	*10*	**16**
Aluminum	mg/L	0.129	0.034	**0.069**	AE	AE	AE	AE	AE	AE	0.043	0.034	AE	0.129	AE	AE		*0.05-0.2*	*0.005*	**0.053**
Iron	mg/L	0.416	ND	**0.186**	< 0.1	< 0.1	< 0.1	< 0.1	0.244	0.366	0.228	0.207	0.268	0.416	0.248	0.262		*0.3*	*0.005*	**0.072**
Copper	mg/L	ND	ND	**0.000**	AE	AE	AE	AE	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.001	*1.3 (AL)*		*0.002*	
Magnesium	mg/L	8.03	7.00	**7.48**	7.00	7.43	7.68	7.33	7.31	8.03	7.60	7.63	7.53	7.90	7.12	7.21			*0.5*	**0.31**
Calcium	mg/L	27.6	24.2	**25.9**	AE	AE	AE	AE	25.7	27.6	25.7	25.9	26.3	27.4	24.2	24.5			*0.1*	**1.2**
Sodium	mg/L	5.62	4.43	**4.78**	AE	AE	AE	AE	4.57	5.62	4.76	4.83	4.78	4.79	4.43	4.48		*20 (2)*	*0.1*	**0.37**
Potassium	mg/L	1.07	0.95	**1.01**	1.06	1.06	1.07	1.01	0.99	1.06	0.95	0.97	1.02	1.05	0.96	0.95			*0.1*	**0.05**
Manganese	mg/L	0.007	ND	**0.002**	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	0.005	0.003	< 0.002	0.003	0.007	0.002	0.003		*0.05*	*0.002*	**0.002**
Lead	mg/L	ND	ND	**0.000**	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	*0.015 (AL)*		*0.002*	
Zinc	mg/L	ND	ND	**0.00**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.01	< 0.01		*5*	*0.1*	
Silica	mg/L	2.2	1.2	**1.8**	2.1	2.1	2.1	1.9	1.2	1.6	1.7	1.7	1.8	2.0	1.9	2.2			*0.4*	**0.3**
Sulfate	mg/L	20.5	14.7	**16.7**	18.2	18.6	20.5	AE	15.4	16.2	16.1	16.4	15.9	16.4	14.9	14.7				**1.7**
Chloride	mg/L	10.1	6.7	**7.8**	7.4	6.9	10.1	8.1	7.2	9.4	8.4	7.6	7.2	6.8	6.7	7.9		*250*	*5*	**1.1**
Phosphorus	mg/L	ND	ND	**0.00**	< 0.05	< 0.05	AE	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05			*0.05*	
Free Carbon Dioxide	mg/L	10.0	0.5	**2.6**	10.0	8.5	1.2	4.0	1.0	0.9	0.6	0.5	1.1	1.3	1.4	1.0				**3.2**
Total Hardness (3), (4), (5)	mg/L	108	98	**102**	98	100	108	102	100	102	104	100	100	100	100	104				**3**
Total Alkalinity (3)	mg/L	90	80	**84**	86	86	90	84	84	84	82	82	80	88	84	82				**3**
Carbonate Alkalinity (3)	mg/L	0	0	**0**	0	0	0	0	0	0	0	0	0	0	0	0				**0**
Bi-Carbonate Alkalinity (3)	mg/L	89	79	**83**	85	85	89	84	83	82	80	80	79	87	83	81				**3**
Non-Carbonate Hardness (3)	mg/L	22	12	**17**	12	14	18	18	16	18	22	18	20	12	16	22				**3**
Chemical Oxygen Demand	mg/L	5.9	ND	**3.3**	2.7	AE	AE	AE	AE	AE	< 2	4.4	4.6	5.9	5.7	< 2			*2*	**1.3**
Dissolved Oxygen	mg/L	15.6	7.5	**11.2**	13.6	13.5	15.6	12.1	11.6	9.1	9.0	8.8	7.5	9.0	10.2	13.9				**2.6**
Nitrite Nitrogen	mg/L	ND	ND	**0.0**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	*1*		*0.1*	
Nitrate Nitrogen	mg/L	0.43	0.27	**0.37**	0.27	0.42	0.39	0.43	0.38	0.41	0.32	0.28	0.42	0.39	0.34	0.36	*10*	*10*	*0.1*	**0.05**
Fluoride	mg/L	0.12	0.06	**0.08**	0.07	0.08	0.08	0.07	0.06	0.08	0.06	0.07	0.11	0.10	0.12	0.09	*4*		*0.5*	**0.02**
pH		8.49	7.62	**8.16**	8.07	8.12	8.18	7.62	8.22	8.26	8.42	8.49	8.14	8.12	8.07	8.22	*6.5-8.5*	*6.5-8.5*		**0.21**
Specific Conductance @ 25 °C.	µmhos	290	202	**220**	221	227	233	217	212	215	204	290	207	202	205	208				**24**
Temperature	°C	25.5	4.1	**14.3**	7.5	6.0	7.3	11.0	12.0	20.0	24.5	25.5	23.0	18.0	12.5	4.1				**7.6**

Legend	Notes:
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of daily samples in any month
Sec.Std: Secondary Standard	(2) EPA Guidance Level
NTU: Nephelometric Turbidity Unit	(3) As Calcium Carbonate
mg/L: Milligram Per Liter	mg/L is equivalent to part per million (ppm)
µg/L: Microgram Per Liter	µg/L is equivalent to part per billion (ppb)
MDL: Method Detection Limit	(4) By Titration
< : Less than	(5) Tap Water Hardnessin in Grains per Gallon multiply value by 0.058 (Grains/Gallon)/(mg/L) -->
AE: Analytical Error	(6) Reported results are below the low calibration standard but above the instrument detection limit.
IV: Invalid Sample	ND = Not detected above the reporting limit
Below dertection limit	Blue text indicates value was less than the detection limit and is considered zero for calculation purposes.

Maximum	Minimum	Average	
6.3	5.7	5.9	GPG

Modified: 02/10/2021, 09:11

Chemist II: Patrick Williford

WATER OPERATING SERVICES
WATER QUALITY
10100 EAST JEFFERSON AVENUE
DETROIT, MICHIGAN 48214
PHONE: 313-926-8102 / 313-926-8127

GLWA
Great Lakes Water Authority

Water: TAP
Year: 2020

Plant Name: Water Works Park (WWP)

		Yearly Summary			Monthly Mineral Analyses Annual Averages															
					01/14/2020	02/11/2020	03/10/2020	04/14/2020	05/12/2020	06/16/2020	07/14/2020	08/10/2020	09/08/2020	10/12/2020	11/09/2020	12/15/2020	← Sample Dates			
Parameter	**Units**	**Max.**	**Min.**	**Avg.**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	***MCL***	***Sec.Std***	***MDL***	***STDEV***
Turbidity	N.T.U.	0.70	0.05	**0.13**	0.08	0.13	0.70	0.09	0.05	0.06	0.08	0.06	0.08	0.07	0.05	0.05	*0.3/95% (1)*			**0.18**
Total Solids	mg/L	165	87	**131**	89	127	135	142	139	160	151	165	87	153	121	100		*500*	*10*	**27**
Total Dissolved Solids	mg/L	135	77	**114**	83	77	133	135	125	131	129	102	125	124	114	94		*500*	*10*	**20**
Aluminum	mg/L	0.197	0.023	**0.100**	AE	AE	AE	AE	0.197	0.067	0.173	0.131	0.102	0.066	0.044	0.023		*0.05-0.2*	*0.005*	**0.062**
Iron	mg/L	0.182	ND	**0.112**	< 0.1	< 0.1	< 0.1	< 0.1	0.176	0.182	0.167	0.161	0.173	0.165	0.166	0.156		*0.3*	*0.005*	**0.008**
Copper	mg/L	ND	ND	**0.000**	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.001	*1.3 (AL)*		*0.002*	
Magnesium	mg/L	7.95	6.68	**7.29**	6.78	6.85	6.68	6.85	7.39	7.95	7.60	7.50	7.92	7.66	7.21	7.12			*0.5*	**0.45**
Calcium	mg/L	30.2	24.2	**27.2**	AE	29.6	30.0	30.2	26.0	27.9	25.8	25.5	27.7	26.8	25.0	24.2			*0.1*	**7.4**
Sodium	mg/L	6.18	4.43	**5.10**	5.02	5.29	5.87	6.18	4.65	5.47	4.93	4.91	5.04	4.89	4.49	4.43		*20 (2)*	*0.1*	**0.53**
Potassium	mg/L	1.03	0.91	**0.98**	1.00	0.99	1.03	1.01	0.97	1.03	0.94	0.95	1.03	1.00	0.94	0.91			*0.1*	**0.04**
Manganese	mg/L	ND	ND	**0.000**	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001		*0.05*	*0.002*	
Lead	mg/L	ND	ND	**0.000**	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	*0.015 (AL)*		*0.002*	
Zinc	mg/L	0.00	ND	**0.00**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	0.00	< 0.001		*5*	*0.1*	
Silica	mg/L	19.5	1.2	**3.5**	2.1	2.4	2.2	19.5	1.2	1.9	2.0	1.8	2.0	2.0	2.0	2.4			*0.4*	**5.0**
Sulfate	mg/L	27.9	14.5	**22.2**	22.6	22.6	27.9	14.5	21.3	23.1	20.9	23.2	23.0	22.7	21.8	22.9				**3.0**
Chloride	mg/L	10.9	8.1	**9.5**	9.7	8.9	10.9	9.9	8.5	10.4	10.4	9.4	9.0	8.7	8.1	9.9		*250*	*5*	**0.9**
Phosphorus	mg/L	1.11	0.13	**0.48**	0.37	1.11	1.09	0.38	0.38	0.36	0.13	0.39	0.37	0.38	0.41	0.33			*0.05*	**0.30**
Free Carbon Dioxide	mg/L	8.7	6.2	**7.3**	8.7	7.8	6.5	7.0	6.2	7.6	7.3	6.9	7.0	8.0	8.5	6.3				**0.8**
Total Hardness (3), (4), (5)	mg/L	106	98	**102**	98	102	106	102	102	102	98	100	100	104	98	106				**3**
Total Alkalinity (3)	mg/L	80	70	**75**	74	78	76	72	78	80	70	72	72	76	72	74				**3**
Carbonate Alkalinity (3)	mg/L	0	0	**0**	0	0	0	0	0	0	0	0	0	0	0	0				**0**
Bi-Carbonate Alkalinity (3)	mg/L	80	70	**74**	74	78	76	72	78	80	70	72	72	76	72	74				**3**
Non-Carbonate Hardness (3)	mg/L	32	22	**27**	24	24	30	30	24	22	28	28	28	28	26	32				**3**
Chemical Oxygen Demand	mg/L	4.4	ND	**2.2**	< 2	AE	AE	AE	AE	AE	2.5	2.4	2.5	4.4	3.4	< 2			*2*	**0.9**
Dissolved Oxygen	mg/L	17.0	9.2	**12.6**	15.3	15.0	17.0	14.5	12.6	10.7	11.3	10.4	9.2	10.7	11.6	12.8				**2.4**
Nitrite Nitrogen	mg/L	ND	ND	**0.0**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	*1*		*0.1*	
Nitrate Nitrogen	mg/L	0.42	0.28	**0.37**	0.28	0.39	0.39	0.42	0.40	0.40	0.35	0.37	0.39	0.38	0.34	0.38	*10*	*10*	*0.1*	**0.04**
Fluoride	mg/L	0.81	0.52	**0.66**	0.59	0.74	0.71	0.58	0.52	0.61	0.61	0.67	0.67	0.81	0.72	0.65	*4*		*0.5*	**0.08**
pH		7.40	7.23	**7.31**	7.23	7.30	7.37	7.31	7.40	7.32	7.28	7.32	7.31	7.28	7.23	7.37	*6.5-8.5*	*6.5-8.5*		**0.05**
Specific Conductance @ 25 °C.	µmhos	236	195	**218**	225	225	236	212	219	218	195	228	217	212	214	215				**10**
Temperature	°C	23.5	5.5	**13.7**	9.0	7.0	5.5	9.5	10.0	18.5	23.0	23.5	21.5	16.5	14.0	6.0				**6.7**

Legend	Notes:
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of daily samples in any month
Sec.Std: Secondary Standard	(2) EPA Guidance Level
NTU: Nephelometric Turbidity Unit	(3) As Calcium Carbonate
mg/L: Milligram Per Liter	mg/L is equivalent to part per million (ppm)
µg/L: Microgram Per Liter	µg/L is equivalent to part per billion (ppb)
MDL: Method Detection Limit	(4) By Titration
< : Less than	(5) Tap Water Hardnessin in Grains per Gallon multiply value by 0.058 (Grains/Gallon)/(mg/L) -->
AE: Analytical Error	(6) Reported results are below the low calibration standard but above the instrument detection limit.
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Below dertection limit	Blue text indicates value was less than the detection limit and is considered zero for calculation purposes.

Maximum	Minimum	Average	
6.1	5.7	5.9	GPG

Modified: 02/10/2021, 09:11

Chemist II: Patrick Williford

GLWA
Great Lakes Water Authority

Water: TAP
Year: 2020

Plant Name: **Northeast (NE)**

WATER OPERATING SERVICES
WATER QUALITY
10100 EAST JEFFERSON AVENUE
DETROIT, MICHIGAN 48214
PHONE: 313-926-8102 / 313-926-8127

		Yearly Summary			Monthly Mineral Analyses Annual Averages															
					01/14/2020	02/11/2020	03/10/2020	04/14/2020	05/12/2020	06/16/2020	07/14/2020	08/10/2020	09/08/2020	10/12/2020	11/09/2020	12/15/2020	← Sample Dates			
Parameter	**Units**	**Max.**	**Min.**	**Avg.**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	***MCL***	***Sec.Std***	***MDL***	***STDEV***
Turbidity	N.T.U.	0.10	0.05	**0.07**	0.07	0.08	0.08	0.05	0.06	0.10	0.06	0.06	0.06	0.07	0.05	0.08	*0.3/95% (1)*			**0.01**
Total Solids	mg/L	165	109	**141**	111	150	126	149	146	148	165	153	159	133	147	109		*500*	*10*	**18**
Total Dissolved Solids	mg/L	148	87	**128**	130	145	130	126	131	145	137	120	148	134	103	87		*500*	*10*	**18**
Aluminum	mg/L	0.149	0.024	**0.065**	AE	AE	AE	AE	0.128	0.037	0.049	0.064	0.149	0.046	0.024	0.024		*0.05-0.2*	*0.005*	**0.048**
Iron	mg/L	0.181	ND	**0.113**	< 0.1	< 0.1	< 0.1	< 0.1	0.181	0.178	0.166	0.161	0.175	0.178	0.167	0.153		*0.3*	*0.005*	**0.010**
Copper	mg/L	ND	ND	**0.000**	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.001	*1.3 (AL)*		*0.002*	
Magnesium	mg/L	8.11	6.83	**7.46**	7.30	6.93	7.20	6.83	7.60	7.83	7.73	7.59	7.84	8.11	7.44	7.10			*0.5*	**0.40**
Calcium	mg/L	30.9	24.3	**27.6**	AE	30.0	30.9	30.6	26.5	27.4	26.1	25.9	27.5	28.6	25.7	24.3			*0.1*	**2.2**
Sodium	mg/L	5.93	4.46	**5.12**	5.24	5.27	5.92	5.93	4.78	5.30	4.93	4.87	4.98	5.11	4.67	4.46		*20 (2)*	*0.1*	**0.45**
Potassium	mg/L	1.06	0.91	**0.99**	0.99	0.98	1.03	0.99	0.99	1.01	0.95	0.96	1.03	1.06	0.97	0.91			*0.1*	**0.04**
Manganese	mg/L	ND	ND	**0.000**	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001		*0.05*	*0.002*	
Lead	mg/L	ND	ND	**0.000**	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	*0.015 (AL)*		*0.002*	
Zinc	mg/L	ND	ND	**0.00**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.001	< 0.001		*5*	*0.1*	
Silica	mg/L	2.4	1.4	**2.0**	2.0	2.3	2.0	2.1	1.4	1.9	1.8	1.8	2.0	2.1	2.2	2.4			*0.4*	**0.2**
Sulfate	mg/L	43.0	21.9	**26.2**	27.2	27.2	30.9	43.0	21.9	24.0	22.5	23.8	23.5	22.1	24.3	24.1				**5.9**
Chloride	mg/L	11.9	8.6	**9.6**	9.4	9.4	11.9	9.4	9.0	10.4	9.9	9.6	9.0	9.2	8.6	9.9		*250*	*5*	**0.9**
Phosphorus	mg/L	1.40	0.11	**0.53**	0.43	1.40	1.24	0.43	0.43	0.37	0.11	0.41	0.34	0.47	0.35	0.39			*0.05*	**0.38**
Free Carbon Dioxide	mg/L	10.9	7.2	**8.8**	8.9	8.6	10.4	10.9	8.9	8.7	7.2	7.9	7.2	8.7	9.5	8.5				**1.1**
Total Hardness (3), (4), (5)	mg/L	108	96	**102**	100	101	107	101	104	108	104	96	100	100	100	106				**4**
Total Alkalinity (3)	mg/L	76	66	**72**	72	70	70	72	74	76	72	70	72	76	66	72				**3**
Carbonate Alkalinity (3)	mg/L	0	0	**0**	0	0	0	0	0	0	0	0	0	0	0	0				**0**
Bi-Carbonate Alkalinity (3)	mg/L	76	66	**72**	72	70	70	72	74	76	72	70	72	76	66	72				**3**
Non-Carbonate Hardness (3)	mg/L	37	24	**30**	28	31	37	29	30	32	32	26	28	24	34	34				**4**
Chemical Oxygen Demand	mg/L	4.4	ND	**1.9**	< 2	AE	AE	AE	AE	AE	2.5	4.4	< 2	3.0	3.4	< 2			*2*	**0.8**
Dissolved Oxygen	mg/L	13.4	8.2	**10.5**	12.3	13.0	13.4	10.3	10.9	8.9	8.2	8.8	8.5	9.6	11.0	11.3				**1.8**
Nitrite Nitrogen	mg/L	ND	ND	**0.0**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	*1*		*0.1*	
Nitrate Nitrogen	mg/L	0.45	0.26	**0.36**	0.28	0.45	0.36	0.43	0.39	0.42	0.30	0.26	0.38	0.35	0.34	0.35	*10*	*10*	*0.1*	**0.06**
Fluoride	mg/L	0.80	0.49	**0.64**	0.49	0.52	0.80	0.57	0.56	0.69	0.59	0.77	0.68	0.70	0.70	0.62	*4*		*0.5*	**0.10**
pH		7.30	7.12	**7.22**	7.21	7.21	7.13	7.12	7.22	7.24	7.30	7.25	7.30	7.24	7.14	7.23	*6.5-8.5*	*6.5-8.5*		**0.06**
Specific Conductance @ 25 °C.	µmhos	237	210	**223**	230	229	237	210	224	226	210	231	223	218	223	221				**8**
Temperature	°C	25.8	2.5	**15.2**	5.2	2.5	10.2	8.6	15.1	19.9	25.8	24.7	21.5	17.2	18.8	13.0				**7.5**

Legend	Notes:
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of daily samples in any month
Sec.Std: Secondary Standard	(2) EPA Guidance Level
NTU: Nephelometric Turbidity Unit	(3) As Calcium Carbonate
mg/L: Milligram Per Liter	mg/L is equivalent to part per million (ppm)
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Maximum	Minimum	Average	
6.3	5.6	5.9	GPG

Modified: 02/10/2021, 09:11

Chemist II: Patrick Williford

GLWA
Great Lakes Water Authority

Water: TAP
Year: 2020

Plant Name: Springwells (SPW)

WATER OPERATING SERVICES
WATER QUALITY
10100 EAST JEFFERSON AVENUE
DETROIT, MICHIGAN 48214
PHONE: 313-926-8102 / 313-926-8127

		Yearly Summary			Monthly Mineral Analyses Annual Averages															
					01/14/2020	02/11/2020	03/10/2020	04/14/2020	05/12/2020	06/16/2020	07/14/2020	08/10/2020	09/08/2020	10/12/2020	11/09/2020	12/15/2020	← Sample Dates			
Parameter	**Units**	**Max.**	**Min.**	**Avg.**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	***MCL***	***Sec.Std***	***MDL***	***STDEV***
Turbidity	N.T.U.	0.19	0.03	**0.08**	0.04	0.03	0.04	0.11	0.05	0.08	0.05	0.19	0.04	0.14	0.10	0.09	*0.3/95% (1)*			**0.05**
Total Solids	mg/L	165	76	**136**	76	117	131	142	147	160	165	163	151	159	130	91		*500*	*10*	**29**
Total Dissolved Solids	mg/L	140	98	**121**	99	124	139	133	134	140	140	108	120	107	113	98		*500*	*10*	**16**
Aluminum	mg/L	0.106	0.014	**0.045**	AE	AE	AE	AE	0.106	0.047	0.043	0.070	0.033	0.029	0.022	0.014		*0.05-0.2*	*0.005*	**0.030**
Iron	mg/L	0.177	ND	**0.110**	< 0.1	< 0.1	< 0.1	< 0.1	0.177	0.177	0.165	0.164	0.170	0.168	0.162	0.141		*0.3*	*0.005*	**0.012**
Copper	mg/L	0.008	ND	**0.001**	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.008	< 0.005	< 0.005	< 0.001	*1.3 (AL)*		*0.002*	
Magnesium	mg/L	7.82	5.93	**7.32**	7.10	7.05	7.23	5.93	7.57	7.82	7.75	7.60	7.76	7.74	7.35	6.96			*0.5*	**0.54**
Calcium	mg/L	31.2	23.5	**27.3**	AE	29.8	30.5	31.2	26.7	27.3	26.1	26.0	27.2	26.9	25.4	23.5			*0.1*	**2.3**
Sodium	mg/L	5.94	4.51	**5.01**	4.88	5.26	5.37	5.94	4.75	5.32	4.94	4.87	4.89	4.82	4.57	4.51		*20 (2)*	*0.1*	**0.40**
Potassium	mg/L	1.06	0.89	**0.98**	1.01	0.98	1.06	0.99	0.98	1.01	0.96	0.97	1.01	1.01	0.95	0.89			*0.1*	**0.04**
Manganese	mg/L	ND	ND	**0.000**	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001		*0.05*	*0.002*	
Lead	mg/L	ND	ND	**0.000**	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.001	*0.015 (AL)*		*0.002*	
Zinc	mg/L	0.00	ND	**0.00**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.001	0.00		*5*	*0.1*	
Silica	mg/L	2.4	ND	**1.8**	1.9	< 0.5	2.0	2.0	1.4	2.1	1.9	1.8	1.8	2.0	2.1	2.4			*0.4*	**0.2**
Sulfate	mg/L	31.8	21.9	**25.9**	27.5	28.3	31.8	26.4	24.0	23.8	21.9	26.3	26.7	23.9	26.6	23.2				**2.7**
Chloride	mg/L	11.6	8.5	**9.8**	9.4	9.4	11.6	10.3	8.5	10.4	10.4	9.9	8.8	9.4	9.0	9.9		*250*	*5*	**0.9**
Phosphorus	mg/L	1.17	0.16	**0.53**	0.39	1.17	1.17	0.34	0.41	0.38	0.16	0.51	0.49	0.38	0.50	0.47			*0.05*	**0.31**
Free Carbon Dioxide	mg/L	10.4	5.7	**7.4**	10.2	10.0	10.4	8.3	6.0	5.7	5.9	6.5	5.7	7.7	5.9	6.9				**1.8**
Total Hardness (3), (4), (5)	mg/L	108	98	**102**	98	105	102	100	102	108	104	100	104	98	102	106				**3**
Total Alkalinity (3)	mg/L	74	66	**70**	72	66	70	72	70	74	66	70	70	72	66	72				**3**
Carbonate Alkalinity (3)	mg/L	0	0	**0**	0	0	0	0	0	0	0	0	0	0	0	0				**0**
Bi-Carbonate Alkalinity (3)	mg/L	74	66	**70**	72	66	70	72	70	74	66	70	70	72	66	72				**3**
Non-Carbonate Hardness (3)	mg/L	39	26	**32**	26	39	32	28	32	34	38	30	34	26	36	34				**4**
Chemical Oxygen Demand	mg/L	13.5	ND	**2.8**	< 2	AE	AE	AE	AE	AE	13.5	3.2	< 2	< 2	2.6	< 2			*2*	**6.1**
Dissolved Oxygen	mg/L	13.8	8.8	**11.1**	12.3	12.9	13.8	12.1	10.7	9.4	9.3	9.4	8.8	10.2	12.1	12.2				**1.7**
Nitrite Nitrogen	mg/L	ND	ND	**0.0**	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	*1*		*0.1*	
Nitrate Nitrogen	mg/L	0.43	0.27	**0.36**	0.29	0.41	0.37	0.43	0.39	0.41	0.31	0.27	0.38	0.33	0.35	0.35	*10*	*10*	*0.1*	**0.05**
Fluoride	mg/L	0.77	0.49	**0.62**	0.57	0.51	0.63	0.56	0.49	0.70	0.52	0.77	0.65	0.71	0.63	0.65	*4*		*0.5*	**0.09**
pH		7.41	7.12	**7.29**	7.15	7.12	7.13	7.24	7.37	7.41	7.35	7.33	7.39	7.27	7.35	7.32	*6.5-8.5*	*6.5-8.5*		**0.10**
Specific Conductance @ 25 °C.	µmhos	243	213	**224**	229	227	235	243	224	213	214	224	221	218	223	220				**9**
Temperature	°C	24.6	3.5	**13.4**	4.3	3.5	7.7	9.3	10.1	19.1	24.6	23.8	21.8	16.5	11.8	8.1				**7.5**

Legend	Notes:
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of daily samples in any month
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6.3	5.7	5.9	GPG

Modified: 02/10/2021, 09:11

Chemist II: Patrick Williford

GLWA
Great Lakes Water Authority

Water: TAP
Year: 2020

Plant Name: **Detroit (WWP-SPW-NE-SW)**

WATER OPERATING SERVICES
WATER QUALITY
10100 EAST JEFFERSON AVENUE
DETROIT, MICHIGAN 48214
PHONE: 313-926-8102 / 313-926-8127

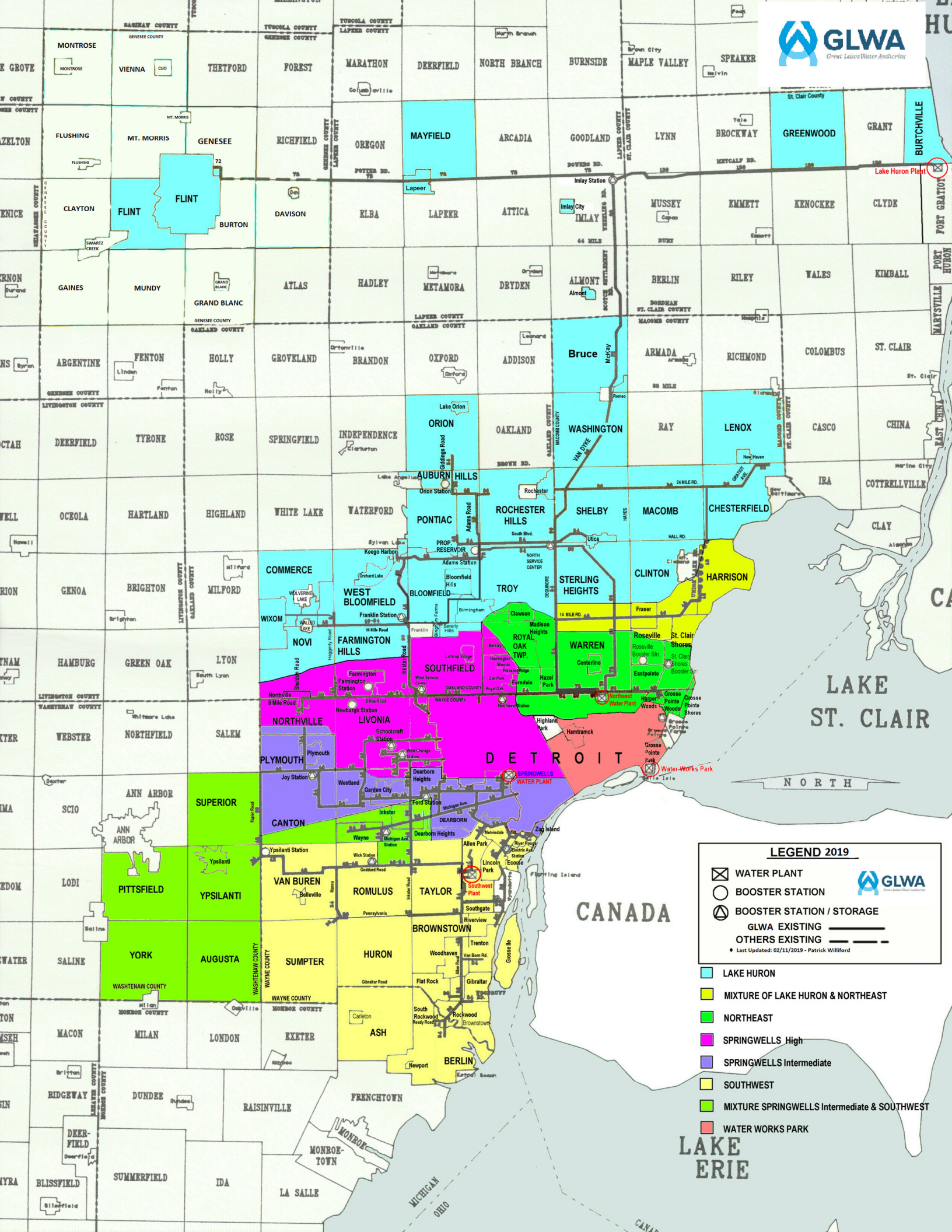
		Yearly Summary			Monthly Mineral Analyses Annual Averages															
					01/14/2020	02/11/2020	03/10/2020	04/14/2020	05/12/2020	06/16/2020	07/14/2020	08/10/2020	09/08/2020	10/12/2020	11/09/2020	12/15/2020	← Sample Dates			
Parameter	**Units**	**Max.**	**Min.**	**Avg.**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	***MCL***	***Sec.Std***	***MDL***	***STDEV***
Turbidity	N.T.U.	0.70	0.03	**0.11**	0.12	0.19	0.29	0.09	0.08	0.09	0.08	0.10	0.09	0.08	0.06	0.08	*0.3/95% (1)*			**0.06**
Total Solids	mg/L	167	46	**137**	81	139	136	144	144	156	162	158	141	152	141	97		*500*	*10*	**25**
Total Dissolved Solids	mg/L	162	77	**123**	108	127	137	131	131	139	132	117	131	115	110	92		*500*	*10*	**14**
Aluminum	mg/L	0.197	0.014	**0.071**	*AE*	*AE*	*AE*	*AE*	0.150	0.050	0.090	0.087	0.086	0.045	0.036	0.021		*0.05-0.2*	*0.005*	**0.041**
Iron	mg/L	0.183	ND	**0.112**	*ND*	*ND*	*ND*	*ND*	0.179	0.180	0.165	0.166	0.172	0.171	0.167	0.151		*0.3*	*0.005*	**0.009**
Copper	mg/L	0.008	ND	**0.000**	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	0.002	*ND*	*ND*	*ND*	*1.3 (AL)*		*0.002*	
Magnesium	mg/L	8.36	5.93	**7.40**	7.08	6.98	7.22	6.62	7.57	7.88	7.65	7.76	7.83	7.82	7.34	7.09			*0.5*	**0.41**
Calcium	mg/L	34.8	23.5	**27.6**	*AE*	31.1	31.4	24.0	26.5	27.6	25.8	26.2	27.4	27.5	25.5	24.2			*0.1*	**2.4**
Sodium	mg/L	7.78	4.43	**5.14**	5.10	5.90	5.99	5.68	4.79	5.32	4.89	5.10	4.97	4.93	4.58	4.48		*20 (2)*	*0.1*	**0.49**
Potassium	mg/L	1.31	0.89	**1.00**	1.00	1.06	1.08	0.99	0.99	1.02	0.95	0.99	1.02	1.02	0.97	0.91			*0.1*	**0.05**
Manganese	mg/L	ND	ND	**0.000**	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*		*0.05*	*0.002*	
Lead	mg/L	ND	ND	**0.000**	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*0.015 (AL)*		*0.002*	
Zinc	mg/L	0.00	ND	**0.00**	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	0.00	0.00		*5*	*0.1*	**0.00**
Silica	mg/L	19.5	ND	**2.3**	2.1	1.8	2.1	6.4	1.4	2.0	1.9	1.8	1.9	2.0	2.1	2.4			*0.4*	**1.3**
Sulfate	mg/L	43.0	14.5	**25.1**	25.8	28.9	30.5	30.3	21.7	23.4	21.3	24.9	24.5	23.2	23.8	22.7				**3.2**
Chloride	mg/L	13.9	8.1	**9.6**	9.5	9.3	12.1	9.6	8.7	10.3	10.3	9.8	8.8	9.0	8.5	9.8		*250*	*5*	**1.0**
Phosphorus	mg/L	1.40	0.11	**0.51**	0.39	1.23	1.17	0.37	0.40	0.37	0.13	0.41	0.39	0.39	0.43	0.38			*0.05*	**0.33**
Free Carbon Dioxide	mg/L	16.7	5.7	**8.0**	9.0	10.8	9.1	8.2	6.8	7.1	6.7	7.3	7.0	8.0	8.5	7.9				**1.2**
Total Hardness (3), (4), (5)	mg/L	118	95	**103**	100	107	108	100	103	107	102	99	101	101	100	107				**3**
Total Alkalinity (3)	mg/L	80	66	**72**	73	73	73	72	74	76	71	70	71	75	69	73				**2**
Carbonate Alkalinity (3)	mg/L	0	0	**0**	0	0	0	0	0	0	0	0	0	0	0	0				**0**
Bi-Carbonate Alkalinity (3)	mg/L	80	66	**72**	72	73	73	71	74	76	70	69	71	74	69	73				**2**
Non-Carbonate Hardness (3)	mg/L	40	22	**30**	28	34	34	28	29	31	31	30	30	27	31	34				**2**
Chemical Oxygen Demand	mg/L	13.5	ND	**2.4**	0.6	*AE*	*AE*	*AE*	*AE*	*AE*	6.1	3.6	0.6	2.6	3.1	*ND*			*2*	**2.1**
Dissolved Oxygen	mg/L	17.0	7.8	**11.1**	12.9	13.4	14.2	12.3	11.2	9.4	9.2	9.3	8.6	9.9	11.3	11.9				**1.8**
Nitrite Nitrogen	mg/L	ND	ND	**0.0**	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*ND*	*1*		*0.1*	
Nitrate Nitrogen	mg/L	1.18	0.21	**0.38**	0.28	0.61	0.43	0.43	0.39	0.42	0.32	0.28	0.37	0.35	0.34	0.37	*10*	*10*	*0.1*	**0.09**
Fluoride	mg/L	0.81	0.49	**0.65**	0.59	0.58	0.71	0.59	0.55	0.69	0.58	0.73	0.69	0.73	0.68	0.65	*4*		*0.5*	**0.07**
pH		7.41	6.97	**7.26**	7.21	7.15	7.22	7.25	7.35	7.34	7.32	7.28	7.31	7.27	7.22	7.28	*6.5-8.5*	*6.5-8.5*		**0.06**
Specific Conductance @ 25 °C.	µmhos	274	195	**224**	228	239	242	229	223	220	208	227	220	215	220	219				**10**
Temperature	°C	25.8	1.8	**13.7**	5.5	3.7	7.5	8.7	11.2	19.0	24.4	24.0	21.5	16.6	14.0	8.4				**7.3**

Legend	**Notes:**
MCL: Maximum Contaminant Level	(1) Turbidity must not exceed 0.3 NTU in 95% of daily samples in any month
Sec.Std: Secondary Standard	(2) EPA Guidance Level
NTU: Nephelometric Turbidity Unit	(3) As Calcium Carbonate
mg/L: Milligram Per Liter	mg/L is equivalent to part per million (ppm)
µg/L: Microgram Per Liter	µg/L is equivalent to part per billion (ppb)
MDL: Method Detection Limit	(4) By Titration
< : Less than	(5) Tap Water Hardnessin in Grains per Gallon multiply value by 0.058 (Grains/Gallon)/(mg/L) -->
AE: Analytical Error	(6) Reported results are below the low calibration standard but above the instrument detection limit.
IV: Invalid Sample	ND = Not detected above the reporting limit
Below dertection limit	Blue text indicates value was less than the detection limit and is considered zero for calculation purposes.

Maximum	Minimum	Average	
6.8	5.5	6.0	GPG

Modified: 02/10/2021, 09:11

Chemist II: Patrick Williford


GLWA
Great Lakes Water Authority
LEGEND 2019
WATER PLANT
BOOSTER STATION
BOOSTER STATION / STORAGE
GLWA EXISTING
OTHERS EXISTING
Last Updated: 02/11/2019 - Patrick Williford
LAKE HURON
MIXTURE OF LAKE HURON & NORTHEAST
NORTHEAST
SPRINGWELLS High
SPRINGWELLS Intermediate
SOUTHWEST
MIXTURE SPRINGWELLS Intermediate & SOUTHWEST
WATER WORKS PARK
Lake Huron Plant
Northeast Water Plant
Southwest Plant
SPRINGWELLS WATER PLANT
Water Works Park
DETROIT
LAKE ST. CLAIR
LAKE ERIE
CANADA
NORTH
FLINT
MAYFIELD
GREENWOOD
BURTCHVILLE
BRUCE
WASHINGTON
LENOX
ORION
AUBURN HILLS
PONTIAC
ROCHESTER HILLS
SHELBY
MACOMB
CHESTERFIELD
HARRISON
COMMERCE
WEST BLOOMFIELD
BLOOMFIELD
TROY
STERLING HEIGHTS
CLINTON
NOVI
FARMINGTON HILLS
SOUTHFIELD
ROYAL OAK TWP.
WARREN
NORTHVILLE
LIVONIA
PLYMOUTH
SUPERIOR
CANTON
DEARBORN
SPRINGWELLS WATER PLANT
PITTSFIELD
YPSILANTI
VAN BUREN
ROMULUS
TAYLOR
YORK
AUGUSTA
SUMPTER
HURON
BROWNSTOWN
ASH
BERLIN
Grosse Ile
Fighting Island
Zug Island
Belle Isle