



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

Lake Huron Water Treatment Plant Mineral Report

Sample Date: 07/12/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	1.70	0.07	0.3/95% (1)		
Total Solids		mg/L	156	166		500	10
Total Dissolved Solids		mg/L	146	147		500	10
Aluminum	Al	mg/L	< 0.050	0.083		0.05-0.2	0.005
Iron	Fe	mg/L	0.076	< 0.050		0.3	0.005
Copper	Cu	mg/L	0.006	< 0.005	1.3 (AL)	1.0	0.005
Magnesium	Mg	mg/L	8.94	9.32			0.5
Calcium	Ca	mg/L	29.3	30.2			0.1
Sodium	Na	mg/L	4.27	4.40		20 (2)	0.1
Potassium	K	mg/L	0.98	0.95			0.1
Manganese	Mn	mg/L	0.006	< 0.002		0.05	0.002
Lead	Pb	mg/L	< 0.002	< 0.002	0.015 (AL)		0.002
Zinc	Zn	mg/L	< 0.010	< 0.010		5	0.1
Silica	SiO ₂	mg/L	0.7	1.0			0.4
Sulfate	SO ₄ ²⁻	mg/L	16.1	19.4		250	
Chloride	Cl ⁻	mg/L	8.0	10.0		250	5
Phosphorus	P	mg/L	< 0.05	0.35			0.05
Free Carbon Dioxide	CO ₂	mg/L	1.3	3.9			
Total Hardness (3), (4), (5)		mg/L	100	102			
Total Alkalinity (3)		mg/L	80	75			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	80	75			
Non-Carbonate Hardness (3)		mg/L	20	27			
Chemical Oxygen Demand		mg/L	6.0	5.6			2
Dissolved Oxygen		mg/L	9.3	9.0			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.32	0.31	10		0.1
Fluoride	F ⁻	mg/L	0.13	0.87	4.0	2.0	0.5
pH			8.09	7.58	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	221	226			
Temperature		°C	16.0	16.0			

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) Tap Water Hardness in Grains per Gallon 5.92 GPG
AE: Analytical Error	(6) Reported results are below the low calibration standard but above the instrument
IV: Invalid Sample	detection limit.

Analyst: Brian Brown Chemist-I Initial **B. B.** Date: 10/14/2016
 Reviewed By: Patrick Williford Chemist-II Initial **P. W.** Date: 10/14/2016

Great Lakes Water Authority



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Southwest Water Treatment Plant Mineral Report

Sample Date: 07/12/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	13.10	0.04	0.3/95% (1)		
Total Solids		mg/L	174	151		500	10
Total Dissolved Solids		mg/L	140	129		500	10
Aluminum	Al	mg/L	0.167	0.089		0.05-0.2	0.005
Iron	Fe	mg/L	0.168	< 0.050		0.3	0.005
Copper	Cu	mg/L	0.010	< 0.005	1.3 (AL)	1.0	0.005
Magnesium	Mg	mg/L	11.69	8.36			0.5
Calcium	Ca	mg/L	29.0	8.6			0.1
Sodium	Na	mg/L	4.30	4.33		20 (2)	0.1
Potassium	K	mg/L	0.97	0.94			0.1
Manganese	Mn	mg/L	0.012	< 0.002		0.05	0.002
Lead	Pb	mg/L	< 0.002	< 0.002	0.015 (AL)		0.002
Zinc	Zn	mg/L	< 0.010	< 0.010		5	0.1
Silica	SiO ₂	mg/L	0.6	0.8			0.4
Sulfate	SO ₄ ²⁻	mg/L	17.1	21.7		250	
Chloride	Cl ⁻	mg/L	8.0	10.0		250	5
Phosphorus	P	mg/L	< 0.05	0.36			0.05
Free Carbon Dioxide	CO ₂	mg/L	0.8	3.9			
Total Hardness (3), (4), (5)		mg/L	100	101			
Total Alkalinity (3)		mg/L	87	72			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	87	72			
Non-Carbonate Hardness (3)		mg/L	13	29			
Chemical Oxygen Demand		mg/L	2.4	3.6			2
Dissolved Oxygen		mg/L	9.6	9.4			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.29	0.25	10		0.1
Fluoride	F ⁻	mg/L	0.15	0.80	4.0	2.0	0.5
pH			8.32	7.57	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	217	224			
Temperature		°C	24.0	24.0			

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) Tap Water Hardness in Grains per Gallon 5.86 GPG
AE: Analytical Error	(6) Reported results are below the low calibration standard but above the instrument detection limit.
IV: Invalid Sample	

Analyst: Brian Brown Chemist-I Initial **B. B.** Date: 10/14/2016
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Water Works Park Water Treatment Plant Mineral Report

Sample Date: 07/12/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	2.60	0.11	0.3/95% (1)		
Total Solids		mg/L	146	163		500	10
Total Dissolved Solids		mg/L	146	142		500	10
Aluminum	Al	mg/L	< 0.050	0.083		0.05-0.2	0.005
Iron	Fe	mg/L	0.053	< 0.050		0.3	0.005
Copper	Cu	mg/L	< 0.005	< 0.005	1.3 (AL)	1.0	0.005
Magnesium	Mg	mg/L	9.18	9.31			0.5
Calcium	Ca	mg/L	27.9	28.7			0.1
Sodium	Na	mg/L	4.00	4.11		20 (2)	0.1
Potassium	K	mg/L	0.99	0.95			0.1
Manganese	Mn	mg/L	0.003	< 0.002		0.05	0.002
Lead	Pb	mg/L	< 0.002	< 0.002	0.015 (AL)		0.002
Zinc	Zn	mg/L	< 0.010	< 0.010		5	0.1
Silica	SiO ₂	mg/L	0.8	0.9			0.4
Sulfate	SO ₄ ²⁻	mg/L	17.5	21.2		250	
Chloride	Cl ⁻	mg/L	8.0	9.5		250	5
Phosphorus	P	mg/L	< 0.05	0.27			0.05
Free Carbon Dioxide	CO ₂	mg/L	5.8	5.1			
Total Hardness (3), (4), (5)		mg/L	98	100			
Total Alkalinity (3)		mg/L	84	71			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	84	71			
Non-Carbonate Hardness (3)		mg/L	14	29			
Chemical Oxygen Demand		mg/L	3.6	6.4			2
Dissolved Oxygen		mg/L	9.2	10.3			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.39	0.31	10		0.1
Fluoride	F ⁻	mg/L	0.19	0.67	4.0	2.0	0.5
pH			7.46	7.44	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	218	234			
Temperature		°C	25.0	23.7			

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) Tap Water Hardness in Grains per Gallon 5.80 GPG
AE: Analytical Error	(6) Reported results are below the low calibration standard but above the instrument
IV: Invalid Sample	detection limit.

Analyst: Brian Brown Chemist-I Initial **B. B.** Date: 10/14/2016
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Northeast Water Treatment Plant Mineral Report

Sample Date: 07/12/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	2.60	0.05	0.3/95% (1)		
Total Solids		mg/L	146	142		500	10
Total Dissolved Solids		mg/L	146	119		500	10
Aluminum	Al	mg/L	< 0.050	0.058		0.05-0.2	0.005
Iron	Fe	mg/L	0.053	< 0.050		0.3	0.005
Copper	Cu	mg/L	< 0.005	< 0.005	1.3 (AL)	1.0	0.005
Magnesium	Mg	mg/L	9.18	9.47			0.5
Calcium	Ca	mg/L	27.9	28.1			0.1
Sodium	Na	mg/L	4.00	4.43		20 (2)	0.1
Potassium	K	mg/L	0.99	0.90			0.1
Manganese	Mn	mg/L	0.003	< 0.002		0.05	0.002
Lead	Pb	mg/L	< 0.002	< 0.002	0.015 (AL)		0.002
Zinc	Zn	mg/L	< 0.010	< 0.010		5	0.1
Silica	SiO ₂	mg/L	0.8	0.9			0.4
Sulfate	SO ₄ ²⁻	mg/L	17.5	24.0		250	
Chloride	Cl ⁻	mg/L	8.0	10.5		250	5
Phosphorus	P	mg/L	< 0.05	0.31			0.05
Free Carbon Dioxide	CO ₂	mg/L	5.8	5.0			
Total Hardness (3), (4), (5)		mg/L	98	100			
Total Alkalinity (3)		mg/L	84	74			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	84	74			
Non-Carbonate Hardness (3)		mg/L	14	26			
Chemical Oxygen Demand		mg/L	3.6	4.8			2
Dissolved Oxygen		mg/L	9.2	9.8			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.39	0.25	10		0.1
Fluoride	F ⁻	mg/L	0.19	0.73	4.0	2.0	0.5
pH			7.46	7.47	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	218	225			
Temperature		°C	25.0	25.2			

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) Tap Water Hardness in Grains per Gallon 5.80 GPG
AE: Analytical Error	(6) Reported results are below the low calibration standard but above the instrument
IV: Invalid Sample	detection limit.

Analyst: Brian Brown Chemist-I Initial **B. B.** Date: 10/14/2016
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Springwells Water Treatment Plant Mineral Report

Sample Date: 07/12/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	2.60	0.16	0.3/95% (1)		
Total Solids		mg/L	146	133		500	10
Total Dissolved Solids		mg/L	146	143		500	10
Aluminum	Al	mg/L	< 0.050	0.083		0.05-0.2	0.005
Iron	Fe	mg/L	0.053	< 0.050		0.3	0.005
Copper	Cu	mg/L	< 0.005	< 0.005	1.3 (AL)	1.0	0.005
Magnesium	Mg	mg/L	9.18	8.56			0.5
Calcium	Ca	mg/L	27.9	23.3			0.1
Sodium	Na	mg/L	4.00	4.25		20 (2)	0.1
Potassium	K	mg/L	0.99	0.93			0.1
Manganese	Mn	mg/L	0.003	0.006		0.05	0.002
Lead	Pb	mg/L	< 0.002	< 0.002	0.015 (AL)		0.002
Zinc	Zn	mg/L	< 0.010	0.04		5	0.1
Silica	SiO ₂	mg/L	0.8	0.9			0.4
Sulfate	SO ₄ ²⁻	mg/L	17.5	24.0		250	
Chloride	Cl ⁻	mg/L	8.0	11.5		250	5
Phosphorus	P	mg/L	< 0.05	0.64			0.05
Free Carbon Dioxide	CO ₂	mg/L	5.8	5.8			
Total Hardness (3), (4), (5)		mg/L	98	103			
Total Alkalinity (3)		mg/L	84	82			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	84	82			
Non-Carbonate Hardness (3)		mg/L	14	21			
Chemical Oxygen Demand		mg/L	3.6	2.4			2
Dissolved Oxygen		mg/L	9.2	9.6			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.39	0.25	10		0.1
Fluoride	F ⁻	mg/L	0.19	0.70	4.0	2.0	0.5
pH			7.46	7.45	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	218	226			
Temperature		°C	25.0	24.0			

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) Tap Water Hardness in Grains per Gallon 5.97 GPG
AE: Analytical Error	(6) Reported results are below the low calibration standard but above the instrument detection limit.
IV: Invalid Sample	

Analyst: Brian Brown Chemist-I Initial **B. B.** Date: 10/14/2016
 Reviewed By: Patrick Williford Chemist-II Initial **P. W.** Date: 10/14/2016

Great Lakes Water Authority



All GLWA Water Treatment Plant Mineral Reports

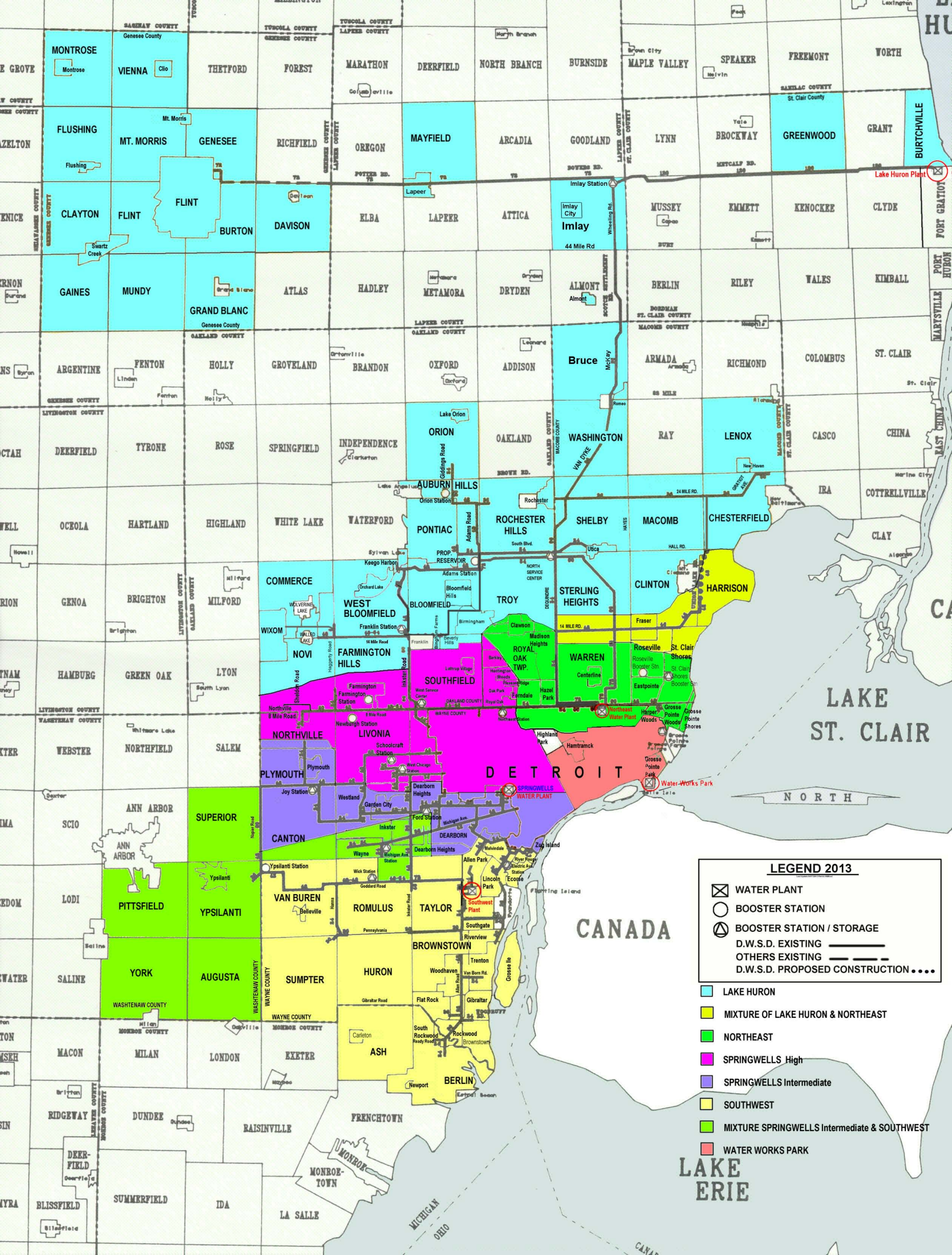
Sample Dates: 07/12/2016 07/12/2016 07/12/2016 07/12/2016 07/12/2016 07/12/2016 07/12/2016 07/12/2016

Parameter	Formula	Units	Lake Huron		Southwest		Belle Isle		Water Works Park	Northeast	Springwells	MCL	Sec.Std	MDL
			Raw	Tap	Raw	Tap	Raw	Tap	Tap	Tap	Tap			
Turbidity		NTU	1.70	0.07	13.10	0.04	2.60	0.11	0.05	0.16	0.3/95% (1)			
Total Solids		mg/L	156	166	174	151	146	163	142	133			500	10
Total Dissolved Solids		mg/L	146	147	140	129	146	142	119	143			500	10
Aluminum	Al	mg/L	< 0.050	0.083	0.167	0.089	< 0.050	0.083	0.058	0.083			0.05-0.2	0.005
Iron	Fe	mg/L	0.076	< 0.050	0.168	< 0.050	0.053	< 0.050	< 0.050	< 0.050			0.3	0.005
Copper	Cu	mg/L	0.006	< 0.005	0.010	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	1.3 (AL)		1.0	0.005
Magnesium	Mg	mg/L	8.94	9.32	11.69	8.36	9.18	9.31	9.47	8.56				0.5
Calcium	Ca	mg/L	29.3	30.2	29.0	8.6	27.9	28.7	28.1	23.3				0.1
Sodium	Na	mg/L	4.27	4.40	4.30	4.33	4.00	4.11	4.43	4.25			20 (2)	0.1
Potassium	K	mg/L	0.98	0.95	0.97	0.94	0.99	0.95	0.90	0.93				0.1
Manganese	Mn	mg/L	0.006	< 0.002	0.012	< 0.002	0.003	< 0.002	< 0.002	0.006			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	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.04			5	0.1
Silica	SiO ₂	mg/L	0.7	1.0	0.6	0.8	0.8	0.9	0.9	0.9				0.4
Sulfate	SO ₄ ²⁻	mg/L	16.1	19.4	17.1	21.7	17.5	21.2	24.0	24.0			250	
Chloride	Cl ⁻	mg/L	8.0	10.0	8.0	10.0	8.0	9.5	10.5	11.5			250	5
Phosphorus	P	mg/L	< 0.05	0.35	< 0.05	0.36	< 0.05	0.27	0.31	0.64				0.05
Free Carbon Dioxide	CO ₂	mg/L	1.3	3.9	0.8	3.9	5.8	5.1	5.0	5.8				
Total Hardness (3), (4), (5)		mg/L	100	102	100	101	98	100	100	103				
Total Alkalinity (3)		mg/L	80	75	87	72	84	71	74	82				
Carbonate Alkalinity (3)		mg/L	0	0	0	0	0	0	0	0				
Bi-Carbonate Alkalinity (3)		mg/L	80	75	87	72	84	71	74	82				
Non-Carbonate Hardness (3)		mg/L	20	27	13	29	14	29	26	21				
Chemical Oxygen Demand		mg/L	6.0	5.6	2.4	3.6	3.6	6.4	4.8	2.4				2
Dissolved Oxygen		mg/L	9.3	9.0	9.6	9.4	9.2	10.3	9.8	9.6				
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	0.32	0.31	0.29	0.25	0.39	0.31	0.25	0.25			10	0.1
Fluoride	F ⁻	mg/L	0.13	0.87	0.15	0.80	0.19	0.67	0.73	0.70			4.0	2.0
pH			8.09	7.58	8.32	7.57	7.46	7.44	7.47	7.45			6.5-8.5	6.5-8.5
Specific Conductance @ 25 °C.		micromhos	221	226	217	224	218	234	225	226				
Temperature		°C	16.0	16.0	24.0	24.0	25.0	23.7	25.2	24.0				

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) Tap Water Hardness 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
IV: Invalid Sample	detection limit.

Analyst: Brian Brown Chemist-I Initial **B. B.** Date: 10/14/2016
 Reviewed By: Patrick Williford Chemist-II Initial **P. W.** Date: 10/14/2016

Great Lakes Water Authority



LEGEND 2013

- ☒ WATER PLANT
- BOOSTER STATION
- ⊕ BOOSTER STATION / STORAGE
- D.W.S.D. EXISTING
- - - OTHERS EXISTING
- ⋯ D.W.S.D. PROPOSED CONSTRUCTION

- ☐ LAKE HURON
- ☐ MIXTURE OF LAKE HURON & NORTHEAST
- ☐ NORTHEAST
- ☐ SPRINGWELLS High
- ☐ SPRINGWELLS Intermediate
- ☐ SOUTHWEST
- ☐ MIXTURE SPRINGWELLS Intermediate & SOUTHWEST
- ☐ WATER WORKS PARK

LAKE ERIE

NORTH

CANADA

MICHIGAN
OHIO