



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: 04/12/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	4.60	0.06	0.3/95% (1)		
Total Solids		mg/L	124	128		500	10
Total Dissolved Solids		mg/L	124	117		500	10
Aluminum	Al	mg/L	< 0.050	< 0.050		0.05-0.2	0.005
Iron	Fe	mg/L	0.103	< 0.050		0.3	0.005
Copper	Cu	mg/L	0.006	< 0.005	1.3	1.0	0.002
Magnesium	Mg	mg/L	9.39	9.15			0.5
Calcium	Ca	mg/L	23.2	23.3			0.1
Sodium	Na	mg/L	5.13	5.03		20 (2)	0.1
Potassium	K	mg/L	0.98	0.93			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	1.1	1.3			0.4
Sulfate	SO ₄ ²⁻	mg/L	16.8	23.0		250	
Chloride	Cl ⁻	mg/L	7.5	9.0		250	5
Phosphorus	P	mg/L	< 0.05	0.35			0.05
Free Carbon Dioxide	CO ₂	mg/L	5.8	6.1			
Total Hardness (3), (4), (5)		mg/L	110	102			
Total Alkalinity (3)		mg/L	82	62			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	82	62			
Non-Carbonate Hardness (3)		mg/L	28	40			
Chemical Oxygen Demand		mg/L	6.0	4.4			2
Dissolved Oxygen		mg/L	12.3	12.8			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.37	0.34	10		0.1
Fluoride	F ⁻	mg/L	0.07	0.56	4.0	2.0	0.5
pH			7.45	7.31	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	181	218			
Temperature		°C	9.7	8.8			

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) 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: 06/29/2016
 Reviewed By: Patrick Williford Chemist-II Initial **P. W.** Date: 06/30/2016

Great Lakes Water Authority



WATER QUALITY DEPARTMENT
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Southwest Water Treatment Plant Mineral Report

Sample Date: 04/12/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	16.00	0.04	0.3/95% (1)		
Total Solids		mg/L	158	170		500	10
Total Dissolved Solids		mg/L	130	135		500	10
Aluminum	Al	mg/L	0.361	< 0.050		0.05-0.2	0.005
Iron	Fe	mg/L	0.362	< 0.050		0.3	0.005
Copper	Cu	mg/L	0.016	< 0.005	1.3	1.0	0.002
Magnesium	Mg	mg/L	10.24	11.01			0.5
Calcium	Ca	mg/L	27.0	23.2			0.1
Sodium	Na	mg/L	6.80	7.23		20 (2)	0.1
Potassium	K	mg/L	1.09	1.17			0.1
Manganese	Mn	mg/L	0.008	< 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	1.1	1.1			0.4
Sulfate	SO ₄ ²⁻	mg/L	19.4	33.4		250	
Chloride	Cl ⁻	mg/L	10.5	12.5		250	5
Phosphorus	P	mg/L	< 0.05	0.27			0.05
Free Carbon Dioxide	CO ₂	mg/L	3.2	8.2			
Total Hardness (3), (4), (5)		mg/L	110	126			
Total Alkalinity (3)		mg/L	102	80			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	102	80			
Non-Carbonate Hardness (3)		mg/L	8	46			
Chemical Oxygen Demand		mg/L	3.6	4.4			2
Dissolved Oxygen		mg/L	12.1	11.9			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.67	0.80	10		0.1
Fluoride	F ⁻	mg/L	0.09	0.44	4.0	2.0	0.5
pH			7.80	7.29	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	252	265			
Temperature		°C	7.0	5.8			

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) Tap Water Hardness in Grains per Gallon 7.31 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: 06/29/2016
 Reviewed By: Patrick Williford Chemist-II Initial **P. W.** Date: 06/30/2016

Great Lakes Water Authority



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Water Works Park Water Treatment Plant Mineral Report

Sample Date: 04/12/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	12.00	0.05	0.3/95% (1)		
Total Solids		mg/L	135	140		500	10
Total Dissolved Solids		mg/L	124	134		500	10
Aluminum	Al	mg/L	0.151	< 0.050		0.05-0.2	0.005
Iron	Fe	mg/L	0.220	< 0.050		0.3	0.005
Copper	Cu	mg/L	< 0.005	0.006	1.3	1.0	0.002
Magnesium	Mg	mg/L	10.07	8.38			0.5
Calcium	Ca	mg/L	26.3	23.2			0.1
Sodium	Na	mg/L	5.61	5.11		20 (2)	0.1
Potassium	K	mg/L	1.49	1.06			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	1.1	1.2			0.4
Sulfate	SO ₄ ²⁻	mg/L	17.5	21.7		250	
Chloride	Cl ⁻	mg/L	8.5	10.0		250	5
Phosphorus	P	mg/L	< 0.05	0.32			0.05
Free Carbon Dioxide	CO ₂	mg/L	6.7	10.5			
Total Hardness (3), (4), (5)		mg/L	112	108			
Total Alkalinity (3)		mg/L	80	76			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	80	76			
Non-Carbonate Hardness (3)		mg/L	32	32			
Chemical Oxygen Demand		mg/L	5.6	< 2.0			2
Dissolved Oxygen		mg/L	12.0	12.5			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.44	0.51	10		0.1
Fluoride	F ⁻	mg/L	0.06	0.59	4.0	2.0	0.5
pH			7.38	7.16	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	190	245			
Temperature		°C	9.5	10.3			

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) Tap Water Hardness in Grains per Gallon 6.26 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: 06/29/2016
 Reviewed By: Patrick Williford Chemist-II Initial **P. W.** Date: 06/30/2016

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Northeast Water Treatment Plant Mineral Report

Sample Date: 04/12/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	12.00	0.07	0.3/95% (1)		
Total Solids		mg/L	135	154		500	10
Total Dissolved Solids		mg/L	124	124		500	10
Aluminum	Al	mg/L	0.151	< 0.050		0.05-0.2	0.005
Iron	Fe	mg/L	0.220	< 0.050		0.3	0.005
Copper	Cu	mg/L	< 0.005	0.005	1.3	1.0	0.002
Magnesium	Mg	mg/L	10.07	9.47			0.5
Calcium	Ca	mg/L	26.3	25.8			0.1
Sodium	Na	mg/L	5.61	5.65		20 (2)	0.1
Potassium	K	mg/L	1.49	1.03			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	1.1	1.2			0.4
Sulfate	SO ₄ ²⁻	mg/L	17.5	28.3		250	
Chloride	Cl ⁻	mg/L	8.5	10.5		250	5
Phosphorus	P	mg/L	< 0.05	0.34			0.05
Free Carbon Dioxide	CO ₂	mg/L	6.7	7.0			
Total Hardness (3), (4), (5)		mg/L	112	110			
Total Alkalinity (3)		mg/L	80	80			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	80	80			
Non-Carbonate Hardness (3)		mg/L	32	30			
Chemical Oxygen Demand		mg/L	5.6	2.4			2
Dissolved Oxygen		mg/L	12.0	12.6			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.44	0.48	10		0.1
Fluoride	F ⁻	mg/L	0.06	0.44	4.0	2.0	0.5
pH			7.38	7.36	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	190	239			
Temperature		°C	9.5	7.5			

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) Tap Water Hardness in Grains per Gallon 6.38 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: 06/29/2016
 Reviewed By: Patrick Williford Chemist-II Initial **P. W.** Date: 06/30/2016

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Springwells Water Treatment Plant Mineral Report

Sample Date: 04/12/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	12.00	0.11	0.3/95% (1)		
Total Solids		mg/L	135	143		500	10
Total Dissolved Solids		mg/L	124	122		500	10
Aluminum	Al	mg/L	0.151	< 0.050		0.05-0.2	0.005
Iron	Fe	mg/L	0.220	0.212		0.3	0.005
Copper	Cu	mg/L	< 0.005	0.006	1.3	1.0	0.002
Magnesium	Mg	mg/L	10.07	11.13			0.5
Calcium	Ca	mg/L	26.3	25.3			0.1
Sodium	Na	mg/L	5.61	5.48		20 (2)	0.1
Potassium	K	mg/L	1.49	1.13			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	0.01		5	0.1
Silica	SiO ₂	mg/L	1.1	1.1			0.4
Sulfate	SO ₄ ²⁻	mg/L	17.5	26.5		250	
Chloride	Cl ⁻	mg/L	8.5	11.5		250	5
Phosphorus	P	mg/L	< 0.05	0.64			0.05
Free Carbon Dioxide	CO ₂	mg/L	6.7	5.9			
Total Hardness (3), (4), (5)		mg/L	112	104			
Total Alkalinity (3)		mg/L	80	78			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	80	78			
Non-Carbonate Hardness (3)		mg/L	32	26			
Chemical Oxygen Demand		mg/L	5.6	< 2.0			2
Dissolved Oxygen		mg/L	12.0	12.9			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.44	0.50	10		0.1
Fluoride	F ⁻	mg/L	0.06	0.44	4.0	2.0	0.5
pH			7.38	7.42	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	190	237			
Temperature		°C	9.5	7.3			

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) Tap Water Hardness in Grains per Gallon 6.03 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: 07/01/2016
 Reviewed By: Patrick Williford Chemist-II Initial **P. W.** Date: 07/01/2016

Great Lakes Water Authority



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All GLWA Water Treatment Plant Mineral Reports

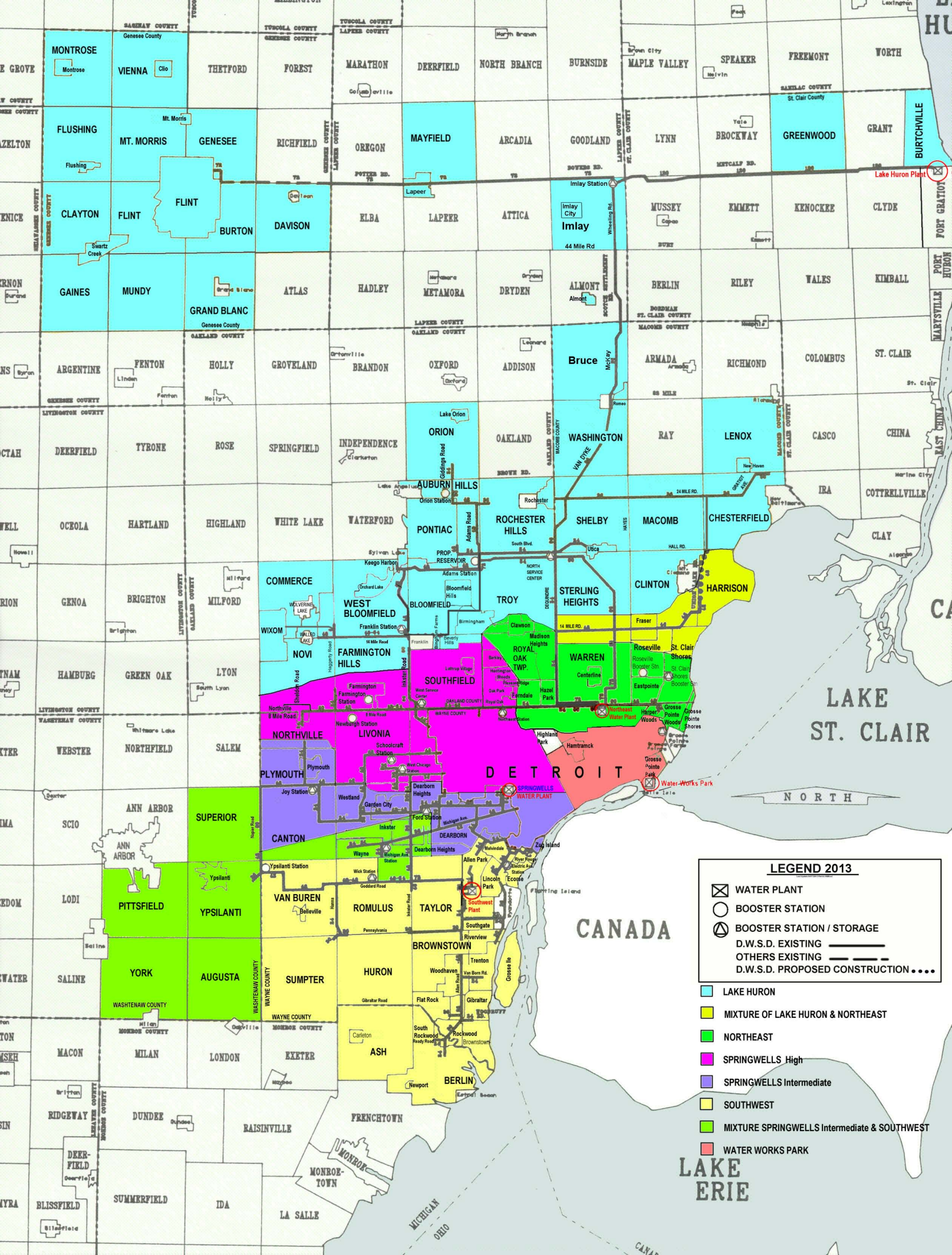
Sample Dates: 04/12/2016 04/12/2016 04/12/2016 04/12/2016 04/12/2016 04/12/2016 04/12/2016 04/12/2016

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	4.60	0.06	16.00	0.04	12.00	0.05	0.07	0.11	0.3/95% (1)			
Total Solids		mg/L	124	128	158	170	135	140	154	143		500	10	
Total Dissolved Solids		mg/L	124	117	130	135	124	134	124	122		500	10	
Aluminum	Al	mg/L	< 0.050	< 0.050	0.361	< 0.050	0.151	< 0.050	< 0.050	< 0.050		0.05-0.2	0.005	
Iron	Fe	mg/L	0.103	< 0.050	0.362	< 0.050	0.220	< 0.050	< 0.050	0.212		0.3	0.005	
Copper	Cu	mg/L	0.006	< 0.005	0.016	< 0.005	< 0.005	0.006	0.005	0.006	1.3	1.0	0.002	
Magnesium	Mg	mg/L	9.39	9.15	10.24	11.01	10.07	8.38	9.47	11.13			0.5	
Calcium	Ca	mg/L	23.2	23.3	27.0	23.2	26.3	23.2	25.8	25.3			0.1	
Sodium	Na	mg/L	5.13	5.03	6.80	7.23	5.61	5.11	5.65	5.48		20 (2)	0.1	
Potassium	K	mg/L	0.98	0.93	1.09	1.17	1.49	1.06	1.03	1.13			0.1	
Manganese	Mn	mg/L	0.003	< 0.002	0.008	< 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)		0.002	
Zinc	Zn	mg/L	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.01		5	0.1	
Silica	SiO ₂	mg/L	1.1	1.3	1.1	1.1	1.1	1.2	1.2	1.1			0.4	
Sulfate	SO ₄ ²⁻	mg/L	16.8	23.0	19.4	33.4	17.5	21.7	28.3	26.5		250		
Chloride	Cl ⁻	mg/L	7.5	9.0	10.5	12.5	8.5	10.0	10.5	11.5		250	5	
Phosphorus	P	mg/L	< 0.05	0.35	< 0.05	0.27	< 0.05	0.32	0.34	0.64			0.05	
Free Carbon Dioxide	CO ₂	mg/L	5.8	6.1	3.2	8.2	6.7	10.5	7.0	5.9				
Total Hardness (3), (4), (5)		mg/L	110	102	110	126	112	108	110	104				
Total Alkalinity (3)		mg/L	82	62	102	80	80	76	80	78				
Carbonate Alkalinity (3)		mg/L	0	0	0	0	0	0	0	0				
Bi-Carbonate Alkalinity (3)		mg/L	82	62	102	80	80	76	80	78				
Non-Carbonate Hardness (3)		mg/L	28	40	8	46	32	32	30	26				
Chemical Oxygen Demand		mg/L	6.0	4.4	3.6	4.4	5.6	< 2.0	2.4	< 2.0			2	
Dissolved Oxygen		mg/L	12.3	12.8	12.1	11.9	12.0	12.5	12.6	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	0.37	0.34	0.67	0.80	0.44	0.51	0.48	0.50	10		0.1	
Fluoride	F ⁻	mg/L	0.07	0.56	0.09	0.44	0.06	0.59	0.44	0.44	4.0	2.0	0.5	
pH			7.45	7.31	7.80	7.29	7.38	7.16	7.36	7.42	6.5-8.5	6.5-8.5		
Specific Conductance @ 25 °C.		micromhos	181	218	252	265	190	245	239	237				
Temperature		°C	9.7	8.8	7.0	5.8	9.5	10.3	7.5	7.3				

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) 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: 07/01/2016
 Reviewed By: Patrick Williford Chemist-II Initial **P. W.** Date: 07/01/2016

Great Lakes Water Authority

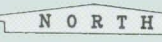


LEGEND 2013

- 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



CANADA

MICHIGAN
OHIO