



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: 02/14/2017 02/14/2017 02/14/2017 02/14/2017 02/14/2017 02/14/2017 02/14/2017 02/14/2017

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			
Turbidity		NTU	1.20	0.07	6.80	0.02	2.10	0.12	0.07	0.03	0.3/95% (1)		
Total Solids		mg/L	133	146	149	152	143	147	140	156		500	10
Total Dissolved Solids		mg/L	84	100	86	105	95	106	96	116		500	10
Aluminum	Al	mg/L	0.061	0.091	0.239	0.076	0.083	0.079	0.071	0.056		0.05-0.2	0.005
Iron	Fe	mg/L	0.209	0.150	0.807	0.069	0.807	0.119	0.009	0.011		0.3	0.005
Copper	Cu	mg/L	0.010	0.011	0.016	0.009	< 0.005	0.008	0.007	0.010	1.3 (AL)	1.0	0.002
Magnesium	Mg	mg/L	8.16	10.43	9.73	10.14	11.10	10.79	8.49	8.56			0.5
Calcium	Ca	mg/L	30.3	27.9	35.4	32.8	31.0	31.7	29.5	32.2			0.1
Sodium	Na	mg/L	4.71	4.52	5.66	5.88	5.48	5.76	5.79	6.08		20 (2)	0.1
Potassium	K	mg/L	0.91	0.93	0.98	0.97	0.96	0.96	0.97	0.95			0.1
Manganese	Mn	mg/L	< 0.002	< 0.002	0.006	< 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	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.03		5	0.1
Silica	SiO ₂	mg/L	0.8	1.0	0.9	1.1	1.0	1.0	1.0	1.0			0.4
Sulfate	SO ₄ ²⁻	mg/L	17.5	20.3	17.1	27.7	17.6	22.9	24.1	30.9		250	
Chloride	Cl ⁻	mg/L	7.0	8.5	17.5	17.5	8.5	10.0	10.0	9.5		250	5
Phosphorus	P	mg/L	< 0.05	0.37	< 0.05	0.35	< 0.05	0.32	0.36	0.67			0.05
Free Carbon Dioxide	CO ₂	mg/L	1.8	1.8	1.4	3.2	6.5	2.8	2.7	1.3			
Total Hardness (3), (4), (5)		mg/L	108	104	100	104	100	102	102	108			
Total Alkalinity (3)		mg/L	94	82	92	76	86	82	86	72			
Carbonate Alkalinity (3)		mg/L	0	0	0	0	0	0	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	94	82	92	76	86	82	86	72			
Non-Carbonate Hardness (3)		mg/L	14	22	8	28	14	20	16	36			
Chemical Oxygen Demand		mg/L	5.6	6.0	2.4	2.4	7.2	6.4	3.2	2.0			2
Dissolved Oxygen		mg/L	11.7	11.5	12.5	11.8	11.8	8.3	12.0	13.4			
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	0.29	0.28	0.30	0.38	0.33	0.32	0.30	0.28	10		0.1
Fluoride	F ⁻	mg/L	0.10	0.69	0.10	0.56	0.10	0.69	0.63	0.54	4.0	2.0	0.5
pH			8.02	7.96	8.10	7.67	7.42	7.76	7.80	8.04		6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	224	221	220	240	229	247	237	242			
Temperature		°C	8.4	9.5	3.9	5.2	4.5	4.5	5.4	6.0			

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
 Reviewed By: Patrick Williford

Chemist-I
 Management Professional - Ops.

Initials: **B. B.**
 Initials: **P. W.**

Date: 05/23/2017
 Date: 05/24/2017

Great Lakes Water Authority



WATER OPERATING SERVICES
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Lake Huron Water Treatment Plant - Mineral Report

Sample Dates: 02/14/2017

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	1.20	0.07	0.3/95% (1)		
Total Solids		mg/L	133	146		500	10
Total Dissolved Solids		mg/L	84	100		500	10
Aluminum	Al	mg/L	0.061	0.091		0.05-0.2	0.005
Iron	Fe	mg/L	0.209	0.150		0.3	0.005
Copper	Cu	mg/L	0.010	0.011	1.3 (AL)	1.0	0.002
Magnesium	Mg	mg/L	8.16	10.43			0.5
Calcium	Ca	mg/L	30.3	27.9			0.1
Sodium	Na	mg/L	4.71	4.52		20 (2)	0.1
Potassium	K	mg/L	0.91	0.93			0.1
Manganese	Mn	mg/L	< 0.002	< 0.002		0.05	0.002
Lead	Pb	mg/L	< 0.002	< 0.002	0.015 (AL)		0.001
Zinc	Zn	mg/L	< 0.010	< 0.010		5	0.1
Silica	SiO ₂	mg/L	0.8	1.0			0.4
Sulfate	SO ₄ ²⁻	mg/L	17.5	20.3		250	
Chloride	Cl ⁻	mg/L	7.0	8.5		250	5
Phosphorus	P	mg/L	< 0.05	0.37			0.05
Free Carbon Dioxide	CO ₂	mg/L	1.8	1.8			
Total Hardness (3), (4), (5)		mg/L	108	104			
Total Alkalinity (3)		mg/L	94	82			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	94	82			
Non-Carbonate Hardness (3)		mg/L	14	22			
Chemical Oxygen Demand		mg/L	5.6	6.0			2
Dissolved Oxygen		mg/L	11.7	11.5			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.29	0.28	10		0.1
Fluoride	F ⁻	mg/L	0.10	0.69	4.0	2.0	0.5
pH			8.02	7.96		6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	224	221			
Temperature		°C	8.4	9.5			

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 6.03 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 Initials: **B. B.** Date: 05/23/2017
 Reviewed By: Patrick Williford Management Professional - Ops. Initials: **P. W.** Date: 05/24/2017

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Northeast Water Treatment Plant - Mineral Report

Sample Dates: 02/14/2017

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	2.10	0.07	0.3/95% (1)		
Total Solids		mg/L	143	140		500	10
Total Dissolved Solids		mg/L	95	96		500	10
Aluminum	Al	mg/L	0.083	0.071		0.05-0.2	0.005
Iron	Fe	mg/L	0.807	0.009		0.3	0.005
Copper	Cu	mg/L	< 0.005	0.007	1.3 (AL)	1.0	0.002
Magnesium	Mg	mg/L	11.10	8.49			0.5
Calcium	Ca	mg/L	31.0	29.5			0.1
Sodium	Na	mg/L	5.48	5.79		20 (2)	0.1
Potassium	K	mg/L	0.96	0.97			0.1
Manganese	Mn	mg/L	0.002	< 0.002		0.05	0.002
Lead	Pb	mg/L	< 0.002	< 0.002	0.015 (AL)		0.001
Zinc	Zn	mg/L	< 0.010	< 0.010		5	0.1
Silica	SiO ₂	mg/L	1.0	1.0			0.4
Sulfate	SO ₄ ²⁻	mg/L	17.6	24.1		250	
Chloride	Cl ⁻	mg/L	8.5	10.0		250	5
Phosphorus	P	mg/L	< 0.05	0.36			0.05
Free Carbon Dioxide	CO ₂	mg/L	6.5	2.7			
Total Hardness (3), (4), (5)		mg/L	100	102			
Total Alkalinity (3)		mg/L	86	86			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	86	86			
Non-Carbonate Hardness (3)		mg/L	14	16			
Chemical Oxygen Demand		mg/L	7.2	3.2			2
Dissolved Oxygen		mg/L	11.8	12.0			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.33	0.30	10		0.1
Fluoride	F ⁻	mg/L	0.10	0.63	4.0	2.0	0.5
pH			7.42	7.80		6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	229	237			
Temperature		°C	4.5	5.4			

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 Initials: **B. B.** Date: 05/23/2017
 Reviewed By: Patrick Williford Management Professional - Ops. Initials: **P. W.** Date: 05/24/2017

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Southwest Water Treatment Plant - Mineral Report

Sample Dates: 02/14/2017

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	6.80	0.02	0.3/95% (1)		
Total Solids		mg/L	149	152		500	10
Total Dissolved Solids		mg/L	86	105		500	10
Aluminum	Al	mg/L	0.239	0.076		0.05-0.2	0.005
Iron	Fe	mg/L	0.807	0.069		0.3	0.005
Copper	Cu	mg/L	0.016	0.009	1.3 (AL)	1.0	0.002
Magnesium	Mg	mg/L	9.73	10.14			0.5
Calcium	Ca	mg/L	35.4	32.8			0.1
Sodium	Na	mg/L	5.66	5.88		20 (2)	0.1
Potassium	K	mg/L	0.98	0.97			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)		0.001
Zinc	Zn	mg/L	< 0.010	< 0.010		5	0.1
Silica	SiO ₂	mg/L	0.9	1.1			0.4
Sulfate	SO ₄ ²⁻	mg/L	17.1	27.7		250	
Chloride	Cl ⁻	mg/L	17.5	17.5		250	5
Phosphorus	P	mg/L	< 0.05	0.35			0.05
Free Carbon Dioxide	CO ₂	mg/L	1.4	3.2			
Total Hardness (3), (4), (5)		mg/L	100	104			
Total Alkalinity (3)		mg/L	92	76			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	92	76			
Non-Carbonate Hardness (3)		mg/L	8	28			
Chemical Oxygen Demand		mg/L	2.4	2.4			2
Dissolved Oxygen		mg/L	12.5	11.8			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.30	0.38	10		0.1
Fluoride	F ⁻	mg/L	0.10	0.56	4.0	2.0	0.5
pH			8.10	7.67		6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	220	240			
Temperature		°C	3.9	5.2			

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 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 Initials: **B. B.** Date: 05/23/2017
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Springwells Water Treatment Plant - Mineral Report

Sample Dates: 02/14/2017

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	2.10	0.03	0.3/95% (1)		
Total Solids		mg/L	143	156		500	10
Total Dissolved Solids		mg/L	95	116		500	10
Aluminum	Al	mg/L	0.083	0.056		0.05-0.2	0.005
Iron	Fe	mg/L	0.807	0.011		0.3	0.005
Copper	Cu	mg/L	< 0.005	0.010	1.3 (AL)	1.0	0.002
Magnesium	Mg	mg/L	11.10	8.56			0.5
Calcium	Ca	mg/L	31.0	32.2			0.1
Sodium	Na	mg/L	5.48	6.08		20 (2)	0.1
Potassium	K	mg/L	0.96	0.95			0.1
Manganese	Mn	mg/L	0.002	< 0.002		0.05	0.002
Lead	Pb	mg/L	< 0.002	< 0.002	0.015 (AL)		0.001
Zinc	Zn	mg/L	< 0.010	0.03		5	0.1
Silica	SiO ₂	mg/L	1.0	1.0			0.4
Sulfate	SO ₄ ²⁻	mg/L	17.6	30.9		250	
Chloride	Cl ⁻	mg/L	8.5	9.5		250	5
Phosphorus	P	mg/L	< 0.05	0.67			0.05
Free Carbon Dioxide	CO ₂	mg/L	6.5	1.3			
Total Hardness (3), (4), (5)		mg/L	100	108			
Total Alkalinity (3)		mg/L	86	72			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	86	72			
Non-Carbonate Hardness (3)		mg/L	14	36			
Chemical Oxygen Demand		mg/L	7.2	2.0			2
Dissolved Oxygen		mg/L	11.8	13.4			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.33	0.28	10		0.1
Fluoride	F ⁻	mg/L	0.10	0.54	4.0	2.0	0.5
pH			7.42	8.04		6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	229	242			
Temperature		°C	4.5	6.0			

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 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 Initials: **B. B.** Date: 05/23/2017
 Reviewed By: Patrick Williford Management Professional - Ops. Initials: **P. W.** Date: 05/24/2017

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Water Works Park Water Treatment Plant - Mineral Report

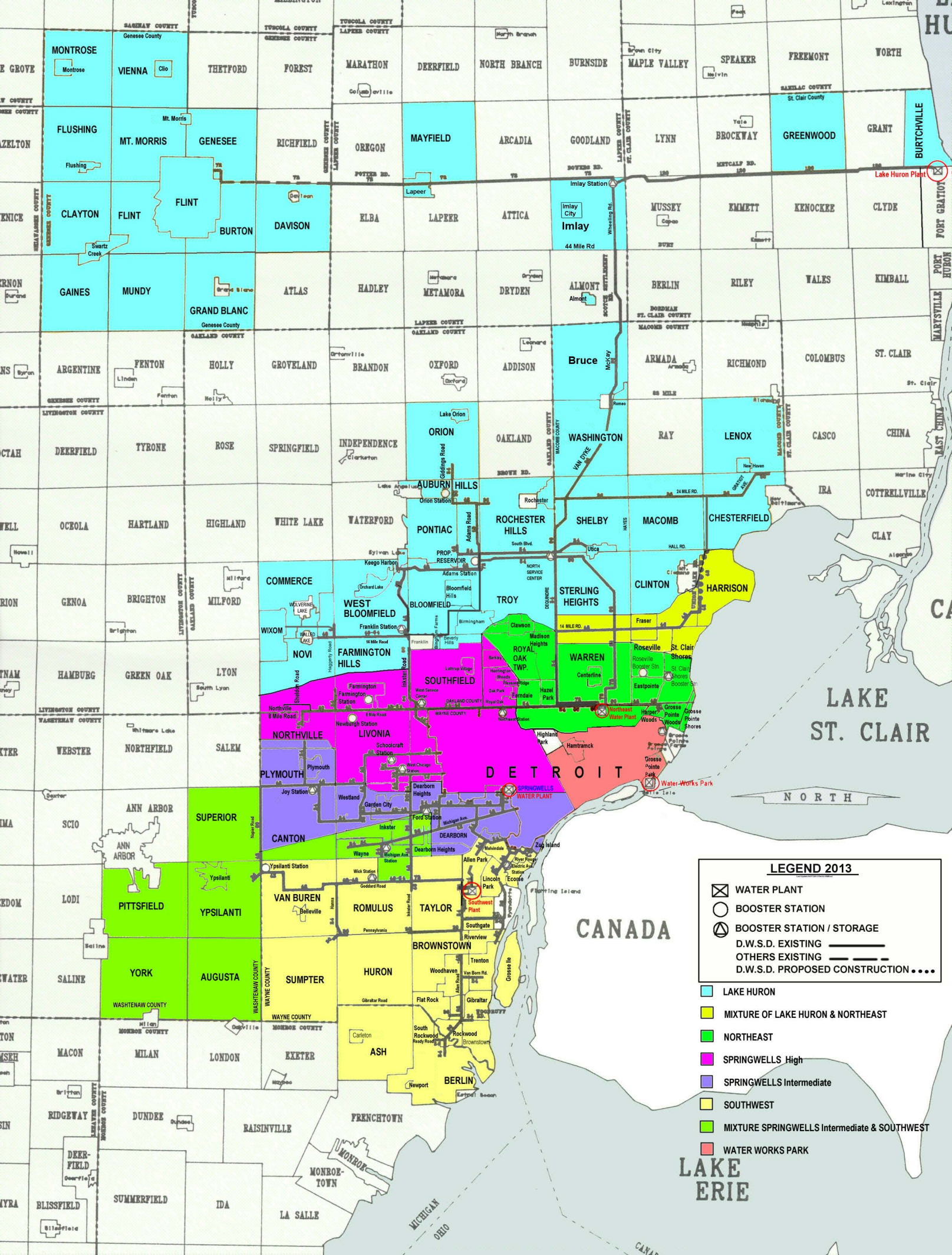
Sample Dates: 02/14/2017

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	2.10	0.12	0.3/95% (1)		
Total Solids		mg/L	143	147		500	10
Total Dissolved Solids		mg/L	95	106		500	10
Aluminum	Al	mg/L	0.083	0.079		0.05-0.2	0.005
Iron	Fe	mg/L	0.807	0.119		0.3	0.005
Copper	Cu	mg/L	< 0.005	0.008	1.3 (AL)	1.0	0.002
Magnesium	Mg	mg/L	11.10	10.79			0.5
Calcium	Ca	mg/L	31.0	31.7			0.1
Sodium	Na	mg/L	5.48	5.76		20 (2)	0.1
Potassium	K	mg/L	0.96	0.96			0.1
Manganese	Mn	mg/L	0.002	< 0.002		0.05	0.002
Lead	Pb	mg/L	< 0.002	< 0.002	0.015 (AL)		0.001
Zinc	Zn	mg/L	< 0.010	< 0.010		5	0.1
Silica	SiO ₂	mg/L	1.0	1.0			0.4
Sulfate	SO ₄ ²⁻	mg/L	17.6	22.9		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	6.5	2.8			
Total Hardness (3), (4), (5)		mg/L	100	102			
Total Alkalinity (3)		mg/L	86	82			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	86	82			
Non-Carbonate Hardness (3)		mg/L	14	20			
Chemical Oxygen Demand		mg/L	7.2	6.4			2
Dissolved Oxygen		mg/L	11.8	8.3			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.33	0.32	10		0.1
Fluoride	F ⁻	mg/L	0.10	0.69	4.0	2.0	0.5
pH			7.42	7.76		6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	229	247			
Temperature		°C	4.5	4.5			

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 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 Initials: **B. B.** Date: 05/23/2017
 Reviewed By: Patrick Williford Management Professional - Ops. Initials: **P. W.** Date: 05/24/2017

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

MICHIGAN
OHIO

NORTH

CANADA

LAKE
ST. CLAIR

DETROIT