

Great Lakes Water Authority
Water Quality Department
Laboratory Analysis of Water Samples Collected at
Lake Huron Plant
02/09/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	0.20	0.04	0.3/95% (1)		
Total Solids		mg/L	141	139		500	10
Total Dissolved Solids		mg/L	107	105		500	10
Aluminum	Al	mg/L	< 0.050	< 0.050		0.05-0.2	0.005
Iron	Fe	mg/L	< 0.050	0.055		0.3	0.005
Copper	Cu	mg/L	0.005	< 0.005	1.3	1.0	0.002
Magnesium	Mg	mg/L	9.16	8.79			0.5
Calcium	Ca	mg/L	21.8	21.3			0.1
Sodium	Na	mg/L	4.66	5.20		20 (2)	0.1
Potassium	K	mg/L	0.92	0.89			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)		0.002
Zinc	Zn	mg/L	< 0.010	< 0.010		5	0.1
Silica	SiO ₂	mg/L	1.0	1.4			0.4
Sulfate	SO ₄ ²⁻	mg/L	17.9	19.9		250	
Chloride	Cl ⁻	mg/L	6.0	8.0		250	5
Phosphorus	P	mg/L	< 0.05	0.35			0.05
Free Carbon Dioxide	CO ₂	mg/L	2.7	8.0			
Total Hardness (3), (4), (5)		mg/L	106	96			
Total Alkalinity (3)		mg/L	88	76			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	88	76			
Non-Carbonate Hardness (3)		mg/L	18	20			
Chemical Oxygen Demand		mg/L	< 2.0	< 2.0			2
Dissolved Oxygen		mg/L	12.6	12.8			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.35	0.32	10		0.1
Fluoride	F ⁻	mg/L	0.09	0.63	4.0	2.0	0.5
pH			7.81	7.28	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	209	213			
Temperature		°C	1.0	1.0			

Legend

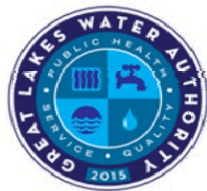
MCL: Maximum Contaminant Level
 Sec.Std: Secondary Standard
 NTU: Nephelometric Turbidity Unit
 mg/L: Milligram Per Liter
 AL: Action Level
 MDL: Method Detection Limit
 < : Less than
 AE: Analytical Error
 IV: Invalid Sample

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) Tap Water Hardness in Grains per Gallon **5.57 GPG**
 (6) Reported results are below the low calibration standard but above the instrument detection limit.

Analyst: Brian Brown Chemist Initial **B. B.** Date: 03/28/2016
 Reviewed By: Patrick Williford Chemist Initial **P. W.** Date: 03/28/2016

Detroit Water & Sewerage Department



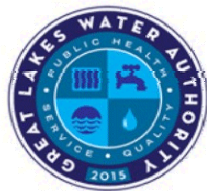
Great Lakes Water Authority
Water Quality Department
Laboratory Analysis of Water Samples Collected at
Southwest Plant
02/09/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	2.40	0.04	0.3/95% (1)		
Total Solids		mg/L	146	147		500	10
Total Dissolved Solids		mg/L	111	117		500	10
Aluminum	Al	mg/L	0.069	< 0.050		0.05-0.2	0.005
Iron	Fe	mg/L	0.080	< 0.050		0.3	0.005
Copper	Cu	mg/L	0.017	0.006	1.3	1.0	0.002
Magnesium	Mg	mg/L	8.46	8.37			0.5
Calcium	Ca	mg/L	22.1	2.1			0.1
Sodium	Na	mg/L	5.43	5.04		20 (2)	0.1
Potassium	K	mg/L	0.88	0.87			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)		0.002
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	16.5	21.9		250	
Chloride	Cl ⁻	mg/L	8.0	9.0		250	5
Phosphorus	P	mg/L	< 0.05	0.26			0.05
Free Carbon Dioxide	CO ₂	mg/L	2.5	7.0			
Total Hardness (3), (4), (5)		mg/L	104	104			
Total Alkalinity (3)		mg/L	90	78			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	90	78			
Non-Carbonate Hardness (3)		mg/L	14	26			
Chemical Oxygen Demand		mg/L	12.0	6.0			2
Dissolved Oxygen		mg/L	12.9	12.8			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.36	0.31	10		0.1
Fluoride	F ⁻	mg/L	0.10	0.53	4.0	2.0	0.5
pH			7.85	7.35	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	215	220			
Temperature		°C	3.0	3.0			

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 6.03 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 Initial **B. B.** Date: 03/28/2016
Reviewed By: Patrick Williford Chemist Initial **P. W.** Date: 03/28/2016

Detroit Water & Sewerage Department



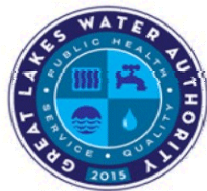
Great Lakes Water Authority
Water Quality Department
Laboratory Analysis of Water Samples Collected at
Water Works Park Plant
02/09/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	3.50	0.04	0.3/95% (1)		
Total Solids		mg/L	144	148		500	10
Total Dissolved Solids		mg/L	126	119		500	10
Aluminum	Al	mg/L	< 0.050	< 0.050		0.05-0.2	0.005
Iron	Fe	mg/L	0.101	< 0.050		0.3	0.005
Copper	Cu	mg/L	< 0.005	< 0.005	1.3	1.0	0.002
Magnesium	Mg	mg/L	9.07	8.74			0.5
Calcium	Ca	mg/L	22.6	21.2			0.1
Sodium	Na	mg/L	5.58	5.31		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)		0.002
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	15.5	21.7		250	
Chloride	Cl ⁻	mg/L	7.0	9.5		250	5
Phosphorus	P	mg/L	< 0.05	0.32			0.05
Free Carbon Dioxide	CO ₂	mg/L	7.0	7.6			
Total Hardness (3), (4), (5)		mg/L	100	102			
Total Alkalinity (3)		mg/L	86	78			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	86	78			
Non-Carbonate Hardness (3)		mg/L	14	24			
Chemical Oxygen Demand		mg/L	< 2.0	< 2.0			2
Dissolved Oxygen		mg/L	12.3	13.8			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.35	0.46	10		0.1
Fluoride	F ⁻	mg/L	0.08	0.59	4.0	2.0	0.5
pH			7.39	7.31	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	226	241			
Temperature		°C	9.1	9.4			

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 Initial **B. B.** Date: 03/28/2016
Reviewed By: Patrick Williford Chemist Initial **P. W.** Date: 03/28/2016

Detroit Water & Sewerage Department



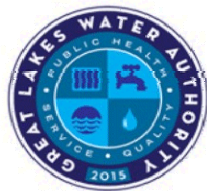
Great Lakes Water Authority
Water Quality Department
Laboratory Analysis of Water Samples Collected at
Northeast Plant
02/09/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	3.50	0.07	0.3/95% (1)		
Total Solids		mg/L	144	150		500	10
Total Dissolved Solids		mg/L	126	113		500	10
Aluminum	Al	mg/L	< 0.050	< 0.050		0.05-0.2	0.005
Iron	Fe	mg/L	0.101	< 0.050		0.3	0.005
Copper	Cu	mg/L	< 0.005	< 0.005	1.3	1.0	0.002
Magnesium	Mg	mg/L	9.07	11.13			0.5
Calcium	Ca	mg/L	22.6	24.4			0.1
Sodium	Na	mg/L	5.58	6.10		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)		0.002
Zinc	Zn	mg/L	< 0.010	< 0.010		5	0.1
Silica	SiO ₂	mg/L	0.9	1.2			0.4
Sulfate	SO ₄ ²⁻	mg/L	15.5	23.4		250	
Chloride	Cl ⁻	mg/L	7.0	9.5		250	5
Phosphorus	P	mg/L	< 0.05	0.25			0.05
Free Carbon Dioxide	CO ₂	mg/L	7.0	8.1			
Total Hardness (3), (4), (5)		mg/L	100	108			
Total Alkalinity (3)		mg/L	86	74			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	86	74			
Non-Carbonate Hardness (3)		mg/L	14	34			
Chemical Oxygen Demand		mg/L	< 2.0	< 2.0			2
Dissolved Oxygen		mg/L	12.3	12.9			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.35	0.33	10		0.1
Fluoride	F ⁻	mg/L	0.08	0.51	4.0	2.0	0.5
pH			7.39	7.26	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	226	225			
Temperature		°C	9.1	3.0			

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 Initial **B. B.** Date: 03/28/2016
Reviewed By: Patrick Williford Chemist Initial **P. W.** Date: 03/28/2016

Detroit Water & Sewerage Department



Great Lakes Water Authority
Water Quality Department
Laboratory Analysis of Water Samples Collected at
Springwells Plant
02/09/2016

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	3.50	0.06	0.3/95% (1)		
Total Solids		mg/L	144	142		500	10
Total Dissolved Solids		mg/L	126	103		500	10
Aluminum	Al	mg/L	< 0.050	< 0.050		0.05-0.2	0.005
Iron	Fe	mg/L	0.101	< 0.050		0.3	0.005
Copper	Cu	mg/L	< 0.005	0.007	1.3	1.0	0.002
Magnesium	Mg	mg/L	9.07	11.40			0.5
Calcium	Ca	mg/L	22.6	22.6			0.1
Sodium	Na	mg/L	5.58	6.24		20 (2)	0.1
Potassium	K	mg/L	0.96	1.03			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)		0.002
Zinc	Zn	mg/L	< 0.010	0.05		5	0.1
Silica	SiO ₂	mg/L	0.9	1.2			0.4
Sulfate	SO ₄ ²⁻	mg/L	15.5	23.9		250	
Chloride	Cl ⁻	mg/L	7.0	10.0		250	5
Phosphorus	P	mg/L	< 0.05	0.35			0.05
Free Carbon Dioxide	CO ₂	mg/L	7.0	9.9			
Total Hardness (3), (4), (5)		mg/L	100	110			
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	28			
Chemical Oxygen Demand		mg/L	< 2.0	< 2.0			2
Dissolved Oxygen		mg/L	12.3	13.0			
Nitrite Nitrogen	NO ₂ ⁻ -N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO ₃ ⁻ -N	mg/L	0.35	0.35	10		0.1
Fluoride	F ⁻	mg/L	0.08	0.51	4.0	2.0	0.5
pH			7.39	7.22	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	226	227			
Temperature		°C	9.1	4.0			

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) Tap Water Hardness in Grains per Gallon **6.38 GPG**
 (6) Reported results are below the low calibration standard but above the instrument detection limit.

Analyst: Brian Brown Chemist Initial **B. B.** Date: 03/28/2016
 Reviewed By: Patrick Williford Chemist Initial **P. W.** Date: 03/28/2016

Detroit Water & Sewerage Department



**Great Lakes Water Authority
Water Quality Department
Laboratory Analysis of Water Samples Collected at Each Plant**

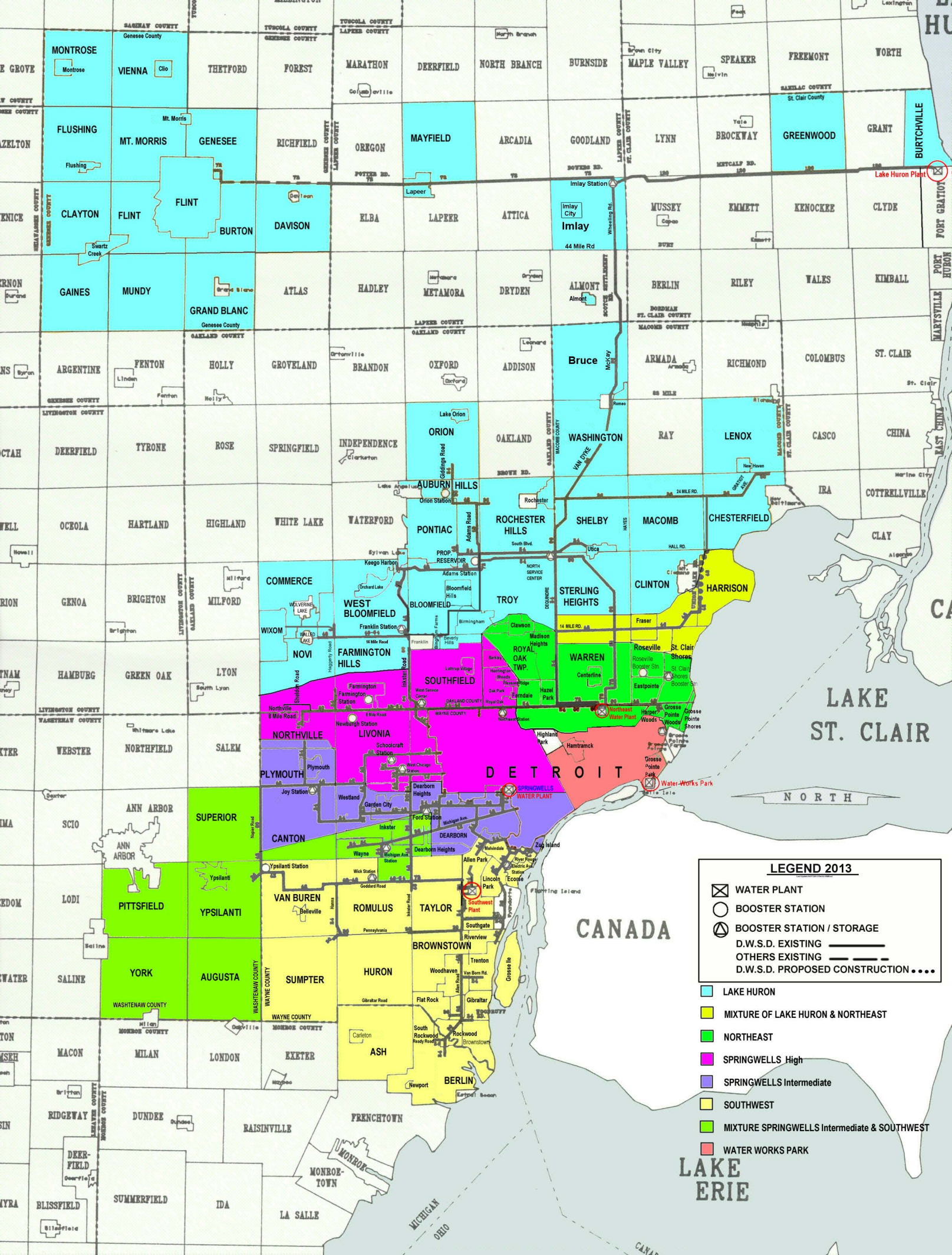
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Parameter	Formula	Units	Lake Huron		Southwest		Belle Isle	Water Works Park	Northeast	Springwells	MCL	Sec.Std	MDL
			Raw	Tap	Raw	Tap	Raw	Tap	Tap	Tap			
Turbidity		NTU	0.20	0.04	2.40	0.04	3.50	0.04	0.07	0.06	0.3/95% (1)		
Total Solids		mg/L	141	139	146	147	144	148	150	142		500	10
Total Dissolved Solids		mg/L	107	105	111	117	126	119	113	103		500	10
Aluminum	Al	mg/L	< 0.050	< 0.050	0.069	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050		0.05-0.2	0.005
Iron	Fe	mg/L	< 0.050	0.055	0.080	< 0.050	0.101	< 0.050	< 0.050	< 0.050		0.3	0.005
Copper	Cu	mg/L	0.005	< 0.005	0.017	0.006	< 0.005	< 0.005	< 0.005	0.007	1.3	1.0	0.002
Magnesium	Mg	mg/L	9.16	8.79	8.46	8.37	9.07	8.74	11.13	11.40			0.5
Calcium	Ca	mg/L	21.8	21.3	22.1	2.1	22.6	21.2	24.4	22.6			0.1
Sodium	Na	mg/L	4.66	5.20	5.43	5.04	5.58	5.31	6.10	6.24		20 (2)	0.1
Potassium	K	mg/L	0.92	0.89	0.88	0.87	0.96	0.96	0.95	1.03			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	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.05		5	0.1
Silica	SiO ₂	mg/L	1.0	1.4	0.9	1.1	0.9	1.1	1.2	1.2			0.4
Sulfate	SO ₄ ²⁻	mg/L	17.9	19.9	16.5	21.9	15.5	21.7	23.4	23.9		250	
Chloride	Cl ⁻	mg/L	6.0	8.0	8.0	9.0	7.0	9.5	9.5	10.0		250	5
Phosphorus	P	mg/L	< 0.05	0.35	< 0.05	0.26	< 0.05	0.32	0.25	0.35			0.05
Free Carbon Dioxide	CO ₂	mg/L	2.7	8.0	2.5	7.0	7.0	7.6	8.1	9.9			
Total Hardness (3), (4), (5)		mg/L	106	96	104	104	100	102	108	110			
Total Alkalinity (3)		mg/L	88	76	90	78	86	78	74	82			
Carbonate Alkalinity (3)		mg/L	0	0	0	0	0	0	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	88	76	90	78	86	78	74	82			
Non-Carbonate Hardness (3)		mg/L	18	20	14	26	14	24	34	28			
Chemical Oxygen Demand		mg/L	< 2.0	< 2.0	12.0	6.0	< 2.0	< 2.0	< 2.0	< 2.0			2
Dissolved Oxygen		mg/L	12.6	12.8	12.9	12.8	12.3	13.8	12.9	13.0			
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	0.32	0.36	0.31	0.35	0.46	0.33	0.35	10		0.1
Fluoride	F ⁻	mg/L	0.09	0.63	0.10	0.53	0.08	0.59	0.51	0.51	4.0	2.0	0.5
pH			7.81	7.28	7.85	7.35	7.39	7.31	7.26	7.22	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	209	213	215	220	226	241	225	227			
Temperature		°C	1.0	1.0	3.0	3.0	9.1	9.4	3.0	4.0			

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 detection limit.
IV: Invalid Sample	

Analyst: Brian Brown	Chemist	Initial	B. B.	Date: 03/28/2016
Reviewed By: Patrick Williford	Chemist	Initial	P. W.	Date: 03/28/2016

Detroit Water & Sewerage Department



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