Detroit Water and Sewerage Department

Water Quality Division

Laboratory Analysis of Water Samples Collected at Lake Huron Plant

4/13/2015

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	0.45	0.04	0.3/95% (1)		
Total Solids		mg/L	142	136		500	10
Total Dissolved Solids		mg/L	117	126		500	10
Aluminum	Al	mg/L	0.079	0.079		0.05-0.2	0.005
Iron	Fe	mg/L	0.057	< 0.050		0.3	0.005
Copper	Cu	mg/L	0.011	< 0.005	1.3	1.0	0.002
Magnesium	Mg	mg/L	7.33	7.69			0.5
Calcium	Ca	mg/L	24.6	25.4			0.1
Sodium	Na	mg/L	4.12	4.25		20 (2)	0.1
Potassium	K	mg/L	0.80	0.82			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	0.9			0.4
Sulfate	SO_4^{2-}	mg/L	16.0	20.4		250	
Chloride	Cl^-	mg/L	8.0	8.5		250	5
Phosphorus	P	mg/L	< 0.05	0.31			0.05
Free Carbon Dioxide	CO_2	mg/L	2.1	8.0			
Total Hardness (3), (4), (5)		mg/L	102	104			
Total Alkalinity (3)		mg/L	82	78			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	82	78			
Non-Carbonate Hardness (3)		mg/L	20	26			
Chemical Oxygen Demand		mg/L	7.2	6.0			2
Dissolved Oxygen		mg/L	18.3	18.6			
Nitrite Nitrogen	NO_2^--N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO_3^--N	mg/L	0.34	0.34	10		0.1
Fluoride	F^-	mg/L	0.14	0.61	4.0	2.0	0.5
pH			7.88	7.29	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	218	222			
Temperature		°C	10.5	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 Hardnessin 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: 7/6/2015

Reviewed By: Patrick Williford Chemist Initial **P. W.** Date: 7/14/2015

Detroit Water & Sewerage Department

Revised January 2014

Detroit Water and Sewerage Department

Water Quality Division

Laboratory Analysis of Water Samples Collected at Southwest Plant

4/13/2015

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	1.63	0.04	0.3/95% (1)		
Total Solids		mg/L	135	131		500	10
Total Dissolved Solids		mg/L	123	124		500	10
Aluminum	Al	mg/L	0.103	0.090		0.05-0.2	0.005
Iron	Fe	mg/L	0.072	0.086		0.3	0.005
Copper	Cu	mg/L	0.015	< 0.005	1.3	1.0	0.002
Magnesium	Mg	mg/L	7.47	7.40			0.5
Calcium	Ca	mg/L	24.6	24.7			0.1
Sodium	Na	mg/L	4.47	4.59		20 (2)	0.1
Potassium	K	mg/L	0.80	0.81			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	0.9			0.4
Sulfate	SO_4^{2-}	mg/L	13.2	22.2		250	
Chloride	Cl^-	mg/L	8.5	9.5		250	5
Phosphorus	P	mg/L	< 0.05	0.28			0.05
Free Carbon Dioxide	CO_2	mg/L	2.1	8.5			
Total Hardness (3), (4), (5)		mg/L	100	104			
Total Alkalinity (3)		mg/L	84	76			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	84	76			
Non-Carbonate Hardness (3)		mg/L	16	28			
Chemical Oxygen Demand		mg/L	< 2.0	4.8			2
Dissolved Oxygen		mg/L	11.6	11.6			
Nitrite Nitrogen	NO_2^--N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO_3^--N	mg/L	0.36	0.37	10		0.1
Fluoride	F^-	mg/L	0.14	0.74	4.0	2.0	0.5
pH			7.89	7.25	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	222	230			
Temperature		°C	7.1	6.5			

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 Hardnessin 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: 7/6/2015

Reviewed By: Patrick Williford Chemist Initial **P. W.** Date: 7/14/2015

Detroit Water & Sewerage Department

Revised January 2014

Detroit Water and Sewerage Department

Water Quality Division

Laboratory Analysis of Water Samples Collected at Water Works Park Plant

4/13/2015

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	1.90	0.06	0.3/95% (1)		
Total Solids		mg/L	137	140		500	10
Total Dissolved Solids		mg/L	120	144		500	10
Aluminum	Al	mg/L	0.110	0.083		0.05-0.2	0.005
Iron	Fe	mg/L	0.134	< 0.050		0.3	0.005
Copper	Cu	mg/L	0.012	< 0.005	1.3	1.0	0.002
Magnesium	Mg	mg/L	7.45	7.60			0.5
Calcium	Ca	mg/L	24.9	24.8			0.1
Sodium	Na	mg/L	4.16	4.37		20 (2)	0.1
Potassium	K	mg/L	0.86	0.82			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	0.9	1.0			0.4
Sulfate	SO_4^{2-}	mg/L	14.0	24.5		250	
Chloride	Cl^-	mg/L	7.5	11.0		250	5
Phosphorus	P	mg/L	< 0.05	0.28			0.05
Free Carbon Dioxide	CO_2	mg/L	7.4	11.5			
Total Hardness (3), (4), (5)		mg/L	102	102			
Total Alkalinity (3)		mg/L	66	66			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	66	66			
Non-Carbonate Hardness (3)		mg/L	36	36			
Chemical Oxygen Demand		mg/L	10.8	8.0			2
Dissolved Oxygen		mg/L	12.0	13.7			
Nitrite Nitrogen	NO_2^--N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO_3^--N	mg/L	0.37	0.38	10		0.1
Fluoride	F^-	mg/L	0.16	0.71	4.0	2.0	0.5
pH			7.25	7.06	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	218	229			
Temperature		°C	10.7	10.8			

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 Hardnessin 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: 7/6/2015

Reviewed By: Patrick Williford Chemist Initial **P. W.** Date: 7/14/2015

Detroit Water & Sewerage Department

Revised January 2014

Detroit Water and Sewerage Department

Water Quality Division

Laboratory Analysis of Water Samples Collected at Northeast Plant

4/13/2015

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	1.90	0.07	0.3/95% (1)		
Total Solids		mg/L	137	131		500	10
Total Dissolved Solids		mg/L	120	120		500	10
Aluminum	Al	mg/L	0.110	0.097		0.05-0.2	0.005
Iron	Fe	mg/L	0.134	< 0.050		0.3	0.005
Copper	Cu	mg/L	0.012	0.008	1.3	1.0	0.002
Magnesium	Mg	mg/L	7.45	7.55			0.5
Calcium	Ca	mg/L	24.9	24.7			0.1
Sodium	Na	mg/L	4.16	4.70		20 (2)	0.1
Potassium	K	mg/L	0.86	0.88			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	0.04		5	0.1
Silica	SiO_2	mg/L	0.9	1.0			0.4
Sulfate	SO_4^{2-}	mg/L	14.0	22.6		250	
Chloride	Cl^-	mg/L	7.5	10.5		250	5
Phosphorus	P	mg/L	< 0.05	0.24			0.05
Free Carbon Dioxide	CO_2	mg/L	7.4	7.7			
Total Hardness (3), (4), (5)		mg/L	102	106			
Total Alkalinity (3)		mg/L	66	72			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	66	72			
Non-Carbonate Hardness (3)		mg/L	36	34			
Chemical Oxygen Demand		mg/L	10.8	5.2			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	0.37	0.36	10		0.1
Fluoride	F^-	mg/L	0.16	0.61	4.0	2.0	0.5
pH			7.25	7.27	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	218	227			
Temperature		°C	10.7	10.4			

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 Hardnessin in Grains per Gallon **6.15 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: 7/6/2015

Reviewed By: Patrick Williford Chemist Initial **P. W.** Date: 7/14/2015

Detroit Water & Sewerage Department

Revised January 2014

Detroit Water and Sewerage Department

Water Quality Division

Laboratory Analysis of Water Samples Collected at Springwells Plant

4/13/2015

Parameter	Formula	Units	Raw	Tap	MCL	Sec.Std	MDL
Turbidity		NTU	1.90	0.09	0.3/95% (1)		
Total Solids		mg/L	137	131		500	10
Total Dissolved Solids		mg/L	120	123		500	10
Aluminum	Al	mg/L	0.110	0.111		0.05-0.2	0.005
Iron	Fe	mg/L	0.134	0.487		0.3	0.005
Copper	Cu	mg/L	0.012	0.006	1.3	1.0	0.002
Magnesium	Mg	mg/L	7.45	7.27			0.5
Calcium	Ca	mg/L	24.9	24.6			0.1
Sodium	Na	mg/L	4.16	4.42		20 (2)	0.1
Potassium	K	mg/L	0.86	0.79			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	0.04		5	0.1
Silica	SiO_2	mg/L	0.9	0.9			0.4
Sulfate	SO_4^{2-}	mg/L	14.0	20.9		250	
Chloride	Cl^-	mg/L	7.5	9.5		250	5
Phosphorus	P	mg/L	< 0.05	0.28			0.05
Free Carbon Dioxide	CO_2	mg/L	7.4	8.1			
Total Hardness (3), (4), (5)		mg/L	102	104			
Total Alkalinity (3)		mg/L	66	74			
Carbonate Alkalinity (3)		mg/L	0	0			
Bi-Carbonate Alkalinity (3)		mg/L	66	74			
Non-Carbonate Hardness (3)		mg/L	36	30			
Chemical Oxygen Demand		mg/L	10.8	4.8			2
Dissolved Oxygen		mg/L	12.0	12.4			
Nitrite Nitrogen	NO_2^--N	mg/L	< 0.1	< 0.1	1		0.1
Nitrate Nitrogen	NO_3^--N	mg/L	0.37	0.36	10		0.1
Fluoride	F^-	mg/L	0.16	0.61	4.0	2.0	0.5
pH			7.25	7.26	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos	218	228			
Temperature		°C	10.7	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 Hardnessin 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: 7/6/2015

Reviewed By: Patrick Williford Chemist Initial **P. W.** Date: 7/14/2015

Detroit Water & Sewerage Department

Revised January 2014

Detroit Water and Sewerage Department
Water Quality Division
Laboratory Analysis of Water Samples Collected at Each Plant

			Date:	4/13/2015	4/13/2015	4/13/2015	4/13/2015	4/13/2015	4/13/2015	4/13/2015	4/13/2015			
				Lake Huron		Southwest		Belle Isle	Water Works Park	Northeast	Springwells			
Parameter	**Formula**	**Units**		**Raw**	**Tap**	**Raw**	**Tap**	**Raw**	**Tap**	**Tap**	**Tap**	**MCL**	**Sec.Std**	**MDL**
Turbidity		NTU		0.45	0.04	1.63	0.04	1.90	0.06	0.07	0.09	0.3/95% (1)		
Total Solids		mg/L		142	136	135	131	137	140	131	131		500	10
Total Dissolved Solids		mg/L		117	126	123	124	120	144	120	123		500	10
Aluminum	Al	mg/L		0.079	0.079	0.103	0.090	0.110	0.083	0.097	0.111		0.05-0.2	0.005
Iron	Fe	mg/L		0.057	< 0.050	0.072	0.086	0.134	< 0.050	< 0.050	0.487		0.3	0.005
Copper	Cu	mg/L		0.011	< 0.005	0.015	< 0.005	0.012	< 0.005	0.008	0.006	1.3	1.0	0.002
Magnesium	Mg	mg/L		7.33	7.69	7.47	7.40	7.45	7.60	7.55	7.27			0.5
Calcium	Ca	mg/L		24.6	25.4	24.6	24.7	24.9	24.8	24.7	24.6			0.1
Sodium	Na	mg/L		4.12	4.25	4.47	4.59	4.16	4.37	4.70	4.42		20 (2)	0.1
Potassium	K	mg/L		0.80	0.82	0.80	0.81	0.86	0.82	0.88	0.79			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)		0.002
Zinc	Zn	mg/L		< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	0.04	0.04		5	0.1
Silica	SiO_2	mg/L		0.9	0.9	0.9	0.9	0.9	1.0	1.0	0.9			0.4
Sulfate	SO_4^{2-}	mg/L		16.0	20.4	13.2	22.2	14.0	24.5	22.6	20.9		250	
Chloride	Cl^-	mg/L		8.0	8.5	8.5	9.5	7.5	11.0	10.5	9.5		250	5
Phosphorus	P	mg/L		< 0.05	0.31	< 0.05	0.28	< 0.05	0.28	0.24	0.28			0.05
Free Carbon Dioxide	CO_2	mg/L		2.1	8.0	2.1	8.5	7.4	11.5	7.7	8.1			
Total Hardness (3), (4), (5)		mg/L		102	104	100	104	102	102	106	104			
Total Alkalinity (3)		mg/L		82	78	84	76	66	66	72	74			
Carbonate Alkalinity (3)		mg/L		0	0	0	0	0	0	0	0			
Bi-Carbonate Alkalinity (3)		mg/L		82	78	84	76	66	66	72	74			
Non-Carbonate Hardness (3)		mg/L		20	26	16	28	36	36	34	30			
Chemical Oxygen Demand		mg/L		7.2	6.0	< 2.0	4.8	10.8	8.0	5.2	4.8			2
Dissolved Oxygen		mg/L		18.3	18.6	11.6	11.6	12.0	13.7	12.6	12.4			
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		0.34	0.34	0.36	0.37	0.37	0.38	0.36	0.36	10		0.1
Fluoride	F^-	mg/L		0.14	0.61	0.14	0.74	0.16	0.71	0.61	0.61	4.0	2.0	0.5
pH				7.88	7.29	7.89	7.25	7.25	7.06	7.27	7.26	6.5-8.5	6.5-8.5	
Specific Conductance @ 25 °C.		micromhos		218	222	222	230	218	229	227	228			
Temperature		°C		10.5	9.5	7.1	6.5	10.7	10.8	10.4	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 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
IV: Invalid Sample	detection limit.

Analyst: Brian Brown Chemist Initial **B. B.** Date: 7/6/2015

Reviewed By: Patrick Williford Chemist Initial **P. W.** Date: 7/14/2015

Detroit Water & Sewerage Department

Revised January 2014