



Ontario Clean Water Agency
Agence Ontarienne Des Eaux

2019 Client Monthly Operations Report

Lambton Area Water Supply System

November 30, 2019

Facility Description

Facility Name:	Lambton Area Water Supply System
Facility Type:	Municipal
Classification:	Class 4 Water Treatment Class 4 Water Distribution
Title Holder:	Municipality
Operation Status:	OCWA
Sr. Operations Manager:	Dave Hunt (519) 344-7429 Ext. 251
Business Development Manager:	Susan Budden
Capacity (m3/d):	181844
Service Area:	City of Sarnia, Village of Point Edward, Township of St. Clair, Township of Warwick-Watford, Municipality of Lambton Shores, Town of Plympton-Wyoming
Service Population:	104,162
In service Date:	1975

Operational Description

The Lambton WTP is a direct filtration surface water facility consisting of chemically assisted filtration with disinfection. The facility consists of an intake system (and alternate intake), a low lift pump station, a treatment system and distribution pumping system situated in the City of Sarnia. Water is drawn into the plant (a zebra mussel system is available as needed) and screened at the surge wells (pre-disinfection is utilized). Water flows to the pump wells where a total of 4 vertical turbine pumps are located and used as needed which pump to a discharge header. Coagulant is added, flashed mixed (PAC is also applied at this location when needed) the raw water is then flocculated (Polymer is added at the flocculation trains as needed) and diverted to filtration (10 dual media filters). The gravity fed filter effluents combine into two clear wells where sodium hypochlorite is injected. To maximize the contact time the water is diverted to the two baffled reservoirs (in series). Six vertical turbine pumps are available for supplying the distribution demand as needed. The entire water treatment system is continuously monitored (via SCADA) with continuous on-line analyzers equipped throughout the processes. The utility serves a large part of Lambton County and has over 250 kilometers of pipeline of various sizes and materials. There is also the East Lambton Booster Station with 9,000 cubic meters of storage capacity which is remotely monitored and controlled from the Lambton WTP via SCADA. During the 1997 calendar year the West Lambton Pumping Station, with the largest above ground water storage in the province with a capacity of 90,000m³, was brought on-line. This pumping station is also remotely monitored and controlled from Lambton WTP via SCADA. The LAWSS distribution system has 5 towers/elevated tanks that the utility monitors via SCADA. In 2007 the Residual Management System (RMS) which treats backwash effluent was brought on-line.

Treatment Process

Pre-treatment Chemicals:	Prechlorination (sodium hypochlorite); Zebra mussel control
Coagulation/Flocculation:	Aluminum Sulphate (Clar+Ion A7)
Filtration:	Dual Media; Filter Aid polymer
Disinfection Method:	Sodium hypochlorite
Post Treatment Chemical Addition:	Fluoride
Waste Residue Management:	Filter backwash effluent is treated by an Actiflo system.
Waste effluent/residue Disposal:	Sludge is hauled to Sarnia WPCP on a needed basis.

Inspections: None

Maintenance, Operations & Distribution Works Summary 2019

Maintenance

November:

Date	(P)reventative Capital Major Mtc (C)orrective	Description
Nov 1	P	Conducted monthly inspection of safety showers and eyewash stations at the water treatment plant.
Nov 1-5	C	Connecting level indicator probe for the North Clearwell.
Nov 1-8	C	Upgrading lighting at West Lambton Pumping Station.
Nov 4-6	C	Divers in to inspect reservoir at water treatment plant.
Nov 5	P	2 year inspection on MCC panels at the water treatment plant is complete.
Nov 5	P	Conducted monthly calibration of West Lambton Pumping Station chlorine analyzers.
Nov 5	P	Completed annual inspection of RMS polymer pumps.
Nov 5	P	Tested alarm system at West Lambton Pumping Station.
Nov 6	P	Tested diesel generators at East and West Lambton Pumping Stations. East Lambton Pumping Station generator did not start.
Nov 6	P	Completed monthly calibration of filter turbidity meters 1, 2, 3, 4, 5, 6, 7 and 9.
Nov 6	P	Completed semi-annual inspection of surface wash pump.
Nov 6	P	Completed semi-annual inspection of grit pump.
Nov 6	P	Completed monthly inspection of water treatment plant compressors.
Nov 6	P	Conducted annual inspection of air relief valve #34.

Nov 7	C	Alberts Generator Service on site at East Lambton Pumping Station to investigate failed start. Battery & Charging system was replaced and generator worked correctly.
Nov 7	P	Completed monthly calibration of East Lambton Pumping Station chlorine analyzers.
Nov 7	P	Adjusted sand hopper level sensor for auto shutoff at low level.
Nov 7	P	Completed six month inspection of low lift pumps.
Nov 8	P	Completed six month inspection of Forest and Watford Pumps.
Nov 8	P	Completed monthly calibration of filters 8 and 10 and Station 5 and 7 turbidity meters.
Nov 8	P	Completed monthly inspection of vacuum priming system at East Lambton Pumping Station.
Nov 12-13	P	Completed monthly maintenance on water treatment plant flocculators.
Nov 12-15	Major Mtc	Ainsworth at West Lambton Pumping Station to work on generator louvres.
Nov 12	C	Repaired small sodium hypochlorite leak at West Lambton Pumping Station.
Nov 12	P	Conducted monthly calibration of streaming current meters.
Nov 12	P	Completed monthly calibration of lab turbidity meter.
Nov 12	P	Tested generators at West Lambton Pumping Station.
Nov 13	P	Conducted monthly checks of RMS turbidity meters.
Nov 13	P	Completed monthly calibration of pH probes at the water treatment plant.
Nov 14	Capital	Balancing of Admin Area HVAC system being completed.
Nov 14	P	Annual inspection of backflow preventer starts.
Nov 14	P	Completed monthly inspection of travelling screens.
Nov 15	P	Completed monthly calibration of hand held chlorine analyzers.
Nov 15	P	Completed monthly inspection of online fluoride analyzer.
Nov 18	C	Repaired overhead heater in valve house hallway at the water treatment plant.
Nov 19	P	Cleaned out both Residual Management System Actiflo Units.
Nov 19-20	C	Repair sump issues at West Lambton Pumping Station and cleanup.
Nov 20	P	Sentry fire in at East Lambton for fire extinguisher and emergency lighting annual checks.
Nov 21	P	Cleaned out filter inlet channels.
Nov 21	P	Zelus on site at West Lambton Pumping Station to do annual inspection of lifting devices.
Nov 22	C	Ainsworth installed new bisulphite lines for plant drainage dechlorination.
Nov 25	Capital	Onsite for generator startup.

Nov 25	P	Zelus onsite to conduct annual inspection of lifting devices at the water treatment plant.
Nov 26	P	Completed annual overflow of Forest Standpipe to test for levels and chlorine residuals.
Nov 26	P	Completed final connection to injector for storm drain dechlorination project.
Nov 27	P	Zelus onsite to conduct annual inspection of lifting devices at the water treatment plant.
Nov 27	P	Completed annual overflow of Watford Standpipe to test for levels and chlorine residuals.
Nov 28	P	Zelus has completed annual inspection of lifting devices at the water treatment plant.
Nov 28	P	Completed annual inspection of drainage pumps at East Lambton Pumping Station.
Nov 28	P	Completed monthly calibration of East Lambton chlorine analyzers.
Nov 29	P	Ainsworth in to do annual backflow preventer inspection at East Lambton Pumping Station.

Operations and Compliance

November:

Nov 2	Operated Pump 1 at West Lambton Pumping Station
Nov 3	Operated Pump 5 at West Lambton Pumping Station
Nov 3	Pre CI Pump #3 faulted due to air lock. Pump and panel were reset with no issues.
Nov 4	Quarterly THM, HAA and nitrate samples taken.
Nov 5	South Clearwell Pump #2 faulted due to air lock. Pump and panel were reset with no issues.
Nov 8	Conducted management review.
Nov 9	Operated Pump 1 at West Lambton Pumping Station
Nov 10	Operated Pump 5 at West Lambton Pumping Station
Nov 12	Switched over alum dosing pumps and sample pumps at the water treatment plant.
Nov 13	West Lambton Pumping Station shut down for louvre work.
Nov 13	Ravenswood interconnect to allow for LAWSS water to be taken. Interconnect was closed the same day.
Nov 14	Fourth quarter THM reports completed and sent.
Nov 16	Operated Pump 1 at West Lambton Pumping Station
Nov 17	Operated Pump 5 at West Lambton Pumping Station
Nov 18	Sample calendars for 2020 created and sent out.
Nov 19	Conducted monthly test of chlorine residuals on the Residual Management System effluent.
Nov 20	South clearwell level probe not working. New probe has been ordered.
Nov 21	Switched to West Low Lift header from East.
Nov 23	Operated Pump 5 at West Lambton Pumping Station

Nov 24	Operated Pump 1 at West Lambton Pumping Station
Nov 25	Completed management review report with management review minutes and sent to client.
Nov 27	Power blip at water treatment plant. Reset pumps with no other issues.
Nov 28	Conducted monthly test of polymer system at the water treatment plant.
Nov 30	Operated Pump 5 at West Lambton Pumping Station
Nov 30	Power blip at water treatment plant. Reset pumps with no other issues.

Distribution

November:

Nov 5	Valve operations in Plympton-Wyoming on Fleming and Lakeshore.
Nov 6	Chamber inspections on Lakeshore.
Nov 5-6	Onsite for third party work at 3539 Confederation Line
Nov 7	Onsite for third party work at 4359 Lakeshore Rd.
Nov 7	Chamber inspections in Plympton-Wyoming.
Nov 7	Valve operations in Sarnia.
Nov 8	Onsite for third party work at LaSalle Line and Highway 40.
Nov 14	Installed heat trace on sample line at Indian Rd Tower.
Nov 15	Installed GFI adaptor at Indian Road Tower sample shed.
Nov 15	Valve operations in Sarnia on Campbell St.
Nov 19	Onsite for third party work at 3574 St Clair Parkway.
Nov 19	Conducting valve operations and chamber checks on Lakeshore near Mandaumin.
Nov 19	Site meet with VanBree at Fleming Rd.
Nov 20	Conducting chamber inspection on Lakeshore Rd in Plympton-Wyoming.
Nov 21	Onsite for third party work at Cathcart and LeCaron.
Nov 25	Emergency service repair at 4083 London Line in Plympton-Wyoming.
Nov 26	Close and drain air relief valves on London Line at Telfer Creek.
Nov 29	Completed meter reads.

Call Outs 2019

November: Call out for watermain break at 4033 London Line on November 16th. Call out for flood alarm at West Lambton Pumping Station on November 19th.

One Call Utility Locates

These numbers represent the number of locate notifications that were cleared from LAWSS assets

Number of Locates/Month

YEAR	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
2018	50	64	107	149	189	166	163	146	141	163	111	58
2019	69	62	104	164	189	149	182	153	121	148	81	

RMS Sludge Haulage

These numbers represent total monthly amounts of sludge produced by the Residual Management System and hauled to Sarnia WPCP

Amount of sludge produced per month in m³

YEAR	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
2018	493	300	239	320	230	318	240	240	79	227	238	234
2019	236	158	237	236	216	158	313	237	160	160	159	

Required Monthly Reports

Monthly System Flows- see separate attached summary report

Workplace Management System Reports – see separate attached reports

Performance Data and Compliance – See separate attached report

Required Financial Reports

Quarterly Financial Summary –Q4 due January 30, 2020

Semi-Annual “Schedule G” Reconcilable Commodities Report –Due January 30, 2020

Health & Safety Work Order Summary by Facility

Start Date: 2019-01-01

End Date: 2019-11-30

Hub: Lambton

Cluster	ORG ID	Facility ID	Health and Safety					Closure Rate		
			Initiated	Approved	Completed	Total Labor Hrs	Total Cost \$	Target	Actual	Variance
LAWSS (133000)	Lambton Area Water Treatment Plant (5544)	5544, East Lambton Distribution (5544-WDEL)	0	0	0	0.00	0.00	85.00%	100.00%	-15.00%
		5544, East Lambton PS (5544-WPEL)	0	0	0	0.00	0.00	85.00%	100.00%	-15.00%
		5544, Forrest Standpipe (5544-WDFS)	0	0	0	0.00	0.00	85.00%	100.00%	-15.00%
		5544, Indian Road Tower (5544-WDIR)	0	0	0	0.00	0.00	85.00%	100.00%	-15.00%
		5544, Lambton Area RMS (5544-WWLA)	0	0	0	0.00	0.00	85.00%	100.00%	-15.00%
		5544, Lambton Area WTP (5544-WTLA)	43	43	43	79.50	3258.98	85.00%	100.00%	-15.00%
		5544, Port Lambton Standpipe (5544-WDPL)	0	0	0	0.00	0.00	85.00%	100.00%	-15.00%
		5544, Watford Standpipe (5544-WDWF)	0	0	0	0.00	0.00	85.00%	100.00%	-15.00%
		5544, West Lambton Booster Stn (5544-WPWL)	0	0	0	0.00	0.00	85.00%	100.00%	-15.00%
		5544, West ST.Clair Distribution (5544-WDWS)	0	0	0	0.00	0.00	85.00%	100.00%	-15.00%
		Lambton Area Water Treatment Plant (5544)	5	5	4	11.75	575.37	85.00%	80.00%	5.00%
Total			48	48	47	91.25	3834.35	85.00%	97.92%	-12.92%

Key Column	Colour	Meaning
Init		No Work Orders initialized
Closed		Closure Rate between 20-50%
Closed		Closure Rate less than 20%

Work Order Summary by Facility

Start Date: 2019-01-01
End Date: 2019-11-30
Hub: Lambton

Key Col	Colour	Meaning
Init		No Work Orders initialized
Closed		Closure Rate between 20-50%
Closed		Closure Rate less than 20%

			Corrective Maintenance					Emergency Maintenance					Call Back				
			Init	Approved	Completed	Total Labor Hrs	Total Cost \$	Init	Approved	Completed	Total Labor Hrs	Total Cost \$	Init	Approved	Completed	Total Labor Hrs	Total Cost \$
LAWSS (133000)	Lambton Area Water Treatment Plant (5544)	5544, East Lambton Distribution (5544-WDEL)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		5544, East Lambton PS (5544-WPEL)	16	16	14	130	5960.09	7	7	7	57	2630.24	0	0	0	0	0
		5544, Lambton Area RMS (5544-WWLA)	7	7	6	45	2106.1	0	0	0	0	0	0	0	0	0	0
		5544, Lambton Area WTP (5544-WTLA)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		5544, West Lambton Booster Stn (5544-WPWL)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		5544, West ST.Clair Distribution (5544-WDWS)	9	9	9	77	3225.48	0	0	0	0	0	1	1	1	15	662.4
		Lambton Area Water Treatment Plant (5544)	44	44	40	334.75	17209.38	1	1	1	1	46.68	4	4	4	36	1505.9
Grand Total			76	76	69	586.75	28501.05	8	8	8	58.00	2676.92	5	5	5	51.00	2168.30

0
0

Work Order Summary by Facility

Start Date: 2019-01-01
End Date: 2019-11-30
Hub: Lambton

Key Col	Colour	Meaning
Init		No Work Orders initialized
Closed		Closure Rate between 20-50%
Closed		Closure Rate less than 20%

			Preventive Maintenance					Operational					Capital/Project Work					Closure Rate		
			Init	Approved	Completed	Total Labor Hrs	Total Cost \$	Init	Approved	Completed	Total Labor Hrs	Total Cost \$	Init	Approved	Completed	Total Labor Hrs	Total Cost \$	Target	Actual	Variance
LAWSS (133000)	Lambton Area Water Treatment Plant (5544)	5544, East Lambton Distribution (5544-WDEL)	0	0	0	0	0	0	0	0	0	0	1	1	1	0	1795.2	85%	100%	-15.0%
		5544, East Lambton PS (5544-WPEL)	9	9	9	17	1006.35	46	46	46	127.5	5593.32	5	5	4	36.5	22474.59	85%	97.43%	-12.4%
		5544, Lambton Area RMS (5544-WWLA)	60	60	59	124.25	6037.64	23	23	23	91.25	4295.38	0	0	0	0	0	85%	97.77%	-12.7%
		5544, Lambton Area WTP (5544-WTLA)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	85%	100%	-15.0%
		5544, West Lambton Booster Stn (5544-WPWL)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	85%	100%	-15.0%
		5544, West ST.Clair Distribution (5544-WDWS)	28	28	28	59.5	2733.52	22	22	22	38.25	1519.48	1	1	1	27.25	22007.7	85%	100%	-15.0%
		Lambton Area Water Treatment Plant (5544)	398	398	375	1450.5	77573.12	136	136	135	17669	458705.2	7	7	4	193.75	55459.48	85%	95.19%	-10.1%
Grand Total			495	495	471	1651.25	87350.63	227	227	226	17926	470113.4	14	14	10	257.5	101737	85%	100%	-15.0%

From: 01/01/2019 to 30/11/2019

Facility Org Number:	5544
Facility Works Number:	210000906
Facility Name:	LAMBTON AREA WATER SUPPLY SYSTEM (LAWSS)
Facility Owner:	Local Services Board: LAMBTON AREA WATER SUPPLY SYSTEM
Facility Classification:	Class 4 Water Treatment
Receiver:	
Service Population:	100000.0
Total Design Capacity:	181844.0 m3/day

		01/2019	02/2019	03/2019	04/2019	05/2019	06/2019	07/2019	08/2019	09/2019	10/2019	11/2019	Total	Avg	Max	Min
Coagulation/Floculation / Coagulant Dosage-Calculated - mg/L																
Max IH		38.605	29.517	32.268	31.172	26.559	26.095	23.836	25.822	22.272	31.139	26.33			38.605	
Mean IH		26.801	24.002	23.839	22.375	22.91	21.551	20.805	20.898	19.819	21.006	21.255		22.294		
Min IH		21.912	18.131	18.009	17.868	19.041	18.452	18.086	19.041	17.621	18.079	16.818				16.818
Coagulation/Floculation / Coagulant Used - kg																
Max IH		1792	1408	1651.2	1241.6	1344	2150.4	2060.8	1804.8	1356.8	1472	1203.2			2150.4	
Mean IH		1220.542	1167.086	1160.671	1009.067	1129.29	1339.307	1594.632	1397.677	1108.139	996.335	987.307		1193.014		
Min IH		972.8	947.2	832	768	934.4	921.6	1088	1100.8	844.8	652.8	729.6				652.8
Total IH		37836.8	32678.4	35980.8	30272	35008	40179.2	49433.6	43328	33244.16	30886.4	29619.2	398466.6			
Coagulation/Floculation / Coagulant Volume Used - m³																
Max IH		1.4	1.1	1.29	0.97	1.05	1.68	1.61	1.41	1.06	1.15	0.94			1.68	
Mean IH		0.954	0.912	0.907	0.788	0.882	1.046	1.246	1.092	0.866	0.778	0.771		0.932		
Min IH		0.76	0.74	0.65	0.6	0.73	0.72	0.85	0.86	0.66	0.51	0.57				0.51
Total IH		29560	25530	28110	23650	27350	31390	38620	33850	25972	24130	23140	311302			
Coagulation/Floculation / Polymer Dosage - mg/L																
Max IH		0.042			0.024										0.042	
Mean IH		0.02			0.024									0.021		
Min IH		0.002			0.024											0.002
Coagulation/Floculation / Polymer Used - kg																
Max IH		2.1			1.1										2.1	
Mean IH		1.025			1.1									1.04		
Min IH		0.1			1.1											0.1
Total IH		4.1			1.1								5.2			
DW THM Data / Trihalomethane: Total - µg/l																
Max Lab			30			37			58			55			58	
Mean Lab			27			31.667			52.667			50		40.333		
Min Lab			24			25			46			45				24
East Lambton Booster Station / Cl Residual: Inlet Free - mg/L																
Max OL		1.74	2.49	1.68	1.58	1.43	1.4	1.36	1.29	1.56	1.64	1.48			2.49	
Mean OL		1.535	1.401	1.428	1.388	1.3	1.277	1.22	1.124	1.344	1.348	1.356		1.338		
Min OL		0	0	0	0	0	0	0	0	0	0	0				0
Filter Backwash / Backwash Volume - m³																
Max IH		4792	2408	2992	3006	3004	3004	2998	3002	2418	2418	2410			4792	
Mean IH		2268.323	1929.786	2028.194	1927.733	1900.774	2043	2095.032	2056.903	1966.067	1893.871	1863.733		1998.76		
Min IH		1794	1788	1794	1198	1204	1792	1788	1059	1796	1204	1196				1059
HFS / Fluoride Dosage - mg/L																
Max IH		0.64	0.644	0.614	0.622	0.592	0.628	0.612	0.589	0.573	0.655	0.649			0.655	
Mean IH		0.556	0.557	0.559	0.557	0.542	0.548	0.535	0.537	0.531	0.533	0.6		0.55		
Min IH		0.46	0.417	0.482	0.487	0.486	0.464	0.486	0.49	0.474	0.476	0.531				0.417
HFS / Fluoride Used - l																

Max IH	108.877	97.419	97.419	94.553	100.284	186.246	171.916	143.263	117.475	114.611	103.149				186.246	
Mean IH	85.495	87.63	89.655	83.952	90.041	115.949	139.658	123.298	101.43	85.218	91.975		99.602			
Min IH	65.901	66.384	71.631	71.631	74.497	88.823	111.745	103.149	85.957	68.766	83.09					65.901
Total IH	2650.36	2453.634	2779.305	2518.562	2791.284	3478.466	4329.406	3822.244	3042.903	2641.76	2759.246	33267.17				
HFS / HFS (kg) - kg																
Max IH	132.83	118.851	118.851	115.355	122.347	227.22	209.737	174.781	143.32	139.825	125.842				227.22	
Mean IH	104.304	106.908	109.379	102.422	109.851	141.458	170.383	150.424	123.745	103.966	112.209		121.515			
Min IH	80.399	80.989	87.39	87.39	90.886	108.364	136.329	125.842	104.868	83.895	101.37					80.399
Total IH	3233.439	2993.434	3390.752	3072.646	3405.367	4243.728	5281.875	4663.138	3712.342	3222.947	3366.28	40585.95				
HFS / Treated Water Fluoride Residual - mg/L																
Max OL	0.71	0.7	0.7	2	0.84	0.82	0.79	0.7	0.68	2	0.75				2	
Mean OL	0.631	0.601	0.578	0.597	0.611	0.575	0.63	0.611	0.576	0.565	0.614		0.599			
Min OL	0.56	0.54	0.51	0	0.51	0.24	0.49	0.55	0.42	0	0.37					0
Post Disinfection / Chlorine Dosage - mg/L																
Max IH	1.668	1.854	1.682	1.832	1.795	3.071	2.185	2.463	2.654	2.116	2.04				3.071	
Mean IH	1.434	1.391	1.458	1.468	1.535	1.696	1.952	2.087	2.142	1.883	1.59		1.696			
Min IH	1.215	0.891	1.048	1.271	1.05	1.097	1.594	1.842	1.522	1.64	1.3					0.891
Post Disinfection / Hypochlorite Dosage - mg/L																
Max IH	13.899	15.45	14.016	15.268	14.96	25.593	18.208	20.526	22.113	17.637	16.997				25.593	
Mean IH	11.947	11.588	12.152	12.232	12.79	14.136	16.268	17.39	17.847	15.692	13.246		14.137			
Min IH	10.126	7.428	8.737	10.593	8.747	9.142	13.282	15.347	12.686	13.665	10.832					7.428
Post Disinfection / Hypochlorite Used - kg																
Max IH	653.3	665.05	681.5	706.175	808.4	1975.175	1590.95	1434.675	1257.25	974.075	768.45				1975.175	
Mean IH	543.456	564	590.191	552.994	632.264	885.167	1241.672	1162.454	997.614	749.157	614.016		777.787			
Min IH	444.15	326.65	454.725	407.725	431.225	460.6	956.45	930.6	689.725	471.175	488.8					326.65
Total IH	16847.15	15792	18295.93	16589.83	19600.18	26555	38491.83	36036.08	29928.43	23223.88	18420.48	259780.8				
Post Disinfection / Hypochlorite Volume-Total - m³																
Max IH	0.556	0.566	0.58	0.601	0.688	1.681	1.354	1.221	1.07	0.829	0.654				1.681	
Mean IH	0.463	0.48	0.502	0.471	0.538	0.753	1.057	0.989	0.849	0.638	0.523		0.662			
Min IH	0.378	0.278	0.387	0.347	0.367	0.392	0.814	0.792	0.587	0.401	0.416					0.278
Total IH	14338	13440	15571	14119	16681	22600	32759	30669	25471	19765	15677	221090				
Post Disinfection / Station 7 Cl Residual: Free - mg/L																
Max OL	1.89	1.85	1.92	1.78	1.71	1.75	5	1.76	1.91	1.87	1.82				5	
Mean OL	1.699	1.712	1.716	1.608	1.521	1.504	1.533	1.562	1.716	1.706	1.657		1.63			
Min OL	1.52	1.54	1.53	1.4	1.29	0	1.26	1.33	1.44	0	1.49					0
PrTr / P.A.C. Dosage - mg/L																
Max IH						0.464	0.367	0.54	0.624	0.731	0.796				0.796	
Mean IH						0.338	0.291	0.409	0.525	0.622	0.632		0.479			
Min IH						0.176	0.218	0.274	0.431	0.499	0.53					0.176
PrTr / P.A.C. Used - kg																
Max IH						28.9	25.634	29.462	29.452	29.452	33.815				33.815	
Mean IH						22.199	21.929	26.752	29.152	29.311	29.205		26.74			
Min IH						12.27	16.36	22.089	26.179	25.09	22.907					12.27
Total IH						377.381	679.812	829.31	874.545	908.636	876.162	4545.846				
Pre-chlorination / Chlorine Dosage - mg/L																
Max IH	1.248	1.52	1.193	1.467											1.52	
Mean IH	1.173	1.106	1.07	1.111									1.115			
Min IH	1.061	0.931	0.91	0.972												0.91
Pre-chlorination / Cl Residual: Free - mg/L																
Max IH	0.74	0.74	0.68	0.7											0.74	
Mean IH	0.632	0.657	0.623	0.623									0.634			
Min IH	0.55	0.59	0.5	0.56												0.5
Pre-chlorination / Cl Residual: Total - mg/L																
Max IH	0.91	0.89	0.83	0.84											0.91	
Mean IH	0.783	0.824	0.774	0.783									0.79			
Min IH	0.69	0.78	0.66	0.72												0.66

Pre-chlorination / Hypochlorite Dosage - mg/L																	
Max IH	10.399	12.665	9.939	12.221												12.665	
Mean IH	9.773	9.216	8.92	9.258											9.294		
Min IH	8.838	7.76	7.581	8.098													7.581
Pre-chlorination / Hypochlorite Used - kg																	
Max IH	524.05	556.95	511.125	560.475												560.475	
Mean IH	443.657	447.717	433.461	417.692											435.629		
Min IH	383.05	394.8	340.75	338.4													338.4
Total IH	13753.38	12536.08	13437.3	12113.08										51839.83			
Pre-chlorination / Hypochlorite Volume-Total-1 - m³																	
Max IH	0.446	0.474	0.435	0.477												0.477	
Mean IH	0.378	0.381	0.369	0.355											0.371		
Min IH	0.326	0.336	0.29	0.288													0.288
Total IH	11705	10669	11436	10309										44119			
Raw Water / Background - cfu/100mL																	
Max Lab	160	82	82	410	260	720	2800	2800	8600	56	2					8600	
Mean Lab	69.2	33.25	21.5	105.8	69.25	346.25	751.2	1137.5	2760	15.5	0.5				519.292		
Min Lab	18	0	1	13	0	0	0	0	160	0	0						0
Raw Water / Conductivity - µS/cm																	
Max IH	228.5	223.2	231.5	232.3	243.7	238.2	238.8	236.2	235.2	228.6	225.3					243.7	
Mean IH	221.019	219.725	222.174	225.038	233.042	232.617	236.165	235.252	231.17	227.025	222.907				227.902		
Min IH	217.8	218	217.9	170	222.6	228.5	232.2	234.1	223.8	225.2	221.3						170
Raw Water / E. Coli: EC - cfu/100mL																	
Max Lab	1	0	0	1	0	0	10	< 10	< 10	0	0				< 10		
Mean Lab	0.4	0	0	0.2	0	0	3.8	< 3.25	< 2.4	0	0				< 0.979		
Min Lab	0	0	0	0	0	0	0	< 0	< 0	0	0					< 0	
Raw Water / Raw Flow Daily - m³/d																	
Max IH	52987	56479	56245	51694	56670	100783	98594	80666	61463	59068	55288					100783	
Mean IH	45445.45	48755.75	48621.65	45139.4	49348.52	62028.87	76680.9	66893.58	55870.33	47562.55	46442.57				53954.28		
Min IH	40082	40763	41664	36877	42212	47569	60157	54511	47226	34339	37635						34339
Raw Water / Raw Flow Rate - l/s																	
Max IH	613.27	653.69	650.98	598.31	654.75	1166.47	1141.13	933.63	926.67	683.66	639.91					1166.47	
Mean IH	526.72	565.27	562.75	522.45	571.13	717.93	887.51	774.13	653.31	550.49	534.28				624.91		
Min IH	463.91	471.79	482.22	426.82	488.56	550.57	696.26	630.91	546.6	397.44	435.9						397.44
Raw Water / Raw Water Turbidity - NTU																	
Max OL	21.4	7.14	13.7	12.2	6.8	3.1	7	2.17	2.4	26.5	5.63					26.5	
Mean OL	2.887	1.135	2.448	2.458	1.769	1.08	0.97	0.75	0.785	2.341	1.526				1.65		
Min OL	0.46	0.23	0.201	0.57	0.445	0.365	0.33	0.34	0.2	0.284	0.28						0.2
Raw Water / Raw Water pH - ---																	
Max IH	8.22	8.12	8.2	8.9	8.35	8.35	8.41	8.41	8.39	8.4	8.28					8.9	
Mean IH	8.045	8.008	8.056	8.197	8.239	8.269	8.331	8.355	8.307	8.241	8.192				8.205		
Min IH	7.94	7.88	7.86	8.09	8.18	8.2	8.26	8.26	8.22	8.11	8.08						7.86
Raw Water / Temperature - °C																	
Max IH	8.01	6	8	11.5	13.1	18.5	23	25	22.5	17.6	12.7					25	
Mean IH	6.396	5.025	5.653	9.285	11.661	15.612	21.142	23.064	19.033	14.308	10.062				12.902		
Min IH	3	3.25	4	7	10	13	17.8	22	16	12	7.75						3
Raw Water / Total Coliform: TC - cfu/100mL																	
Max Lab	39	15	10	31	4	2	100	71	< 66	0	0				< 100		
Mean Lab	10.2	4.5	2.5	8.2	1.25	0.75	23.6	< 20.25	< 29.2	0	0				< 9.854		
Min Lab	2	0	0	0	0	0	0	< 0	< 0	0	0					< 0	
Treated Water / Background - cfu/100mL																	
Max Lab	0	0	0	0	0	0	0	0	0	0	0					0	
Mean Lab	0	0	0	0	0	0	0	0	0	0	0				0		
Min Lab	0	0	0	0	0	0	0	0	0	0	0						0
Treated Water / E. Coli: EC - cfu/100mL																	
Max Lab	0	0	0	0	0	0	0	0	0	0	0					0	

Mean Lab		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Min Lab		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Treated Water / Electrical Consumption - kWh																	
Total IH		963849.2	1042697	1022817	1067361	931726.5	922742.6	979665.2	1081486	978235.3	849895.7	785786.5	10626262				
Treated Water / Flow: Total of All Sources - m³/d																	
Max IH		51137	53292	51967	49343	52401	97988	96442	77634	64029	60875	50600			97988		
Mean IH		44841	46364	46748.23	44048.37	48460.74	61126.97	76220.23	67154.84	56044.43	47285.74	45425.17		53142.44			
Min IH		41397	41527	41284	39452	41184	41283	60988	56137	50125	41493	42109					39452
Total IH		1390071	1298192	1449195	1321451	1502283	1833809	2362827	2081800	1681333	1465858	1362755	17749574				
Treated Water / HPC - cfu/mL																	
Max Lab	<	10	<	10	<	10	<	10	<	10	<	10	<	10		<	10
Mean Lab	<	10	<	10	<	10	<	10	<	10	<	10	<	10		<	10
Min Lab	<	10	<	10	<	10	<	10	<	10	<	10	<	10			<
Treated Water / Total Coliform: TC - cfu/100mL																	
Max Lab		0	0	0	0	0	0	0	0	0	0	0			0		
Mean Lab		0	0	0	0	0	0	0	0	0	0	0		0			
Min Lab		0	0	0	0	0	0	0	0	0	0	0					0
Treated Water / Turbidity - NTU																	
Max OL		0.117	0.08	0.1	0.082	0.11	0.095	0.096	0.097	0.096	0.088	0.096			0.117		
Mean OL		0.062	0.063	0.065	0.063	0.064	0.066	0.066	0.067	0.067	0.066	0.067		0.065			
Min OL		0.043	0.047	0.046	0.047	0.046	0.046	0.049	0.052	0.052	0.047	0.051					0.043
West Lambton Booster Station / Cl Residual: Outlet Free - mg/L																	
Max OL		2.19	1.86	1.83	1.8	1.6	1.62	4.99	1.67	2.17	4.99	2.6			4.99		
Mean OL		1.684	1.685	1.595	1.586	1.429	1.413	1.395	1.395	1.651	1.868	2.001		1.609			
Min OL		0	0	0	0	0	0	0	0	0	0	0					0
Zebra Mussel Control / Chlorine Dosage - mg/L																	
Max IH					1.125	1.173	1.25	1.327	1.29	1.218	1.285	1.228			1.327		
Mean IH					1.125	1.068	1.127	1.158	1.206	1.126	1.112	1.058		1.122			
Min IH					1.125	0.955	1.01	1.028	1.113	0.948	0.955	0.953					0.948
Zebra Mussel Control / Cl Residual: Free - mg/L																	
Max IH					0.36	0.67	0.66	0.63	0.64	0.64	0.63	0.66			0.67		
Mean IH					0.36	0.6	0.588	0.559	0.586	0.59	0.587	0.595		0.586			
Min IH					0.36	0.44	0.52	0.39	0.52	0.52	0.5	0.43					0.36
Zebra Mussel Control / Cl Residual: Total - mg/L																	
Max IH					0.54	0.81	0.8	0.79	0.79	0.81	0.78	0.84			0.84		
Mean IH					0.54	0.746	0.712	0.679	0.72	0.736	0.726	0.745		0.722			
Min IH					0.54	0.55	0.63	0.51	0.66	0.66	0.62	0.54					0.51
Zebra Mussel Control / Hypochlorite Dosage - mg/L																	
Max IH					9.374	9.777	10.417	11.057	10.753	10.149	10.71	10.231			11.057		
Mean IH					9.374	8.898	9.392	9.649	10.049	9.382	9.266	8.813		9.352			
Min IH					9.374	7.961	8.418	8.569	9.277	7.9	7.954	7.938					7.9
Zebra Mussel Control / Hypochlorite Used - kg																	
Max IH					433.575	514.65	848.35	851.875	774.325	598.075	548.725	517			851.875		
Mean IH					433.575	439.147	582.408	735.512	670.735	524.246	439.715	409.488		543.052			
Min IH					433.575	336.05	444.15	619.225	538.15	413.6	367.775	321.95					321.95
Total IH					433.575	13613.55	17472.25	22800.88	20792.8	15727.38	13631.18	12284.63	116756.2				
Zebra Mussel Control / Hypochlorite Volume-Total-1 - m³																	
Max IH					0.369	0.438	0.722	0.725	0.659	0.509	0.467	0.44			0.725		
Mean IH					0.369	0.374	0.496	0.626	0.571	0.446	0.374	0.349		0.462			
Min IH					0.369	0.286	0.378	0.527	0.458	0.352	0.313	0.274					0.274
Total IH					369	11586	14870	19405	17696	13385	11601	10455	99367				