SUMMARY REPORT

St. Thomas Area Secondary Water Supply System

Municipal Drinking Water License No.: 190-101
Drinking Water Works Permit No.: 190-201

Provincial Regulation 170/03
Summary Report

For the Period
January 1, 2021 – December 31, 2021

ST. THOMAS
THE RAILWAY CITY

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1 Summary Report Requirements

1.1 Introduction

The 2021 Summary Report for the St. Thomas Area Secondary Water Supply System (STASWSS) has been prepared to satisfy Schedule 22 of Ontario Regulation 170/03. The Summary Report is to include a summary of water system operations, regulatory non-compliances, and provide an evaluation of the water systems adequacy, with respect to its ability to continue meeting the water demands of the serviced community.

As per Ontario Regulation 170/03, the summary report must:

a. List the requirements of the Act, the regulations, the system's approval, drinking water works permit, municipal drinking water licence, and any orders applicable to the system that were not met at any time during the period covered by the report; and
b. For each requirement referred to in clause (a) that was not met, specify the duration of the failure and the measures that were taken to correct the failure.

The report must also include the following information for the purpose of enabling the owner of the system to assess the capability of the system to meet existing and planned uses of the system:

- A summary of the quantities and flow rates of the water supplied during the period covered by the report, including monthly average and maximum daily flows.
- A comparison of the summary to the rated capacity and flow rates approved in the system's approval, drinking water works permit or municipal drinking water licence, or if the system is receiving all of its water from another system under an agreement, to the flow rates specified in the written agreement.

The information provided is for the purpose of enabling the owner of the system to assess the capacity of the system. This report covers the reporting period from January 1, 2021 to December 31, 2021.

1.2 System Description

The STASWSS is supplied water from the Elgin Middlesex Pumping Station (EMPS) and Reservoir. The EMPS reservoir is filled by the Elgin Area Primary Water Supply System (EAPWSS) which obtains its water from Lake Erie and provides water treatment at the Elgin Area Primary Water Treatment Plant, located on Dexter Line, East of Port Stanley Ontario.

Operation and Maintenance of the EMPS- St. Thomas section is currently under contract with the Ontario Clean Water Agency (OCWA). The operation and maintenance of the associated transmission main and distribution system of the STASWSS is currently conducted by the City of St. Thomas – Environmental Services Dept.

The STASWSS is considered a distribution-only system, providing water directly to the City of St. Thomas and sections of the Township of Southwold and Municipality of Central Elgin Water Distribution Systems.

1.3 System Approvals and Regulatory Requirements

Operation and Maintenance of the STASWSS is governed by the *Safe Drinking Water Act, 2002*, and the regulations established under this Act. In accordance with the *Safe Drinking Water Act*, The Joint Board of Management holds a Municipal Drinking Water Licence (MDWL) and Drinking Water Works Permit (DWWP), which provide approval for the establishment of the drinking water infrastructure and provide the authority to operate and maintain said water system.

During the reporting period, The STASWSS was operated pursuant to the approvals, licences and permits listed below:

- MDWL No. 190-101, (Issue 3 to April 23, 2021, Issue 4 to Sept 30, 2021, Issue 5 to Dec 31, 2021)
- DWWP No. 190-201, (Issue 2 to Sept 30,2021, Issue 3 to Dec 31, 2021)

Ontario Regulation 170/03 – Drinking Water Systems, governs the operation, maintenance, and water quality monitoring requirements for municipal drinking water systems in Ontario. Ontario Regulation 128/04 – Certification of Drinking Water System Operations and Water Quality Analysts sets out the requirements for persons performing operational or maintenance activities on the water system. The *Safe Drinking Water Act, 2002* and the associated regulations are enforced by the Ministry of Environment, Conservation and Parks (MECP) and monitored through annual inspections by Ministry personnel. Any non-compliant conditions identified during the course of the annual inspection are listed in the Inspection Report issued at the conclusion of the inspection period and are summarized in section 4.1 of this report.

Ontario Regulation 169/03 – Ontario Drinking Water Quality Standards sets the limits for parameters of concern in drinking water. Drinking water quality is monitored by the Operating Authority and any exceedance of the Drinking Water Quality Standards must be reported to the MECP and Public Health Unit, verbally and in written form, through the use of a Notice of Adverse Test Results and Issue Resolution Form. Any non-compliant conditions identified through water quality monitoring exercises over the reporting period have been documented on a Notice of Adverse Test Results and Issue Resolution Form and are summarized in section 4.2 of this report.

2 Evaluation of Water Quantities and Flow Rates

The EMPS is situated on a site owned by the Elgin Area Primary Water Supply System (EAPWSS) and includes the original St. Thomas pump station, constructed in 1966 that services St. Thomas, and sections of the Municipality of Central Elgin, Township of Southwold and indirectly, Dutton/Dunwich. Two additional pump stations were completed in 1994 and service the City of London, as well as, the Township of Malahide, Town of Aylmer, and portions of the Municipality of Central Elgin.

The St. Thomas pump station is comprised of three high-lift pumps that deliver water through a transmission main that services the St. Thomas Area Secondary Water Supply System. A gas re-chlorination system provides re- chlorination for water being directed to the St. Thomas Area Secondary Water Supply System.

The Ontario Clean Water Agency (OCWA) is currently the Operating Authority for all 3 pump stations located within the EMPS, and ultimately control the pumps directing water into the STASWSS.

OCWA has prepared a Summary Report for their operations at the EMPS for the reporting period, which evaluates the volumes of water delivered to the STASWSS. The report is attached as Appendix A.

3 Water Quality Summary

A summary of water quality testing completed by the City of St. Thomas – Environmental Services Dept. over the course of the reporting period is available in the Annual Report, attached as Appendix B.

A summary of water quality testing completed by OCWA over the course of the reporting period is available in the Annual Report included as an appendix to the Summary Report (Appendix A to this report).

4 Summary of Non-Compliant Conditions

4.1 Ministry of the Environment, Conservation and Parks Inspection

The Ontario Ministry of the Environment, Conservation and Parks (MECP) conducts an inspection of the St. Thomas portion of the Elgin-Middlesex Pumping Station, operated by OCWA, annually along with the St Thomas Area Secondary Water System, operated by the City of St Thomas.

An MECP inspection took place on November 4th, 2021. The final inspection report was issued on January 5th, 2022. Zero non-compliances were identified within the inspection report.

The MECP Inspection Report identified an inspection risk rating of 0% and achieving an overall final inspection rating of 100**%**, indicating that the risk was minimal.

MECP Inspection Finding	O.A. Responsible	Action Taken
N/A	**N/A**	**N/A**

4.2 Adverse Test Results and Issue Resolution

Any non-compliant conditions identified through water quality monitoring exercises undertaken by St. Thomas Environmental Services over the reporting period, and actions taken are summarized in the table below.

Adverse Test Result (Date / Location)	O.A. Responsible	Action Taken
N/A	**N/A**	**N/A**

5 List of Appendices

Appendix A – OCWA EMPS – St. Thomas Secondary Water Supply System – 2021 Summary Report

Appendix B - St. Thomas Area Secondary Water Supply System – 2021 Annual Report

APPENDIX A

ELGIN-MIDDLESEX PUMPING STATION

ST. THOMAS AREA SECONDARY WATER SUPPLY SYSTEM

2021 COMPLIANCE REPORT

(Schedule 22 Summary Report)

Facility Name: Elgin-Middlesex Pumping Station -
St. Thomas Area Secondary Water Supply System

Mailing Address: Elgin Area Primary Water Supply System
P.O. Box 220
Port Stanley, ON N5L 1J4

Source Water: Elgin Area Primary Water Supply System

CONTACT INFO:

Contract Administration:
City of St. Thomas, City Hall
Environmental Services
545 Talbot Street, St. Thomas, ON N5P3V7
Contact: Mr. Justin Lawrence
Director of Environmental
Services and City Engineer

Operator:
Ontario Clean Water Agency.
P.O. Box 220, Port Stanley, Ontario N5L 1J4
Contact: Mr. Simon Flanagan - Senior Operations Manager
(519) 782-3101

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System Approval:

The St. Thomas Area Secondary Water Supply System is supplied water through the Elgin-Middlesex Pump Station, which receives water from the Elgin Area Primary Water Supply System on Dexter Line, east of Port Stanley, Ontario. During the reporting period, The St. Thomas Area Secondary Water Supply System was operated pursuant to the approvals, licenses and permits listed below.

The supply and distribution of water to the system is governed by the following Municipal Drinking Water Licenses (MDWL) and Drinking Water Works Permits (DWWP):

St. Thomas Area Secondary Water Supply System

- MDWL No. 190-101, issued on September 30, 2021
- DWWP No. 190-201, issued on September 30, 2021

The DWWP and MDWL were issued in accordance with the *Safe Drinking Water Act* (SDWA), 2002.

Treated Water Requirements:

The Drinking Water Systems Regulations (O.Reg.170/03) and the Ontario Drinking Water Quality Standards (O.Reg.169/03) under the *Safe Drinking Water Act*, 2002.

Staff Complement and Training:

In 2021, the St. Thomas facility at the Elgin-Middlesex Pump Station (EMPS) was operated and maintained under the operating authority, Ontario Clean Water Agency. The operational and maintenance staff are based at the Elgin Area Primary Water Supply System (EAPWSS) located east of Port Stanley, Ontario, and share their time between the two facilities. Employees responsible for the operations and maintenance of the facility included one (1) Senior Operations Manager, (1) Compliance Manager, two (2) Team Leads, six (6) full time equivalent operations staff, four (4) full time equivalent maintenance staff and one (1) administrative assistant.

The Compliance Manager shares their work hours between the EMPS Systems, Lake Huron Primary Water Supply System (LHPWSS) and the Elgin Area Primary Water Supply System (EAPWSS).

Regional staff provides administrative support services to the EMPS which include the Regional Manager, Technical Projects Coordinator, Asset Maintenance Specialist and Regional Business Manager.

In 2021, all employees received Director Approved and practical on-the-job training which contributed to annual MECP training requirements.

History of Facility:

The EMPS is occupied by three booster stations that comprise an integrated booster station consisting of two in-ground storage reservoirs, each having a capacity of 27.3 million liters. The two storage reservoirs and the site upon which the three booster stations are situated are owned by the Elgin Area Primary Water Supply System (EAPWSS). This includes the original St. Thomas pump station, constructed in 1966 that services St. Thomas, and sections of the Municipalities of Central Elgin and Southwold. Two additional pump stations were completed in 1994 and service the City of London, as well as the Municipality of Malahide, Town of Aylmer, and the Municipality of Central Elgin.

The St. Thomas pump station is comprised of three high-lift pumps that deliver water through a transmission main that services the St. Thomas Area Secondary Water Supply System. A gas re-chlorination system provides re- chlorination for water being directed to the St. Thomas Area Secondary Water Supply System.

In the event of a power failure, an on-site generator can provide sufficient standby power to operate the facility and the St. Thomas pumps.

Remote monitoring and control of all three pump stations is performed by staff at the Elgin Area Primary Water Supply System (EAPWSS) near Port Stanley, Ontario. Remote monitoring and control capabilities are made possible via the EAPWSS and the EMPS SCADA systems

Process Description:

The Elgin-Middlesex Pump Station (EMPS) receives treated water from the Elgin Area Primary Water Supply System, which treats water at the water treatment plant located on the shores of Lake Erie to the east of Port Stanley. Water from the plant is pumped into the EAPWSS reservoirs located at the EMPS where it is subsequently fed via a series of headers to each of the pumping stations serving the Aylmer Area Secondary Water Supply System, the City of London Distribution System, and the St. Thomas Area Secondary Water Supply System.

The St. Thomas pump station has two duty pumps and one standby pump. All three pumps are equipped with Variable Frequency Drives (VFD). However, the VFD's are presently configured to act as soft starts. Each pump has a rated capacity of 263 L/s.

Post-Treatment:

The St. Thomas Area and Aylmer Area Secondary Water Supply System pump stations both utilize a gas re-chlorination system. The system consists of two scaled 68kg gas chlorine cylinders and three chlorinators equipped with booster pumps. The three chlorinators redundantly serve the Aylmer Area Secondary Water Supply System (AASWSS) and St. Thomas Area Secondary Water Supply System (STASWSS) and have a dosage capacity range of 1-60kg/h of chlorine gas.

High Lift Pump Station:

The three high lift pumps provide redundant pumping capacity into the St. Thomas Area Secondary Water Supply System. See Appendix B for 2021 Total Daily Flows and Appendix C for 2021 Daily Instantaneous Peak Flows.

Maintenance:

Site maintenance was carried out by Ontario Clean Water Agency field services staff based at the Elgin Area Primary Water Supply System. Specialty maintenance services are provided, on an as needed basis by external service providers. All maintenance scheduling is monitored through a computerized maintenance management system (Maximo).

In addition to the routine preventative maintenance program, a number of maintenance projects were completed at the EMPS in 2021. A summary of non-routine maintenance is available in Appendix D, the 2021 Annual Report.

Sampling Procedures:

All samples collected by licensed OCWA personnel are submitted to CALA (Canadian Association for Laboratory Accreditation) accredited laboratories for bacteriological and chemical analysis.

Distribution water samples are taken twice per week at the inlet to the reservoir and submitted for bacteriological analysis. The distribution water entering the St. Thomas Area Secondary Water Supply System is sampled weekly and submitted to an external laboratory for bacteriological analysis. Chlorine residual, for the water entering the St. Thomas Area Secondary Water Supply System, is monitored continuously from the Elgin Area Primary Water Supply System by means of the SCADA system.

On a quarterly basis the distribution water entering the reservoir, as well as the water entering the St. Thomas Area Secondary Water Supply System is sampled and submitted to an accredited laboratory for testing of Total Trihalomethanes (THMs) and Haloacetic Acids (HAA's), disinfection by-products. Twice annually, the distribution water entering the reservoir is sampled and submitted to an accredited laboratory for testing of lead concentrations. All water quality sampling at the Elgin- Middlesex Pump Station is performed in accordance with Ontario Regulation 170/03.

Flow Measurement and Water Quality Monitoring:

Flow leaving the EMPS directed to St. Thomas Secondary System is measured utilizing a magnetic flow measuring device. As of April 2021, metered daily flows recorded are known to be inaccurate as a leaking valve has contributed to total volume inaccuracies. This valve is currently scheduled for repair in April 2022. Monthly flow estimates have been made based on consumption metering from the limited connections to the system and historical non-revenue water data and are available in Appendix B. Comparisons made in the section below are not a true reflection of system capacities as they are based on the metered flow, which are known to be elevated. Chlorine residual levels are monitored by an on-line analyzer located at the point of entry into the St. Thomas Secondary Water Supply System. These devices were calibrated in 2021 by licensed OCWA staff and contractors. See Appendix A for a summary of 2021 water quality data.

Statement of Comparison:

The previous Certificate of Approval and new Municipal Drinking Water License for the St. Thomas Area Secondary Water Supply System does not identify a rated capacity for the system. The pumping station has an available capacity of 68,169m^3/day, whereby instantaneous peak flow is 789 L/s.

The maximum total daily flow witnessed by the system in 2021 was 14,960m^3/day, approximately 22% of the capacity. The average total daily flow witnessed by the system in 2021 was 9,053m^3/day, approximately 13% of the capacity.

The maximum instantaneous peak flow witnessed by the system in 2021 was 600 L/s, approximately 76% of the capacity. See Appendix B for 2021 total daily flow values and Appendix C for 2021 daily instantaneous peak flow rates.

Ministry of the Environment Conservation and Parks Inspections:

The Ontario Ministry of the Environment Conservation and Parks (MECP) conducts an inspection of the St. Thomas portion of the Elgin-Middlesex Pumping Station annually along with the St Thomas Area Secondary Water System operated by the City of St Thomas. A MECP inspection took place in November 2021. The final inspection report was issued on January 5, 2022. There were no non- compliances identified in the inspection report. The final inspection rating received for the 2021reporting year was 100.00%

Benefiting Municipalities:

Following the adoption of the Municipal Water and Sewer Transfer Act in 1997, the Ontario Ministry of the Environment Conservation and Parks transferred the ownership of the three booster stations from the Province of Ontario to the water systems' benefiting municipalities. As a result, the Aylmer Area Secondary Water Supply System portion of the EMPS and associated equipment is owned by the Aylmer Area Secondary Water Supply System Joint Board of Management, the London portion of the EMPS is owned by the Corporation of the City of London, and the St. Thomas Area Secondary Water System portion of the EMPS and associated appurtenances are owned by the St. Thomas Area Secondary Water System Joint Board of Management. Jointly these water systems benefit, and are managed on behalf of, the communities of Aylmer, Central Elgin, London, Malahide, Southwold and St. Thomas. A list of municipalities that receive water directly and indirectly from the St. Thomas Area Secondary Water Supply System at the EMPS is provided in Appendix D. The Ontario Clean Water Agency operates and maintains the Elgin- Middlesex Pump Station, under contracts to the Aylmer Area Secondary Water Supply System, The Corporation of the City of London and the St. Thomas Area Secondary Water Supply System.

This report was prepared by Ontario Clean Water Agency, the Operating Authority for the St. Thomas portion of the EMPS, on behalf of the St. Thomas Area Secondary Water Supply System Joint Board of Management.

APPENDIX A – EMPS ST. THOMAS
WATER QUALITY SUMMARY 2021

MONTH	POST TREATMENT Free Cl_2 mg/L
January	
Minimum	0.97
Maximum	2.10
Average	1.15
February	
Minimum	0.90
Maximum	1.86
Average	1.37
March	
Minimum	0.85
Maximum	2.57
Average	1.42
April	
Minimum	0.94
Maximum	2.42
Average	1.51
May	
Minimum	0.88
Maximum	2.11
Average	1.40
June	
Minimum	0.83
Maximum	2.77
Average	1.54
July	
Minimum	0.86
Maximum	2.57
Average	1.64
August	
Minimum	0.83
Maximum	2.51
Average	1.58
September	
Minimum	0.55
Maximum	2.78
Average	1.52
October	
Minimum	0.77
Maximum	3.15
Average	1.64
November	
Minimum	0.88
Maximum	2.96
Average	1.85
December	
Minimum	0.96
Maximum	2.87
Average	1.70
Yearly Minimum	0.55
Yearly Maximum	3.15
Yearly Average	1.53

Note: Chlorine residuals obtained from SCADA.

APPENDIX B
EMPS ST. THOMAS TOTAL DAILY FLOW ** - 2021

Date	January m^3	February m^3	March m^3	April m^3	May m^3	June m^3	July m^3	August m^3	September m^3	October m^3	November m^3	December m^3	
1	5465	6087	5933	7293	9300	11169	13113	7783	10643	9590	9214	8981	
2	6113	5747	5486	8127	10147	10744	11939	8732	9568	9653	9150	11113	
3	7119	6136	5731	8326	8596	9990	12759	9554	10411	9178	10100	9368	
4	6049	5807	5646	8674	7870	10398	14287	9292	9883	9100	9210	9174	
5	5537	6159	5767	8220	8434	11542	14565	11376	9479	8606	9251	10505	
6	5452	6990	6354	8294	8908	11841	14842	10842	9848	8852	9493	9302	
7	5948	7332	6699	8614	8708	11421	13162	10282	10763	9074	9869	9049	
8	6032	6327	6310	8281	9166	10285	12278	10637	9967	8747	8568	9255	
9	6480	6116	5666	7450	9308	12284	11769	11026	10897	10605	8845	9538	
10	6589	5954	5870	9278	9342	12788	13250	9362	10061	9659	9487	9001	
11	6052	6392	6663	9159	8783	12768	11950	9294	10853	10573	9364	9359	
12	5483	6024	5683	8014	9966	12305	12782	8706	13285	9749	9178	10167	
13	5890	6382	6224	7877	10127	12517	11850	9822	10606	9709	9478	9354	
14	5787	6198	6700	8438	10599	10717	12399	9901	11597	9176	9698	8988	
15	5417	6762	5781	8166	11225	10646	12549	10035	10840	9181	9246	9292	
16	6416	5680	5596	8020	11209	11099	8969	10573	11649	9124	8898	8914	
17	6425	6236	5741	8723	11586	11289	9304	9634	11294	10394	8185	9237	
18	5903	5783	5302	9213	11482	8803	10071	9757	11726	9455	9394	9426	
19	5163	6219	5798	8261	12818	9770	9620	10493	11808	10183	8750	9574	
20	5358	6708	6413	8703	12620	10499	9455	11225	10745	10481	9908	9390	
21	5576	6675	6646	8185	13025	8804	9728	10144	9291	9641	9706	9447	
22	5609	6215	5847	8420	10763	9650	10350	9996	9318	8901	9587	9158	
23	6711	6266	5455	8244	11954	10142	10870	10056	8614	9580	9502	9528	
24	6521	6358	6747	9371	12144	13818	9731	9969	8991	9827	9057	9605	
25	5999	5856	8243	10513	11037	11652	9364	10318	9400	9408	9104	8848	
26	5504	6290	8083	8761	9345	12680	10046	10616	9835	8945	8685	9341	
27	5820	6561	8438	8905	11256	13688	9560	10256	10152	9056	9612	9155	
28	5630	7124	8821	8504	8988	14960	9112	10164	9068	9100	9985	9203	
29	5542		8299	8049	8820	14243	8199	9780	9740	8826	9381	9001	
30	6619		8384	8591	10574	12336	8195	9701	10107	9572	9292	8973	
31	6822		7724		9814		9004	10292		9304		9446	
Metered Total Volume **	185,031	176,384	202,050	254,674	317,914	344,848	345,072	309,618	310,439	293,249	279,197	290,692	3,309,168
Estimated Total Volume **	185,031	176,384	202,050	177,602	233,524	268,430	265,128	235,515	234,249	197,655	209,373	192,814	2,577,756
Minimum	5,163	5,680	5,302	7,293	7,870	8,803	8,195	7,783	8,614	8,606	8,185	8,848	5,163
Maximum	7,119	7,332	8,821	10,513	13,025	14,960	14,842	11,376	13,285	10,605	10,100	11,113	14,960
Average	5,969	6,299	6,518	8,489	10,255	11,495	11,131	9,988	10,348	9,460	9,307	9,377	9,053

**** - As of April 2021, daily metered flow values are known to be inaccurate due to a leaking valve allowing for double registration of some flows.**
Monthly flow estimates have been made based on consumption metering from the limited connections to the system and historical non-revenue water data and are provided in the table above.

APPENDIX C
EMPS ST. THOMAS DAILY INSTANTANEOUS PEAK FLOW - 2021

Date	January L/s	February L/s	March L/s	April L/s	May L/s	June L/s	July L/s	August L/s	September L/s	October L/s	November L/s	December L/s	
1	260	279	273	281	274	275	271	275	271	274	314	305	
2	254	277	275	287	276	283	270	275	254	296	351	357	
3	254	278	277	279	273	281	266	275	251	276	366	293	
4	259	278	271	277	277	275	267	267	251	276	343	286	
5	255	279	274	279	269	276	266	252	253	279	344	327	
6	252	274	281	278	266	275	269	273	251	275	338	308	
7	274	281	272	282	267	271	279	274	256	277	324	404	
8	273	277	287	571	266	329	503	277	272	276	307	303	
9	272	277	273	272	267	278	280	275	251	278	271	302	
10	274	270	273	266	260	289	279	277	254	338	302	400	
11	274	249	275	265	264	283	274	276	254	276	308	295	
12	274	253	274	267	273	278	283	275	252	316	296	388	
13	276	247	274	279	264	281	283	278	251	302	282	363	
14	266	249	275	280	268	281	279	277	276	276	348	416	
15	248	248	284	275	267	277	264	269	274	332	354	412	
16	255	249	277	280	267	275	262	280	272	364	353	298	
17	251	277	274	277	270	275	256	256	278	328	341	345	
18	263	284	277	278	271	268	259	272	274	346	301	412	
19	255	286	275	282	266	274	258	336	282	281	320	483	
20	273	284	273	476	265	270	253	267	600	303	341	349	
21	276	277	283	266	265	273	254	252	282	299	357	580	
22	274	279	272	264	267	284	254	257	283	276	353	364	
23	290	279	268	267	266	276	259	257	277	288	309	450	
24	290	278	292	263	271	280	254	275	280	268	329	467	
25	278	276	271	267	268	286	254	258	279	306	332	430	
26	286	277	270	266	275	282	253	279	276	291	357	390	
27	275	284	271	264	274	285	258	257	284	294	340	483	
28	273	280	272	274	276	286	276	255	278	308	345	467	
29	273		277	277	273	293	280	255	278	313	336	343	
30	286		271	278	279	277	279	264	276	338	329	296	
31	273		278		273		272	254		319		297	
Minimum	248	247	268	263	260	268	253	252	251	268	271	286	247
Maximum	290	286	292	571	279	329	503	336	600	364	366	580	600
Average	269	272	275	291	270	281	275	270	279	299	330	375	290

Drinking-Water System Number:	260078897
Drinking-Water System Name:	**Elgin Middlesex Pumping Station - St. Thomas Area Secondary Water Supply System**
Drinking-Water System Owner:	St. Thomas Area Secondary Water Supply System Joint Board of Management
Drinking-Water System Category:	Large Municipal Residential
Period being reported:	January 1, 2021 through December 31, 2021

Complete if your Category is Large Municipal Residential or Small Municipal Residential

Does your Drinking-Water System serve more than 10,000 people? Yes [X] No [ ]

Is your annual report available to the public at no charge on a web site on the Internet? Yes [X] No [ ]

Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection.

City of St. Thomas, City Hall
Environmental Services
545 Talbot Street
St Thomas, ON.
N5P 3V7
www.city.st-thomas.on.ca

Elgin Area Primary Water Supply System
Treatment Plant
43665 Dexter Line, Union, ON
N0L 2L0

Complete for all other Categories.

Number of Designated Facilities served:

N/A

Did you provide a copy of your annual report to all Designated Facilities you serve?
Yes [ ] No [ ]

Number of Interested Authorities you report to: N/A

Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility?
Yes [ ] No [ ]

List all Drinking-Water Systems (if any), which receive all of their drinking water from your system:

Systems that receive their drinking water directly from the St. Thomas EMPS:

Drinking Water System Name	Drinking Water System Number
St. Thomas Area Secondary Water Supply System	260078897
St. Thomas Distribution System	260002187

Systems that receive their drinking water indirectly from the St. Thomas EMPS:

Drinking Water System Name	Drinking Water System Number
Dutton/Dunwich Distribution System	220002967
Municipality of Central Elgin	260004761
Southwold Distribution Supply	210001362

Did you provide a copy of your annual report to all Drinking-Water System owners that are connected to you and to whom you provide all of its drinking water?

Yes [X] No [ ]

Indicate how you notified system users that your annual report is available, and is free of charge.

- **[X] Public access/notice via the web**
- **[X] Public access/notice via Government Office**
- **[ ] Public access/notice via a newspaper**
- **[X] Public access/notice via Public Request**
- **[ ] Public access/notice via a Public Library**
- **[ ] Public access/notice via other method**

Describe your Drinking-Water System

The Elgin Middlesex Pumping Station (EMPS) receives water from the Elgin Area Primary Water Supply System (EAPWSS), which is located to the east of Port Stanley. Water from the EAPWSS is pumped into the EAPWSS site reservoirs located at the EMPS. The total capacity of the 2 reservoirs is 54,600$m^{3.}$ Through various secondary water supply systems, the EMPS serves the Cities of London, St. Thomas, Town of Aylmer, and Municipalities of Central Elgin, Malahide, Dutton-Dunwich and Southwold.

The EMPS is a shared facility. Booster pumps are dedicated to directing water to the City of London, St. Thomas Secondary and/or Aylmer Area Secondary Water Supply Systems. A gas chlorine system is utilized to provide re-chlorination for water being directed to the St. Thomas and Aylmer Area Secondary Water Supply Systems. The facility also houses a 600kW standby diesel generator that provides emergency power to support pumping of water into the St. Thomas and Aylmer systems during a power interruption.

Three pipelines exit the EMPS: one exits to the south of the EMPS property and extends west to service the St. Thomas Secondary Water Supply System; the second services the City of London distribution system; the third services the municipalities on the Aylmer Area Secondary Water Supply System.

List all water treatment chemicals used over this reporting period

Chlorine Gas

Were any significant expenses incurred to?

[ ] Install required equipment
[ ] Repair required equipment
[X] Replace required equipment

Please provide a brief description and a breakdown of monetary expenses incurred

- Solenoid valve replacement
- PLC/Control Panel Wiring
- Suction pipe painting
- Review of PLC and SCADA Alarming for consistency
- Removals of non-current pump support system piping

Notices submitted in accordance with subsection 18(1) of the Safe Drinking-Water Act or section 16-4 of Schedule 16 of O.Reg.170/03 and reported to Spills Action Centre

Incident Date	Parameter	Result	Unit of Measure	Corrective Action	Corrective Action Date
N/A	N/A	N/A	N/A	N/A	**N/A**

Microbiological testing done under the Schedule 10, 11 or 12 of Regulation 170/03, during this reporting period.

	Number of Samples	Range of E.coli Results (CFU/100 mL) (min #)-(max #)	Range of Total Coliform Results (CFU/100 mL) (min #)-(max #)	Number of Heterotrophic Plate Count (HPC) Samples	Range of HPC Results (CFU/1 mL) (min #)-(max #)
Distribution	70	(0) – (0)	(0) – (0)	70	(0) - (<2000)

Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this Annual Report.

Parameter	Number of Grab Samples (Continuous Monitoring)	Min	Max	Avg
Free Chlorine Residual (mg/L)	8760	0.55	3.15	1.56

Note: *The free chlorine residual spiked on occasion during 2021. Each spike corresponded with a pump start-up.*

Summary of Organic parameters sampled during this reporting period or the most recent sample results

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
THM (NOTE: result value is based on one sample)	January 6, 2021 April 6, 2021 July 12, 2021 October 18, 2021	12 20 22 28	µg/L µg/L µg/L µg/L	NO
THM Running Annual Average (RAA)	2021	21.0	µg/L	NO
HAA (NOTE: result value is based on one sample)	January 6, 2021 April 6, 2021 July 12, 2021 October 18, 2021	ND 6.9 7.2 7.8	µg/L µg/L µg/L µg/L	NO
HAA Running Annual Average (RAA)	2021	7.3	µg/L	NO

ND= Non-detect

APPENDIX E EMPS Chemical Consumption - 2021	
Month	**Total Chlorine Gas Usage - Kg**
January	160.3
February	145.0
March	167.2
April	130.2
May	168.2
June	258.5
July	290.6
August	252.7
September	271.4
October	259.9
November	242.0
December	249.3
Yearly Total	**2595.3**

Please note: Aylmer and St.Thomas combined cl2 usage

APPENDIX B

Drinking-Water System Number:	**260078897**
Drinking-Water System Name:	**St. Thomas Area Secondary Water Supply System**
Drinking-Water System Owner:	Joint Board of Management of the St. Thomas Area Secondary Water Supply System
Drinking-Water System Category:	Large Municipal Residential
Period being reported:	January 1, 2021 through December 31, 2021

Complete if your Category is Large Municipal Residential or Small Municipal Residential

Does your Drinking-Water System serve more than 10,000 people? Yes [ ] No [X]

Is your annual report available to the public at no charge on a web site on the Internet? Yes [X] No [ ]

Location where Summary Report required under O. Reg. 170/03 Schedule 22 will be available for inspection.

City of St. Thomas, City Hall
Environmental Services
545 Talbot Street
St Thomas, Ontario

Complete for all other Categories.

Number of Designated Facilities served:

NA

Did you provide a copy of your annual report to all Designated Facilities you serve?
Yes [ ] No [ ]

Number of Interested Authorities you report to: NA

Did you provide a copy of your annual report to all Interested Authorities you report to for each Designated Facility?
Yes [ ] No [ ]

List all Drinking-Water Systems (if any), which receive all of their drinking water from your system:

Drinking Water System Name	Drinking Water System Number
City of St. Thomas Water Distribution System	260002187
Municipality of Central Elgin	260004761
Township of Southwold	210001362
Dutton/Dunwich Distribution System	220002967

Did you provide a copy of your annual report to all Drinking-Water System owners that are connected to you and to whom you provide all of its drinking water?
Yes [X] No [ ]

Indicate how you notified system users that your annual report is available, and is free of charge.

[x] Public access/notice via the web
City of St. Thomas Website – www.st.thomas.ca
[x] Public access/notice via Government Office
[ ] Public access/notice via a newspaper
[x] Public access/notice via Public Request
[ ] Public access/notice via a Public Library
[ ] Public access/notice via other method _____

Describe your Drinking-Water System

The system consists of an Elevated Water Tower storage tank and trunk water mains. A 750 mm diameter waterman is connected to the Primary System at the East Chamber on South Edgeware Road. The watermain follows along South Edgeware Road to Water Works Park, where the West Chamber is located. The watermain then connects to the Elevated Storage Tank, a 0.76 ML (200,000 gallon) steel teardrop elevated tank, that is located just off Water Tower Line Road near Waterworks Park in the City of St. Thomas. The pipeline then extends west for approximately 2.6 km along Edgeware Road to County Road 26 and then along Ford Road/Wonderland Road before turning northwesterly for approximately 3.6 km. to the Ford Chamber located at the northwest corner of Clinton Line (Concession Road 11) and Wonderland Road. At the intersection of Ford Road and Talbotville Road, the diameter of the pipeline is reduced to 500 mm.

List all water treatment chemicals used over this reporting period

12% Sodium Hypochlorite Chlorine Gas (EMPS)
Sodium Metabisulphite

Were any significant expenses incurred to?

[X] Install required equipment
[X] Repair required equipment
[X] Replace required equipment

Please provide a brief description and a breakdown of monetary expenses incurred

Tower removal engineering	$10,000
Valve Replacement	$10,800

Provide details on the notices submitted in accordance with subsection 18(1) of the Safe Drinking-Water Act or section 16-4 of Schedule 16 of O.Reg.170/03 and reported to Spills Action Centre

Incident Date	Parameter	Result	Unit of Measure	Corrective Action	Corrective Action Date
NA	NA	NA	NA	NA	NA

Microbiological testing done under the Schedule 10, 11 or 12 of Regulation 170/03, during this reporting period.

	Number of Samples	Range of E.Coli Or Fecal Results (min #)-(max #)	Range of Total Coliform Results (min #)-(max #)	Number of HPC Samples	Range of HPC Results (min #)-(max #)
Raw	NA	NA	NA	NA	NA
Treated	NA	NA	NA	NA	NA
Distribution	104	(0)-(0)	(0)-(0)	104	(<10)-(20)

Operational testing done under Schedule 7, 8 or 9 of Regulation 170/03 during the period covered by this Annual Report.

	Number of Grab Samples	Range of Results (min #)-(max #)
Chlorine (Grab Samples)	104	(0.89)-(2.09)
Chlorine (Continuous Monitoring)	8760	(0.00)-(2.80)

***NOTE**: For continuous monitors use 8760 as the number of samples.*

***NOTE**: The value of 0.00 mg/L was recorded on the continuous chlorine sampler as a result of equipment abnormality/SCADA issue/maintenance work or calibration.*

Summary of additional testing and sampling carried out in accordance with the requirement of an approval, order or other legal instrument.

Date of legal instrument issued	Parameter	Date Sampled	Result	Unit of Measure
NA	NA	NA	NA	NA

Summary of Inorganic parameters tested during this reporting period or the most recent sample results

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
NA	NA	NA	NA	NA

Summary of lead testing under Schedule 15.1 during this reporting period
(applicable to the following drinking water systems; large municipal residential systems**,** small municipal residential systems, and non-municipal year-round residential systems)

Location Type	Number of Samples	Range of Lead Results (min#) – (max #)	Number of Exceedances
Plumbing	NA	NA	NA
Distribution	NA	NA	NA

Summary of Organic parameters sampled during this reporting period or the most recent sample results

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
HAA5	Mar 11 2021 Jun 7 2021 Oct 19 2021 Dec 22 2021	30.0	ug/L	no
THM (NOTE: show latest annual average)	Mar 11 2021 Jun 7 2021 Oct 19 2021 Dec 22 2021	8.05	ug/L	no

List any Inorganic or Organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards.

Parameter	Result Value	Unit of Measure	Date of Sample
NA	NA	NA	NA
NA	NA	NA	NA