Elgin Area
Primary Water Supply System

2021 Compliance Report

Contact Info:

Owner:
Elgin Area Primary Water Supply System Board of Management
c/o City of London, Regional Water Supply Division
235 North Centre Road, Suite 200, London, ON N5X 4E7
519-930-3505

Operating Authority:
Ontario Clean Water Agency
P.O. Box 220, Port Stanley, ON N5L 1J4
519-782-3101

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Profile

Who We Are

The Elgin Area Primary Water Supply System (EAPWSS) is owned by a Board of Management who governs the drinking water system. The Board of Management is made up of members appointed from each of the eight (8) member municipalities that are currently supplied with water from the EAPWSS. One of these member municipalities, the City of London, acts as the Administering Municipality. Accordingly, the City of London provides all associated administrative and management services on behalf of the Board. The Board of Management currently utilizes the services of an independent contracted Operating Authority.

The water system is operated and maintained by Ontario Clean Water Agency (OCWA) under contract to the Board of Management.

Operating Authority:

ONTARIO CLEAN WATER AGENCY
AGENCE ONTARIENNE DES EAUX

EAPWSS Board Member Municipalities:

- City of London (Administering Municipality)
- Town of Aylmer
- Municipality of Bayham
- Municipality of Central Elgin
- Municipality of Dutton Dunwich
- Township of Malahide
- City of St. Thomas
- Township of Southwold

What Is Important

Values of the Water System

The values of the EAPWSS are the inherent beliefs or moral standards that generally reflect what the EAPWSS Board of Management stands for and believes in:

- **Sustainable** - be financially, environmentally, socially, and physically sustainable;
- **Inclusive** - provide access to bulk drinking water for current and prospective members, in accordance with Board policy;
- **Fair and equitable** - balance the interests of individual members with the best interests of all members, as well as the needs of existing members with the needs of new members;
- **Vigilant** - ensure an adequate supply of safe and reasonably priced drinking water is available to members;
- **Innovative** - be receptive to and supportive of new ideas and opportunities for improvement;
- **Cooperative** – be supportive to the needs of the Elgin Area Primary Water Supply System;
- **Open and transparent –** conduct business in a manner that enables member municipalities and the public to review and provide input into major decisions as appropriate;
- **Public Ownership –** retain ownership of the water system in public hands.

What We Do

Water Treatment & Supply

The EAPWSS is responsible for the treatment and transmission of drinking water to eight (8) municipalities in southwestern Ontario. The population served by this system is approximately 138,000. Water is provided bulk wholesale to the municipalities who then distribute it to their customers.

The Elgin Area Water Treatment Plant (WTP) was constructed in the late 1960's and officially began operating in 1972. The WTP employs pre-chlorination, screening, powder activated carbon addition (seasonally on an as-required basis), coagulation, flocculation, sedimentation, dual-media filtration, UV disinfection, post-chlorination, fluoridation and pH adjustment using both carbon dioxide and sodium hydroxide to treat raw water obtained from Lake Erie. After the water is treated it is pumped from the WTP to various communities or to the terminal storage reservoirs. The drinking water system is monitored at various locations throughout the system via a Supervisory Control and Data Acquisition (SCADA) system.

The Elgin Area Primary Water Supply System is operated under the Municipal Drinking Water Licence (MDWL) #048-101 and Drinking Water Works Permit (DWWP) #048-201.

EAPWSS Assets:

- 1 low lift pumping station
- 1 water treatment plant
- 1 residuals management facility
- 2 surge facilities
- 1 terminal storage reservoir (consists of 2 reservoir cells)
- 14.7 km primary transmission pipeline (2 pipelines, 1 currently decommissioned)

Figure 1: Low Lift Pumping Station located on Lake Erie

EAPWSS: At A Glance

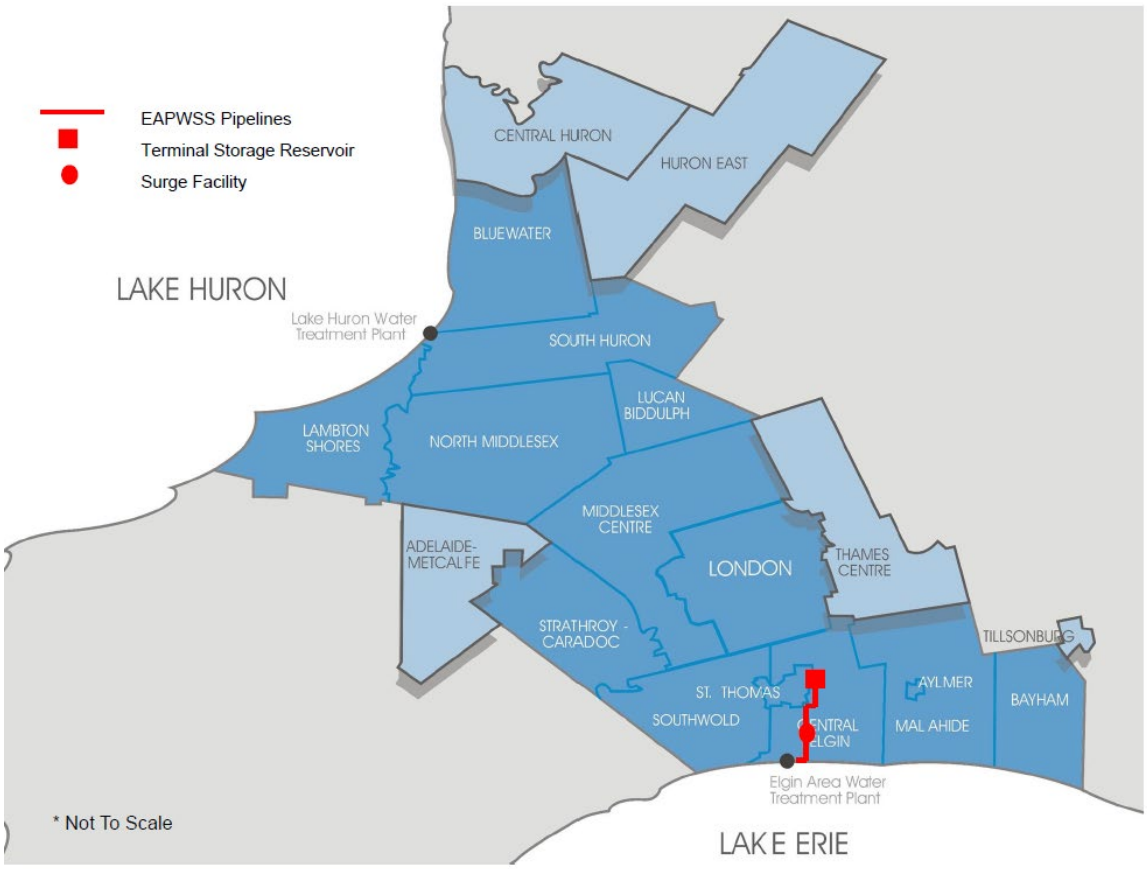

Figure 2: EAPWSS Major Infrastructure Locations

The Water Treatment Process

The following figure provides a general overview of the conventional water treatment process. The processes outlined below are very similar to the treatment at the Elgin Area WTP, although they are not an exact representation. Some details may vary.

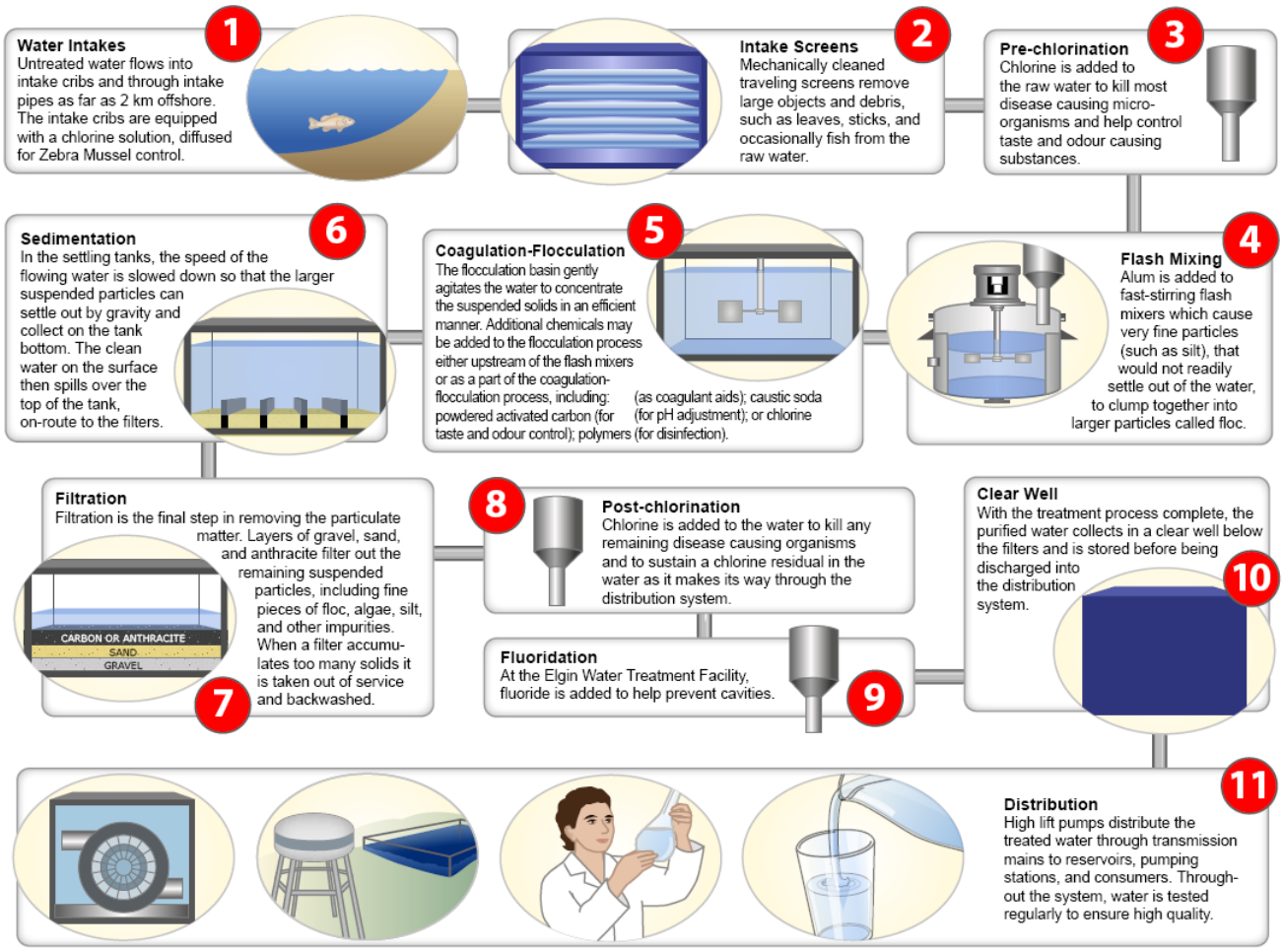

Figure 3: General Overview of the Water Treatment Process

At the Elgin Area WTP, several additional treatment steps take place:

- Carbon dioxide is injected prior to the flash mixing (Step 4) to lower the raw water pH in order to improve the treatment process effectiveness and efficiency.
- A UV reactor is located after each filter (Step 7) for additional disinfection when required.
- Sodium Hydroxide is added as the treated water leaves the WTP and enters the transmission system (Step 11) to raise the treated water pH, resulting in reduced corrosion potential.

2021 Highlights - General

Climate Change Vulnerability Assessment

The Climate Change Vulnerability Assessment Tool was developed by Conservation Ontario in 2018 to assess well and surface water intake sensitivities and vulnerabilities due to climate change. The Lake Erie Source Protection Region approached the EAPWSS to undertake the assessment, as the EAPWSS has a major water supply intake in the Region.

The EAPWSS utilized the assessment tool to evaluate the intake and area level sensitivities related to climate change. The intake and area level received an overall vulnerability rating of low. This is based on receiving a high overall impact rating, but with a high adaptive capacity rating.

From the assessment tool, draft recommendations have been developed for consideration by the EAPWSS, the local municipality, and the Source Protection Region. The draft recommended opportunities for improvements to the overall vulnerability score that the EAPWSS can consider include performing an intake study and a detailed climate change assessment study.

The tool can also aid in improving existing policies and management practices the EAPWSS has adopted such as the Environmental and Quality Management Systems, the Asset Management Policy, and the development of a Climate Action Plan. In addition, the tool can support other activities including the development of capital budgets and plans, process optimization, and risk mitigation strategies. With the aid of the tool the EAPWSS can maintain or potentially improve its resiliency to climate change.

2021 Capital Project Highlights

Pipeline Condition Assessment

The original 750mm concrete transmission pipeline between the Elgin Area WTP and the terminal reservoir was constructed in the late 1960's. In 2012 the EAPWSS constructed a new 900mm transmission pipeline, resulting in a fully twinned transmission system.

In June 2018 the 750mm pipeline was temporarily decommissioned to address operational needs. This presented the opportunity to complete a condition assessment while the pipeline is out of service. The condition assessment was necessary to determine the current state of this infrastructure, understand potential risks associated with this 50-year-old pipeline, and develop a program for any pipeline rehabilitation work that would be required prior to returning the 750mm pipeline to service.

Pure Technologies was awarded a contract in June 2020 to complete a comprehensive condition assessment of the 750mm pipeline, chambers, associated valves, and appurtenances.

Field work completed in 2021 included:

- Electromagnetic inspection (to identify concrete pipe wire breaks)
- Closed-circuit television (CCTV) inspection (visual inspection of pipe interior)
- Concrete pipe structural analysis
- Visual assessment of chambers and valves
- Satellite leak detection survey, and
- Cathodic protection audit

Pure Technologies has prepared a draft inspection report outlining the findings from their inspection of the 750mm pipeline and offered a number of pipeline observations and remediation recommendations for future consideration by EAPWSS.

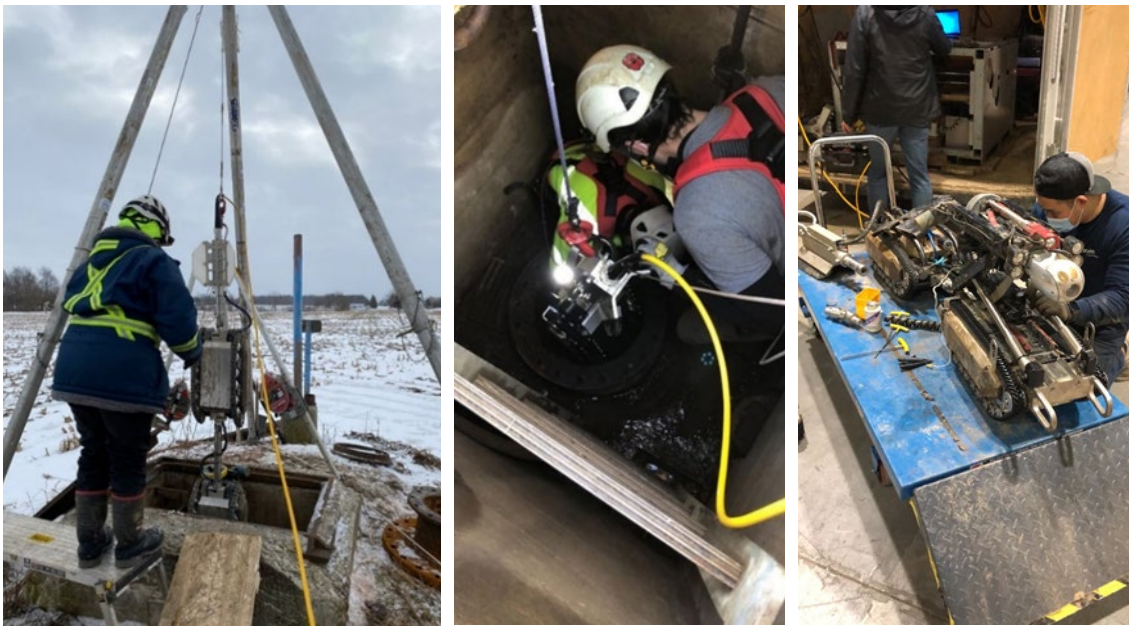

Figure 4a: Elgin 750mm pipeline PureRobotics™ electromagnetic inspection; set up at a pipeline chamber.
Figure 4b: Elgin 750mm pipeline PureRobotics™ electromagnetic inspection; insertion of the robotic tool into the pipeline.
Figure 4c: Offsite equipment preparation of the robotic tool.

Figure 4d: Elgin 750mm pipeline PureRobotics™ electromagnetic inspection; set up at a pipeline chamber.

Instrumentation Replacement Program

The WTP instrumentation replacement program is an annual reoccurring program that funds a systematic replacement of the online analyzers. These analyzers are critically necessary to ensure ongoing compliance with regulations and the system's Municipal Drinking Water Licence. As the analyzers reach the end of their useful life they are replaced.

In 2021 the chlorine system was enhanced by adding a chlorine signal generator. A vacuum switch was installed in each of the three (3) chlorinators. The switches are configured to the SCADA system to allow for a loss of vacuum signal alarm. This will provide early detection and alarming should a chlorinator fail based on loss of service water or another issue affecting vacuum supply.

Also of note for 2021 was the replacement of the Residuals Management Facility (RMF) chlorine analyzer. The effluent that leaves the RMF must be dechlorinated and cannot have any detectable chlorine residual as it reaches the natural environment. The RMF effluent chlorine analyzer is critically important to ensure environmental compliance. A new CL17 chlorine analyzer was installed on a trial basis, then made permanent given the positive results.

Figure 5: New RMF CL17 Total Chlorine Analyzer

2021 Flow Summary

As per the water system's current Permit to Take Water (PTTW), the amount of raw water taken into the Elgin Area WTP cannot exceed 91.0 million litres/day. This converts to 1053 litres/second.

The water taking in 2021 was approved under PTTW #6283-8QZM3N.

As per the water system's Municipal Drinking Water Licence (MDWL), the rated capacity of the WTP is 91.0 million litres/day. The maximum daily volume of treated water that flows from the treatment plant into the distribution system shall not exceed this value.

The following table contains a flow summary, with comparison to the system's rated capacity and permit limits in order to assess the capability of the system to meet existing and planned uses.

	Total Daily Flow (ML/day)	**Total Daily Flow (% of Capacity)**	**Daily Instantaneous Peak Flow (L/s)**
PTTW – permitted amount of raw water taking	91.0	100.00%	1053
Raw Water Flow – Average Day	44.7	49.1%	904
Raw Water Flow – Max. Day	59.1	64.9%	1051
WTP Rated Capacity	91.0	100.00%	1053
Treated Water Flow – Average Day	43.7	48.0%	726
Treated Water Flow – Max. Day	58.5	64.3%	1039

A complete flow summary for the EAPWSS can be found in Appendix A.

Treated Water Volumes

The average daily flow from the Elgin Area Primary Water Supply System was 43.7 ML/day, which is a 0.1% decrease from the previous year. The maximum daily flow for 2021 was 58.5 ML/day, which is a 5.5% decrease from the previous year.

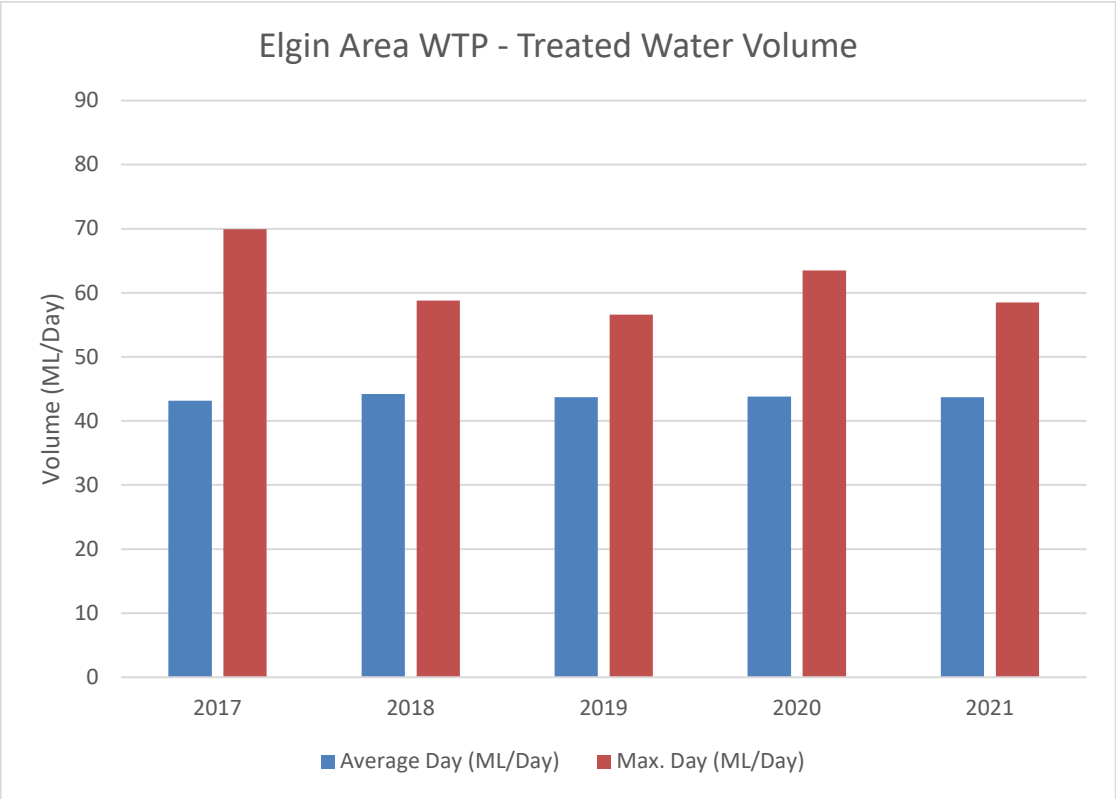

Figure 6: Five (5) Year Treated Water Volumes

The majority of the volume of treated drinking water from the EAPWSS is used by the City of London. As shown in Figure 7, London takes 50.53% of the volume; St. Thomas takes 30.22%, and the other six municipalities using the remaining 19.25%.

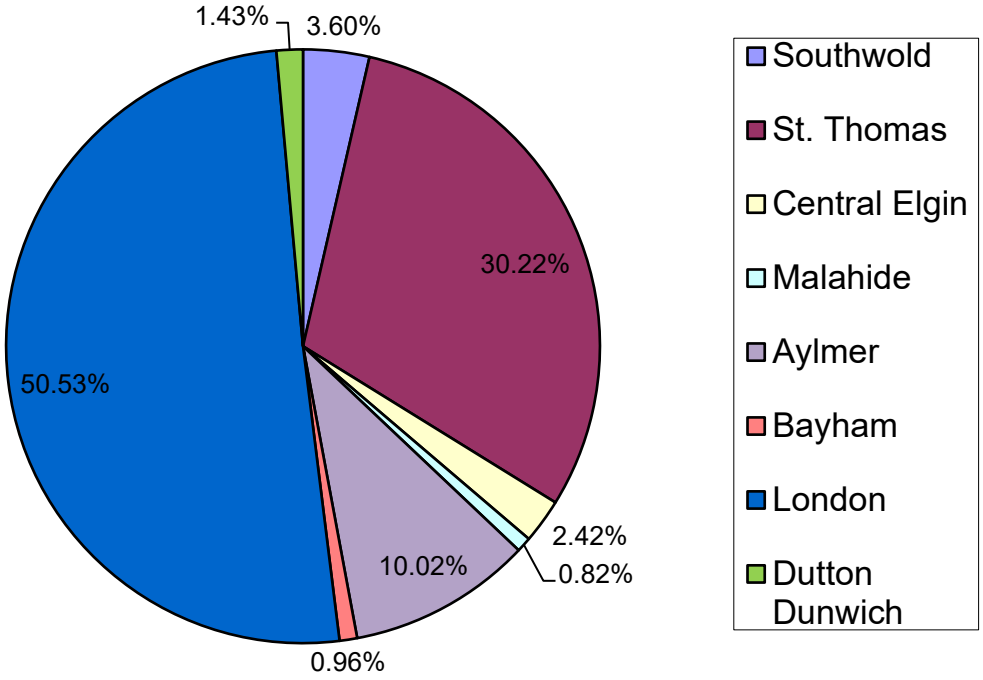

Figure 7: 2021 Treated Water Volumes per Municipality

2021 Chemical Consumption

A variety of water treatment chemicals are used at the Elgin Area WTP to ensure safe, clean drinking water. The following table outlines the chemicals most frequently used for the EAPWSS. As part of the system's registered ISO14001 Environmental Management System, objectives and targets are currently in place to optimize chemical usage.

Chemical	Purpose	Total amount used in 2021
Aluminum Sulphate	Coagulant	659,486 kg
Polymer	Coagulant aid	87 kg
Powdered Activated Carbon	Taste and odour control (seasonally)	17,224 kg
Chlorine Gas	Primary disinfection	33,442 kg
Chlorine Gas	Mussel control at the intake crib	5,478 kg
Fluoride	Prevention of dental cavities	8,307 kg
Carbon Dioxide	pH adjustment - injected at the start of the treatment process to lower the raw water pH for improved treatment effectiveness and efficiency	155,776 kg
Sodium Hydroxide	pH adjustment – injected at the end of the treatment process to raise the treated water pH for reduced corrosion potential	262,676 kg
Sodium Bisulphite	Residuals Management Facility Dechlorination	7,077 kg
Polymer	Residuals Management Facility Centrifuge	1,837 kg
Polymer	Residuals Management Facility Thickener	397 kg

2021 Water Quality Sampling and Monitoring

The EAPWSS consistently provides treated drinking water with water quality above the standards required by provincial regulation. Where desirable, the EAPWSS standards are more stringent than what is required by regulation. For example, the target at the Elgin Area WTP for treated water turbidity (a measure of the cloudiness of water) is ten times more stringent than the provincial standard. The EAPWSS is practicing continual improvement to ensure that high drinking water standards are maintained and enhanced where possible.

All water quality sampling at the EAPWSS is performed in accordance with the Safe Drinking Water Act and its associated regulations. All samples are collected by licensed operating authority personnel and are submitted to Canadian Association for Laboratory Accreditation (CALA)/ Standards Council of Canada (SCC) accredited laboratories for both bacterial and chemical analysis.

In 2021, a total of 522 microbiological samples were collected from raw, treated and distribution system water, and were tested for E Coli, total coliforms and heterotrophic plate count (HPC). There were no incidents of adverse microbiological test results in 2021. For more information, please see the Annual Report, which is included as Appendix B.

Annual samples are collected and tested for inorganics (metals) and organics which include herbicides, pesticides and volatile organic parameters. Quarterly sampling is also conducted for trihalomethanes and haloacetic acids (disinfection by-products), nitrates and nitrites.

Seasonal samples are collected and tested for total microcystin from June through to the end of October as part of the Harmful Algal Bloom (HAB) Monitoring and Sampling Program. The program is to keep drinking water safe from potential impacts of overgrowth of aquatic algal bacteria (i.e. cyanobacteria), that produce or have the potential to produce toxins (i.e. cyanotoxins) in the surrounding water, when the algal cells are damaged or die. These toxins, which include microcystins, can be harmful to people. A total of 22 raw water samples were tested for total microcystin. Of these samples, there was one (1) detectable result for total microcystins in the raw water, with a maximum value of 0.2µg/L. The Maximum Acceptable Concentration (MAC) for total microcystins is 1.5µg/L.

In addition, the WTP operator samples the raw, in-process and treated water six times per day and carries out an array of physical and chemical tests for operational control.

As required by regulation, the EAPWSS also prepares an Annual Report which includes a summary of water quality test results and a maintenance report. The 2021 Annual Report can be found in Appendix B.

Residuals Management Facility (RMF) Compliance

The Municipal Drinking Water Licence for the EAPWSS requires that non-compliant discharges of total chlorine residual to the natural environment must be reported. This annual compliance report includes a report on the date and time of any non-compliant discharges, the duration, maximum total chlorine residual value, volume of non-compliant discharge, reason, and corrective action taken.

In 2021, there were two (2) incidents of reportable non-compliant discharges of total chlorine residual. The 2021 RMF Non-Compliant Discharge Summary Report can be found in Appendix C.

Research and Partnerships

The EAPWSS acknowledges the importance of scientific research on water quality and the effects on human health. The EAPWSS has partnered with the Natural Sciences and Engineering Research Council (NSERC) Chair in Drinking Water Research at the University of Waterloo and University of Toronto to pursue research opportunities, as well as Western University, and is a member of the Water Research Foundation (WRF). In addition, the EAPWSS continues to evaluate and conduct specific research on the efficacy of the existing treatment processes, optimizing and improving treatment systems, and evaluating the potential and need of more advanced treatment alternatives.

Ministry Inspection

Annual Inspection

The Ontario Ministry of the Environment, Conservation and Parks (MECP) conducts an inspection of the EAPWSS annually. A MECP inspection took place on October 19, 2021. The final inspection report was issued on December 7, 2021. There were no non-compliances identified in the inspection report. The final inspection rating received for the 2021 reporting year was 100.00%.

Elgin Area
Primary Water Supply System

Regional Water Supply Division
235 North Centre Road
Suite 200
London, ON N5X 4E7
519-930-3505

https://huronelginwater.ca/

Appendix A – 2021 Flow Summary

1. Raw Water Intake – Flow (m^3/Day)

Day	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	42,323	44,273	38,266	31,886	40,424	46,524	41,592	48,282	49,900	42,082	40,328	47,142
2	41,014	40,714	51,772	44,500	46,228	47,630	49,518	48,096	53,922	51,758	41,202	47,474
3	47,283	48,073	42,308	38,904	50,130	45,322	44,994	41,578	40,054	38,944	42,494	46,270
4	42,380	41,330	36,562	49,190	41,166	43,704	45,642	49,274	49,852	54,268	52,404	48,694
5	43,882	45,056	49,198	41,252	40,432	53,640	45,312	46,746	47,538	39,308	39,894	43,332
6	39,762	40,223	39,086	35,524	39,918	52,368	50,976	57,706	43,286	39,744	46,718	48,124
7	44,931	43,566	46,344	48,374	46,984	41,598	48,572	43,658	50,526	44,224	40,118	46,428
8	41,940	44,779	41,908	44,558	46,472	49,072	40,468	47,898	50,674	47,938	41,670	46,346
9	38,357	43,597	45,600	40,712	40,990	55,258	46,668	45,182	48,602	44,438	52,138	47,020
10	47,201	40,775	41,546	42,064	44,044	52,768	42,484	48,024	35,408	46,408	38,326	48,528
11	35,147	46,128	46,988	43,878	47,328	40,114	48,222	43,008	35,446	44,652	41,900	41,720
12	50,785	45,145	44,748	39,462	47,222	55,990	41,008	44,500	35,422	44,796	43,202	43,410
13	46,064	46,991	40,902	47,600	43,898	51,104	45,020	50,630	35,406	50,976	46,904	39,530
14	41,122	39,465	47,776	40,678	48,022	45,060	46,438	46,416	32,912	44,468	40,036	49,696
15	45,149	44,172	39,554	35,564	50,602	46,574	50,022	39,630	35,380	47,642	47,486	48,054
16	37,044	49,059	43,266	48,622	40,640	48,918	42,680	21,542	35,372	49,542	42,994	49,854
17	39,280	36,504	46,148	38,896	54,656	46,434	45,786	34,062	47,076	40,414	49,072	54,906
18	40,411	47,339	41,694	51,652	56,638	47,680	42,122	50,476	43,406	48,604	43,268	47,832
19	49,220	41,221	39,422	40,884	33,358	50,316	49,312	49,004	49,046	49,276	44,528	51,236
20	45,123	42,517	48,662	44,902	43,846	50,446	50,386	48,210	48,290	43,582	39,644	53,180
21	42,573	41,299	42,620	22,600	47,396	42,136	43,810	51,988	45,876	45,780	51,130	48,938
22	48,466	46,443	42,240	35,360	58,804	41,316	52,294	42,490	47,380	46,370	39,524	52,444
23	41,081	38,875	46,986	45,876	41,850	52,782	43,846	47,256	44,216	46,530	44,090	37,072
24	45,046	51,205	43,402	41,846	59,088	40,354	46,164	49,578	45,762	44,086	34,386	49,606
25	45,625	39,059	38,316	47,674	34,006	54,696	51,786	45,152	52,726	45,314	26,230	49,810
26	39,298	41,668	48,388	44,854	40,318	38,092	44,264	45,470	39,652	48,808	47,602	42,344
27	42,654	47,207	41,906	39,740	36,196	49,994	47,868	49,962	50,428	40,062	39,960	48,798
28	42,033	40,809	45,204	50,016	42,968	43,512	57,738	47,758	41,394	29,224	42,768	45,208
29	43,490		42,886	51,272	37,176	47,668	41,410	48,116	53,926	39,160	45,500	42,156
30	42,330		42,572	38,444	45,114	47,168	47,976	42,988	44,756	49,678	40,974	45,444
31	42,756		27,736		50,594		41,666	49,040		50,434		50,308
Monthly Total	1,333,770	1,217,492	1,334,006	1,266,784	1,396,508	1,428,238	1,436,044	1,423,720	1,333,634	1,398,510	1,286,490	1,460,904

Day	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)
Monthly Minimum	35,147	36,504	27,736	22,600	33,358	38,092	40,468	21,542	32,912	29,224	26,230	37,072
Monthly Maximum	50,785	51,205	51,772	51,652	59,088	55,990	57,738	57,706	53,926	54,268	52,404	54,906
Monthly Average	43,025	43,482	43,032	42,226	45,049	47,608	46,324	45,926	44,454	45,113	42,883	47,126

Annual Total (m^3)	16,316,100
Annual Minimum (m^3)	21,542
Annual Maximum (m^3)	59,088
Annual Average (m^3)	44,702

Note: (i) As per the water system's current Permit To Take Water, the amount of raw water taken into the Elgin Area Water Treatment Plant cannot exceed 91,000 m^3/day.

2. Raw Water Instantaneous Peak Flow (L/s)

Day	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	912	1015	1,005	878	904	800	988	1,007	1,004	772	749	978
2	796	941	1,006	1,013	913	800	1,016	938	1,024	854	800	922
3	790	1014	1,016	897	912	800	926	1,025	954	936	800	870
4	1006	1016	1,012	987	992	800	879	873	836	1,003	912	972
5	925	1018	943	861	1,004	800	956	869	831	980	860	974
6	907	891	989	767	934	800	912	841	972	889	830	977
7	903	940	975	1,026	1,008	907	1,014	1,019	999	931	917	1,012
8	800	1012	959	1,008	788	851	937	1,025	990	950	805	804
9	800	1001	918	956	789	1,014	773	1,024	1,005	915	998	859
10	800	979	758	794	840	982	982	793	412	934	998	731
11	800	966	1,008	826	1,010	931	953	1,008	413	885	918	800
12	859	1018	976	877	972	788	901	905	412	867	855	800
13	873	1009	923	801	843	756	1,006	979	412	1,007	862	800
14	874	1015	935	985	851	1,002	759	968	446	957	868	742
15	799	1014	939	913	784	979	828	780	412	955	927	800
16	796	1008	1,008	802	1,016	1,006	851	967	411	857	778	800
17	857	842	997	970	836	1,013	972	883	775	925	848	1,020
18	797	836	1,009	897	822	1,004	1,012	779	1,015	953	790	871
19	874	864	959	932	963	981	977	954	861	942	900	863
20	875	910	886	902	911	996	818	789	917	960	833	1,009
21	754	1005	759	780	926	920	997	987	917	863	791	1,007
22	1005	1000	909	847	945	906	982	1,031	904	995	1,009	990
23	1006	753	905	928	844	910	1,011	1,007	1,018	973	904	894
24	1017	1015	800	946	923	1,012	857	1,025	1,015	981	421	865
25	986	1011	988	976	976	948	948	1,024	890	997	785	981
26	1008	1006	881	974	804	933	989	886	823	1,016	994	892
27	873	886	1,004	992	800	924	966	966	1,005	821	846	1,006
28	970	997	1,013	1,001	800	843	970	1,024	802	726	884	989
29	999		1,002	990	800	863	1,023	1,020	794	728	805	893
30	992		960	977	800	1,036	1,010	1,051	773	723	865	807
31	948		857		800		795	889		724		900

Day	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)
Monthly Minimum	754	753	758	767	784	756	759	779	411	723	421	731
Monthly Maximum	1,017	1,018	1,016	1,026	1,016	1,036	1,023	1,051	1,024	1,016	1,009	1,020
Monthly Average	890	964	945	917	887	910	936	946	801	904	852	898

Annual Minimum (L/s)	411
Annual Maximum (L/s)	1,051
Annual Average (L/s)	904

Note: (i) As per the water system's current Permit To Take Water, the amount of raw water taken into the Elgin Area Water Treatment Plant cannot exceed 91,000 m^3/day. This converts to 1053 litres/second.

3. Treated Water Flow (m^3/Day)

Day	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	40,004	44,376	39,445	30,315	39,732	46,874	39,144	46,710	49,155	41,040	39,052	46,861
2	41,288	39,269	50,601	43,712	44,833	45,881	49,444	46,825	53,000	50,855	41,402	45,157
3	44,813	46,909	41,327	39,195	49,349	45,976	44,915	41,898	40,131	39,440	42,171	46,523
4	42,204	39,863	34,981	47,933	40,411	43,959	44,279	47,449	48,633	51,817	47,040	48,178
5	42,130	44,546	48,036	39,093	40,590	52,541	44,874	46,367	46,019	39,467	39,996	41,054
6	40,337	39,740	39,356	35,537	40,012	51,932	49,652	55,293	43,964	38,585	44,870	47,480
7	43,580	41,573	45,579	51,639	45,858	37,752	48,662	43,507	48,939	43,092	41,545	45,488
8	41,424	43,565	40,523	43,317	45,183	48,780	39,641	46,488	48,722	47,180	40,023	44,686
9	39,215	44,173	45,655	39,212	39,825	53,375	46,369	45,373	46,934	42,818	50,226	46,426
10	44,210	39,740	40,722	41,780	44,371	49,516	40,471	46,550	33,444	46,795	38,604	47,194
11	34,806	43,686	45,766	42,890	40,540	38,798	49,399	41,208	34,211	43,542	40,014	40,800
12	48,556	43,642	44,567	38,675	47,532	55,629	38,628	43,700	33,442	43,802	43,479	41,717
13	44,656	46,549	39,899	47,525	42,064	49,675	45,702	50,543	34,533	48,790	46,035	39,594
14	39,363	39,227	45,778	39,045	47,979	43,990	45,212	43,973	33,457	43,809	40,363	46,670
15	43,287	42,843	38,816	35,115	49,671	44,396	48,394	38,949	32,988	46,599	45,048	47,002
16	36,275	48,921	42,536	47,279	39,598	47,784	41,518	19,128	36,045	49,407	42,903	48,658
17	39,936	34,978	44,926	39,715	52,498	47,046	45,230	30,037	46,246	39,788	46,407	50,669
18	39,926	46,961	40,419	49,642	56,212	45,619	42,679	52,069	41,317	47,085	43,160	45,742
19	46,390	40,502	40,526	40,989	32,162	50,080	47,234	46,083	49,896	49,119	41,583	49,861
20	39,127	40,549	46,675	44,257	43,196	48,368	47,778	47,740	46,612	43,693	41,221	51,959
21	39,924	40,618	42,857	21,253	46,326	38,733	42,964	50,624	45,486	44,770	49,717	49,324
22	47,188	46,503	41,827	34,468	57,048	42,928	52,478	42,938	46,287	43,580	38,552	50,885
23	38,515	38,364	44,771	44,705	40,402	50,067	43,092	44,729	44,503	45,496	41,713	33,954
24	44,692	49,255	41,610	41,672	58,505	40,949	45,550	49,728	43,744	43,577	34,800	47,944
25	44,043	39,241	39,414	46,259	34,719	52,781	50,726	42,874	51,796	46,050	25,023	49,283
26	38,800	39,403	46,461	43,177	39,586	38,815	41,452	44,707	38,120	44,660	46,633	39,972
27	41,229	46,896	40,782	38,787	34,751	49,560	45,270	50,444	50,180	40,485	39,148	48,764
28	41,675	39,338	45,237	49,888	41,432	41,823	56,493	46,055	40,994	28,820	42,157	43,289
29	41,839		42,646	48,829	36,309	46,921	40,561	46,919	52,485	40,113	45,374	40,435
30	41,443		40,777	39,150	45,566	47,192	45,576	43,319	45,010	48,431	38,110	45,559
31	41,882		27,875		49,488		41,921	46,646		49,604		49,420
Monthly Total	1,292,759	1,191,228	1,310,391	1,245,051	1,365,747	1,397,740	1,405,308	1,388,872	1,306,293	1,372,308	1,256,368	1,420,551

Day	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)
Monthly Minimum	34,806	34,978	27,875	21,253	32,162	37,752	38,628	19,128	32,988	28,820	25,023	33,954
Monthly Maximum	48,556	49,255	50,601	51,639	58,505	55,629	56,493	55,293	53,000	51,817	50,226	51,959
Monthly Average	41,702	42,544	42,271	41,502	44,056	46,591	45,333	44,802	43,543	44,268	41,879	45,824

Annual Total (m^3)	15,952,617
Annual Minimum (m^3)	19,128
Annual Maximum (m^3)	58,505
Annual Average (m^3)	43,693

Note: (i) As per the water system's current Municipal Drinking Water Licence, the rated capacity of the Water Treatment Plant is 91,000 m^3/day. The maximum daily volume of treated water that flows from the treatment plant into the distribution system shall not exceed this value.

4. Treated Water Instantaneous Peak Flow (L/s)

Day	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	484	638	463	837	652	866	852	852	864	853	463	866
2	875	467	866	660	647	872	863	1,039	645	854	645	842
3	865	646	877	466	862	870	861	629	637	826	647	853
4	861	470	862	875	481	737	877	629	655	854	873	867
5	643	631	873	463	477	646	864	625	643	626	491	828
6	643	629	989	666	481	872	861	850	931	460	884	859
7	638	631	664	870	651	653	869	857	627	850	489	877
8	631	638	482	869	637	881	843	852	625	628	492	638
9	459	642	854	464	624	858	861	843	859	619	880	646
10	865	481	883	859	867	666	810	581	475	851	473	877
11	658	713	884	868	864	635	874	625	472	628	872	645
12	870	643	864	469	866	863	832	854	468	621	855	642
13	863	874	472	867	650	859	863	853	493	636	860	470
14	461	463	641	462	653	828	851	858	494	620	639	874
15	641	640	624	857	875	626	860	847	469	628	868	869
16	539	648	866	868	485	863	637	893	471	852	632	869
17	465	648	655	468	870	841	737	892	853	638	864	865
18	466	633	481	868	878	643	633	850	848	635	863	864
19	870	473	481	641	861	860	859	858	861	637	624	863
20	656	473	648	856	859	864	858	845	917	634	639	872
21	472	474	643	856	870	866	862	873	647	632	860	865
22	869	866	654	861	863	632	852	841	635	652	472	880
23	854	474	649	852	640	861	829	866	860	646	632	487
24	867	643	635	845	861	859	632	860	619	646	472	876
25	664	467	463	624	478	863	859	843	856	865	638	862
26	473	464	653	619	467	855	834	858	871	870	417	637
27	864	881	640	459	484	877	854	846	867	636	465	651
28	868	464	637	870	868	860	853	624	868	868	647	823
29	623		640	990	485	882	637	628	859	850	654	875
30	859		626	462	658	926	624	633	861	867	640	865
31	632		870		657		625	862		862		883

Day	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)
Monthly Minimum	459	463	463	459	467	626	624	581	468	460	417	470
Monthly Maximum	875	881	989	990	878	926	877	1,039	931	870	884	883
Monthly Average	693	600	695	723	696	809	807	802	708	721	665	796

Annual Minimum (L/s)	417
Annual Maximum (L/s)	1,039
Annual Average (L/s)	726

Note: (i) As per the water system's current Municipal Drinking Water Licence, the rated capacity of the Water Treatment Plant is 91,000 m^3/day. This converts to 1053 litres/second. The maximum daily volume of treated water that flows from the treatment plant into the distribution system shall not exceed this value.

Appendix B – 2021 Annual Report

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Drinking-Water Systems Regulation O. Reg. 170/03

Drinking-Water System Number:	210000871
Drinking-Water System Name:	**Elgin Area Primary Water Supply System**
Drinking-Water System Owner:	Elgin Area Primary Water Supply System Joint Board of Management
Drinking-Water System Operating Authority:	Ontario Clean Water Agency (OCWA)
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	**Complete for all other Categories.**
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.** Lake Huron and Elgin Area Water Supply Systems c/o Regional Water Supply Division 235 North Centre Road, Suite 200 London, ON N5X 4E7 https://huronelginwater.ca/ Elgin Area Water Treatment Plant 43665 Dexter Line, Union, ON N0L 2L0	**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 [ ]**

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Drinking-Water Systems Regulation O. Reg. 170/03

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 EAPWSS:

Drinking Water System Name	Drinking Water System Number
City of London Distribution System	260004917
St. Thomas Area Secondary Water Supply System	260078897
Aylmer Area Secondary Water Supply System	260004722
Port Burwell Area Secondary Water Supply System	260004735
Central Elgin Distribution System	260004761
St. Thomas Distribution System	260002187

Systems that receive their drinking water indirectly from the EAPWSS:

Drinking Water System Name	Drinking Water System Number
Aylmer Distribution System	260002136
Malahide Distribution System	260004774
Dutton Dunwich Distribution System	220002967
Bayham Distribution System	260004748
Southwold Distribution System	210001362
Ontario Police College Distribution System	260002161

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**
- **[ ] 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 Area Primary Water Supply System employs pre-chlorination, screening, process pH adjustment (utilizing carbon dioxide), powder activated carbon addition (seasonally on an as-required basis), coagulation, flocculation, sedimentation, dual-media filtration, UV disinfection, post-chlorination, final pH adjustment (utilizing sodium hydroxide) and fluoridation to treat raw water obtained from Lake Erie. The WTP has a rated capacity of 91 ML/day (MLD). Water is pumped from the plant through the primary transmission main (900mm diameter) to various communities enroute to the Elgin-Middlesex Terminal Reservoir located northeast of St. Thomas in the Municipality of Central Elgin. The drinking water system is monitored at various locations throughout the system via a Supervisory Control and Data Acquisition (SCADA) system.
A Residuals Management Facility (RMF) provides equalization, clarification, sediment thickening and dechlorination. Thickened sediment is dewatered by centrifuges and the thickened sediment is sent to the landfill for final disposal. Clarified and dechlorinated liquid streams are discharged back to Lake Erie through the plant drain.

List all water treatment chemicals used over this reporting period

Carbon Dioxide
Aluminum Sulphate
Cationic Polymer
Powder Activated Carbon
Chlorine Gas
Hydrofluosilicic Acid
Sodium Hydroxide
Dewatering Polymer (Residuals Management Facility)
Sodium Bisulphite (Residuals Management Facility)

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:

Capital Projects:

- Instrumentation replacements
- Filter effluent flow meter (4) replacements
- LED lighting upgrades
- Filter #1 and #4 drain valve actuator replacements
- Interior door replacements
- Alum loading area safety shower installation
- Powder Activated Carbon (PAC) room safety shower installation

- Hand railing replacements
- Heating, Ventilation, and Air Conditioning (HVAC) upgrade at the Low Lift Building
- A-Pipeline condition assessment
- Site security trailer installation
- Service water piping replacements at the Low Lift Building

Maintenance Projects:

- Low lift pump #1 rebuild

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 Report 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.

Location	Number of Samples	Range of E. coli Results (CFU/100 mL) (min #)-(max #)	Range of Total Coliform Results (CFU/100 mL) (min #)-(max #)	Range of HPC Results (CFU/100 mL) (min #)-(max #)
Raw Water	104	(0)-(400)	(0)-(28,000)	(<10)-(>2,000)
Treated Water (WTP)	261	(0)-(0)	(0)-(0)	(0)-(>2,000)
Distribution (EMPS Valve House)	105	(0)-(0)	(0)-(0)	(0)-(90)
Distribution (Fruitridge Surge Facility)	52	(0)-(0)	(0)-(0)	(<10)-(10)

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	Range of Results (min #)-(max #)
Treated Water Free Chlorine (mg/L)	Continuous Monitoring	(0.54)-(2.76)
Treated Water Free Chlorine (mg/L)	2127	(0.76)-(2.17)
Treated Water Turbidity (NTU)	Continuous Monitoring	(0.011)-(2.00)
Treated Water Turbidity (NTU)	2126	(0.016)-(2.22)
Treated Water Fluoride (mg/L)	Continuous Monitoring	(0.12)-(2.00)*
Treated Water Fluoride (mg/L)	749	(0.20)-(0.80)
Filter #1 - Filtered Water Turbidity (NTU)	Continuous Monitoring	(0.015)-(0.292)
Filter #2 - Filtered Water Turbidity (NTU)	Continuous Monitoring	(0.015)-(0.411)
Filter #3 - Filtered Water Turbidity (NTU)	Continuous Monitoring	(0.015)-(0.420)
Filter #4 - Filtered Water Turbidity (NTU)	Continuous Monitoring	(0.013)-(0.395)
Combined Filtered Water Turbidity (NTU)	2125	(0.015)-(0.483)

NOTE: *Fluoride spikes > 1.50 mg/L on treated water coincide with pump start-ups or pump changes. Fluoride residual spikes > 1.50 mg/L did not exceed 5 minutes at any time in 2021, therefore not reportable (not an adverse result).

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Drinking-Water Systems Regulation O. Reg. 170/03
Summary of Inorganic parameters tested during this reporting period
*(*All tests were conducted on treated water leaving the WTP unless otherwise noted)*

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Antimony	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Arsenic	Jan. 6, 2021 Aug. 3, 2021	0.0003 0.0003	mg/L mg/L	NO
Barium	Jan. 6, 2021 Aug. 3, 2021	0.0217 0.0194	mg/L mg/L	NO
Boron	Jan. 6, 2021 Aug. 3, 2021	0.019 0.023	mg/L mg/L	NO
Cadmium	Jan. 6, 2021 Aug. 3, 2021	0.000007 0.000005	mg/L mg/L	NO
Chromium	Jan. 6, 2021 Aug. 3, 2021	0.00012 0.00032	mg/L mg/L	NO
Lead (EMPS Valve House)	Jan. 6, 2021 July 12, 2021	0.00002 0.00003	mg/L mg/L	NO
Mercury	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Selenium	Jan. 6, 2021 Aug. 3, 2021	0.00016 0.00014	mg/L mg/L	NO
Uranium	Jan. 6, 2021 Aug. 3, 2021	0.000042 0.000073	mg/L mg/L	NO
Sodium	Jan. 6, 2021	15.9	mg/L	NO
Nitrite	Jan. 6, 2021 Apr. 6, 2021 Jul. 12, 2021 Oct. 18, 2021	Not Detected Not Detected Not Detected Not Detected	mg/L mg/L mg/L mg/L	NO
Nitrate	Jan. 6, 2021 Apr. 6, 2021 Jul. 12, 2021 Oct. 18, 2021	0.225 0.301 0.124 0.150	mg/L mg/L mg/L mg/L	NO

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Drinking-Water Systems Regulation O. Reg. 170/03

Summary of Organic parameters sampled during this reporting period

*(*All tests were conducted on treated water leaving the WTP unless otherwise noted)*

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Alachlor	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Atrazine + N-dealkylated metabolites	Jan. 6, 2021 Aug. 3, 2021	0.00007 0.00005	mg/L mg/L	NO
Azinphos-methyl	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Benzene	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Benzo(a)pyrene	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Bromoxynil	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Carbaryl	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Carbofuran	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Carbon Tetrachloride	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Chlorpyrifos	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Diazinon	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Dicamba	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
1,2-Dichlorobenzene	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
1,4-Dichlorobenzene	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
1,2-Dichloroethane	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
1,1-Dichloroethylene (vinylidene chloride)	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Dichloromethane	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO

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Drinking-Water Systems Regulation O. Reg. 170/03

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
2-4 Dichlorophenol	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
2,4-Dichlorophenoxy acetic acid (2,4-D)	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Diclofop-methyl	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Dimethoate	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Diquat	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Diuron	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Glyphosate	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Haloacetic Acids (HAA's) (EMPS Valve House)	Jan. 6, 2021 Apr. 6, 2021 Jul. 12, 2021 Oct. 18, 2021	Not Detected 0.006 0.009 0.005	mg/L mg/L mg/L mg/L	NO
Haloacetic Acids (HAA's) (EMPS Valve House) Running Annual Average	2021	0.005	mg/L	NO
Malathion	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
2-Methyl-4-chlorophenoxyacetic acid	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Metolachlor	Jan. 6, 2021 Aug. 3, 2021	0.00002 0.00002	mg/L mg/L	NO
Metribuzin	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Monochlorobenzene	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Paraquat	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Pentachlorophenol	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO

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Drinking-Water Systems Regulation O. Reg. 170/03

Parameter	Sample Date	Result Value	Unit of Measure	Exceedance
Phorate	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Picloram	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Polychlorinated Biphenyls (PCB)	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Prometryne	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Simazine	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Total Trihalomethanes (THMs) (EMPS Valve House)	Jan. 6, 2021 Apr. 6, 2021 Jul. 12, 2021 Oct. 18, 2021	0.010 0.015 0.022 0.019	mg/L mg/L mg/L mg/L	NO
Total Trihalomethanes (THMs) (EMPS Valve House) Running Annual Average	2021	0.017	mg/L	NO
Terbufos	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Tetrachloroethylene	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
2,3,4,6-Tetrachlorophenol	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Triallate	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Trichloroethylene	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
2,4,6-Trichlorophenol	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Trifluralin	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO
Vinyl Chloride	Jan. 6, 2021 Aug. 3, 2021	Not Detected Not Detected	mg/L mg/L	NO

NOTE: During 2021, no Inorganic or Organic parameter(s) exceeded half the standard prescribed in Schedule 2 of Ontario Drinking Water Quality Standards.

Appendix C – 2021 RMF Non-Compliant Discharge Summary Report

Appendix C - 2021 RMF Non-Compliant Discharge Summary Report

Date & Time	Duration (hh:mm:ss)	Max. Total Chlorine Residual (mg/L)	Volume	Reason	Corrective Actions
June 21, 2021 14:27	00:25:00	0.75 mg/L	1590m^3	During a plant drain flush, the dechlorination dosage was too low when the operator switched from low flow to the high flow during the backwash	1. Increased dechlorination dosage 2. Added dechlorination pucks to the plant drain chamber 3. Reduced the backwash flow rate
August 16, 2021 18:25	00:09:40	0.16 mg/L	803m^3	The RMF has two backwash tanks. One of the backwash tanks was out of service for annual cleaning. During a backwash to the RMF the backwash tank was overflowed. The overflow is tied to the plant drain that discharges to the lake. Overflow dechlorination pump did not start. Water from overflow was not dechlorinated resulting in a high chlorine discharge.	1. The Operator increased the dechlorination agent at the RMF and manually added sodium bisulphite (SBS) to the plant drain chamber. 2. Review/test dechlorination pump. Verify functionality and address any issues.