2024 Annual Drinking Water System Summary Report

Innerkip Drinking Water System

1. GENERAL INFORMATION

Oxford County (the County) prepares a report summarizing system operation and water quality for every municipal drinking water system annually. The reports detail information required for Annual Reports and Summary Reports under Ontario Regulation (O. Reg.) 170/03 of the *Safe Drinking Water Act,* 2002 including the latest water quality testing results, water quantity statistics and any adverse conditions that may have occurred for the previous year. They are available for review by the end of February on the County website at www.oxfordcounty.ca/drinkingwater or by contacting the Public Works Department.

All efforts have been made to ensure the information presented in this report is accurate. If you have any questions or comments concerning the report, please contact the County at the address and phone number listed below or by email at water@oxfordcounty.ca.

Drinking Water System:	Innerkip Drinking Water System
Drinking Water System Number:	260046995
Reporting Period:	January 1, 2024 – December 31, 2024

Drinking Water System Owner & Contact Information:

Oxford County Public Works Department - Water Services
P.O. Box 1614
21 Reeve Street
Woodstock, ON N4S 7Y3
Telephone: 519-539-9800
Toll Free: 866-537-7778
Email: water@oxfordcounty.ca

1.1 System Description

The Innerkip Drinking Water System (DWS) is a large municipal residential water system as defined by Ontario Regulation (O. Reg.) 170/03 and serves a population of approximately 1,710 people. The system consists of two well sources which are secure groundwater wells. The water is treated with sodium hypochlorite for disinfection and in 2024 approximately 8,200 L of sodium hypochlorite was used. This chemical is certified to meet standards set by the Standards Council of Canada or American National Standards Institute. The water is filtered to remove iron and manganese.

The treatment facility houses filters, high lift pumps, monitoring equipment, and a 700 m^3 storage standpipe. There is a retention lagoon for backwash water from the filters which discharges to a tributary of the Thames River. A standby generator is available to run the facility in the event of a power failure. The system is maintained by licensed water system operators, who operate treatment and monitoring equipment and collect samples as specified by O. Reg. 170/03. Alarms automatically notify operators in the event of failure of critical operational requirements. The Innerkip DWS does not supply drinking water to any other drinking water systems.

1.2 Major Expenses

Planning for major drinking water system expenses is included within Oxford County's Water Services Master Plan and managed according to our Asset Management and Capital Replacement Program.

The Innerkip Drinking Water System is one of 14 water systems with revenues and expenses pooled for economy-of-scale purposes. The systems are combined into the Township Water financial system and in 2024 had operating and maintenance expenditures of approximately $4,100,000.

In addition to regular operational and maintenance expenditures, Capital Improvement Projects for the Township’s systems totalled $1,800,000 for improvements to water treatment systems and replacement of distribution mains in the Township System.

Township Capital Improvement Projects included:

- $300,000 repair and maintenance on wells, water pump stations, and water treatment facilities;
- $260,000 for facilities improvements; and
- $18,000 distribution replacements.

Capital Improvement projects for all systems included:

- $750,000 to develop Countywide SCADA Master Plan for all water systems.

2. MICROBIOLOGICAL TESTING

2.1 E. coli and Total Coliform

Bacteriological tests for *E. coli* and total coliforms are required weekly from the raw and treated water at the facility and from the distribution system. Extra samples are taken after major repairs or maintenance work. Any *E. coli* or total coliform results above the Maximum Allowable Concentration (MAC) of 0 colonies per 100 mL in treated water samples must be reported to the Ministry of Environment, Conservation and Parks (MECP) and the Medical Officer of Health (MOH). Resamples and any other required actions are taken as quickly as possible. The results from the annual sampling program are shown on the table below. There was one adverse test result from 214 treated water samples taken in 2024. The corrective action for which is summarized in section 6.2.

Source	*Number of Samples*	*Range of E. coli Min - Max MAC = 0 (colonies / 100 mL)*	*Range of Total Coliform Min - Max MAC = 0 (colonies / 100 mL)*
Raw	114	0	0 - 20
Treated	53	0	0
Distribution	161	0	0 – 2

2.2 Heterotrophic Plate Count (HPC)

HPC analyses are required from the treated and distribution water. The tests are required weekly for treated water and for 25% of the required distribution system bacteriological samples. HPC should be less than 500 colonies per 1 mL. Results over 500 colonies per 1 mL may indicate a change in water quality but it is not considered an indicator of unsafe water. Annual results are shown in the following table.

Source	*Number of Samples*	*Range of HPC Min – Max (colonies / mL)*
Treated	**53**	**0 – 10**
Distribution	**42**	**0 – 10**

3. CHEMICAL TESTING

The *Safe Drinking Water Act,* 2002 requires periodic testing of the water for approximately 60 different chemical parameters. The latest results for all parameters are provided in Appendix ‘A’. The sampling frequency varies for different types and sizes of water systems and chemical parameters. If the concentration of a parameter is above half of the MAC under the Ontario Drinking Water Quality Standards, an increased testing frequency of once every three months is required by O. Reg. 170/03. Where concerns regarding a parameter exist, the MECP can also require additional sampling be undertaken.

Information on the health effects and allowable limits of components in drinking water may be found on the MECP web page through the link provided in Appendix 'A'. Additional information on common chemical parameters specific to the Innerkip Drinking Water System is provided below.

3.1 Hardness

This is an aesthetic parameter that may affect the appearance of the water but is not related to health. Well water commonly has high levels of hardness and other minerals from being in contact with underground rock formations. Many households have water softeners to help reduce white calcium deposits and improve the efficiency of soaps. This information is included here to help residents set the water softener at the level recommended by the manufacturer. Samples for hardness are collected at a minimum every three years from raw water. The Hardness for the Innerkip Drinking Water System was tested in 2022 and ranged from 929 - 1,670 mg/L (54 - 98 grains/gallon).

3.2 Required Additional Testing

Under the Regulation, additional quarterly sampling is required if a parameter listed in Schedule 23 or 24 exceeds half of the MAC. Based on the latest test results no additional testing is required under O. Reg. 170/03.

Testing of the suspended solids from the filter backwash which is discharged to the retention lagoon is required under the Municipal Drinking Water Licence Environmental Discharge Parameters. A summary of the monitoring results for 2024 is provided in the following table.

Parameter	*Annual Result Range (Min–Max) (mg/L)*	*Average (mg/L)*	*Number of Samples*	*Limit*	*MDL (mg/L)*
Suspended Solids from Filter Backwash	(<MDL – 245)	12	53	25 mg/L Annual Average	2.0

4. OPERATIONAL MONITORING

4.1 Chlorine Residual

Free chlorine levels in the treated water are continuously monitored at the discharge point of the Water Treatment Facility and in the distribution system. As a target, free chlorine residuals within the distribution system should be above 0.20 mg/L. A free chlorine level lower than 0.05 mg/L must be reported and corrective action taken. A summary of the chlorine residual readings is provided in the table below. There were no reportable incidents in 2024.

4.2 Turbidity

Turbidity of treated water is continuously monitored at the treatment facility as a change in turbidity can indicate an operational problem. As a minimum, turbidity for each well is required to be tested monthly. Turbidity is measured in nephelometric turbidity units (NTU). Under O. Reg. 170/03 turbidity in groundwater from a secure well or a well with effective in-situ filtration is not reportable however, turbidity should be < 1 NTU at the treatment plant and < 5 NTU in the distribution system. A summary of the annual monitoring results is provided in the following table.

Parameter	*Number of Tests or Monitoring Frequency*	*Range of Results (Min – Max) and Average*
Chlorine residual after treatment (mg/L)	Continuous	(1.01 – 2.14) 1.49
Chlorine residual in distribution (mg/L)	Continuous	(0.61 – 1.71) 1.24
Well 1 turbidity before treatment (NTU)	53	(0.18 – 28.00) 1.55
Well 2 turbidity before treatment (NTU)	53	(0.09 – 2.16) 0.58
Turbidity after treatment (NTU)	Continuous	(0.05 – 1.66) 0.16

5. WATER QUANTITY

Continuous monitoring of flow rates from supply wells into the treatment system and from the Water Treatment Facility into the distribution system is required by O. Reg. 170/03. The Permit to Take Water (PTTW) and Municipal Drinking Water License (MDWL) issued by the MECP regulate the amount of water that can be utilized over a given time period. Terms used to evaluate capacity and current values for the Innerkip DWS are provided in the following table.

Capacity Term	*Description*	*Capacity (m^3/day)*
Supply Capacity	The limiting capacity of either the PTTW or MDWL.	1,296
Dynamic Supply Capacity	Accounts for any current constraints on the water supply (such as offline wells, reduced well capacity, water quality considerations).	1,296
Firm Capacity	Firm Capacity is defined as the removal of the highest producing well in an emergency or operational / maintenance situation with the ability to transport a maximum of 100 m^3/day to maintain system integrity if appropriate.	1,296
Dynamic Firm Capacity	Considers the removal of the largest production well and other current system constraints. Trucked in water may be considered for some systems.	1,296

This system consists of two supply wells. The PTTW restricts the operation to only one well operating at a time. In this case, all capacity considerations for the system are the same and trucked water is not considered under firm capacity scenarios.

A summary comparing flows in 2024 to current capacities is provided in the following table and presented graphically in Appendix ‘B’.

Flow Summary	*Supply Capacity (m^3/day)*	*Dynamic Supply Capacity (m^3/day)*	*Max Daily Flow (m^3/day)*	*Average Daily Flow (m^3/day)*	*Average Monthly Flow (m^3/month)*	*Total Yearly Flow (m^3/year)*
Innerkip Water Treatment Facility	1,296	1,296	629	361	11,008	132,095

6. NON-COMPLIANCE FINDINGS AND ADVERSE RESULTS

This section documents any known incidents of non-compliance or adverse results and the associated corrective actions taken to resolve the issue. Non-compliance issues are typically identified by either the Operating Authority or the MECP Drinking Water Inspectors. The issues and associated required actions are documented in the system's Annual Inspection Report. All non-compliance issues are investigated, corrective actions taken and documented using the County's Drinking Water Quality Management System (DWQMS) procedures.

6.1 Non-Compliance Findings

The annual MECP inspection took place in November 2024. The Inspection Report Rating was 92% with two minor non-compliances for the Innerkip drinking water system noted due to irretrievable continuous monitoring data resulting from a UPS failure which spanned approximately 40 minutes. Raw wells were locked out for the duration of the UPS failure and the UPS has since been replaced. It is important to note that during this timeframe, the plant was still equipped with automatic alarms and shut offs to ensure the water supplied to distribution continued to meet ODWS limits and that County Water Operators attended the site and confirmed that the chlorine residuals and plant operations were normal. The MECP did not require any further corrective actions from this non-compliance.

6.2 Adverse Results

Any adverse bacteriological or chemical results or observations of operational conditions that may indicate adverse water quality are reported as required and corrective actions are taken. There was one adverse water quality result in 2024.

- A bacteriological sample result taken from the distribution system on October 15, 2024 was found to have total coliforms of 2 CFU/100 mL. The result was reported to the MECP and the MOH. Resamples were collected at the site and from an upstream and downstream location. All re-samples were determined to be acceptable by Ontario Drinking Water Standards.

APPENDIX 'A': SUMMARY OF CHEMICAL RESULTS

UNDERSTANDING CHEMICAL TEST RESULTS

The following tables summarize the laboratory results of the chemical testing the County is required to complete. Different types of parameters are required to be tested for at different frequencies as noted below. Explanations on the health impacts of these parameters can be found in the MECP document PSIB 4449e01 titled "Technical Support Document for Ontario Drinking Water Standards, Objectives and Guidelines" available at https://cvc.ca/wp-content/uploads/2011/03/std01_079707.pdf.

Results are shown as concentrations with units of either milligrams per litre (mg/L) or micrograms per litre (µg/L) where 1 mg/L is equal to 1000 µg/L. The Maximum Acceptable Concentration (MAC) is the highest amount of a parameter that is acceptable in municipal drinking water and can be found in the MECP Drinking Water Standards. The Method Detection Limit (MDL) is the lowest amount to which the laboratory can confidently measure. A result of "ND" stands for "Not Detected" and means that the concentration of the chemical is lower than the laboratory's equipment is capable of measuring. In the event that some sample results are ND, and other results are above the MDL, the value of the MDL will be used in place of the ND where an average result must be calculated. Where all collected samples are ND the average sample result will be assumed to be ND.

Nitrate and nitrite samples are required every three months in normal operation.

Parameter	*Number of Tests*	*Result Range Min – Max (mg/L)*	*Average Result (mg/L)*	*MAC (mg/L)*	*MDL (mg/L)*
Nitrite	4	ND – 0.026	0.009	1.0	0.003
Nitrate	4	0.044 – 0.097	0.065	10.0	0.006

Trihalomethane (THM) and total Haloacetic Acids (HAA) are by-products of the disinfection process. The samples are required every three months from the distribution system.

Parameter	*Annual Average*	*Result Value (µg/L)*	*MAC (µg/L)*	*MDL (µg/L)*
Trihalomethane (THM)	2024	19.3	100	0.37
Haloacetic Acids (HAA)	2024	8.9	80	5.3

The following table summarizes the most recent test results for sodium and fluoride. Testing and reporting any adverse results is required every five years.

Parameter	*Sample Date*	*Result Value (mg/L)*	*MAC (mg/L)*	*MDL (mg/L)*
Sodium	August 16, 2021	17.7	20*	0.01
Fluoride	February 18, 2020	0.74	1.5**	0.06

*Sodium levels between 20 – 200 mg/L must be reported every five years.
**Natural levels of fluoride between 1.5 – 2.4 mg/L must be reported every five years.

The following table summarizes the most recent results for the Lead Testing Program. Lead samples are taken every three years. Levels of alkalinity and pH are monitored twice per year in the distribution system to ensure water quality is consistent and does not facilitate leaching of lead into the water.

Parameter	*Result Range (Min - Max)*	*Number of Samples*	*Acceptable Level*
Distribution Alkalinity 2024	232 – 247 mg/L	4	30 – 500 mg/L
Distribution pH 2024	7.26 – 7.38	4	6.5 – 8.5
Distribution Lead 2024	ND – 0.59 µg/L	4	10 µg/L MAC

The following table summarizes the most recent test results for Schedule 23 parameters. Testing is required every three years for secure groundwater wells in large systems.

Parameter	*Sample Date*	*Result Value (µg/L)*	*MAC (µg/L)*	*MDL (µg/L)*
Antimony	February 27, 2023	ND	6	0.6
Arsenic	February 27, 2023	0.4	10	0.2
Barium	February 27, 2023	67.8	1000	0.02
Boron	February 27, 2023	103	5000	2
Cadmium	February 27, 2023	0.003	5	0.003
Chromium	February 27, 2023	0.13	50	0.08
Mercury	February 27, 2023	ND	1	0.01
Selenium	February 27, 2023	0.26	50	0.04
Uranium	February 27, 2023	0.518	20	0.002

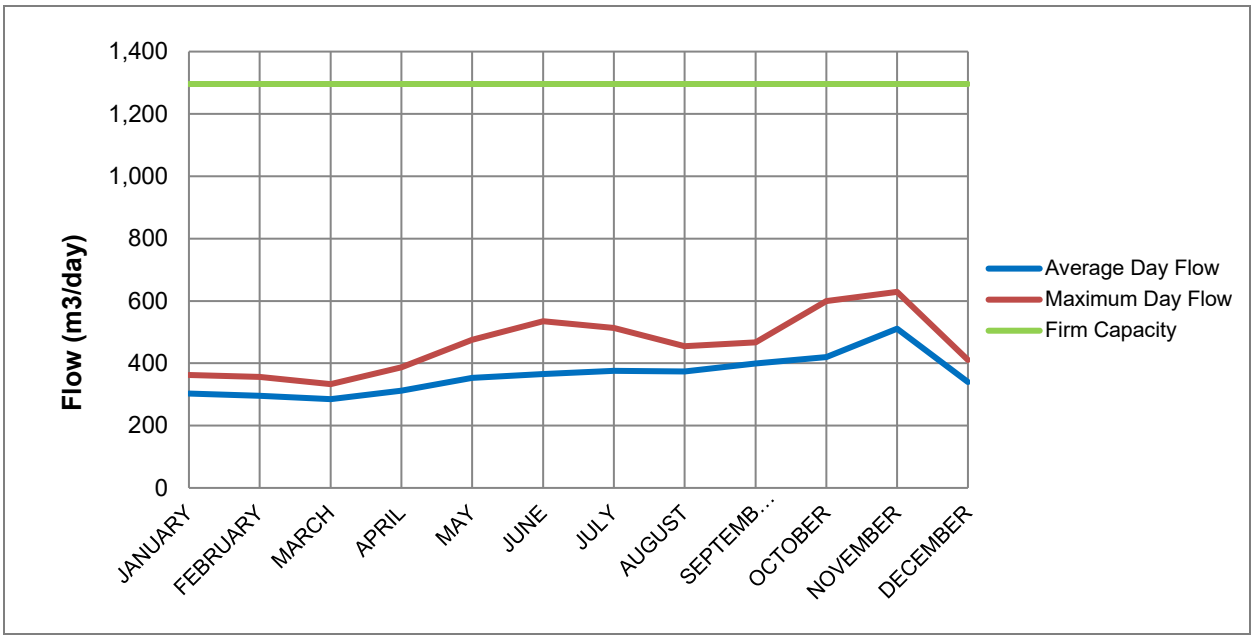
The following table summarizes the most recent test results for Schedule 24 parameters. Testing is required every three years for secure groundwater wells in large systems.

Parameter	*Sample Date*	*Result Value (µg/L)*	*MAC (µg/L)*	*MDL (µg/L)*
Alachlor	February 27, 2023	ND	5	0.02
Atrazine + N-dealkylatedmetobolites	February 27, 2023	ND	5	0.01
Azinphos-methyl	February 27, 2023	ND	20	0.05
Benzene	February 27, 2023	ND	1	0.32
Benzo(a)pyrene	February 27, 2023	ND	0.01	0.004
Bromoxynil	February 27, 2023	ND	5	0.33
Carbaryl	February 27, 2023	ND	90	0.05
Carbofuran	February 27, 2023	ND	90	0.01
Carbon Tetrachloride	February 27, 2023	ND	2	0.17
Chlorpyrifos	February 27, 2023	ND	90	0.02
Diazinon	February 27, 2023	ND	20	0.02
Dicamba	February 27, 2023	ND	120	0.20
1,2-Dichlorobenzene	February 27, 2023	ND	200	0.41
1,4-Dichlorobenzene	February 27, 2023	ND	5	0.36
1,2-Dichloroethane	February 27, 2023	ND	5	0.35
1,1-Dichloroethylene (vinylidene chloride)	February 27, 2023	ND	14	0.33
Dichloromethane	February 27, 2023	ND	50	0.35
2-4 Dichlorophenol	February 27, 2023	ND	900	0.15

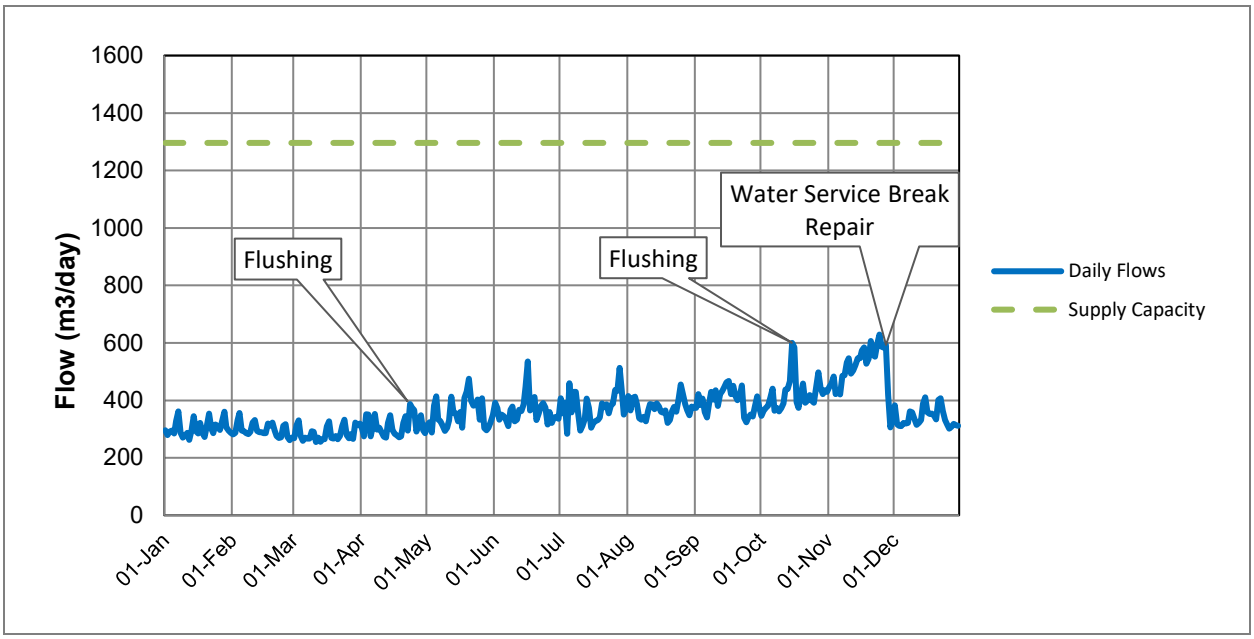
Parameter	*Sample Date*	*Result Value (µg/L)*	*MAC (µg/L)*	*MDL (µg/L)*
2,4-Dichlorophenoxy acetic acid (2,4-D)	February 27, 2023	ND	100	0.19
Diclofop-methyl	February 27, 2023	ND	9	0.40
Dimethoate	February 27, 2023	ND	20	0.06
Diquat	February 27, 2023	ND	70	1
Diuron	February 27, 2023	ND	150	0.03
Glyphosate	February 27, 2023	ND	280	1
Malathion	February 27, 2023	ND	190	0.02
2-methyl-4chlorophenoxyacetic acid (MCPA)	February 27, 2023	ND	100	0.12
Metolachlor	February 27, 2023	ND	50	0.01
Metribuzin	February 27, 2023	ND	80	0.02
Monochlorobenzene	February 27, 2023	ND	80	0.30
Paraquat	February 27, 2023	ND	10	1
Pentachlorophenol	February 27, 2023	ND	60	0.15
Phorate	February 27, 2023	ND	2	0.01
Picloram	February 27, 2023	ND	190	1
Polychlorinated Biphenyls(PCB)	February 27, 2023	ND	3	0.04
Prometryne	February 27, 2023	ND	1	0.03
Simazine	February 27, 2023	ND	10	0.01
Terbufos	February 27, 2023	ND	1	0.01
Tetrachloroethylene	February 27, 2023	ND	10	0.35
2,3,4,6-Tetrachlorophenol	February 27, 2023	ND	100	0.20
Triallate	February 27, 2023	ND	230	0.01
Trichloroethylene	February 27, 2023	ND	5	0.44
2,4,6-Trichlorophenol	February 27, 2023	ND	5	0.25
Trifluralin	February 27, 2023	ND	45	0.02
Vinyl Chloride	February 27, 2023	ND	1	0.17

APPENDIX 'B': WATER QUANTITY SUMMARY

2024 Average vs Maximum Daily Flow Rates



2024 Daily Flow



In 2024, the Innerkip the Supply Capacity, Dynamic Supply Capacity, and Firm Capacity were the same.

2024 Total Production by Well