



**Welland Distribution System (Drinking Water)**  
**City of Welland**

**2022 Annual Water Quality, Lead Evaluation, and Summary Report**  
(Prepared under Ontario Regulation 170/03)

**January 1 to December 31, 2022**

**Ministry of Environment, Conservation and Parks**

**Municipal Drinking Water Licence # 076-101**  
**Drinking Water Works Permit # 076-201**

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## **1. Water Quality Report**

This annual water quality report summarizes the quality of drinking water from the Welland Distribution System, Drinking Water System number (DWS) 260003149, from January 1 to December 31, 2022.

Additional water quality information for the Welland Water Treatment Plant can be accessed from Niagara Region's Water Quality Report website (<https://www.niagararegion.ca/living/water/water-quality-reports/welland/default.aspx>).

This report satisfies the requirements of Ontario Regulation 170/03 – Drinking Water Systems.

### **1.1. Description of Drinking Water System**

The City of Welland (City) is the owner and operating authority of the Welland Distribution System (DWS 260003149).

The City purchases wholesale drinking water for the Welland Distribution System from Niagara Region, the owner and operating authority of the Welland Water Treatment Plant (DWS 2200002048), located at 4 Cross Street North in Welland, Ontario.

The Welland Water Treatment Plant obtains source water indirectly from Lake Erie, via the Welland Canal and the Welland Recreational Waterway (Old Welland canal). The Welland Water Treatment Plant is a conventional surface water treatment plant and, though not used, has the ability to operate as a direct filtration plant. The water treatment process uses aluminum sulphate and primary disinfection is achieved by the use of sodium hypochlorite with ultraviolet light as enhancement.

The Welland Distribution System provides water to the City of Thorold (DWS 260049621) and the Highlands Resident's Association (DWS 260093522). Drinking water is conveyed to consumers via 270 km of City owned watermain and 30.5 km of Niagara Region owned watermain, which range in size from 50 mm (2") to 750 mm (30").

The City does not add additional chemicals within the distribution system for the purpose of drinking water treatment.

### **1.2. Monetary Expenses Incurred**

To ensure safe and efficient operations, the following major repairs or upgrade projects took place:

- Capital watermain replacement – \$2,755,000
- Watermain break repair – \$199,000

*Costs are approximate.*

### 1.3. Summary of Adverse Water Quality Incidents

The following table summarizes the notices of adverse water quality incidents submitted in accordance with the Safe Drinking Water Act. Adverse water quality incidents are reported to the Spills Action Centre and the Medical Officer of Health.

Where there have been no adverse water quality incidents for the reporting period, the table will show “NIL”.

| Incident Date | Adverse Condition  | Corrective Action   | Corrective Actions Complete Date |
|---------------|--|---|----------------------------------|
| 2022-11-14    | Proactive report – Observations of air introduced into distribution system | <ul style="list-style-type: none"> <li>▪ Flush watermain</li> <li>▪ Confirmation of free chlorine residual</li> <li>▪ Two sets of microbiological samples (at location, upstream, downstream) 24 hours apart</li> </ul>   | 2022-11-18                       |
| 2022-11-24    | Suspected contamination during watermain break repair during capital work  | <ul style="list-style-type: none"> <li>▪ Boil water advisory issued to affected consumers and bottled water provided</li> <li>▪ Commissioning of new watermain, including two sets of microbiological samples</li> <li>▪ Water services of affected homes connected to new watermain</li> </ul> | 2022-12-13                       |

### 1.4. Water Quality Test Results

Reported results that are shown with “ND” (non-detect) instead of a numerical value indicate that the sample result is below the lowest possible detection limit for the parameter.

#### 1.4.1. Microbiological Testing

Microbiological testing carried out under Schedule 10 of Ontario Regulation 170/03 – Drinking Water systems, during this reporting period.

| Location     | Number of Samples | Range of E. coli Results (minimum number – maximum number) | Range of Total Coliform Results (minimum number – maximum number) | Prescribed Standard* | Unit of Measure |
|--------------|-------------------|--|---|----------------------|-----------------|
| Distribution | 1605              | Not detectable   | Not detectable  | Not detectable       | CFU/100ml       |

\*Prescribed standards are copied from Ontario Regulation 169/03 - Ontario Drinking Water Quality Standards.

### 1.4.2. Heterotrophic Plate Count Testing

Heterotrophic plate count (HPC) testing is conducted on some distribution system samples. The HPC test is used as a tool to monitor overall quality, but the results are not indicators of water safety. There is no prescribed standard for HPC.

| Location     | Number of Samples | Range of HPC Results<br>(minimum number – maximum number) | Unit of Measure |
|--------------|-------------------|---|-----------------|
| Distribution | 1605              | 0 - 300   | CFU/ml          |

### 1.4.3. Operational Testing

Operational testing carried out under Schedule 7 of Ontario Regulation 170/03 – Drinking Water Systems, during this reporting period.

| Location  | Number of Samples | Range of Results<br>(minimum number – maximum number) | Unit of Measure |
|-----------|-------------------|---|-----------------|
| Turbidity | 4774              | 0 – 9.75  | NTU*            |
| Chlorine  | 4780              | 0.05 – 1.33   | mg/L            |

\*NTU (nephelometric turbidity units) is a unit that measures the lack of water clarity.

### 1.4.4. Additional Testing

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 | Location: Parameter | Date Sampled | Result Value or Range<br>(minimum number – maximum number) | Requirement | Unit of Measure |
|---------------------------------|---------------------|--------------|--|-------------|-----------------|
| NIL                             |                     |              |  |             |                 |

### 1.4.5. Inorganic Testing

Inorganic parameter testing carried out under Schedule 13 of Ontario Regulation 170/03 – Drinking Water Systems, during this reporting period. Inorganic substances include heavy metals and dissolved minerals that may be present in treated drinking water.

| Parameter | Number of Samples | Last Sample Date | Range of Results<br>(minimum number – maximum number) | Prescribed Standard* | Unit of Measure | Exceedance |
|-----------|-------------------|------------------|---|----------------------|-----------------|------------|
| NIL       |                   |                  |   |                      |                 |            |

\*Prescribed standards are copied from Ontario Regulation 169/03 - Ontario Drinking Water Quality Standards. The prescribed standard for sodium is copied from Ontario Regulation 170/03 – Drinking Water Systems.

#### 1.4.6. Lead Testing

Lead testing carried out under Schedule 15.1 of Ontario Regulation 170/03 – Drinking Water Systems, during this reporting period. Additional information for lead sampling is summarized in Section 2.

| Parameter    | Number of Samples | Range of Results<br>(minimum number – maximum number) | Prescribed Standard* | Unit of Measure | Exceedance |
|--------------|-------------------|---|----------------------|-----------------|------------|
| Distribution | 13                | 0.00002 – 0.00029                                     | 0.010                | mg/L            | No         |
| Plumbing     | 42                | 0.00002 – 0.03800                                     | 0.010                | mg/L            | Yes (2)    |

#### 1.4.7. Organic Testing

Organic parameter testing carried out under Schedule 13 of Ontario Regulation 170/03 – Drinking Water Systems, during this reporting period.

| Parameter          | Number of Samples | Results<br>(running annual average) | Prescribed Standard*<br>(running annual average) | Unit of Measure | Exceedance |
|--------------------|-------------------|-------------------------------------|--|-----------------|------------|
| HAA – Distribution | 4                 | 0.005                               | 0.080  | mg/L            | No         |
| THM – Distribution | 4                 | 0.018                               | 0.100  | mg/L            | No         |

\*Prescribed standards are copied from Ontario Regulation 169/03 - Ontario Drinking Water Quality Standards.

#### 1.5. Parameters Exceeding Prescribed Half-Standard

Any inorganic or organic parameter(s) that exceeded half the standard prescribed in Schedule 2 of prescribed standards documented in Ontario Regulation 169/03 - Ontario Drinking Water Quality Standards or prescribed standards documented within Ontario Regulation 170/03 – Drinking Water Systems for large municipal residential drinking water systems.

Where there have been no instances of a half-standard exceedance for the reporting period, the table will show “NIL”.

| Parameter | Range of Results<br>(minimum number – maximum number) | Prescribed Standard* | Unit of Measure | Date of Sample |
|-----------|---|----------------------|-----------------|----------------|
| NIL       |   |                      |                 |                |

\*Prescribed standards are copied from Ontario Regulation 169/03 - Ontario Drinking Water Quality Standards. The prescribed standard for sodium is copied from Ontario Regulation 170/03 – Drinking Water Systems.

## 2. Lead Evaluation Report

This report summarizes the actions taken to monitor the effectiveness of the lead service line replacement program for the Welland Distribution System, Drinking Water System (DWS) number 260003149, from January 1 to December 31, 2022.

This report satisfies the requirements of Schedule D, Section 1.0 Lead Regulatory Relief of the Municipal Drinking Water Licence (Issue 7).

### 2.1.1. Summary of Current Lead Reduction Strategies

Current lead reduction strategies undertaken by the City include:

- Public lead service replacement
- Private lead service replacement (Lead Replacement Program)
- Lead sample collection and analysis for private premise plumbing (residential)
- Resident education and outreach
- Notification and coordination with Niagara Region Public Health

Historically, lead samples collected from the Welland Distribution System meet the prescribed lead standard of 0.010 mg/L required by Ontario Regulation 169/03 – Ontario Drinking Water Quality Standards. Results for lead sampling in the distribution system (2022) ranged from 0.00002 to 0.00029 mg/L and met the prescribed standard.

On occasion, lead samples collected from private premise plumbing do exceed the prescribed standard for lead. In 2022, two private premise plumbing samples exceeded this standard. See Section 2.3 Sample Results for a summary of sample results.

Previous lead sample results for private premise plumbing suggest that efforts to replace City owned lead services has reduced lead levels (full or partial replacement).

## 2.2. Summary of Results and Implementation

### 2.2.1. Lead Service Replacement Progress

The table below summarizes lead service replacements and known remaining services as of December 31, 2022. Additional lead services (City and privately owned) may be identified during watermain replacement and repair work and directly affect the lead service replacement timeline.

| Public Lead Service (City) |                    |          |                | Private Lead Service (Resident) |                |
|----------------------------|--------------------|----------|----------------|---------------------------------|----------------|
| 2021 Remaining             | Previously Unknown | Replaced | 2022 Remaining | Replaced                        | 2022 Remaining |
| 246                        | 41                 | 67       | 220            | 10                              | 994            |

The City continues to fund and replace the remaining lead services from the City owned portion; with a replacement target of 100 services per year, as operational needs permit. Based on this target, and anticipating that additional lead services will be identified, it is estimated that City owned lead services will be replaced within the next three to four years.

The Lead Replacement Program for private lead service replacement is voluntary. The City continues to fund and promote the Lead Replacement Program. The program provides grants to residents when replacing a private lead service. Grant amounts are typically limited to \$1,500; however, provisions may allow amounts up to \$2,000 if certain conditions are met.

#### **2.2.2. Outreach and Education**

City staff continue to provide outreach and education to the public regarding lead service lines and lead in drinking water through:

- The City of Welland website (<https://www.welland.ca/Building/LASSR.asp>).
- Direct communication with residents when lead service lines are discovered.
- Door to door requests for private premise lead sampling.
- Proactive outreach (letter) to areas with known or probable lead services.

Communication to residents includes information on lead in drinking water and information about the City's Lead Replacement Program.

#### **2.2.3. Faucet Filter Program**

The City of Welland does not offer a Faucet Filter program to residents. Where appropriate, the benefits of having a lead rated filter to reduce lead levels at the tap are communicated to residents. The information provided is prepared by Niagara Region Public Health.

#### **2.2.4. Involvement of Public Health Authorities**

Niagara Region Public Health provides education and outreach to residents when requested by City staff.

In addition, Niagara Region Public Health is notified of any lead sample exceedance for the Welland Distribution System or private premise plumbing; these results are reported as an exceedance of a prescribed drinking water sample under Ontario Regulation 170/03 – Drinking Water Systems and appropriate corrective actions are taken should they arise.

### **2.3. Sample Results**

Lead sample results were collected based on the requirements of the Municipal Drinking Water Licence.

In 2022, 42 lead samples were collected from private premise plumbing and resulted in two (2) exceedances of the prescribed lead standard of 0.010 mg/L (Ontario Regulation 169/03 – Ontario Drinking Water Quality Standards). A summary of private residence lead samples completed in 2022 is shown below.



| Drinking Water System       | Sample Date (dd/mmm/yy) | Sample Location  | Sample 1 Result (mg/L) | Sample 2 Result (mg/L) | Exceedance | Replaced |
|-----------------------------|-------------------------|------------------|------------------------|------------------------|------------|----------|
| Welland Distribution System | 10-Feb-22               | Address redacted | 0.01440                | 0.01500                | Yes        | No       |
|                             | 10-Feb-22               | Address redacted | 0.03800                | 0.00314                | No         | No       |
|                             | 10-Feb-22               | Address redacted | 0.00004                | 0.00005                | No         | No       |
|                             | 14-Feb-22               | Address redacted | 0.01320                | 0.02790                | Yes        | No       |
|                             | 15-Feb-22               | Address redacted | 0.00148                | 0.00120                | No         | No       |
|                             | 28-Mar-22               | Address redacted | 0.00167                | 0.00136                | No         | No       |
|                             | 28-Mar-22               | Address redacted | 0.00173                | 0.00160                | No         | No       |
|                             | 4-Apr-22                | Address redacted | 0.00003                | 0.00003                | No         | No       |
|                             | 4-Apr-22                | Address redacted | 0.00002                | 0.00002                | No         | No       |
|                             | 4-Apr-22                | Address redacted | 0.00003                | 0.00002                | No         | No       |
|                             | 5-Apr-22                | Address redacted | 0.00371                | 0.00411                | No         | No       |
|                             | 7-Apr-22                | Address redacted | 0.00012                | 0.00006                | No         | No       |
|                             | 7-Apr-22                | Address redacted | 0.00020                | 0.00010                | No         | No       |
|                             | 12-Apr-22               | Address redacted | 0.00262                | 0.00379                | No         | No       |
|                             | 12-Apr-22               | Address redacted | 0.00042                | 0.00015                | No         | No       |
|                             | 12-Apr-22               | Address redacted | 0.00024                | 0.00026                | No         | No       |
|                             | 12-Apr-22               | Address redacted | 0.00025                | 0.00010                | No         | No       |
|                             | 13-Apr-22               | Address redacted | 0.00159                | 0.00173                | No         | No       |
|                             | 13-Apr-22               | Address redacted | 0.00225                | 0.00738                | No         | No       |
|                             | 13-Apr-22               | Address redacted | 0.00025                | 0.00013                | No         | No       |
|                             | 13-Apr-22               | Address redacted | 0.00007                | 0.00003                | No         | No       |
|                             | 12-Oct-22               | Address redacted | 0.00006                | 0.00003                | No         | No       |
|                             | 13-Oct-22               | Address redacted | 0.00091                | 0.00044                | No         | No       |
|                             | 13-Oct-22               | Address redacted | 0.00017                | 0.00009                | No         | No       |
|                             | 13-Oct-22               | Address redacted | 0.00047                | 0.00021                | No         | No       |
|                             | 13-Oct-22               | Address redacted | 0.00006                | 0.00007                | No         | No       |
|                             | 14-Oct-22               | Address redacted | 0.00260                | 0.00375                | No         | No       |
|                             | 14-Oct-22               | Address redacted | 0.00006                | 0.00019                | No         | No       |
|                             | 14-Oct-22               | Address redacted | 0.00026                | 0.00019                | No         | No       |
|                             | 14-Oct-22               | Address redacted | 0.00003                | 0.00003                | No         | No       |
|                             | 14-Oct-22               | Address redacted | 0.00049                | 0.00025                | No         | No       |
|                             | 14-Oct-22               | Address redacted | 0.00002                | 0.00002                | No         | No       |
|                             | 14-Oct-22               | Address redacted | 0.00036                | 0.00028                | No         | No       |
|                             | 14-Oct-22               | Address redacted | 0.00037                | 0.00018                | No         | No       |
|                             | 14-Oct-22               | Address redacted | 0.00042                | 0.00025                | No         | No       |
|                             | 14-Oct-22               | Address redacted | 0.00064                | 0.00036                | No         | No       |
|                             | 14-Oct-22               | Address redacted | 0.00004                | 0.00003                | No         | No       |
|                             | 15-Oct-22               | Address redacted | 0.00023                | 0.00016                | No         | No       |
|                             | 15-Oct-22               | Address redacted | 0.00036                | 0.00024                | No         | No       |
|                             | 15-Oct-22               | Address redacted | 0.00056                | 0.00044                | No         | No       |
| 15-Oct-22                   | Address redacted        | 0.00033          | 0.00023                | No                     | No         |          |
| 15-Oct-22                   | Address redacted        | 0.00010          | 0.00008                | No                     | No         |          |

### **3. Summary Report – Regulatory Non-Compliance and Water Volume**

This report summarizes the water volume by month, provided by Niagara Region, to the Welland Distribution System (DWS 260003149), from January 1 to December 31, 2022.

This report satisfies the requirements of Ontario Regulation 170/03 – Drinking Water Systems.

#### **3.1. Summary of Regulatory Non-Compliance**

The Welland Distribution System received an inspection rating of 94.44% during the 2022-2023 annual drinking water system inspection. The inspection was conducted by a Provincial Officer with the Ministry of Environment, Conservation and Parks.

During the inspection, records from July 1, 2021 – November 2, 2022, were reviewed by the ministry provincial officer. The inspection was concluded on December 21, 2022.

The inspection identified one non-compliance with Ontario Regulation 128/04 (Certification of Drinking Water System Operators and Water Quality Analysts) related to certified operator functions being performed by staff without the required certification.

The certified operator functions were performed by staff with a recently expired certificate. These functions included collecting, analyzing, and recording free chlorine residuals following routine fire hydrant inspections. The free chlorine sample results were all within regulated requirements of > 0.05 mg/L and there was no risk to public health.

The requirement to sample free chlorine following fire hydrant inspection is an internal City requirement; however, the collection, analysis, and recording of free chlorine residuals within a live distribution system requires the person performing the function to possess valid operator certification at the time of sampling.

##### **3.1.1. Investigation and Root Cause**

It was determined that senior leadership changes, lead hand transitions, and a prolonged vacancy in the Water Compliance Supervisor role (responsible position for processing operator certification) were the main contributing factors to the non-compliance as staffing transitions and vacancies permitted a delay in completing operator training, examination, and certification upgrade.

In addition, a review of internal standard operating procedures was completed. Several gaps were identified which may have contributed to the non-compliance. These include:

- Operator certification tracking responsibilities did not identify a delegate when responsible roles are unable to perform these duties.
- Undefined process for identifying and communicating operator certification status to supervisory positions assigning work.
- Clear direction on tasks that are only to be completed by certified operators.
- Undefined process for the work assignment protocol if operator certification expires.

### 3.1.2. Corrective Actions

Several actions were completed to correct the non-compliance and prevent recurrence. These actions include:

- A status review of operator certification.
- Processing of operator certification renewal or upgrade applications were submitted and are under review by the certification body.
- Internal procedures were revised to address gaps identified during the inspection and investigation. Procedure updates include a framework for identifying required competencies at the job position and procedure level.
- Training on certified operator functions and updated procedures was provided to all certified operators.

### 3.2. Summary of Water Volume

The drinking water volumes captured below are reflective of the wholesale water billing volumes supplied by Niagara Region.

| Month                    | Total Water Volume (m <sup>3</sup> ) |
|--------------------------|--------------------------------------|
| January                  | 620,399                              |
| February                 | 568,711                              |
| March                    | 597,331                              |
| April                    | 543,062                              |
| May                      | 595,618                              |
| June                     | 656,943                              |
| July                     | 664,449                              |
| August                   | 675,127                              |
| September                | 582,165                              |
| October                  | 556,916                              |
| November                 | 534,211                              |
| December                 | 578,298                              |
| <b>2022 Total Volume</b> | <b>7,173,230</b>                     |