City of Waterloo
IPPW, City Utilities

# 2024
# WASTEWATER COLLECTION SYSTEM ANNUAL REPORT

CLI-ECA Wastewater Collection 112-W601

January 1, 2024 to December 31, 2024

## Executive Summary

The Wastewater Collection (WWC) 2024 Annual Performance Report provides a comprehensive overview of the City of Waterloo's performance achievements and initiatives during 2024. This report highlights our operational challenges and corrective actions.

The collection system is continuously monitored and maintained, via regular inspections, remote monitoring and timely issue resolution. Looking ahead, we anticipate two new sewage pumping stations (SPS) in 2027 to provide service to a newly developed area of the City. Public transparency and communication remain a priority, with updates provided through social media and the annual performance report.

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## List of Figures and Tables

# 1.0 Introduction

The 2024 Annual Performance report has been prepared in accordance with the terms and requirements set out in the in the Consolidated Linear Infrastructure Environmental Compliance Approval (CLI-ECA) 112-W601, issued to the City of Waterloo on February 8, 2023, under the *Environmental Protection Act, 1990*. It covers the period from January 1, 2024, to December 31, 2024. It must be submitted to the Ministry of Environment, Conservation and Parks (MECP) no later than March 31, 2024. It must be made available to the public no later than June 1 of the same year.

This report summarizes the monitoring and maintenance results for the WWC system required by the CLI-ECA and describes the systems overall operational performance. See **Table 1** for the reporting requirements.

*Table 1: Reporting Requirements per CLI-ECA Wastewater Collection 112-W601*

| Category | Details |
|---|---|
| **Monitoring Data** | Summary and interpretation of data; conclusions on need for future modifications/alterations |
| **Operating Problems** | Summary of operational problems encountered, and corrective actions taken |
| **Calibration, Maintenance and Repairs** | Summary of calibration, maintenance and repairs on major structures and equipment |
| **Complaints and Resolutions** | Summary of complaints received, and the actions taken to address them |
| **Alterations** | Summary of alterations to the authorized system and significant drinking water threats (SDWT) |
| **Overflows and Spills** | Summary of any collection system overflows and spills: include dates, volume, duration disinfection and corrective actions |
| **Efforts to Reduce Overflows and Spills** | Summary of efforts to reduce overflows and spills, including projects, expenditures, Pollution Prevention Control Plan (PPCP) progress, effectiveness assessments and public reporting |

## 1.1 System Description

The City of Waterloo owns the WWC system; City Utilities is responsible for the operation of the Class II WWC system, including trunk sewers, separate sewers, forcemains and sewage pumping stations (SPS) (**Table 2**). In accordance with the

*Ontario Water Resources Act O. Reg. 129/04,* City Utilities wastewater operators are licensed and adequately trained for the operation of the system.

According to the Region of Waterloo Year End 2024 *Population and Household Estimates*, the City's WWC system serves a population of 154,400 people, including temporary, non-resident students (34,500). The WWC system consists of the following (2024 Data):

- 410.32 km gravity sewer main
- 9.9 km of forcemain
- 31,391 wastewater connections (active accounts)
- 6,938 maintenance holes
- Six sewage pumping stations

The City of Waterloo WWC system sewer mains range in size from 100mm to 1200mm and are constructed from cast iron, ductile iron, steel, clay, vitrified clay, asbestos cement (AC), concrete, high density polyethylene (HDPE) and polyvinyl chloride (PVC). Alterations to the City's collection system are documented through application, Records of Future Alterations forms.

The City of Waterloo does not provide any treatment to wastewater. Discharge is routed to the Waterloo Wastewater Treatment Plant (WWTP), which is owned by the Region of Waterloo and operated by the Ontario Clean Water Agency (OCWA). A small portion of the discharge is routed cross-border to the Kitchener WWC system.

*Table 2: Sewage Pumping Stations within the Collection System*

| SPS Name | SPS Address | CSO* to the Environment |
|---|---|---|
| Beaver Creek | 325 Laurelwood Dr. | No |
| Colonial | 475 Denholm St. | Yes (Colonial Creek) |
| Frobisher | 2700 University Ave. E | Yes (Frobisher SWM** Pond) |
| Malabar | 460 Malabar Dr. | Yes (Colonial Creek) |
| Millennium | 2001 University Ave. E | Yes (Colonial Creek) |
| Northlands | 2401 University Ave. E | Yes (Dorwood SWM** Pond) |

*CSO – Collection System Overflow ** SWM – Stormwater Management

# 2.0 Performance Report

## 2.1 Operational Performance Overview

The requirements of the CLI-ECA set out that the WWC system must be properly operated and maintained, to be interpreted as adequately funded, operated, staffed and monitored on a 24/7 basis, with an after-hours procedure to respond to emergencies.

Monitoring programs are designed to regularly track and observe conditions, processes or performance over time. It is used for long-term data collection aimed at detecting trends or irregularities. City Utilities employs the use of a Supervisory Control and Data

Acquisition (SCADA) system (including hardware, networking equipment, and software) at each pump station to assist with continuous monitoring.

Flow monitors are used for tracking the flow of wastewater. Flow monitoring helps to assess system capacity, identify leaks, inflow and infiltration, and potential blockages. The flow monitors provide data to assist in maintenance planning and help plan for future upgrades to the WWC system.

City Utilities maintains multiple preventive maintenance (PM) programs to assess the condition and performance of the system. Results from these programs are analyzed to identify corrective maintenance actions through repairs or replacements and/or recommendations for improvements and system upgrades. Rehabilitation and/or reconstruction projects are identified and replaced in conjunction with other public utilities.

## 2.2 Monitoring Program

The City of Waterloo has monitoring programs which monitor various aspects of the WWC system. **Table 3** provides a summary of the monitoring programs undertaken by City Utilities.

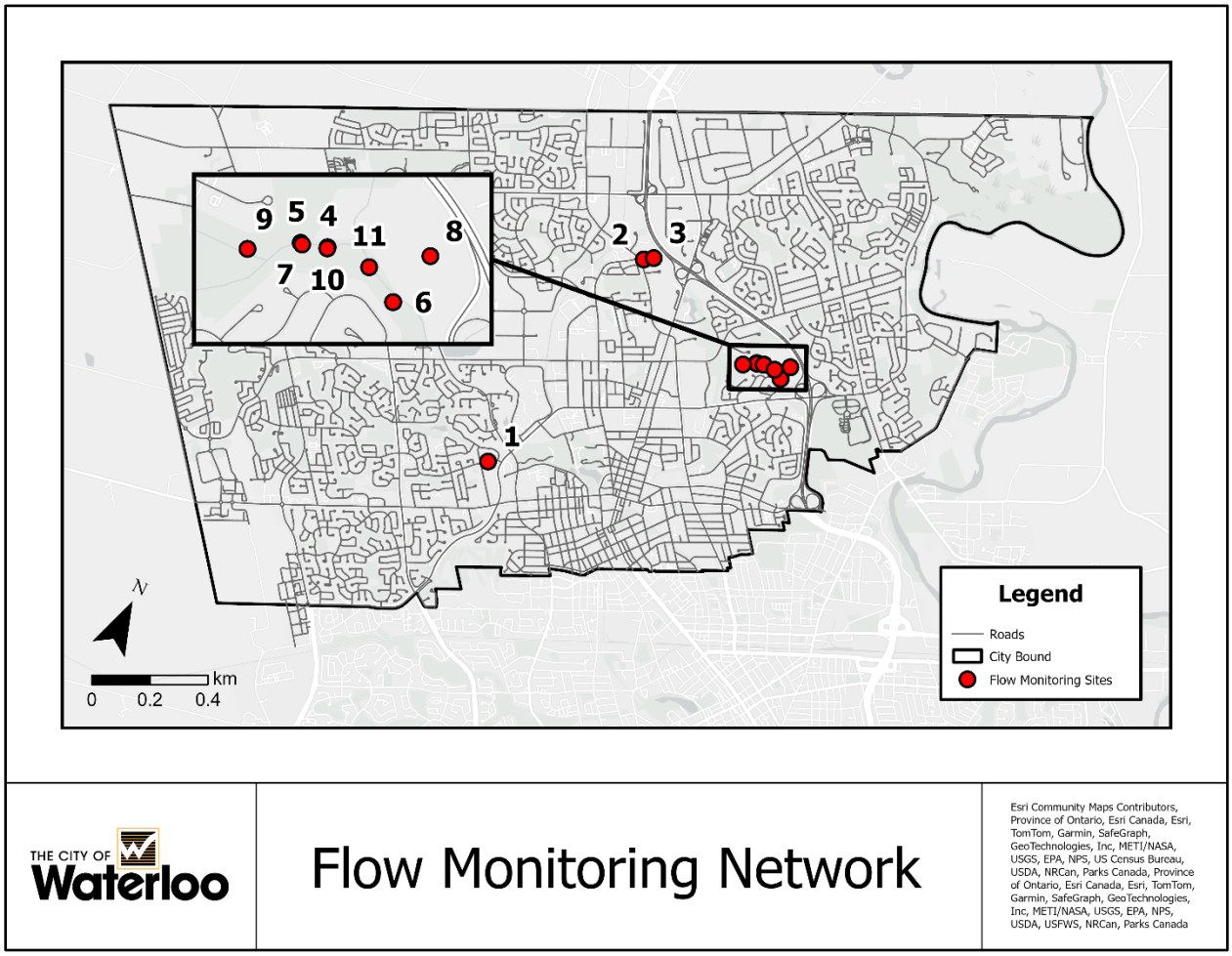
*Table 3: Summary of Monitoring Programs*

| Monitoring Program | Purpose | Interpretation of Data | Conclusions |
|---|---|---|---|
| Wastewater Flow Monitors | Estimate the inflow and infiltration into the WWC system at select locations and determine the impact that inflow and infiltration have on the WWC system | Flow monitors installed June 2024 | Insufficient data to drive a program |
| SPS Flow Monitors and Station Monitoring | Continuous monitoring via SCADA | On site inspections confirm SCADA operation | Monitoring provides good oversight of overall operation of the SPS |

### 2.2.1 Flow Monitors

Flow monitors were installed in the WWC system in June 2024, to monitor the inflow and infiltration at select locations. **Figure 1** shows the locations of the flow monitors within the City of Waterloo.

*Figure 1: Locations of Wastewater Flow Monitors in the City of Waterloo*




### 2.2.1 SPS Monitoring

Pump station operation is monitored remotely by using SCADA software, with all data collected stored in a separate database (historian). This includes parameters such as:

- Inflow in the pump stations
- Forcemain pressure
- Number of pump cycles
- Pump runtime
- Wet well level
- Discharge flow

Alarms are set to trigger and notify staff if values of parameters breach defined thresholds, at the pump stations. These alarms have different priority levels: low, moderate and high. Alarms are tested weekly. In 2024, there were 20 alarms that required operational response. Some examples of alarms include:

- Power failures

- Communication problems
- Equipment issues
- Inflow irregularities

The SPS monitoring system is important for safeguarding public health, protecting private and public property and caring for the environment.

## 2.3 Operational Problems and Corrective Actions

In 2024, the City of Waterloo experienced no bypasses, no power outages leading to pump station failures, and no main collapses; resulting in uninterrupted services and confidence in the infrastructure reliability.

City Utilities executes preventative maintenance programs to identify operational issues and ensure the collection system remains in good condition. Operational problems are addressed through corrective maintenance activities; see section 2.4.2, Maintenance Activities below. Corrective maintenance activities can also be identified through customer complaints, which City Utilities address as needed, with sewer blockages being the most common issue. Section 2.4.3 Sewer Blockages, provides additional information.

## 2.4 Calibration, Maintenance and Repairs

The following is a summary of the calibration, maintenance and repair activities performed on key structures, equipment, apparatus, and mechanisms within the collection system. These activities are necessary for ensuring the continued operation and reliability of the system, by making any necessary adjustments and repairs to maintain optimal performance.

### 2.4.1 Calibration Summary

Each year, the forcemain flow meter at every SPS is calibrated. Backflow certifications are also completed annually for backflow devices.

In 2024, the forcemain flow meters were calibrated and successfully passed. The backflow prevention devices were also successfully certified in 2024. If any SPS forcemain flow meter fails, it will be repaired or replaced. The same process is followed for any failing backflow prevention devices.

### 2.4.2 Maintenance Activities

Maintenance actions in the WWC system are split into two categories: preventative and corrective. Preventative maintenance is pre-emptive and occurs before an issue arises. Corrective maintenance is responsive and occurs once City Utilities is made aware of an issue. These figures are broken down in **Table 4**.

*Table 4: Maintenance Activities*

| Maintenance Type | Number of Instances |
|---|---|
| Preventative | 84 |
| Corrective | 227 |
| Total | 311 |

## Preventative Maintenance

City Utilities maintains PM programs for maintenance hole inspections, gravity main inspections, gravity main flushing, and pump station inspections. These programs can help identify operational problems, while maintaining a robust collection system in good repair. **Table 5** provides a summary of the preventative activities.

*Table 5: Summary of PM Activities*

| Maintenance Activity | Total # Completed | Notes/Comments |
|---|---|---|
| Visual Maintenance Hole Inspections | 6,817 | Visually inspect 1/3 of the maintenance holes each year; includes structural integrity and area blockages |
| Acoustic Main Inspections | 2,849 | Acoustic inspection of 176.8 km of gravity mains; completed on contract |
| CCTV Main Inspections | 369 | CCTV inspection of 19.3 km; completed on contract |
| Flushing of Gravity Main | 119.3 km | 118.2 km completed by City Utilities operations staff; 1.1 km completed on contract |
| SPS Inspections | 312 | Weekly inspections of each SPS |
| Infrared Electrical Box Inspections | 6 | Annual inspection of each SPS electrical box inspected for hot spots |

**Table 6** provides a summary of the inspection programs.

*Table 6: Summary of Inspection Programs*

| Inspection Program | Purpose | Interpretation of Data | Conclusions |
|---|---|---|---|
| Visual Maintenance Hole Inspections | Confirm integrity of structure and observe flow irregularities | Assesses structural integrity and allows visual inspection of flow in the WWC system at | Address concerns, structural deficiencies and blockages to ensure proper flow, public safety and |

| Inspection Program | Purpose | Interpretation of Data | Conclusions |
|---|---|---|---|
| | | designated locations | environmental protection |
| Acoustic Main Inspections | Inspection of the WWC system used to screen blockages within small diameter gravity sewers | Data to identify areas of concern based on possible blockages (initiated July 2024) | Helps identify key areas for risk management; meets obligations for system-wide inspections. In 2024, 50% of collection system completed |
| CCTV Main Inspections | Identify blockages, assess pipe conditions and help detect and prevent future issues, identify inflow and infiltration | Guide maintenance program, prioritize repair and ensure proper functionality | Insight into the condition of the sewer system and allow for a proactive approach for continued reliability |
| Flushing of Gravity Mains | Remove sediment, debris and blockages to ensure ideal flow and system performance | Assess sediment levels and wastewater movement before and after flushing to assess system condition | Flushing improves flow capacity and system longevity while preventing blockages and odour |
| SPS Inspections | Ensure proper operation and identify potential issues | Monitor pump performance, alarms and equipment conditions | Ensure reliable operation, prevents failures and maintains system efficiency |
| Infrared Electrical Box Inspections | Ensure electrical components are safe and functional | Check for signs of wear, corrosion, proper operation of electrical components | Ensures electrical safety, prevents malfunctions and prolongs equipment life |

## Corrective Maintenance

At times, during preventative maintenance or inspections (as described in **Table 5** and **Table 6**), additional repairs or replacements are necessary to restore the functionality of the system. As noted in **Table 4** above, there were 227 corrective maintenance instances in 2024 that included activities such as maintenance hole repair, lateral spot

repairs, sewer lateral blockages, replacing a small section of a sanitary main, and SPS maintenance.

**Sewer Blockages**

City Utilities responded to 107 blockages in 2024, both in sewer laterals and in the sewer main. As can be seen in **Table 7** below, 32% of the known blockages were in City owned infrastructure. The summary does not include responses to complaints where a blockage was not confirmed onsite by the City Utilities responding operator.

*Table 7: Categorized Summary of Sewer Blockages Based on Location*

| Location | Number of Blockages |
|---|---|
| Private Infrastructure – Sewer Lateral | 63 |
| Private Infrastructure – Sewer Main | 2 |
| City Infrastructure – Sewer Lateral | 31 |
| City Infrastructure – Sewer Main | 3 |
| Unknown | 8 |
| Total | 107 |

**Table 8** provides a breakdown by blockage cause.

*Table 8: Summary of Sewer Blockages Categorized by Type of Blockage*

| Cause | Number of Blockages |
|---|---|
| Debris (gravel/dirt) | 2 |
| Grease | 7 |
| Groundwater | 0 |
| Roots | 34 |
| Sanitary Wipes | 4 |
| Structural Failure | 13 |
| Other | 15 |
| Unknown | 32 |
| Total | 107 |

## 2.5 Complaints and Resolutions

Complaints are received from customers and other sources external to the City of Waterloo. **Table 9** provides a summary of complaints received related to the WWC system. Examples of complaints received related to the WWC system include:

- Infrastructure deficiencies (e.g. sinkhole around maintenance hole)
- Noisy or missing maintenance hole cover
- Odour suspected to be emanating from wastewater infrastructure

City Utilities operators investigate complaints and address the root cause.

*Table 9: Summary of WWC System Complaints Received During Reporting Year*

| Number of Complaints | Complaint Type | Typical Course of Action |
|---|---|---|
| 3 | Odour | Address root cause |
| 61 | General Issues | Investigate cause |

## 2.6 Alterations and/or Modifications to the WWC System

An alteration applies to minor change within the WWC system, whereas a modification is for more significant changes within the WWC system. In accordance with the CLI-ECA, **Table 10** provides a summary of the alterations or modifications completed in 2024, with the appropriate SS1 and/or SS2 form(s) submitted for Record of Future Alterations.

*Table 10: Summary of Alterations and Modifications to the WWC System*

| Municipality | Project Name / Number | Project Description | SDWT* (Yes/No) |
|---|---|---|---|
| Waterloo | Hillcrest Ave. / 24-02 | Reconstruction | No |
| Waterloo | Langford Pl. and Quickfall Dr. / 24-03 | Reconstruction | No |
| Waterloo | 90 Margaret Ave. / 24-04 | Sewer Extension | No |
| Waterloo | Moore Ave S. / 24-06 | Reconstruction | No |
| Waterloo | Moore Ave S. / 24-07 | Reconstruction | No |
| Waterloo | SCADA City of Waterloo Pumping Stations | SCADA Upgrade | No |

*SDWT – Significant Drinking Water Threat

## 2.7 Overflows and Spills

There were no incidents of overflows or spills occurring in 2024.

## 2.8 Efforts to Reduce Overflows and Spills

The City of Waterloo's WWC system has the capacity to deal with the existing inflow demands. From a preventative standpoint, the wet wells at all SPS's are monitored 24/7 and response initiated when in an alarm state.

Construction of two additional SPS' in the north-western area of the City, is tentatively scheduled for 2027, to address growth within the City of Waterloo.

## 2.9 Public Reporting Approach; Including Proactive Efforts

Public reporting is conducted through various means of social media platforms which include emergency situations. The Annual Performance Report is posted on the City of Waterloo website.