2023 ANNUAL PERFORMANCE REPORT

SANITARY COLLECTION SYSTEM

Reporting period: Jan. 1, 2023 to Dec. 31, 2023

A description of the City of Vaughan's Municipal Sewage Collection System to fulfill the requirements of CLI-ECA #011-W601

This report is available to the public at no charge on the City of Vaughan's website and upon request

VAUGHAN

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Executive Summary

The City of Vaughan (hereinafter referred to as the "City" or "Owner") received its first Consolidated Linear Infrastructure Environmental Compliance Approval (CLI-ECA #011-W601 [PDF]) for Municipal Sewage Collection System (hereinafter referred to as the "Authorized System") on Nov. 25, 2022. The City is responsible for monitoring, operating and maintaining the authorized system in a state of good repair and for providing municipal services to protect people, the environment and property in alignment with the City's 2022-2026 Term of Council Service Excellence Strategic Plan (PDF). This report summarizes the results of the inspection and maintenance activities completed during the reporting period of Jan. 1, 2023 to Dec. 31, 2023.

The City's Authorized System is designated as a Class III system by the Ministry of Environment, Conservation and Parks (hereinafter referred to as the "Ministry" or "MECP").

Based on the monitoring activities conducted in the reporting period, the system is performing well. The City is committed to focusing on continuous improvement by building strong foundational processes to support operational and service delivery.

No MECP inspections occurred during the reporting period.

105.89 kms
of sanitary sewers CCTV inspected

1,215
lift station inspections

153 inquiries
received and cases resolved

207.30 kms
sanitary sewers flushed

~190 m sanitary sewer repairs

17 maintenance holes repaired

Municipal Sewage Collection System Description

Wastewater generated by the City flows through several kilometres of sewers before it reaches wastewater treatment plants (Dufferin Creek Water Pollution Plant, G.E. Booth Wastewater Treatment Facility and the Kleinburg Water Resource Recovery Facility) prior to discharge into the natural environment. The above noted sewage treatment plants (STP) are not owned or operated by the City.

The City's wastewater assets are managed and maintained to meet provincially issued system and facility operating permits, as well as the City's technical targets for performance and reliability. According to the latest draft of the City's Asset Management Plan (AMP) 2023, the Authorized System is valued at approximately $1.2 billion, encompassing wastewater linear and wastewater facilities asset categories which are further divided into six asset types, ranging from wastewater mains and appurtenances to facilities as detailed in Table 1. Please note that the terms "wastewater" and "sewage" are used interchangeably in this report.

Table 1: Wastewater Services Asset Inventory

Asset Category	Asset Type	Number	Unit of Measure
Wastewater linear	Mains	1,024	Kilometres
	Laterals	263	Kilometres
	Maintenance holes	16,592	Each
	Flow meters	36	Each
Wastewater facilities	Sewage pumping stations	12*	Each
	Generator facility	1	Each

This inventory includes the following asset statuses – a) Active; b) Assumed; c) Unassumed; d) Proposed; e) Unknown; f) Blank. The inventory also includes the following ownership statuses a) Vaughan; b) Park; c) Unknown; d) Blank. If an asset is in the City's GIS database and meets one of the asset statuses AND one of the ownership statuses listed above, then it is part of the inventory as tabulated above. Otherwise, it was excluded. Source – AMP 2023 (Draft).

**Includes one sewage pumping station under maintenance and one unassumed sewage pumping station.*

Please refer to Appendix A for a map of the Authorized System.

CLI-ECA Requirement: Annual Performance Report for Authorized System

In accordance with CLI-ECA #011-W601, Schedule E – Section 4.6, the Owner shall prepare an Annual Performance Report for the Authorized System.

The Report shall:

- if applicable, include a summary of all required monitoring data along with an interpretation of the data and any conclusion drawn from the data evaluation about the need for future modifications to the Authorized System or system operations;
- include a summary of any operating problems encountered and corrective actions taken;
- include a summary of all calibration, maintenance and repairs carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the Municipal Sewage Collection System;
- include a summary of any complaints related to the sewage works received during the reporting period and any steps taken to address the complaints;
- include a summary of all alterations to the Authorized System within the reporting period that are authorized by this approval including a list of alterations that pose a significant drinking water threat;
- include a summary of all collection system overflow(s) and spill(s) of sewage; and
- Include a summary of efforts made to reduce collection system overflows, spills, sewage treatment plant overflows and/or sewage treatment plant bypasses.

Additionally, the Report shall:

- cover the reporting period of Jan. 1, 2023 to Dec. 31, 2023;
- be submitted to the Director (MECP);
- be submitted to the District Manager where a collection system overflow or spill of sewage has occurred in the reporting period; and
- be made available without charge to members of the public who are served by the Authorized System (on request or by publishing the report on the City's website).

Summary and Interpretation of Monitoring Data

This section summarizes the operation, inspection and monitoring data collected by the City as part of the scheduled preventive maintenance activities.

Routine and preventive maintenance activities include sanitary main inspections, main repairs, CCTV sewer programs, flushing and cleaning, sanitary lateral installations, lateral repairs, service investigations, maintenance hole inspections, maintenance hole repairs, methane gas inspections, sample/contamination inspections, spills and cleanups, flow monitoring, backflow valve inspections, and lift station inspections, repairs and maintenance. Table 2 includes details of several routine monitoring programs undertaken during the reporting period.

Data collected through these monitoring programs can be used as an indicator of the overall performance of the Authorized System. This data assists in:

- **identification of pipe renewal and replacement activities.** Data is used to identify the sewage collection system's linear infrastructure assets renewal (CIPP/trenchless repairs) and replacement (open-cut/rehabilitation) requirements.
- **identification of inflow and infiltration reduction activities.** Data is used to determine sources of inflow and infiltration in sanitary sewers and requirements for corrective actions.
- **determining decommissioning and disposal activities.** Asset decommissioning and disposal activities are performed to decommission and dispose of assets due to aging or changes in performance and capacity requirements.
- **providing input to the risk assessment of assets.**
- **providing input to the annual capital and operating budgets.**
- **determining the Authorized System's condition.** As per the latest draft of the City's Asset Management Plan (AMP) 2023, nearly 99.6 per cent of the City's service assets in the Sewage Collection System are in "Very Good" condition. The remainder assets are in "Good" and "Fair" condition indicating they are meeting current needs but may require attention in the future as they age as shown in Figure 1.

Figure 1: Asset Condition Summary (Sewage Collection System)

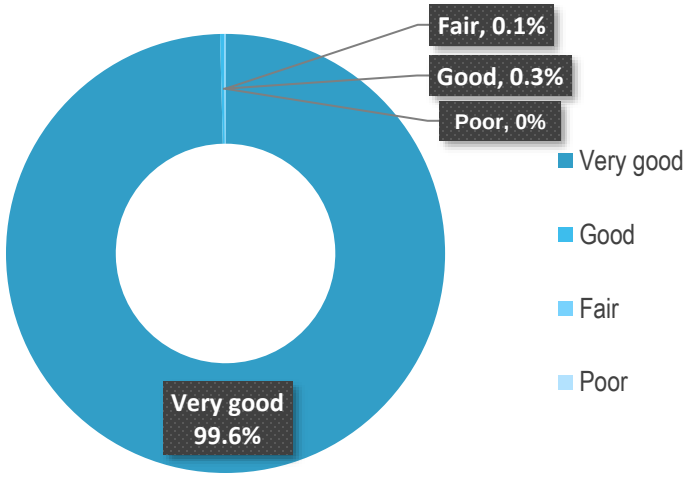


Table 2: Summary and interpretation of Monitoring Data for Sanitary Collection Assets in the City of Vaughan

Monitoring Program	Current Process	Interpretation of Monitoring Data
Wastewater linear	Routine inspection and maintenance at all sewage pumping station facilities assumed and operated by the City. This includes: • routine weekly, bi-weekly and monthly inspections and monitoring, as required. • quarterly wet well cleaning. • monthly and annual generator testing.	Data from routine inspections is digitally recorded in logbooks. Deficiencies or any operating issues are identified, and work orders are issued for corrective action.
Flow monitoring at sewage pumping station facilities	Flow data at the sewage pumping station facilities are recorded in logbooks.	Flow data is monitored to determine the adequacy of pumping station capacities, pump performance, maintenance and rehabilitation needs, infrastructure capacity and condition assessment.
SCADA alarm inspections	Routine SCADA alarm inspections at all sewage pumping station facilities assumed and operated by the City. This is carried out monthly.	Data is used to check the state of readiness of the system to support remote monitoring requirements.
Valve inspections	Annual valve inspections are conducted at all sewage pumping station facilities assumed and operated by the City. This includes: • annual backflow valve inspections. • annual valve exercising.	Data is used to determine maintenance, replacement and/or repair activities.

Monitoring Program	Current Process	Interpretation of Monitoring Data
CCTV inspections	The CCTV program collects structural, hydraulic and location-based information about the City's sewer infrastructure. All sewers within the Authorized System are expected to be inspected once every 10 years.	Data is used to determine maintenance, replacement and/or repair activities. Work orders are generated and combined into repair packages for corrective action.
Sewer main and maintenance hole inspections and flushing	The flushing maintenance program is conducted annually, aiming to flush all sewers in the Authorized System every four years.	As flushing continues, the City will identify areas with higher debris build-up and will investigate the fundamental cause. When an issue is identified, a work order is issued/created for corrective actions.
Smoke and/ or dye tests	Smoke and/or dye testing is used to investigate sanitary-storm cross-connections.	Data collected during these investigations is used to determine maintenance, replacement and/or repair activities. Work orders are created for corrective action.
Flow and rain monitoring	Flow monitors and rain gauges are strategically located in several locations throughout the Authorized System. This equipment monitors the system residual capacity at specific locations, tracks the actual development of wastewater generation and inflow and infiltration values and helps identify potential sources of inflow and infiltration. York Region also has flow monitors at several locations across the City. These flow monitors trigger alarms when sewer pipes are at 80 per cent capacity as warnings to alert staff that a full pipe condition may be developing.	Data analysis involves correlating flow data with rainfall data to perform dry and wet weather flow analyses. Combined with CCTV inspection data, this information can be used to inform smoke and/or dye test locations, identify cross connections and pinpoint potential inflow and infiltration hotspots.

Based on the monitoring activities conducted during the reporting period, the system is performing well. The City is committed to continuous improvement by building strong foundational processes to support operations and service delivery.

Summary of Operating Problems Encountered and Corrective Actions Taken

Table 3 provides a summary of all operating problems encountered during the reporting period and the corresponding corrective actions taken.

Table 3: Summary of Operating Problems Encountered and Corrective Actions Taken

Operating Problems Encountered	Corrective Actions Taken
Bar screen cleaning	The bar screens were cleaned using power washing techniques. In accessible stations, the screens were removed for thorough cleaning. In areas requiring confined space entry, safety protocols were followed to ensure proper cleaning of the screens.
Generator issues (fail to stop)	The fuel valve was closed to force the generator to stop. Where required, qualified contractors were then engaged to troubleshoot and fix the issue.
Instrument/sensor fault alarm on SCADA	The reset function was executed to clear the fault alarm and monitoring continued to ensure normal operation.
Pump fault alarm on SCADA	The pump was run on hand mode. If there were no issues, the SCADA alarm was cleared, and monitoring continued for a full cycle to ensure normal operation.
Heavy grease/solids stuck to level floats causing false high alarms	The floats and pump were flushed, levelled and monitored for a full cycle to ensure normal operation.
Wet well level rising/backup	Bar screen cleaning was performed and, if required, the inlet lines were flushed to clear any debris. Additionally, the float sensor was recalibrated, and the grinder(s) were inspected and repaired, as required.
Bar/basket screen requires cleaning	The screen was cleared of debris.
HVAC/sensor/heater fault	Diagnostic checks were initiated. If the problem persisted following the reset function, qualified contractors were engaged to troubleshoot and fix the issue.
Remote communication (SCADA) loss	The modem was reset. If the problem persisted, the City's Office of the Chief Information Officer was contacted to resolve the issue.
Pumping station gas monitor (fixed) not working	Qualified contractors were engaged to repair or replace faulty gas monitors.
Odour inquiries	Site investigations were undertaken. Maintenance holes were inspected for signs of blockages or back-ups
Valve seized during exercise	Qualified contractors were engaged to repair or replace the valves.
Inflow dish filled with rainwater	Inflow dishes monitored and emptied as needed.

Summary of Inspection, Maintenance and Repairs

Throughout the year, several tasks are conducted to ensure the Authorized System is operated and maintained to achieve compliance with CLI-ECA #011-W601. These tasks are generally grouped into three categories:

- **Preventive Maintenance** – conducted on a routine basis to maintain the equipment in good working order and lessen the likelihood of failure.
- **Corrective Maintenance** – conducted to correct deficiencies discovered during routine inspections or preventive maintenance activities to return equipment to working order.
- **Unplanned (Emergency) Maintenance** – conducted in response to an emergency, such as equipment failure.

Table 4 summarizes the inspection and preventive maintenance activities carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the Authorized System during the reporting period.

Table 4: Summary of Inspection and Preventative Maintenance Activities in the Reporting Period

Work Description	Frequency	Quantity
Sanitary sewer CCTV inspections	Annually (10 per cent program)	105 kilometres
Sanitary sewer flushing	Annually (25 per cent program)	207 kilometres
Sewage pumping station inspections	Weekly, monthly and as required	1,215
Generator testing	Monthly (under normal load – one hour) Annual (under full load – three hours)	104
Wet well cleaning	Quarterly	Four times per year per station
Backflow prevention valve inspections	Annually	Completed for all BFP valves (11)
Odour control unit maintenance	As needed	4
Hoist inspections	Annually	Completed for all hoists (8)

Table 5 and Table 6 summarize corrective and unplanned maintenance and repair activities carried out on any major structure, equipment, apparatus, mechanism or thing forming part of the Authorized System during the reporting period.

Table 5: Summary of Corrective and Unplanned Maintenance and Repair Activities Related to the SPS within the Reporting Period

Work Description	Work Category	Location	Date
Replacement of broken valve	Unplanned	Block 39 Sewage Pumping Station	Jan. 3, 2023
Leaky generator (added to station repair list)	Unplanned	Camlaren Sewage Pumping Station	Feb. 4, 2023
Repair of dry well ventilation	Unplanned	Pine Valley North Sewage Pumping Station	Feb. 4, 2023
Grinder repair	Unplanned	Molise Sewage Pumping Station	Feb. 6, 2023
Grinder repair	Unplanned	Block 39 Sewage Pumping Station	Feb. 22, 2023
Pump repair	Unplanned	Nashville Sewage Pumping Station	April 2, 2023
Pump replacement	Unplanned	Block 39 Sewage Pumping Station	June 29, 2023
Pump repair	Unplanned	Camlaren Sewage Pumping Station	June 30, 2023
Power supply upgrades	Corrective	Camlaren Sewage Pumping Station	Oct. 18, 2023
Odour control unit repair	Unplanned	Block 55 Sewage Pumping Station	Oct. 29, 2023
Pump repair	Corrective	Maplewood Sewage Pumping Station	Dec. 5, 2023
Pump repair	Unplanned	Camlaren Sewage Pumping Station	Various
Valve replacement	Corrective	Several	Various
Pump maintenance and oil change	Corrective	Several	Various

Table 6: Summary of Corrective and Unplanned Maintenance and Repair Activities Related to Linear Infrastructure in the Reporting Period

Work Description	Work Category	Location	Date	Number of Work Orders
Sanitary lateral repairs (160m)	Unplanned	Various	Various	10
Cross connection repairs	Unplanned	Various	Various	7
Sanitary lateral repairs (30m)	Corrective	Various	Various	6
Sanitary maintenance hole repairs	Unplanned	Various	Various	4
Sanitary maintenance hole repairs	Corrective	Various	Various	13

Summary of Calibration and Maintenance on Monitoring Equipment

Calibration and maintenance activities are performed annually according to manufacturers' recommendations. Except for the unassumed sewage pumping station, all monitoring equipment was verified by a third-party agency in December 2023 for the reporting period. Calibration certificates are available upon request. Calibration activities associated with the unassumed sewage pumping station are the responsibility of the developer.

Summary of Complaints

The City makes every effort to address and resolve resident inquiries in a timely manner. A Customer Relationship Management (CRM) database is used to record details, including information collected from the resident on the nature of the inquiries and actions taken by the City. The CRM solution was identified in the Service Vaughan Strategy and Implementation Plan and the Digital Strategy and aligns with Service Vaughan's vision of "Citizen First Through Service Excellence." The benefits of a CRM include:

- enhancement of technology which provides staff with better tools to track, manage, follow up and report on service requests; and
- an improved service delivery model that allows users to have a holistic view of all services delivered to residents, including data analytics.

Table 7 provides a summary of all inquiries related to the Authorized System during the reporting period.

Table 7: Summary of all Inquiries During the Reporting Period

Interaction Type	Description of Inquiry	Number of Inquiries[1]	Status
Catch basins and maintenance holes	• Exposed maintenance hole/lid missing, displaced or broken • Odour issue from maintenance hole • Raised or sunken maintenance hole	6	Active: 0 Resolved: 6
Sewer backup	• Sewer/sink/drain backup • CCTV camera request • Surcharging maintenance hole	132	Active: 0 Resolved: 132
Spills	• Witnessed dumping • Suspected septic tank leak • Spill reporting	3	Active: 0 Resolved: 3
Wastewater – other	• Noise issues • Odor issues	12	Active: 0 Resolved: 12

[1] Inquiries not related to the Authorized System are forwarded to relevant authorities before the case is marked "closed" or "cancelled."

Below are typical corrective actions undertaken in response to inquiries:

- Initiation of site investigation and correspondence with residents.
- Initiation of immediate action on-site to minimize the extent of damage where possible, such as checking downstream maintenance hole with gas monitors for odour issues or eliminating safety issues by attending to exposed maintenance holes.
- Determination of on-site action, where required, to respond to unplanned maintenance or prioritization of further repair work associated with corrective maintenance.
- Creation of work orders for corrective/unplanned repairs as applicable.
- Collaboration and engagement with other City departments or authorities as required for inquiries not related to the Authorized System.

Summary of Alterations to the Authorized System

As per CLI-ECA #011-W601 (PDF), the City can pre-approve low-risk municipal alterations to the Authorized System when the permit's Schedule D criteria are met.

Once new infrastructure is assumed, the City takes on the duty of operating and maintaining it to ensure safety and reliability. These operations and maintenance activities are necessary to ensure the system continues to perform as designed.

Table 8 summarizes all alterations to the Authorized System that were pre-approved by the City within the reporting period, including a list of alterations that pose a significant drinking water threat.

Table 8: Summary of all Alterations to the Authorized System Within the Reporting Period

Number	Alteration to the Authorized System Project Name	Description of Works	Location of Works	Date of Approval (2023)	Form	Does this Alteration Pose a SDWT
1	Block 59 west – spine servicing	Installation of new sanitary sewers in the proposed streets Anatolian Drive and John Lawrie Street, for the purposes of servicing the Block 59 west subdivision development.	Northeast corner of Langstaff Road and Huntington Road.	Jan. 24	SS2	No
2	Block 41 – Pine Valley Drive and Teston Road intersection	Installation of new sanitary sewers to service existing and future developments in Block 41, as a part of York Region's project to reconstruct the Pine Valley Drive and Teston Road intersection.	Pine Valley Drive from ~80m north of Teston Road to ~15m north of Teston Road.	Feb. 10	SS1	No
3	19T-20V005 – Fleur De Cap Developments Inc.	Installation of new sanitary sewers to service Street 1 in Block 34 east by Fleur De Cap Developments Inc. and Cuenca Developments Inc.	~82m west of Jane Street to ~31m east of Shipwill Street.	April 10	SS1	No

Number	Alteration to the Authorized System Project Name	Description of Works	Location of Works	Date of Approval (2023)	Form	Does this Alteration Pose a SDWT
4	19T-20V004 - Nashville Heights residential subdivision (Phase 2B)	Installation of new sanitary sewers on Alsation Crescent	West and south legs - ~22m south of Mactier Dr. to ~17m west of Alsation Crescent; east legs - ~40m north of Alsation Crescent (south leg) to ~21m south of Mactier Drive.	July 19	SS1	No
5	19T-21V004 - 9465 Weston Rd.	Installation of new sanitary sewers to serve the 9465 Weston Rd. residential development on Lichen Court.	Lichen Court: ~60m north of Comdel Boulevard to ~86m north of Comdel Boulevard.	Aug. 25	SS1	No
6	Block 64 south – spine services	Installation of new sanitary sewers on Labourers Way (Street A), to service Block 64 south Landowners Group Inc.	Labourers Way: ~123m east of Highway 50 to ~33m west of Hunters Valley Road.	Sept. 25	SS1	No
7	19T-19V003 – Properties Inc.	Installation of new and replacement of existing sanitary sewers to serve the Block 18 Properties Inc. school block redevelopment	Feversham Court and Muret Crescent.	Sept. 25	SS1	No
8	19T-15V001 – Janessa Court	Installation of new sanitary sewers in on Street A in Block 12 by Condor Properties Ltd.	~100m south of Janessa Court to ~131m south of Janessa Court; Street A to ~66m south of Street A.	Dec. 16	SS1	No
9	Block 64 north – Bethpage Properties West Inc.	Installation of new sanitary sewers to service the industrial development by Bethpage Properties West Inc. within the Block 64 north.	Highway 50 and Rutherford Road.	Dec. 20	SS1	No

Summary of Collection System Overflows or Spills of Sewage

An **overflow** is a controlled discharge of wastewater to the environment from a designed location within the collection system. An overflow occurs when rainwater, groundwater intrusion and/or unplanned situations result in additional flows entering sanitary sewers that overwhelm the system. There were no collection system overflows in the authorized system during the reporting period.

A **spill** is a discharge of any substance to a sewage works or to the natural environment which is abnormal in quantity or quality considering all the circumstances of the discharge.

Overflow and spill events are reported to the Ministry's Spills Action Centre (SAC). Table 9 provides a summary of collection system overflows and/or spills of sewage that occurred in the reporting period.

Table 9: Summary of Collection System Overflows or Spills of Sewage During the Reporting Period

SAC Ref#	Date of Event	Location	Description	Corrective Actions
1-3QWTJ4	-	Various	Various cross-connections were detected during routine CCTV inspections and were reported as a spill to the Spills Action Centre.	All works were added to priority repair lists for immediate action. All cross-connections detected during the reporting period were rectified.
1-4FDXWQ	Nov. 14, 2023	224 Wallace St.	A resident carried out construction without seeking locates or permits from the City or applicable authorities and undertook the excavation of approximately 60m of sanitary sewer mains without a spill response or mitigation plan. The City reported the spill to the Spills Action Centre and the Toronto and Region Conservation Authority (TRCA).	The City installed a temporary by-pass to actively contain the sanitary sewer discharge and replaced the City-owned infrastructure following the completion of soil remediation activities. TRCA permitting was obtained as required under Section 28 of the Conservation Authorities Act.

Summary Efforts Made to Reduce Collection System Overflows, Spills, STP Overflows and/or STP Bypasses

The City takes a proactive approach to identifying inefficiencies in the Authorized System and develops plans and measures to remediate those inefficiencies to improve overall system performance with the goal of reducing adverse environmental impacts and capital expenditures. Identifying and remediating system inefficiencies helps extend the life of infrastructure and increase existing system capacity, ultimately contributing to the long-term environmental and financial sustainability of the Authorized System.

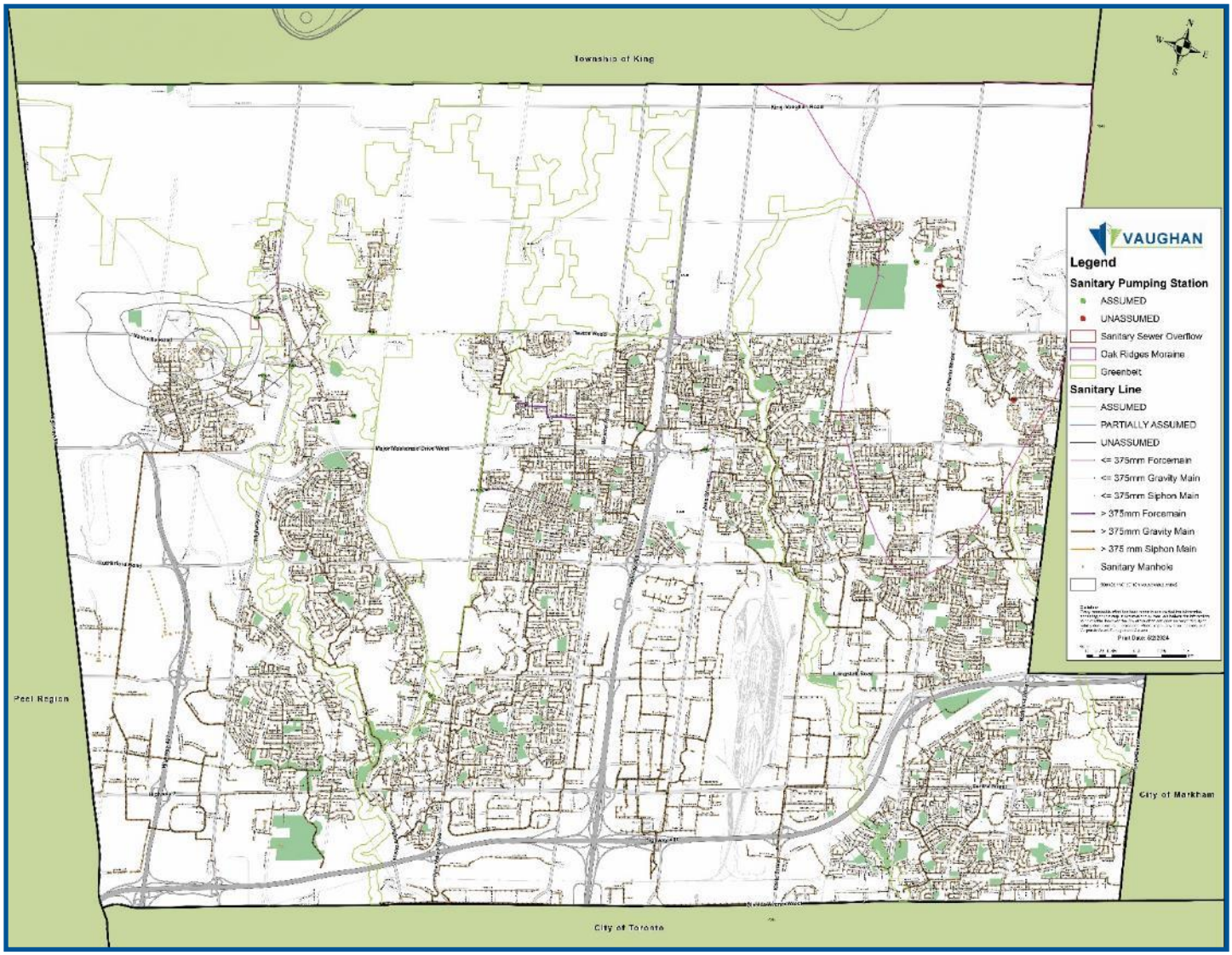
Please note, the City does not own or operate any STPs.

Table 10: Summary of Actions Taken to Reduce Overflows, Spills and Bypasses in the Authorized System

Summary of Effort/Project	Description	Timeline
Wastewater flow monitoring and investigation study	The scope of this project includes monitoring, testing and analysis of sanitary sewers including flow monitoring, CCTV inspections, and smoke and/or dye testing. This project helped the City monitor the system residual capacity at specific locations, track actual development wastewater generation, inflow and infiltration values and investigate potential sources of inflow and infiltration.	Q4 2022 to Q4 2023
Trenchless repairs	Trenchless rehabilitation helps extend the life expectancy of the sanitary sewer by sealing areas where inflow and infiltration are occurring, preventing mineral deposits and sealing of cracked and fractured areas inside City sewers. These repairs ensure the pipe is functioning as designed and reduces the negative impacts of these defects over time. Data collected from the CCTV inspection, maintenance hole inspection, and smoke and/or dye testing was used to create a defects list for repair activities. Remediation works are prioritized for maintenance holes, mainlines and laterals for inflow and infiltration sources.	Active during the reporting period and ongoing. A total of 22 trenchless repairs were completed during the reporting period.
Backwater Valve Subsidy Program	Sanitary backwater valves are designed to protect basements from back-ups caused by flooded sewers during severe weather events. Backwater valves can significantly reduce the risk of basement flooding and prevent damage to the home, streets and surrounding areas.	Active during the reporting period and ongoing. A total of three applications were processed for approval during the reporting period under the subsidy program.

Summary of Effort/Project	Description	Timeline
Public information and education about spills and hazardous materials	The City maintains a webpage for "Spills and Hazardous Materials" with information on what an environmental spill is, what the City does to manage environmental spills, what to do when a spill is spotted and how a spill should be reported to Spills Action Centre. This proactive approach helps to identify, report and respond to a spill promptly.	Active during the reporting period and ongoing.

Appendix A: City of Vaughan Wastewater System

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