CITY OF VAUGHAN

EXTRACT FROM COUNCIL MEETING MINUTES OF MARCH 20, 2018

Item 4, Report No. 12, of the Committee of the Whole (Working Session), which was adopted without amendment by the Council of the City of Vaughan on March 20, 2018.

4 2017 WASTEWATER COLLECTION SYSTEM AND STORMWATER MANAGEMENT REPORT

The Committee of the Whole (Working Session) recommends:

1) That the recommendation contained in the following report of the Deputy City Manager, Public Works, dated March 7, 2018, be approved; and

2) That the presentation by the Director of Environmental Services, and communication C4 titled "Water, Wastewater and Stormwater Update 2017", be received.

Purpose

To update Council on the key wastewater and stormwater related programs and services that were undertaken by Environmental Services, Infrastructure Delivery, Infrastructure Planning and Development Engineering in 2017.

Recommendations

1. That the report be received for information.

Report Highlights

- Initiatives that support the City's and Region's Inflow and Infiltration Reduction Strategy
- Environmental Services activities that support enhanced service delivery
- Wastewater and stormwater projects have been initiated that support corporate asset management

Background

The City owns and operates the local wastewater collection system which is designed to collect wastewater from homes and businesses and bring it to wastewater treatment plants through pipes and pumping stations. The wastewater collection system consists of 10 pumping stations, 997 km of piping, and 12,905 maintenance holes.

The City also owns and operates the stormwater collection system which is designed to collect runoff from rainfall and snowmelt, convey it to stormwater management facilities

…/2

to enhance water quality before the stormwater is released to outlets, rivers and stream. The stormwater system consists of 144 stormwater management ponds, 1,100 km of piping and 17,000 catch basins.

In the last year the Environmental Services Department has undertaken and completed a number of initiatives/projects to enhance service delivery, manage and extend the life of wastewater and storm water infrastructure, protect the environment and public health, exhibit fiscal responsibility and reduce inconvenience to the public. This report highlights some of these initiatives/projects that were completed or are underway.

Previous Reports/Authority

The March 7, 2017 report on the I&I Program Update can be found under: https://www.vaughan.ca/council/minutes_agendas/AgendaItems/CW0307_17_9.pdf

Analysis and Options

Just over $ 13 million in operating expenses and approximately $ 5.3 million for the capital projects were budgeted by Environmental Services in 2017 to achieve enhanced service delivery and to extend the life of the wastewater and stormwater management infrastructure

Environmental Services Department continues to be committed to providing excellence in the provision of wastewater and stormwater related services. This has been demonstrated through the development of programs and undertaking of several capital projects and operational activities.

Wastewater

Environmental Services has initiated and completed new projects and implemented enhanced operational programs to achieve the City's I&I Reduction goals in support of York Region's I&I Reduction Strategy

Inflow and Infiltration (I&I) is rainwater, snow melt and groundwater that enter the wastewater collection system through direct connections and through cracks and holes in pipes and maintenance holes, respectively.

As additional I&I enters the wastewater system, the pumps at the wastewater pumping stations use more energy to pump the wastewater. By reducing I&I, the City will reduce energy usage and associated greenhouse gas emissions as well as enhance sewer capacity and reduce potential risk of basement flooding.

The table below summarizes the list of the projects and activities that were completed in 2017 in support of I&I reduction initiatives:

Project/Activity	Brief Description	Quantity
Flow Monitoring	To measure flow in the sewer system to analyze the variation of flow in various weather conditions	Six (6) flow meters were installed in high priority areas which exhibit evidence of I&I
Closed Circuit Television (CCTV) Inspection	A visual inspection of sanitary sewers to determine any defects and deficiencies	110,500m of CCTV inspection was completed
Cross Connection Investigation and Repair	Investigation of any possible storm sewer pipe connection into the sanitary sewer system and to perform necessary repair	Two (2) were completed
Trenchless Repair	Method to perform sewer repair or rehabilitation works without an open cut or an excavation	Six (6) repairs were completed with Cured-In-Place-Pipe (CIPP) Lining method

In addition to the above projects, the City completed the 2017 I&I Annual Status Report to York Region which includes I&I initiatives, work undertaken and I&I reduction achievements. York Region requires an I&I Annual Status Report from each of the Local Area Municipalities to streamline their annual reporting process and commitment to the MOECC for their I&I Reduction Strategy.

The Wastewater/Stormwater Flushing Program helps maintain the City of Vaughan's wastewater infrastructure through scheduled maintenance flushing

As sewer system networks age, the risk of deterioration and blockages becomes a major concern. As a result, municipalities worldwide are taking proactive measures to improve performance levels of their sewer systems by regularly cleaning sewer lines. Flushing introduces a heavy flow of water into the wastewater or stormwater piping infrastructure at a maintenance hole. The removal of debris and early notification of issues will improve system reliability.

Enhancements introduced to the Flushing Program approximately 18 months ago include programming a four (4) year cycle based on sewer catchment area rather than city blocks. The flushing maintenance wastewater program is running on an annual schedule and is anticipated to finish its first full cycle within a four-year period. Approximately 160,000 metres of wastewater infrastructure and 35,000 metres of stormwater infrastructure are flushed annually.

A hydro vacuum truck was also purchased in 2017 and will be used to reduce the cost of flushing by eventually bringing the emergency work in house. The business case

indicates a savings of one (1) million dollars over the next 10 years.

Supervisory Control and Data Acquisition (SCADA) is the use of a modern computerized monitoring and control system which is common in the operation of municipal wastewater and water systems

The City of Vaughan is responsible for the operation and maintenance of nine (9) wastewater pumping stations, one (1) diesel generator station, one (1) storm sewer pumping station and two (2) water booster stations. Failure to properly operate and maintain these stations exposes the City to significant liability and environmental risk. Pump failures, for example, could result in wastewater discharge into the environment and/or back-ups inside buildings. A SCADA system provides the ability to remotely monitor and control critical infrastructure related to wastewater and water operations.

The City of Vaughan previously had a basic SCADA system comprised of an alarm dialer system which had the capability to provide notification when pump or generator failures occurred at these critical locations so that on-call staff can respond immediately.

The upgrade to the SCADA system was completed over a thirteen (13) month timeframe and concluded in January 2018. Environmental Services worked in partnership with the Office of the Chief Information Officer and an external consultant to install new hardware and software improving the capacity for centralized data collection/recording/trending and alarm response times. The project delivered a series of standards that will ensure consistency as new pump stations are added.

Wastewater pump station condition assessments were completed and recommendations were made to improve the station effectiveness and efficiency

A condition assessment of the pumping stations was completed over a seven (7) month timeframe and concluded in June 2017. The assessments were completed through visual observations of the infrastructure, review of background information and performance tests of the pumps. Various asset categories including building envelope, site works, process mechanical equipment, process piping, electrical and instrumentation, were assessed, risk ranked and prioritized.

Fifty-eight (58) recommendations were documented ranging from small labeling issues to major equipment upgrades. The recommendations identified as immediate, such as fuel system improvements, electrical upgrades and enhanced fall arrest protection, have been initiated and implemented through the support of the Clean Water and Wastewater Fund.

Council approved the delegation of authority to enter into Alternate Locate Agreements to the Director of Environmental Services to enhance efficiencies and save costs

Locating underground infrastructure is vital to protecting underground pipes during excavations. Staff will complete a locate by reviewing drawings and then physically marking the location of underground infrastructure with paint markings. Staff then utilize a software program to communicate locate information to the excavator. An Alternate Locate Agreement (ALA) advises the excavator that a traditional field locate from the ON1Call member is not required, thereby saving the City time and resources to locate the water and wastewater infrastructure.

In 2017, 692 ALAs have executed resulting in an estimated savings of $24,220 to date.

Stormwater

Monitoring stormwater quality helps to determine the operational effectiveness of the Stormwater Management Ponds

Funding from the new stormwater charge was used to implement a new water quality monitoring program at the City's stormwater ponds. Water quality testing is often one of the conditions of the Certificate of Approval (CoA) or Environmental Compliance Approval (ECA). The water quality monitoring program involves monitoring for total suspended solids at the inlet and outlet of wet ponds using mobile testing equipment during wet weather events in the Spring and Fall. Water quality monitoring occurred at over 70 stormwater management ponds. The data will help prioritize future sediment cleanout projects at stormwater management ponds.

Bathymetric Survey initiative was expanded in order to support the future Stormwater Management Pond cleanout program

The wet stormwater management ponds provide quality and quantity control functions in managing stormwater runoff. Over time, sediment accumulation within the ponds affects the functions of wet stormwater ponds. The City implemented a stormwater pond sediment removal/cleaning initiative as part of the stormwater pond maintenance program to restore the ponds to their optimal functioning level and volumes. In order to prioritize the maintenance and sediment removal/cleaning activities of the ponds, the City requires bathymetric survey results to determine the extent of sediment accumulation that has occurred in the wet ponds.

An external consultant surveyed 50 stormwater management ponds during the Spring of 2017. The survey and determination of sediment volumes will enable the Stormwater team to prioritize future stormwater pond cleanouts.

Environmental Services successfully initiated federal and provincial financially supported Clean Water and Wastewater Fund (CWWF) projects

With the announcement of available funding from the CWWF program made in July 2017 of $20 million Environmental Services was able to respond by undertaking and accelerating the following wastewater and stormwater related projects:

- Repair and Rehabilitation of Pump Stations and Booster Station
- Rehabilitation of Stormwater Ponds to Restore Design Volumes and Efficiencies
- Citywide Sanitary Sewer System Inflow and Infiltration Monitoring Program - CCTV inspection
- Citywide Sanitary Sewer System Inflow and Infiltration Monitoring Program - Flow Monitoring
- Church Street Stormwater Pumping Station pump improvements
- Update of the wastewater collection system hydraulic analysis model

CWWF funding was provided to Infrastructure Delivery to implement storm sewer and culverts replacement as well as retaining walls and headwalls in stormwater management facilities projects. In addition, similar funding was allocated to Development Engineering for the Edgeley Pond.

Capital Projects and Studies

Capital projects, with a 2017 budget of $8.2 million, are undertaken in conjunction with Infrastructure Delivery in order to invest, renew and manage infrastructure and assets

In 2017, a number of capital projects were undertaken by Infrastructure Delivery to extend the life of wastewater and stormwater infrastructure, including:

1. Culvert replacements on King-Vaughan Road and Islington Avenue,
2. Storm outfall improvements on Intersite Place,
3. Storm headwall and spillway rehabilitation on Pine Valley Drive,
4. Installation of sanitary sewer on Coldspring Road and Putting Green Crescent and completion of new stormwater management outfall channel
5. Municipal sanitary sewers and Sewage Pumping Station on the Mackenzie Vaughan Hospital site

In addition, Infrastructure Delivery is currently working on the Cross-Asset Optimization, a project that supports the Corporate Asset Management and is a risk based approach to determine sewer infrastructure needs, preventative maintenance and replacement needs.

Infrastructure Planning has initiated new projects in conjunction with Development Engineering to support future growth and intensification

In 2017, Infrastructure Planning has undertaken as well as participated with the Region of York on the following projects.

1. Focus Area Core Sanitary Servicing Strategy – to establish a comprehensive wastewater servicing strategy for the planned growth in the intensification corridors/areas and the West Vaughan Employment area.
2. Northeast Vaughan Water and Wastewater Servicing Class Environmental Assessment - to identify the water and wastewater infrastructure needed to service anticipated growth in northeast Vaughan to the year 2051.

Also, in 2017 the following developer funded major projects and wastewater services were managed by Infrastructure Planning and Development Engineering

1. Kleinburg-Nashville Area I&I investigation
2. Construction of Block 40/47 Pine Valley North Sanitary Pumping Station
3. Construction of Block 40/47 Pine Valley North Pedestrian - Utility/Valley Crossing Bridge Structures

Last year, through the assumption process, the City added 27,163 metres of sanitary and 27,763 metres of stormwater related infrastructure to its municipal assets.

Education and Outreach

Communication with citizens was increased by an enhanced education and outreach program in support of existing and new initiatives

Recognizing the importance of educating the residents of Vaughan about enhanced wastewater and stormwater programs, Environmental Services supports related initiatives. These include: an enhanced backwater valve subsidy program in older neighbourhoods to reduce basement flooding arising during severe rain events, and promotion of rain barrel sales to support the Low Impact Development (LID) initiatives and *Green Directions Vaughan.* The Stormwater team participated in educating an elementary school science class during a field trip to a local stormwater management pond.

Prior to the implementation of the Stormwater charge in Q2-Q3, 2017, an extensive communication plan was implemented. The plan informed residents of the stormwater charge in a variety of ways. The following outlines the metrics associated with the communication plan:

- **110** – 60 second radio promotions on 105.9FM The Region
- **9** – ¼ page newspaper ads in Lo Specchio, Vaughan Citizen and Thornhill Liberal
- **205,000** – utility bill buck slips inserts
- **2,283** - views of the 'What is stormwater' educational video
- **80,000** – homes received 2016 summer edition of Vaughan At Work featuring Stormwater charge
- **7,035** – targeted ads on social media platforms
- **3,523** – letters to agricultural/vacant property owners
- **5** - stories appeared on local media outlets

Financial Impact

There are no financial impacts resulting from the adoption of this report.

Broader Regional Impacts/Considerations

York Region and its local municipalities agreed to work collaboratively to fulfill the conditions of approval for the Southeast Collector Trunk Sewer from the Ministry of the Environmental Climate Change. The City's I&I Reduction Program supports York Region's I&I Reduction Strategy to meet the MOECC condition of approval to track, develop, peer review and implement comprehensive water conservation and I&I reduction strategies.

Conclusion

The past year saw several notable wastewater and stormwater related programs, activities and initiatives undertaken by Environmental Services, Infrastructure Delivery, Development Engineering and Infrastructure Planning. This supports and enhance operational efficiencies such as SCADA, sanitary flow reduction, stormwater quality, enhanced service delivery and support to other City stakeholders such as Corporate Asset Management.

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In recognition of the vision of Environmental Services to be “Leaders for a Greener Future”, programs and projects related to wastewater and stormwater services will continue to be improved and innovation and enhancement will be pursued.

For more information, please contact: Jennifer Rose, Director, Environmental Services.

Attachments

None.

Prepared by

Chris Wolnik, Manager, Wastewater and Stormwater, ext. 6152
Deepak Panjwani, Manager, Program and System Planning, ext. 6110
Harry Persaud, Project Manager, Wastewater and Stormwater, ext. 6034

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ITEM - 4

Water, Wastewater and Stormwater Update 2017

Committee of the Whole (Working Session)

VAUGHAN

Purpose

- Provide Council with an update of the activities to support:
  - Safe drinking water
  - Effective wastewater collection
  - Stormwater Management

- Review Statutory Standard of Care for Owners of Drinking Water Systems and Individual Members of Council

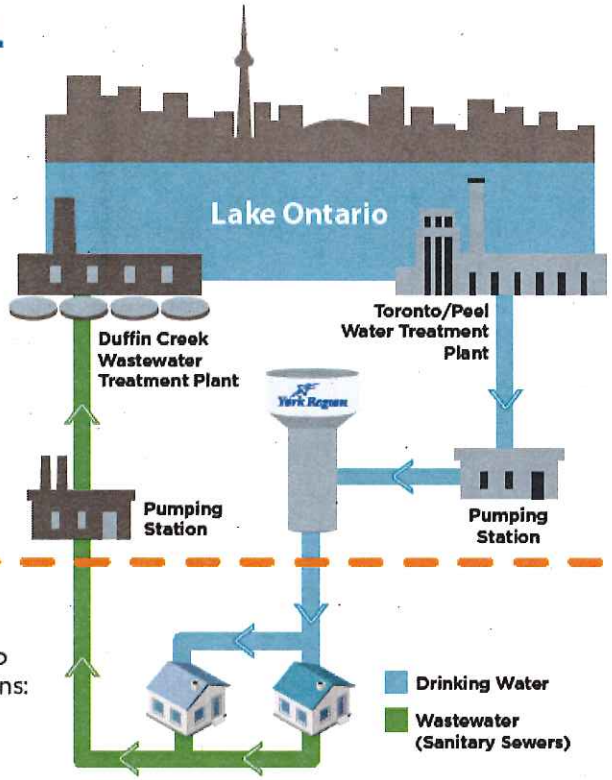
Modernizing the Delivery of Environmental Services: *Leaders in a Greener Future*

Water Distribution and Wastewater Collection Systems

WHERE YOUR MUNICIPAL WATER DOLLARS GO

York Region
Purchases treated drinking water from Peel Region and the City of Toronto and uses advanced technology to treat wastewater. Managing 333 million litres of water per day, York Region's $6.3 billion water system includes:

- Over 675 kilometres of pipes
- 45 reservoirs and water towers
- 40 wells
- 21 water pumping stations
- 3 water treatment plants
- 21 wastewater pumping stations
- 8 wastewater treatment plants



City of Vaughan
Purchases its water and wastewater treatment from York Region and provides these services to its residents. The City also operates and maintains:

- 1 water pumping station
- 1 pressure elevating system
- 9 wastewater pumping stations
- Over 1,800 kilometres of pipes

Water Operations and Compliance

100% Inspection Rating

VAUGHAN

Statutory Standard of Care Embedded in the Safe Drinking Water Act

If the system is owned by a municipality, every person who, on behalf of the municipality, oversees the accredited operating authority of the system or exercises decision-making authority over the system2002, c. 32, s. 19 (2).

Owners of a Drinking Water System (Council) and **Top Management** (DCM, Public Works, Director, Environmental Services, Manager, Water Services, Supervisor(s), Water Services, Supervisor, Compliance and Business Services)

Exercise the level of care, diligence and skill in respect of a municipal drinking water system that a reasonably prudent person would be expected to exercise in a similar situation; and act honestly, competently and with integrity, with a view to ensuring the protection and safety of the users of the municipal drinking water system. 2002, c. 32, s. 19 (1).

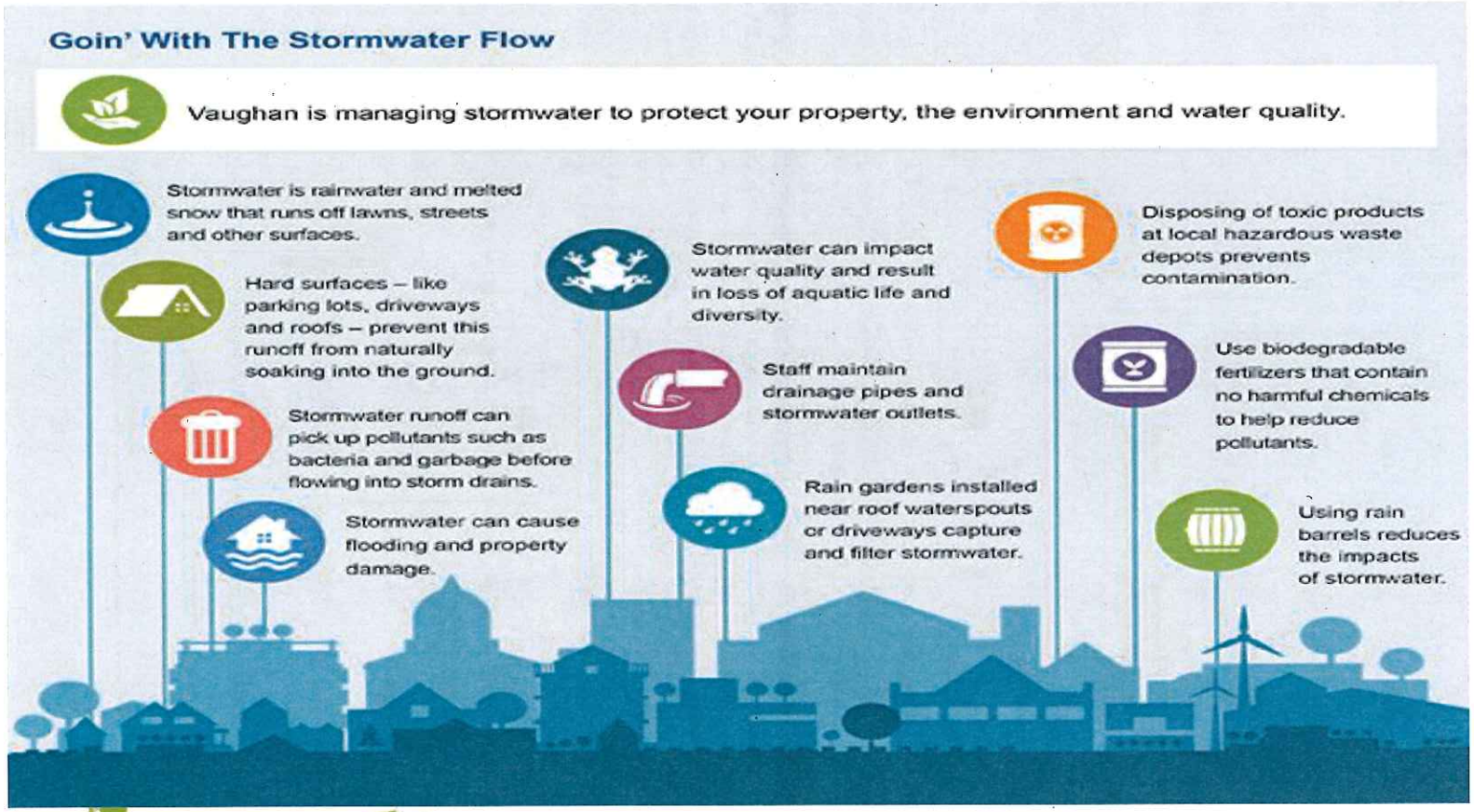
Wastewater Operations

VAUGHAN

Water and Wastewater Projects

- Monitor System Performance
- Condition Assessment
- Replacements
- Repairs to Extend Life of Pipes
- Non Revenue Water Analysis
- Improve Customer Service
- Added 21,163 metres of watermain
- Water and Sewer Servicing Strategies

Stormwater Management



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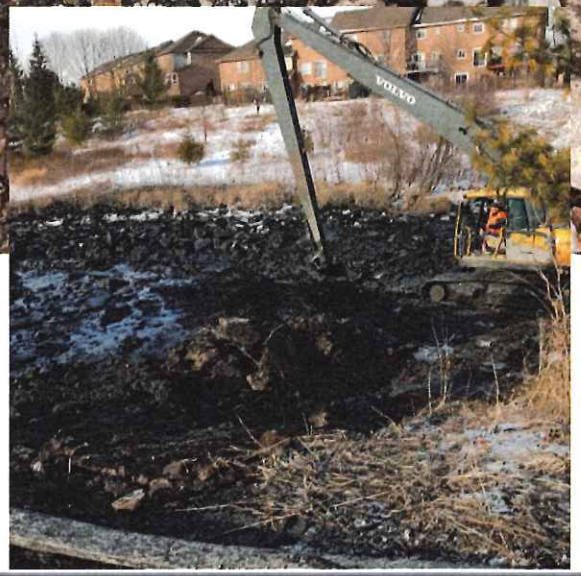
Stormwater Operations



VAUGHAN

Stormwater Projects

Pond Cleanouts

Repairs to Extend Life

Culvert Replacement

New stormwater outfalls to improve flow

Education and Outreach

VAUGHAN

Environmental Services Staff

Questions?

Item:

Committee of the Whole (Working Session)

DATE: Wednesday, March 07, 2018 **WARD(S):** ALL

TITLE: 2017 Wastewater Collection System and Stormwater Management Report

FROM:
Stephen Collins, Deputy City Manager, Public Works

ACTION: FOR INFORMATION

Purpose

To update Council on the key wastewater and stormwater related programs and services that were undertaken by Environmental Services, Infrastructure Delivery, Infrastructure Planning and Development Engineering in 2017.

Recommendations

1. That the report be received for information.

Report Highlights

- Initiatives that support the City's and Region's Inflow and Infiltration Reduction Strategy
- Environmental Services activities that support enhanced service delivery
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Background

The City owns and operates the local wastewater collection system which is designed to collect wastewater from homes and businesses and bring it to wastewater treatment plants through pipes and pumping stations. The wastewater collection system consists of 10 pumping stations, 997 km of piping, and 12,905 maintenance holes.

The City also owns and operates the stormwater collection system which is designed to collect runoff from rainfall and snowmelt, convey it to stormwater management facilities to enhance water quality before the stormwater is released to outlets, rivers and stream. The stormwater system consists of 144 stormwater management ponds, 1,100 km of piping and 17,000 catch basins.

In the last year the Environmental Services Department has undertaken and completed a number of initiatives/projects to enhance service delivery, manage and extend the life of wastewater and storm water infrastructure, protect the environment and public health, exhibit fiscal responsibility and reduce inconvenience to the public. This report highlights some of these initiatives/projects that were completed or are underway.

Previous Reports/Authority

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Analysis and Options

Just over $ 13 million in operating expenses and approximately $ 5.3 million for the capital projects were budgeted by Environmental Services in 2017 to achieve enhanced service delivery and to extend the life of the wastewater and stormwater management infrastructure

Environmental Services Department continues to be committed to providing excellence in the provision of wastewater and stormwater related services. This has been demonstrated through the development of programs and undertaking of several capital projects and operational activities.

Wastewater

Environmental Services has initiated and completed new projects and implemented enhanced operational programs to achieve the City's I&I Reduction goals in support of York Region's I&I Reduction Strategy

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As additional I&I enters the wastewater system, the pumps at the wastewater pumping stations use more energy to pump the wastewater. By reducing I&I, the City will reduce energy usage and associated greenhouse gas emissions as well as enhance sewer capacity and reduce potential risk of basement flooding.

The table below summarizes the list of the projects and activities that were completed in 2017 in support of I&I reduction initiatives:

Project/Activity	Brief Description	Quantity
Flow Monitoring	To measure flow in the sewer system to analyze the variation of flow in various weather conditions	Six (6) flow meters were installed in high priority areas which exhibit evidence of I&I
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Trenchless Repair	Method to perform sewer repair or rehabilitation works without an open cut or an excavation	Six (6) repairs were completed with Cured-In-Place-Pipe (CIPP) Lining method

In addition to the above projects, the City completed the 2017 I&I Annual Status Report to York Region which includes I&I initiatives, work undertaken and I&I reduction achievements. York Region requires an I&I Annual Status Report from each of the Local Area Municipalities to streamline their annual reporting process and commitment to the MOECC for their I&I Reduction Strategy.

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Enhancements introduced to the Flushing Program approximately 18 months ago include programming a four (4) year cycle based on sewer catchment area rather than city blocks. The flushing maintenance wastewater program is running on an annual schedule and is

anticipated to finish its first full cycle within a four-year period. Approximately 160,000 metres of wastewater infrastructure and 35,000 metres of stormwater infrastructure are flushed annually.

A hydro vacuum truck was also purchased in 2017 and will be used to reduce the cost of flushing by eventually bringing the emergency work in house. The business case indicates a savings of one (1) million dollars over the next 10 years.

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Stormwater

Monitoring stormwater quality helps to determine the operational effectiveness of the Stormwater Management Ponds

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Bathymetric Survey initiative was expanded in order to support the future Stormwater Management Pond cleanout program

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Capital Projects and Studies

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2. Construction of Block 40/47 Pine Valley North Sanitary Pumping Station
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Last year, through the assumption process, the City added 27,163 metres of sanitary and 27,763 metres of stormwater related infrastructure to its municipal assets.

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Communication with citizens was increased by an enhanced education and outreach program in support of existing and new initiatives

Recognizing the importance of educating the residents of Vaughan about enhanced wastewater and stormwater programs, Environmental Services supports related initiatives. These include: an enhanced backwater valve subsidy program in older neighbourhoods to reduce basement flooding arising during severe rain events, and promotion of rain barrel sales to support the Low Impact Development (LID) initiatives and *Green Directions Vaughan.* The Stormwater team participated in educating an elementary school science class during a field trip to a local stormwater management pond.

Prior to the implementation of the Stormwater charge in Q2-Q3, 2017, an extensive communication plan was implemented. The plan informed residents of the stormwater charge in a variety of ways. The following outlines the metrics associated with the communication plan:

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Financial Impact

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Broader Regional Impacts/Considerations

York Region and its local municipalities agreed to work collaboratively to fulfill the conditions of approval for the Southeast Collector Trunk Sewer from the Ministry of the Environmental Climate Change. The City's I&I Reduction Program supports York Region's I&I Reduction Strategy to meet the MOECC condition of approval to track, develop, peer review and implement comprehensive water conservation and I&I reduction strategies.

Conclusion

The past year saw several notable wastewater and stormwater related programs, activities and initiatives undertaken by Environmental Services, Infrastructure Delivery, Development Engineering and Infrastructure Planning. This supports and enhance operational efficiencies such as SCADA, sanitary flow reduction, stormwater quality, enhanced service delivery and support to other City stakeholders such as Corporate Asset Management.

In recognition of the vision of Environmental Services to be "Leaders for a Greener Future", programs and projects related to wastewater and stormwater services will continue to be improved and innovation and enhancement will be pursued.

For more information, please contact: Jennifer Rose, Director, Environmental Services.

Attachments

None.

Prepared by

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