

## CITY OF VAUGHAN

### EXTRACT FROM COUNCIL MEETING MINUTES OF MARCH 21, 2017

Item 9, Report No. 10, of the Committee of the Whole, which was adopted without amendment by the Council of the City of Vaughan on March 21, 2017.

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#### INFLOW AND INFILTRATION PROGRAM UPDATE

The Committee of the Whole recommends approval of the recommendation contained in the following report of the Deputy City Manager of Public Works and the Director of Environmental Services, dated March 7, 2017:

##### Recommendation

The Deputy City Manager of Public Works and the Director of Environmental Services, in consultation with the Director, Development Engineering and Infrastructure Planning and the Director of Financial Services/Deputy City Treasurer recommend:

1. That the report be received for information.

##### Contribution to Sustainability

Inflow and infiltration (I/I) are rain water, snow melt and groundwater that enter the wastewater collection system. Inflow is the flow of water into the wastewater system through direct sources such as downspout connections, underground storm water connections and manhole covers. Infiltration occurs when groundwater enters the wastewater system through cracks and holes in manholes, and sewer pipes.

Reducing I/I aligns with the environmental ethic within *Green Directions Vaughan*, our Community Sustainability and Environmental Master Plan, as well as objective 1.2 to reduce greenhouse gas emissions from City facilities. As additional groundwater, rain water and snow melt unnecessarily enter the sanitary sewer system, the pumps at our sanitary sewer lift stations use more energy to move this wastewater. By reducing inflow and infiltration, the City will reduce the energy usage and associated greenhouse gas emissions from sanitary sewer lift stations.

##### Economic Impact

In February 2011, Regional Council, in partnership with the local municipalities, set an initial funding target of \$100 million over a 20 year period to support York Region's I/I programs. Funding is proportionally allocated and shared between York Region and the local municipalities. Vaughan's proportionate allocation and commitment to this strategy is \$0.02 per cubic meter of water consumed. The table below details the total that has been collected and reserved as Vaughan's share of the I/I Reduction Strategy.

Year	Sales (m <sup>3</sup> )	I/I Program Funding
2011	36,078,644	\$721,570
2012	36,683,474	\$733,670
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A key funding principle included in the Region's strategy states that any money collected at the local level will be used to address local priorities identified both by the I/I Reduction Strategy and as determined by each local municipality. Money collected by Vaughan will primarily be spent on Vaughan specific inflow and infiltration identification and reduction initiatives.

York Region charges the City of Vaughan \$1.5176 (2017 rate) to collect and treat wastewater. Any efforts to reduce unnecessary water in the sanitary sewer system have the potential to result in savings. At York Region, reducing I/I will impact the wastewater rate that the Region sets which could then, in turn, impact City of Vaughan wastewater rates.

Council has approved the 2017 Water and Wastewater budget, which includes \$498,000 to conduct activities to identify, measure and mitigate I/I in the wastewater collection system. As the I/I Reduction Program matures future budget expenditures will begin to approach funding levels set aside in the reserve for I/I Program Funding.

#### **Communications Plan**

#### **Communications and outreach are a key component of the Inflow and Infiltration Reduction Program**

The City's I/I Reduction Program includes efforts to educate citizens and businesses about inflow and infiltration in order to inform and engage citizens in participating in activities on their properties to eliminate rain water from entering the wastewater system. Such activities include disconnecting their downspouts from underground pipes and using rain barrels.

Environmental Services will develop communication and education outreach initiatives for residents and businesses in collaboration with the City's Corporate Communication Department and York Region. At a minimum, the following initiatives will be undertaken:

- Update the Environmental Services Department webpage to include information about the I/I Reduction Program;
- Develop a social media campaign that raises awareness of I/I particularly during high periods of wet weather;
- Develop brochures that will communicate information such as benefits of the I/I Reduction Program;
- Prepare Frequently Asked Questions (FAQ) for residents and businesses to address any general inquiry related to the I/I Reduction Program; and
- Work with the Environmental Services Outreach Coordinator to identify opportunities to raise awareness of the I/I Reduction Program at environmental days, school visits, rate payer association meetings and other outreach events.

#### **Purpose**

The purpose of this report is to provide Council with an update on the City's I/I Reduction Program.

#### **Background – Analysis and Options**

The wastewater collection system is designed to collect wastewater from homes and businesses and bring it to wastewater treatment plants through pipes and pump stations. Wastewater consists of water used in homes to clean clothes and dishes and water used in washrooms. The

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wastewater system in Vaughan was not designed to accommodate rain water, snow melt (referred to as surface water) and groundwater. Inflow and infiltration (I/I) are rain water, snow melt and groundwater that enter the wastewater collection system.

#### **York Region developed an Inflow and Infiltration Reduction Strategy which includes partnerships with area municipalities to meet MOECC conditions**

In 2010, the Region received approval from Ministry of the Environment and Climate Change (MOECC), for an Individual Environmental Assessment (IEA) to construct the Southeast Collector (SEC) Trunk Sewer. The approval was subject to a series of conditions. These conditions required the Region to track, develop, peer review, and implement comprehensive water conservation and inflow and infiltration reduction strategies. The Region partnered with all the area municipalities to meet the requirements of the MOECC.

York Region established an I/I Strategy flow reduction target of 71 million litres per day (MLD) at the Southeast Collector over a 24-hour period during a theoretical 25-year storm event in 2031. To achieve the 71 MLD flow reduction, a 40 MLD reduction target in inflow and infiltration was established, with the remaining 31 MLD reduction to be achieved through water conservation. York Region's I/I Reduction Strategy Program Areas include:

- Establish I/I Program goals and targets;
- Monitor and analyze flows;
- Investigate and mitigate;
- New Development and Capital projects;
- Financial management;
- Communication, education and advocacy;
- Report I/I reductions;
- Continuous improvement.

#### **Addressing I/I within wastewater infrastructure is also a key priority for the City of Vaughan and has been identified as a strategic program which supports the Term of Council priority to invest, renew and manage infrastructure**

High volumes of inflow and infiltration predominantly occur during heavy rain events and significant storms. These flows have the potential to cause sewer back-ups, basement flooding, system overflows, risks to health, impact on the natural environment and increased costs. Efforts to reduce I/I will improve the efficiency of the wastewater system by reducing and mitigating adverse impacts resulting from potential I/I sources. The reduction of I/I will allow for effective service delivery, enhance operational performance and enable optimal use of the sanitary sewer system.

#### **York Region identified areas in Vaughan which showed high amounts of I/I during a storm event.**

York Region has developed a comprehensive flow monitoring program that was instrumental in documenting portions of various blocks that the City of Vaughan can focus on to further pinpoint areas for future work.

#### **The City of Vaughan has established an Inflow and Infiltration Program with five key components, which align with York Region's I/I Program Areas**

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The City's Inflow/Infiltration Reduction Program consists of:

- **Flow monitoring.** Flow monitoring helps to identify sources of I/I that are more prevalent during sewer surcharges and conveyance constraints as well as high peak flows during wet weather conditions;
- **Identification of I/I sources.** Several initiatives such as manhole inspections, smoke and dye testing, cross connection investigations and private property initiatives are key to identifying I/I sources;
- **Data management and GIS integration.** A GIS layer and database will be developed for identified I/I defects with mainline, laterals, manhole information as well as rehab works;
- **Rehabilitation program.** In order to address I/I sources, a series of initiatives such as manhole repairs, sewer pipe lining and sump/downspout disconnections will be prioritized and implemented; and
- **Communication and outreach.** Various means such as social media, webpages and brochures will be used to communicate the importance of initiatives to address I/I.

#### **New development projects are important to a successful reduction in I/I**

The City of Vaughan continues to work with the Region to improve detailed design and inspection standards to ensure greater long-term resiliency from potential I/I sources throughout new development areas.

As part of a Developer driven/funded pilot project, the Block 61 Developers' Group has identified sources of I/I throughout the City's local sewer system. Remediation efforts are ongoing. Based on proposed remediation works and flow monitoring data compiled to date, York Region has acknowledged capacity for approximately 1,600 additional residential units can be achieved upon successful completion of the planned remediation work.

#### **Annual reporting on I/I reduction activities and accomplishments is a vital component of the City of Vaughan I/I Reduction Program and the Region's commitment to the Ministry of Environment and Climate Change**

York Region has prepared an Annual Status Report Template for the benefit of the local municipalities in an attempt to streamline the annual reporting process. The new process requires the local municipalities to send an Annual Status Report on their initiatives, rehabilitation work, actual I/I reductions achieved communication plans and any other inflow and infiltration related activities. The City of Vaughan completed the 2017 Annual Status Report– Inflow and Infiltration Reduction Activities and Accomplishments, based on 2016 data as per the Region's request.

Key results in the first year of the I/I Reduction Program that were highlighted in the Annual Status report include:

- Established flow monitoring at 6 locations within the high priority areas;
- Repaired two cross connections to eliminate stormwater entering the wastewater collection system;
- Initiated the development of an in-house wastewater model to help verify priority I/I areas;
- Piloted an on-line manhole inspection form that enables an operator in the field to link the condition of the manhole to our ArcGIS database;
- Developed a roster of general contracting companies for manhole rehabilitation, sewer mainline and lateral rehabilitation by trenchless technology with the goal of executing projects to remediate I/I sources;
- Continued to develop, through Closed Circuit television (CCTV) work, a list of locations where I/I is present within the chambers and mainlines; and

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- Initiated the acquisition of an asset inspection and decision support software system that would improve our ability to review CCTV data in a more timely manner. Future flow monitoring will allow the City to measure the amount of I/I which has been removed from the wastewater system.

#### **Relationship to Term of Council Service Excellence Strategy Map (2015 – 2018)**

The Inflow and Infiltration program aligns with the Term of Council service excellence strategy priority to invest, renew and manage infrastructure and assets.

#### **Regional Implications**

The City of Vaughan's I/I Reduction Program supports York Region's Inflow and Infiltration Reduction Strategy. York Region and its local municipalities agreed to work collaboratively to fulfill conditions of approval for the Southeast Collector Trunk Sewer by the Ministry of Environment and Climate Change (MOECC).

#### **Conclusion**

Inflow is water from rainfall or snow melt that enters the wastewater system from direct sources while infiltration is groundwater that enters the wastewater system from holes and cracks in manholes, laterals and sewer pipes. Excessive inflow and infiltration can result in sewer back-ups, system overflows, risk to public health and potential damage to the environment during storm events as well as increased costs to operate pumping stations. The City of Vaughan has developed an Inflow and Infiltration Reduction Program. The Program includes flow monitoring, identification of I/I sources, data management and GIS integration, a rehabilitation program as well as communication and outreach. The City has completed its first annual status report to York Region to report on initiatives, rehabilitation work, reductions, communication plans and any other inflow and infiltration related activities.

#### **Attachments**

N/A

#### **Report prepared by:**

Chris Wolnik, Manager of Wastewater and Stormwater Services, ext. 6152

**INFLOW AND INFILTRATION PROGRAM UPDATE****Recommendation**

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1. That the report be received for information.

**Contribution to Sustainability**

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**Economic Impact**

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### **Attachments**

N/A

### **Report prepared by:**

Chris Wolnik, Manager of Wastewater and Stormwater Services, ext. 6152

Stephen Collins, P.Eng.  
Deputy City Manager, Public Works

Jennifer Rose  
Director, Environmental Services