



TO: GENERAL COMMITTEE


SUBJECT: PILOT SANITARY INFLOW AND INFILTRATION REDUCTION PROGRAM

WARD: ALL

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RECOMMENDED MOTION

1. That the pilot Sanitary Inflow Reduction Rebate Program as outlined in Staff Report ENG008-15 be endorsed.

PURPOSE & BACKGROUND

2. Sanitary inflow and infiltration (I & I) are extraneous stormwater or groundwater flows that enter the sanitary sewer system and result in abnormally high flows reaching Barrie's Wastewater Treatment Facility (WwTF). This is typically an issue during the spring thaw or during large rainfall events throughout the year. These extraneous sanitary flows can be difficult for the plant to handle, and, therefore, could potentially result in compliance issues at the WwTF. I & I is defined as follows:
 - a) Inflow is the rapid flow of stormwater entering the sanitary system as a result of illegally connected downspouts, sump pumps/foundation drains or leaky maintenance hole covers; and
 - b) Infiltration can occur during both dry and wet weather. During dry weather infiltration can result from a high groundwater table within the soil that can enter the sanitary system as a result of cracks or breaks in sanitary laterals and sewer mains. During rainfall events infiltration can occur as the rainwater permeates through the soil and enters the system again through cracks or breaks in sanitary laterals and sewer mains.
3. As part of the Infrastructure Master Plans prepared for growth within the annexation lands and intensification within the former City boundary, the Wastewater Treatment Master Plan reviewed alternatives to meet the future capacity needs. The preferred alternative includes I & I control as a critical component in deferring WwTF expansion to at least 2031. Addressing I & I is an important aspect in ensuring efficient and effective treatment at the WwTF and ultimately improve the water quality in Lake Simcoe. Through the implementation of I & I control, the WwTF would have less variability as peak flows would be reduced; thereby increasing the consistency of sewage concentrations to the plant and allowing for increased optimization of plant operations.

4. The City has been actively involved in I & I reduction since April 2003. Initiatives have included utilizing rain gauges to collect actual rainfall data within the City, monitoring sanitary sewer flows at strategic points within the system and the production of a preliminary I & I Study identifying areas of high I & I. In 2008, the City initiated a comprehensive Sanitary I & I Study by retaining XCG Consultants Ltd. (XCG). XCG estimated an annual saving of approximately \$280,000 if all recommendations were implemented assuming a 30% reduction of total I & I could reasonably be achieved.
5. There are significant sources of I & I that originate from the private side of the sanitary collection system (i.e. service laterals, illegal connections such as sump pumps, etc). The City does not permit downspouts or sump pumps to discharge into the sanitary system as essentially clean water is then being treated at the WwTF (Sewer Use By-Law 2012-172).
6. XCG has estimated that private side I & I could account for up to 50% of the total I & I in typical sanitary sewer systems (industry accepted estimate).
7. City staff conducted a Sump Pump Survey in 2007 of two areas (see Appendix "A") with high levels of I & I:
 - a) Area 1 - bounded by Tiffin Street, Hwy 400, Mapleton Avenue and Essa Road.
 - b) Area 2 - bounded by Miller Drive, Dunlop Street, Ferndale Drive and Edgehill Drive.

Of the surveys that were returned, 309 respondents noted that they had a sump pump that discharged below ground where they likely connected to the sanitary sewer system.

8. On November 2, 2009, City Council approved Motion 09-G-441 adopting the Sanitary I & I Reduction Program based on recommendations developed by XCG. Elements of the program included sanitary collection system within the public right-of-way and private property.
9. The City has worked diligently to address I & I on the public side of the sanitary collection system. In 2009/2010, the City spent \$350,000 on operating repairs (such as spot repairs, chemical grouting and manhole sealing) to the sanitary sewer system. The repairs completed to date have shown a reduction of approximately 2 ML to average day peak flow and considerable difference in wet weather peak flows. With additional capital and operating repairs scheduled for completion, the goal is to further reduce these flows and associated treatment costs.
10. The next phase in the City's Sanitary I & I Reduction Program is the implementation of a rebate program to address illegal downspout, foundation and sump pump connections to the sanitary sewer.

ANALYSIS

11. The City again retained XCG Consultants Ltd. (XCG) to complete an analysis of existing I & I reduction efforts with a focus of addressing illegal connections (downspouts, foundation drains and sump pumps), recommend a program approach for the City and develop an implementation plan.

12. XCG completed a jurisdictional review of 13 municipalities that have active I & I reduction programs addressing illegal connections (attached in Appendix "A"). Of the 13 programs examined, 4 were mandatory and 9 were voluntary. XCG and Engineering staff identified three distinct program models outlined as follows:

<p>Mandatory Disconnection</p>	<ul style="list-style-type: none"> - This program is modelled after similar programs implemented in the City of Toronto, Town of Fort Erie, Town of Markham and City of St. Catharines. - Residents would be given a grace period to ensure all downspouts, sump pumps and foundation drains are disconnected from the sanitary collection system or have filed for exemption. - Residents would be able to apply for exemptions in certain instances (specific exemption criteria would be detailed). - City inspectors would perform inspections after the expiry of the grace period and issue either compliance certificates or non-compliance warnings/enforcement notices. - Due to the mandatory nature of the program, no rebates would be given.
<p>Real Estate Model</p>	<ul style="list-style-type: none"> - This program is modelled after the City of Orillia's I & I reduction program known as the Enviro-Save Program. - The City would require an inspection certificate prior to transfer of City Water/Sewer accounts and tax roll at time of sale. - The inspection would be conducted by private home inspectors (licensed by the City) retained by either the seller or buyer. - The home inspector would review the property and issue either a compliance certificate or non-compliance certificate outlining the illegal connections. In the instance of non-compliance; homeowners can choose to rectify the illegal connection or apply for an exemption (specific exemption criteria would be detailed). - Based on annual residential sales, it is estimated that program duration of approximately 10 years would result in the inspection of most residential properties. - No rebates would be given using this model.
<p>Voluntary Rebate</p>	<ul style="list-style-type: none"> - A pre-inspection would review the illegal connection with the homeowner. The homeowner would outline their proposed solution. Engineering staff will outline hazards that need to be avoided when redirecting these flows. - In some areas, disconnection may cause a greater drainage problem. In these cases, the resident will be advised to seek professional guidance or advised to leave the illegal connection as is. - The program consists of a time limited voluntary downspout disconnection, sump pump and foundation drain disconnection rebate.

13. XCG and Engineering staff hosted an internal workshop with Building and By-Law Services to evaluate the three program models. Based on feedback generated, XCG and Engineering staff concluded that a limited voluntary rebate program be introduced as the first phase.
14. Engineering staff are proposing to implement a voluntary sanitary inflow reduction rebate program operated as a 12 month pilot program (while funds are available). The purpose of the pilot program is to provide incentive to residents to disconnect their illegal connections and allow staff to gain a better understanding of the illegal connections that exist in the City, specifically:
 - a) Quantity/type of illegal connections;
 - b) Why the illegal connections are in place (any common themes/nuisance issues);
 - c) Identification of areas with high instances of illegal connections;
 - d) Collect cost estimates on retrofitting illegal connections;
 - e) Staff time required to process applications/rebate; and
 - f) Risk mitigation measures.
15. For 2015, approximately \$12,000 has been allocated for rebates.
16. The program will be communicated through a soft launch using social media. The City's Twitter account will be used to advertise the program and link users to a rebate page on the City's website. Subsequent targeted mailings and/or door hangers may be used depending on response levels from Twitter advertisements. The intent of the soft launch is to match demand to the programs budget. Respondents will be directed first to the City's website to check the program status and will be encouraged to register with the program in the event that the rebate funding is no longer available. This will allow the City to easily communicate updates to interested individuals.
17. The City will create an updated web page on the City's website where the program's status will be displayed and contain informational pamphlets developed with XCG. An automated phone message system will be established to assist respondents, similar to the message system used for the Toilet Rebate Program.
18. The City will be investigating partnership opportunities with Lake Simcoe Region Conservation Authority (LSRCA) as the redirection of roof and foundation drain discharges to pervious areas assists in reducing phosphorus loadings, reducing peak flows in the City's watercourses (draining to Lake Simcoe) and increases infiltration to help replenish groundwater. LSRCA currently provides grants to homeowners to construct low impact development (LID) rain gardens and infiltration galleries that will receive stormwater from downspouts and sump pump discharges.
19. The rebate structure for the pilot will be as follows:

Rebate Item	Rebate Amount	Building Permit Required:
Downspout Disconnections	100% of the material cost to disconnect downspouts to a maximum of \$70. \$25 for the first downspout and \$15 for subsequent downspouts to a maximum of 4.	No
Foundation Drain Disconnections	75% of the plumbing related cost to a maximum of \$2000 (including cost of Building Permit)	Yes

Permanently Redirect Sump Pump Discharge to Outdoors	75% of the plumbing related cost to a maximum of \$200	No
Retrofit Existing Sump Pit with Outdoor Discharge	75% of the plumbing related cost to a maximum of \$300	Building Services to be consulted

20. Engineering staff will perform initial site visits to gather data and review the feasibility of disconnection. In some circumstances, a disconnection could result in a greater drainage problem. In areas of high groundwater and/or where many illegal connections to the sanitary sewer exist, some form of alternative discharge point may be required which could involve construction of City infrastructure to provide that outlet. In these instances, information will be gathered, but residents will be advised to maintain their illegal connection. This information will be brought forward as part of the follow-up report on the pilot program.
21. Engineering staff will operate the program and administer rebates. Building Services will be involved where building permits are required and will collect the necessary application submissions.
22. Subject to future Council endorsement, data gathered as part of the pilot program will be used to refine the program in preparation of a formal City wide voluntary rebate program as the next program phase. The intent is to transition to a mandatory compliance program (based on the real estate or mandatory disconnection model) as I & I control is a key component of the Wastewater Treatment Master Plan Preferred Alternative. At the conclusion of the pilot program, staff will report to Council on their findings and any proposed future modifications as part of the next program phase.

ENVIRONMENTAL MATTERS

23. The following environmental matter has been considered in the development of the recommendation:
 - a) Through the implementation of an Inflow Reduction Program, sanitary flows to the WwTF will be further reduced; thereby allowing the WwTF to operate more efficiently within design compliance limits thus ensuring that the water quality within Lake Simcoe is improved.
 - b) The redirection of storm flows from illegal downspout and sump pump connections to pervious areas assists in the reduction of phosphorus loadings, reduction of peak flows in the City's watercourses and recharges groundwater aquifers.

ALTERNATIVES

24. There is one Alternative available for consideration by General Committee:

Alternative #1 General Committee could modify the proposed recommendations for implementation of the Pilot Sanitary Inflow Reduction Rebate Program.

This Alternative is not recommended as the implementation of a pilot program has been carefully considered and will provide the necessary information prior to implementation of a City wide voluntary or mandatory program model.

FINANCIAL

25. The 2015 pilot program budget allocated for rebates is \$12,000 and is funded from the operating budget through wastewater user rates. Data gained through the pilot program will be used to develop subsequent future budget requests.
26. The staff time required per application is estimated as follows and will be confirmed during the pilot program:
- a) Downspout Disconnect:
 - i) 0.5 hour co-op Student (application review/site inspection coordination)
 - ii) 1.0 hour Engineer (including initial site visit and inspection form)
 - iii) 0.75 hour administration (including issuance of rebate cheque)
 - b) Rebates requiring building permit:
 - i) 0.5 hour co-op Student (application review/site inspection coordination)
 - ii) 1.0 hour Engineer (including initial site visit and inspection form)
 - iii) 0.5 hour administration (including issuance of rebate cheque)
 - iv) Building Services staff time will operate on a cost recovery basis through the building permit application process; the pilot program is expected to have minimal impact on staff time as Engineering Staff will conduct initial site visit and assist residents with project screening/next steps.
27. Payback period on rebates:
- a) Downspout Disconnect – Assuming an annual rainfall of approximately 700 mm (typical of Barrie, excluding snowfall), disconnection of an average home with a roof area of 140 m² would result in diversion of nearly 100,000 litres of stormwater annually from the sanitary system assuming all downspouts are illegally connected. A rebate of \$70 would have a return of investment of 7 months, based on wastewater user rates of \$1.25/m³ (residential wastewater user rates effective March 1, 2014; 0-30m³).
 - b) Sump Pump Disconnect – Staff estimate that following a significant rainfall event or spring thaw, a typical sump pump may switch on in excess of 100 times during a 24 hour period. A typical sump could drain in excess of 5000 litres per day of stormwater to the sanitary system. Estimating that there are approximately 30 high flow days during a one year period, a household could unnecessarily discharge in excess of 150,000 litres of water in the sanitary sewer system annually. A rebate of \$2000 would have a return of investment of 10 years in treatment savings at the WwTF, based on wastewater user rates of \$1.25/m³.

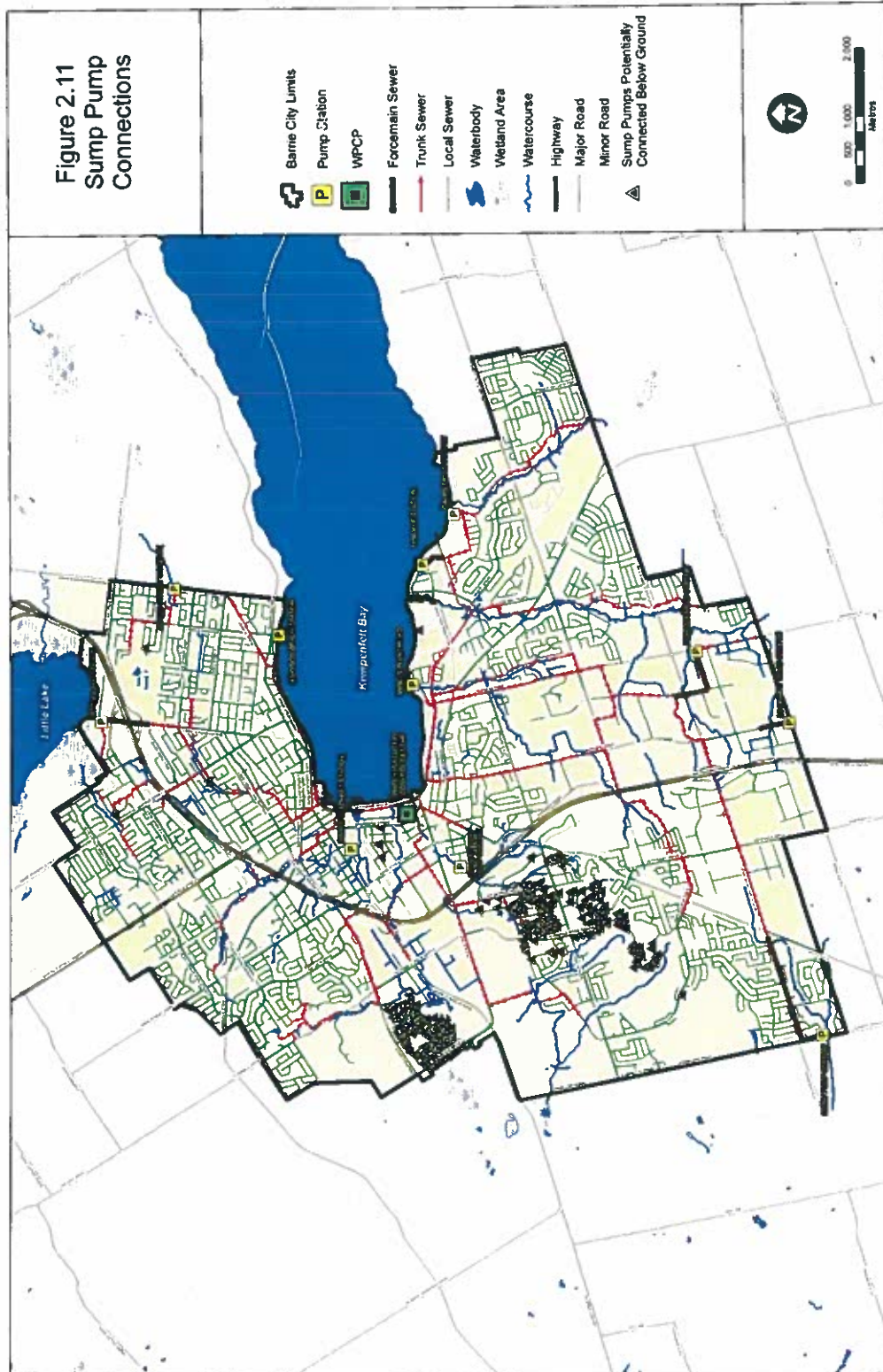
LINKAGE TO COUNCIL STRATEGIC PRIORITIES

28. The recommendation(s) included in this Staff Report support the following goal identified in the 2014-2018 Strategic Plan:
- Responsible Spending

29. Controlling I & I, in part through the implementation of the Sanitary Inflow Reduction Rebate Program, the City is cost effectively implementing I & I control in an effort to defer expansion of the WwTF to 2031 (or beyond depending on growth rates and overall I & I control efforts).
30. Controlling I & I further reduces flows to the WwTF, resulting in lower operating and maintenance costs as well as providing greater consistency in sewage volumes and concentrations thus allowing WwTF staff to operate the plant more efficiently and within its compliance limits.

APPENDIX "A"

Sump Pump Connections



Note: Surveys only distributed to the following areas bounded by:
1) Miller Drive/Edgehill Road, 2) Tiffin Street, Hwy 400, Mapleton Avenue, Essa Road