

January 26, 2018

Ms. Kimberley Kitteringham
City Clerk
City of Markham
101 Town Centre Boulevard
Markham, ON L3R 9W3

Dear Ms. Kitteringham:

Re: Inflow and Infiltration Reduction Update

Regional Council, at its meeting held on January 25, 2018, adopted the following recommendations of Committee of the Whole regarding "Inflow and Infiltration Reduction Update":

1. The Commissioner of Environmental Services be authorized to execute Developer-funded Inflow and Infiltration Reduction Project Agreements, where requested by the subject local municipality, to address capacity constraints in conveyance system (sewers, forcemains and pumping stations), in accordance with the principles outlined in Attachment 1.
2. The Regional Clerk circulate a copy of this report to the local municipalities.

A copy of Clause 6 of Committee of the Whole Report No. 1 is enclosed for your information.

Please contact James Steele, Director, Infrastructure Asset Management at 1-877-464-9675 ext. 73018 if you have any questions with respect to this matter.

Sincerely,



Christopher Raynor
Regional Clerk

/C. Clark
Attachments

Clause 6 in Report No. 1 of Committee of the Whole was adopted, without amendment, by the Council of The Regional Municipality of York at its meeting held on January 25, 2018.

6

Inflow and Infiltration Reduction Update

Committee of the Whole recommends adoption of the following recommendations contained in the report dated December 8, 2017 from the Commissioner of Environmental Services:

1. The Commissioner of Environmental Services be authorized to execute Developer-funded Inflow and Infiltration Reduction Project Agreements, where requested by the subject local municipality, to address capacity constraints in conveyance system (sewers, forcemains and pumping stations), in accordance with the principles outlined in Attachment 1.
2. The Regional Clerk circulate a copy of this report to the local municipalities.

Report dated December 8, 2017 from the Commissioner of Environmental Services now follows:

1. Recommendations

It is recommended that:

1. The Commissioner of Environmental Services be authorized to execute Developer-funded Inflow and Infiltration Reduction Project Agreements, where requested by the subject local municipality, to address capacity constraints in conveyance system (sewers, forcemains and pumping stations), in accordance with the principles outlined in Attachment 1.
2. The Regional Clerk circulate a copy of this report to the local municipalities.

Inflow and Infiltration Reduction Update

2. Purpose

This report provides an update on inflow and infiltration reduction efforts and requests Council authorization for the Commissioner of Environmental Services to enter into agreements, where requested by local municipalities, for additional Developer-funded Inflow and Infiltration Reduction Projects.

To be considered, proposed projects must address capacity constraints in the Regional sewer conveyance system (sewers, forcemains and pumping stations) and assist with achieving the inflow and infiltration reduction targets identified in the Region's Inflow and Infiltration Reduction Strategy.

3. Background and Previous Council Direction

Inflow and infiltration reduction program initiated as condition of Southeast Collector approval in 2010

Inflow and infiltration reduction became a regulatory requirement for York Region, in 2010, upon approval of the Southeast Collector Individual Environmental Assessment. The conditions of approval require the Region to submit and implement an Inflow and Infiltration Reduction Strategy and set a reduction target of 40 million litres in a 24 hour period during a 25-year storm event by 2031. The conditions required annual reporting of work undertaken and resulting flow reductions, to achieve the reduction target. This information is compiled and submitted to the Province, by staff, in March of each year.

In February 2011, Council endorsed the Inflow and Infiltration Reduction Strategy. The strategy included a commitment to review the strategy every five years and the first Strategy update in March 2016. The next update is planned to be brought before Council in March 2021.

The Region continues to meet the goals set in the Inflow and Infiltration Reduction Strategy

Over the last six years, York Region, in partnership with local municipalities, has achieved goals set in 2011. Some of these major achievements are:

- Reductions of flow from inflow and infiltration by nearly 12 million litres per day in the York Durham Sewage System, representing 30 per cent of the 2031 target reduction of 40 million litres per day. This was completed through remedial works including downspout disconnections, laterals and sewer mainline relining, spot repairs and maintenance hole repairs. This reduction has exceeded the 25 per cent interim reduction target set for 2017.

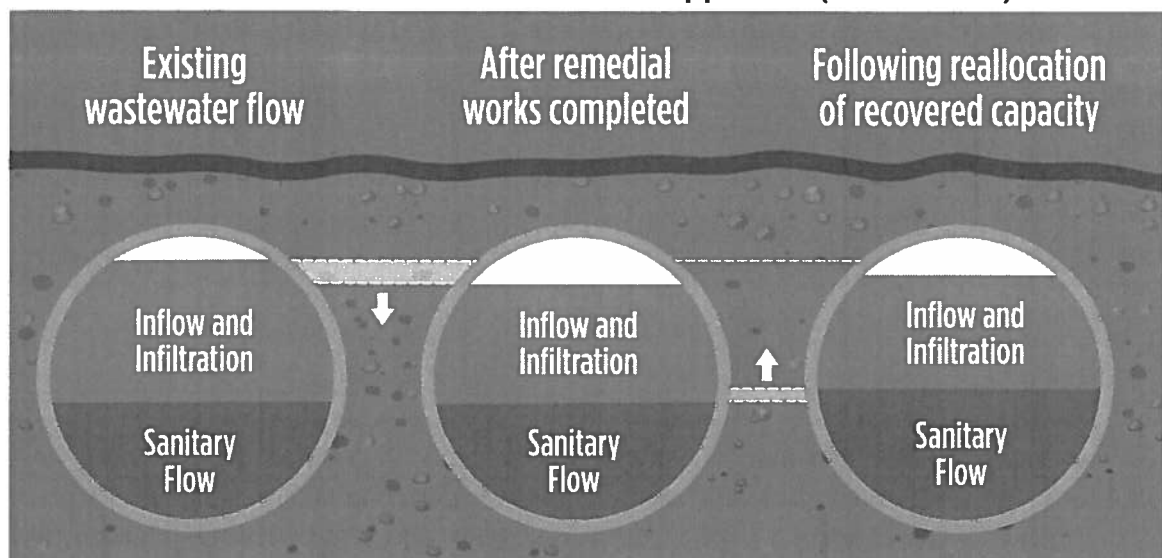
Inflow and Infiltration Reduction Update

- Completion of the Region's Sanitary Sewer System Inspection, Testing and Acceptance Guideline to standardize procedures across York Region.
- Development of a region wide sanitary sewer flow and rainfall monitoring program to identify priority areas with high inflow and infiltration.
- Development of two incentive programs to partner with local municipalities and development industry to reduce inflow and infiltration consisting of the Developer-funded Inflow and Infiltration Reduction Program and the Servicing Incentive Program. Both programs provide participating developers with additional servicing capacity in exchange for completing water efficiency conservation and proven inflow and infiltration related remedial works to more stringent construction and inspection standards.
- Development of an all-pipes hydraulic model to provide a state-of-the-art tool to assist in the assessment of inflow and infiltration and in the decision making process for implementing remedial works.

Developer-funded Inflow and Infiltration Reduction Projects assist in achieving Southeast Collector Approval requirements

Developer-funded Inflow and Infiltration Reduction Projects provided mutually beneficial opportunities to improve wastewater conveyance systems by reducing inflow and infiltration and allocating a portion of recovered capacity to allow planned growth to continue without additional infrastructure investment. Figure 1 depicts how capacity in the Regional wastewater system is recovered through Inflow and Infiltration Reduction Projects and reallocated to support growth.

Figure 1
Inflow and Infiltration Reduction Approach (2 to 1 Ratio)



Inflow and Infiltration Reduction Update

Council approved the first Developer-funded Inflow and Infiltration Reduction Pilot Project in 2010

On September 23, 2010, Council authorized staff to enter into an agreement with the City of Markham and a developer, Upper Unionville Inc., to undertake an inflow and infiltration reduction pilot project. This project was to be funded solely by the developer and in exchange for completing the inflow and infiltration reduction work, the developer was allocated a portion of the recovered capacity, before, or in lieu of, capital infrastructure improvements. The allocation is calculated based on quantities recovered, which provide long-term benefits to the conveyance system.

Staff were also authorized to consider similar developer initiated projects in the remaining local municipalities. For a project to be considered, the proposed development and associated inflow and infiltration reduction works must be situated within a common sewershed, upstream of a Regional conveyance system capacity constraint point. Constraint points are locations in the conveyance system where there is a capacity bottleneck (sewer, forcemain or pumping station capacity), limiting planned growth in the sewershed. In addition, as part of the application review process, staff confirm that there is water system capacity to service the anticipated units realized from the project.

Half of the recovered capacity is retained by the Region to help mitigate future risks on the conveyance system

To reduce future risks on the conveyance system, some of the recovered capacity is retained by the Region. This capacity buffer provides operational flexibility to address circumstances such as aging infrastructure and climate change impacts on the conveyance system. A capacity assignment ratio of two to one (that is, one person capacity is assigned to the developer for every two persons capacity recovered through the project) was established to address these future risks. Recovered capacity is reported against the required reduction target received as a condition of approval of the Southeast Collector Sewer project.

Further analysis of Developer-funded Inflow and Infiltration Reduction Projects was required before considering additional projects

Administration of the agreement for the first Developer-funded Inflow and Infiltration Reduction Project required post-construction evaluation of the capacity recovered and its effect on reducing system bottlenecks. Information gathered during the first project was used to estimate flow reduction benefits for specific types of repair work on subsequent projects. An Inflow and Infiltration Pilot Project Status Update report was brought before Council in November 2012.

Inflow and Infiltration Reduction Update

This report did not recommend acceptance of additional allocation-seeking proposals beyond one pilot per municipality as the full evaluation of the benefits of the first project had not been evaluated at that time.

At the end of 2017, agreements for five Developer-funded Inflow and Infiltration pilot Projects have been executed

Since approval of the first pilot project, four additional pilot projects have been considered and agreements executed. These projects are all at varying stages of completion, from investigation and evaluation to monitoring, verification and capacity assignment. To date, remedial works have been carried out, or are underway, in the Towns of Aurora, Richmond Hill and Newmarket and the Cities of Markham and Vaughan. These projects are summarized in Table 1.

Table 1
Summary of Developer-funded Inflow and Infiltration Reduction Projects

| Local Municipality | Landowners Group | Date of Execution | Initial Estimated Capacity Assignment (units) | Capacity Assigned to Date (units/persons) |
|--------------------|---|-------------------|---|---|
| Markham | Upper Unionville Inc. | May 30, 2011 | 2500 | 480/1488 |
| Vaughan | Huntington Landowners Trustee Inc. | Aug. 24, 2012 | 2899 | 1591/4932 |
| Aurora | Aurora 2C Landowners Group Inc. | Sept. 25, 2012 | 3300 | 1292/4006 |
| Richmond Hill | North-East Leslie Landowners Group Inc. | May 29, 2013 | 2232 | 81/250 |
| Newmarket | Marianneville Developments Limited | July 26, 2016 | 1170 | In Progress |

Inflow and Infiltration Reduction Update

Studies and work undertaken by developers have varied, depending on the site specific conditions of the catchment

Inflow and infiltration remedial works have predominantly included disconnection of residential and commercial rainwater downspouts from the sanitary sewer system. Other types of work completed through the developer-funded projects included in-line point repairs on local sanitary sewers, modifications to drains on reverse sloped residential driveways, disconnection of cross-connected catch basins and manholes, residential sump pump disconnections and manhole structural repairs.

Over four million litres per day of flow from inflow and infiltration have been removed through Developer-funded projects

To date, 4.1 million litres per day of the 12 million litres per day of inflow and infiltration reductions were achieved through Developer-funded Inflow and Infiltration Reduction Projects. These projects have produced one-third of the 12 million litres per day removed through the overall Inflow and Infiltration Reduction Strategy. Continued partnerships with local municipalities and the development community will help achieve the 2031 target of 40 million litres per day.

10,676 persons capacity has been assigned, to date, for Developer-funded Inflow and Infiltration Reduction Projects

At the end of 2017, flows equivalent to 21,352 persons capacity in the York-Durham Sanitary Sewer system, have been recovered through developer-funded projects. Based on the previously established two to one ratio, 10,676 persons capacity was made available to new development. Reductions in flows caused by inflow and infiltration have helped to alleviate system bottlenecks and restored capacity in the conveyance system.

Developer-funded Inflow and Infiltration Reduction Projects provide multiple benefits to the Region

Key benefits of Developer-funded Inflow and Infiltration Reduction Projects are as follows:

- Improvements to the Regional and local infrastructure are completed at no cost to the Region or local municipalities
- Reductions in flows from inflow and infiltration benefit the operation and maintenance of the conveyance system and contribute to achieving the targets set as part of the Southeast Collector Approval

Inflow and Infiltration Reduction Update

- Planned growth, and, in turn, generation of development charges, can be realized without additional infrastructure investment
- Collection of sewer flow data, which can be used by staff for analysis and capacity monitoring of the conveyance system

Principles set out in the first pilot project agreement continue to be effective

Although each Developer-funded Inflow and Infiltration Reduction Project agreement contains minor differences, based on site specific conditions, guiding principles identified in the September 2010 report continue to be effective. Principles contained in the report authorizing the first project are provided in Attachment 1.

4. Analysis and Implications

Developer-funded Inflow and Infiltration Reduction Projects can address capacity constraints in conveyance system

Over the last five years, staff analyzed flow monitoring data and evaluated efficacy of initiatives led by developers. Information obtained through the analysis provides staff with tools to evaluate future proposals, ensuring mutually beneficial outcomes, while minimizing risks to the conveyance system. In appropriate circumstances and where bottlenecks exist in the conveyance system, developer-funded projects can help to address capacity constraints.

A second Developer-funded Inflow and Infiltration Reduction Pilot Project was approved for the Town of Newmarket

Delay in approval for the Upper York Sewage Solutions Environmental Assessment has affected the timing of the twinning of Newmarket forcemain. Allocation of 1,500 persons capacity will be unlocked with commissioning of the second forcemain, however, uncertainty around the timing for the construction and commissioning has created an interim constraint in the conveyance system. To help address this constraint, Council authorized a second developer-funded pilot project for the Town of Newmarket in September 2016, Capacity Assignment report.

Inflow and Infiltration Reduction Update

A second Developer-funded Inflow and Infiltration Reduction Project may address interim conveyance system constraints in the Town of Aurora

Until construction of the Upper York Sewage Solutions project is complete, the conveyance system for the Town of Aurora is constrained. Given the pace of development and demand for capacity allocation in Aurora, developers have approached Town staff to consider opportunities to participate in a second Developer-funded Inflow and Infiltration Reduction Project.

Town of Aurora staff, Regional staff and the interested Developer have discussed the opportunity for a second developer-funded project in the Town to help address the interim capacity constraints. Preliminary information indicates that a second Developer funded Inflow and Infiltration Reduction Pilot project can be authorized.

Subsequent Developer-funded Inflow and Infiltration Projects cannot impact the previous projects' ability to achieve the required allocation

The general principles set out for the first pilot project were to apply to the second project, however, prior to entering into an agreement, the first pilot project in the Town was required to be complete, or analysis could demonstrate, that the second project would not impede first pilot project's ability to achieve the allocation needed to complete its development, up to the maximum capacity stipulated in the project agreement.

Developer-funded Inflow and Infiltration Reduction Projects help achieve fiscally prudent growth

Work completed through Developer-funded Inflow and Infiltration Projects unlocks capacity in the existing conveyance system and allows planned growth to occur in constrained areas. This work has supported growth identified in the Regional Official Plan while optimizing critical infrastructure systems capacity. Both of these objectives are identified as Sustainable Environmental objectives in the 2015 to 2019 Strategic Plan.

5. Financial Considerations

Developer-funded Inflow and Infiltration Reduction Projects provide the Region and local municipalities with opportunities to address capacity constraints and generate development charges, while achieving inflow and infiltration Reduction Strategy objectives without capital expense.

Inflow and Infiltration Reduction Update

Projects are fully funded by the developer including local municipal and Regional costs. Some of these costs are consultant fees for review and inspection of remediation works, costs for Regional and local municipal staff to prepare and administer the agreement and legal fees incurred by the Region.

Additionally, the intent of the pilot project was to accommodate growth where there are currently conveyance capacity constraints. These projects accommodate planned growth and generate development charges, from the advanced capacity assignment, where such opportunity would not otherwise be available.

6. Local Municipal Impact

Developer-funded Inflow and Infiltration Reduction Projects provides local municipalities with opportunities to grow in areas with conveyance system constraints, in turn generating development charges to support capital infrastructure initiatives. In addition, sewer remediation projects that would otherwise be funded by user rates, can be completed with no capital funding required, while supporting commitments under the Inflow and Infiltration Reduction Strategy.

7. Conclusion

Since implementation of the initial pilot project in 2010, the Region has executed five Developer-funded Inflow and Infiltration Reduction agreements, advancing servicing capacity of 10,676 persons. Developer-funded Inflow and Infiltration Reduction projects provide benefits to both local municipalities and the Region.

As the principle of capacity assignment is based on one unit assignment for every two units of capacity created by inflow and infiltration reduction, the program reduces operational risk in the system even as additional capacity is being assigned. The program supports growth and generates development charges from the capacity assignment allocated.

This report seeks Council endorsement to authorize the Commissioner of Environmental Services to execute future agreements.

For more information on this report, please contact James Steele, Director, Infrastructure Asset Management at 1-877-464-9675 ext. 73018.

Inflow and Infiltration Reduction Update

The Senior Management Group has reviewed this report.

December 8, 2017

Attachment

#8121210

Accessible formats or communication supports are available upon request

Developer-funded Inflow and Infiltration Reduction Programs – Guiding Principles

- The work shall be funded by developer at no cost to the Region and is not eligible for Regional development charge credits
- The work shall be an area specific pilot project and co-ordinated with the Region's broader inflow and infiltration reduction program
- Similar initiatives in all other local municipalities based on the same general principles set out in this report are authorized
- Capacity assignment to the local municipality shall be at the sole discretion of the Region. Capacity assignment will be provided based on reduction of inflow and infiltration through remedial works carried out through Developer-funded Inflow and Infiltration Reduction Pilot Project.
- The work will be carried out in prescribed catchment areas defined by the Region and the local municipality. A work plan outlining the remedial works and for the chosen catchment area shall be approved by the Region and local municipality prior to commencement of the work.
- The project will be deemed to be complete if enough capacity is identified to support a total capacity assignment.
- The Region and/or its agent will review the analysis and monitoring works carried out by the developer to determine the inflow and infiltration reduction. At its sole discretion, Region and/or its agent may carry out independent analysis and monitoring works to quantify and verify the inflow and infiltration works. All costs associated with retaining a consultant to act on behalf of the Region of the above shall be borne by the developer/landowner subject to the pilot project.
- The method used to quantify inflow and infiltration reduction shall be one adopted by the Region with a baseline defined by the Region. Capacity assignment to the Town shall not exceed more than 1 unit for every 2 units of proven capacity created by inflow and infiltration reduction.
- Prior to implementing the work, a resident communication protocol shall be established by the developer and/or the Town to the satisfaction of the Region and the Town.
- The Region and/or the Town may inspect the work and may require stoppage of work at its sole and absolute discretion, if the work has been commenced without obtaining the necessary approvals, or private properties entered without prior consent of property owners, and/or the work is not performed in accordance with the Region's overall inflow and infiltration reduction program.

- Any flow monitoring records obtained by the developer shall become the property of the Region at the end of the pilot project.
- Development shall use new sewer design, inspection and commissioning standards developed by York Region in conjunction with local municipalities and inspected to the satisfaction of the Region and the Town.
- Local municipality shall commit a portion of allocation to the developer as part of the Developer funded inflow infiltration pilot project from the existing capacity assignment.
- The developer shall pay a fee equal to 0.5% of the estimated cost of pilot project for the Region's legal costs to prepare and administer the agreement.
- The developer shall agree to pay for the Region's legal costs (external and internal) to prepare the agreement.
- The developer shall provide a Letter of Credit for the full estimated value of the work and if work is subsequently expanded into other catchment areas, the Letter of Credit shall increase accordingly.
- The developer shall agree to fully indemnify the Region against any and all legal action that may arise during the design and construction of works and thereafter, as well as against any action taken against the Region as a result of the Region agreeing to proceed with this project.
- The Region and the local municipality will support draft plan approval provided that no presales be permitted prior to allocation.