



Report to: General Committee

Date Report Authored: March 14, 2014

SUBJECT: Citywide Multi-phase Sanitary System Downspout Disconnection Program – Phase 1 Progress Update and Phase 2 Details

PREPARED BY: Gord Miokovic, Manager-System Engineering (Waterworks)
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RECOMMENDATION:

- 1) That the report entitled “Citywide Multi-phase Sanitary System Downspout Disconnection Program – Phase 1 Progress Update and Phase 2 Details” be received; and
- 2) That Council approve the change in program from 7 Phases (10 years) to 5 Phases (8 years) as a result of process improvements; and
- 3) That Council approve Phase 2, which covers 2,827 properties, as following:
 - a. Area bounded by Kirk Drive to the north, Pomona Mills Creek to the east, East Don River to the south, and Yonge Street to the west;
 - b. Area bounded by Highway 407 to the north, Markham Creek to the east, CN Railway Track/John Street to the south, and Bayview Avenue to the west;
 - c. Area bounded by CN Railway Track to the north and west, German Mills Creek to the east, and Steeles Avenue to the south; and
- 4) That Staff be authorized and directed to do all things necessary to give effect to this resolution.

PURPOSE:

The purpose of this report is to provide a status update on Phase 1 of the Citywide Multi-phase Sanitary System Downspout Disconnection Program (DDP), provide proposed Phase 2 details, to obtain authorization from Council to proceed with the areas chosen for the Phase 2 and to provide information on some other inflow and infiltration reduction initiatives in Markham.

EXECUTIVE SUMMARY:

Under Phase 1, the sanitary and storm sewer smoke testing was completed and the remaining water testing is expected to be completed by end of April 2014. Through smoke testing of the 2,256 properties, 66 properties/locations were identified as inflow/infiltration sources (refer to Table 1 for breakdown by area);

- 15 properties were identified as having downspouts directly connected to the sanitary sewers and
- 51 other locations were identified as being inflow/infiltration (I/I) sources. *(These other sources include: uncapped lateral cleanouts; damaged sanitary manholes; street catch basins, or driveway and stairwell drains connected to the sanitary sewer; etc.)*

Water testing has been performed for properties where the downspouts are non-responsive or connection location not conclusive under smoke testing. Based on testing

of 121 out of the 2,256 properties thus far, the water testing component has yielded minimal benefits (only one additional property out of the 121 tested was determined to be connected to the sanitary sewer) (refer to Table 2 for breakdown by area). In order to ensure the program is cost effective, starting in Phase 2, staff is recommending that only smoke testing be undertaken.

The elimination of the water testing component will result in the program being completed in five phases over an eight year period (2013-2020) instead of seven phases over a ten year period (2013-2022). The removal of the water testing component from future phases when compare to the previous estimate as contained in the 2013 report, "*Citywide Multi-phase Sanitary System Downspout Disconnection Program – Financial Assistance Plan*", will result in over \$0.38M reduction in the overall program budget from \$2.56M to \$2.18M. The estimate for the remaining areas excluding Phase 1 of the program is now at \$1.37M.

Phase 2 of the program is being proposed for the Thornhill Area. Phase 2 would run from 2014 – 2017 at a total estimated cost of \$357,550. Annual reports will be prepared to update Council on the progress of the program. Funding for future phases will be considered as part of the annual budget process.

The DDP is just one of the programs/initiatives to mitigate sanitary system inflow/infiltration issues. The other initiatives include sewer and lateral lining, plugging and sealing manholes, design standard changes, etc. Many of these are being done in partnership with Region of York.

BACKGROUND:

The DDP is an extension of the Pilot Downspout Disconnection Program completed in 2012. The goal of the program is to:

- Reduce the risk of wastewater based basement flooding
- Reduce the flow in the sanitary sewer system by reducing extraneous inflow
- Enforce the existing City of Markham Sewer By-Law #436-86 which does not permit storm water entering the wastewater collection system

The identification of higher risk areas within the City and the phasing of the program were determined by taking into account wastewater flow modeling, wastewater flow monitoring, past flooding incidents reported to the City and all other on-going programs/initiatives within Markham. These higher risk areas are shown on 'Attachment A'.

As an extension of the pilot program, each phase involves the following elements:

- i. Modeling and evaluation of the existing flow monitoring data to assess the extent of extraneous flows in an area
- ii. Public Communication and Education Plan
- iii. Multi-step Site Investigation Approach:
 1. Lot survey identifying all downspouts connected to the underground system;

2. Sanitary and storm sewer smoke testing of all downspouts connected to the underground system;
3. Water testing on the downspouts not responsive to or where the connection location is not conclusive under smoke testing.
- iv. Resident notification for follow-up action required along with Financial Assistant Plan (FAP) information
- v. Reasonable timeframe given for residents to take corrective action
- vi. Follow-up corrective action inspection
- vii. Progressive By-law Enforcement for Non-compliance with required corrections
- viii. Flow Monitoring of area after identified corrective action completed

DISCUSSION:

1. Phase 1 Site Investigation Results

Phase 1 was commenced May 2013 and covered 3 areas in Thornhill (see **Attachment B for a map of the areas**). Tables 1 to 2 summarize the site investigation results for each area.

Table 1: Phase 1 – Sanitary & Storm Sewer Smoke Testing Results

Phase 1 Area	No. of Properties	No. of properties identified with Downspout connect to Sanitary System	No. of other I/I contribution items identified
Area A	669	3	15
Area B	654	3	17
Area C	933	9	19
Total	2256	15	51

Note: Other I/I contribution items include uncapped lateral cleanout, CB, driveway drain, stairwell drains, damaged sanitary MH and etc.

Table 2: Phase 1 – Water Testing Results

Phase 1 Area	No. of Properties	No. of properties identified with DS connect to SAN
Area A	75	1
Area B	46	0
Total	121	1

Note:

- Total of 2,256 properties under Phase 1.
- Area C has identified 70 properties that require water testing and the testing is expected to be completed by end of April 2014.

Disconnection Notices

A “Notice of Disconnection” will be sent out to the affected residences in May 2014 along with the Financial Assistant Plan (FAP) information. The property owners will be given a reasonable timeframe to secure contractors or undertake the work themselves. Literature on how to properly and effectively disconnect the downspout will also be provided to them. Following the disconnection of downspouts and the FAP forms being

submitted, the works will be inspected by City staff and rebates will be mailed out. Post disconnection flow monitoring is expected to commence in 2015 for a one year period.

Other I/I sources

The other sources identified will be addressed by:

- City crews on public property in 2014;
- Sewer lateral lining in the near future
- Work with home owners and other agencies to address private side issues.

2. DDP Approach for Future Phases

The Phase 1 smoke testing cost was \$76,180. Given that 66 sources of I/I contribution were identified, the cost to find each source was \$1,154. The cost of water testing areas A & B was \$21,780 with only one additional property being identified as having downspouts connected to the sanitary sewer system. The area C water testing of 70 properties will take place in April 2014.

The smoke testing is proving to be a more effective process to find sources of I/I contribution. In order to make the future phases of the DDP more cost effective, staff is proposing to remove element iii (3) namely *Water testing on the downspouts not responsive to or where the connection location is not conclusive under smoke testing*. With this change, a larger area can be covered under each phase of the program while reducing program cost. The program can now be completed in five phases implemented over an eight year period with an estimated saving of \$0.38M, from \$2.56M to \$2.18M. The Phase 2 program cost estimate is provided in the “Financial Considerations” section and the overall program estimate is provided in the associate attachment.

3. Phase 2 Sanitary System Downspout Disconnection Program

A subsection of the Thornhill Area is being recommended for Phase 2 of the DDP (see **Attachment C**). This area covers a total of 2,827 properties. The proposed schedule for Phase 2 is as follow:

Table 3: Phase 2 Schedule

i. Public Communication and Education Plan – (Overview of the Public Communication and Education Plan is enclosed in Attachment D)	Start in April 2014
ii. Site Investigation	May 2014 to April 2015
iii. Resident notification for follow-up action required along with FAP information	May 2015 to November 2015
iv. Reasonable timeframe given for residents to take corrective action	
v. Follow-up corrective action inspection	April 2016 to May 2016
vi. Progressive By-law Enforcement for Non-compliance with required corrections	May 2016 to January 2017
vii. Flow Monitoring of area after identified corrective action completed	March 2016 to April 2017

Annual reports will be presented to Council regarding the progress of the program and to confirm future phase areas. The approach implemented under Phase 2 is intended to serve as the basis for all future phases.

4. Other Inflow/Infiltration (I/I) Reduction Initiatives and Programs

The DDP is just one of the many initiatives in Markham that deal with the issue of extraneous flow into the sanitary sewer system. Staff has implemented the following in 2013 and 2014 to mitigate both public and private side I/I issues:

Public side:

- Sanitary Sewer Relining
- Sanitary Manhole Plugging
- Easement based Sanitary Manhole Condition Survey
- Update and Revise the Engineering Design Criteria with a extraneous flow reduction focus
- Resolve public side I/I sources identified during smoke testing of the Sanitary Sewer Downspout Disconnection Program

Private side:

- Private side Inflow/Infiltration (I/I) Reduction Program in Bayview Glen area by the Region of York
- Sustainable Neighborhood Retrofit Action Plan (SNAP) in Bayview Glen area by the Toronto and Region Conservation Authority (TRCA)
- Working with Insurance Bureau to implement additional private side measure to reduce extraneous flow and the risk of basement flooding

Markham has been working closely with Region of York and TRCA on their I/I and SNAP programs. The Phase 1 DDP site investigation results have been provided to Region and TRCA in support of their programs.

FINANCIAL CONSIDERATIONS:

The Phase 2 Program budget of \$357,550 was approved as part of a 2014 Capital Project “Sanitary System Downspout Disconnection Prog - Ph 2 of 8” covering 1,274 properties. With the modified approach now covering 2,827 properties, the following funding allocation breakdown is proposed:

Table 4: Phase 2 Budget Breakdown

Item	Total Budget
<i>Activities:</i>	
<i>Public Communication & Education</i>	\$39,054
<i>Site Investigation</i>	\$94,870
<i>Financial Assistance Plan: Downspout Disconnection & Rain Barrel</i>	\$110,500
<i>Flow Monitoring</i>	\$75,000
<i>Total</i>	\$319,424
<i>Contingency (10%)</i>	\$31,942
Overall Total	\$351,366
Overall Total + Tax	\$357,550

Note: the above budget assumes 6% of the total properties will require downspout disconnection and take advantage of the Financial Assistance Plan.

The Financial Assistance Package (FAP) will remain the same as in Phase 1, which was approved by Council on March 19, 2013 under report, “Citywide Multi-phase Sanitary System Downspout Disconnection Program – Financial Assistant Plan”. The package covers the following:

- 80% of the cost of completing the downspout disconnection, to a maximum of \$500, and
- 100% of the cost of a rain barrel purchased by the home owner, to a maximum of \$150.

The overall program estimate for the remaining areas excluding Phase 1 is now approximately \$1.37 million (refer to **Attachment E** for cost breakdown).

HUMAN RESOURCES CONSIDERATIONS

Resources are available within the Department.

ALIGNMENT WITH STRATEGIC PRIORITIES:

This project aligns with the Building Markham’s Future Together Strategic Plan, improving the areas of Managing our Growth, Protecting our Environment and Excellence in Municipal Services. Disconnecting roof downspouts from the sanitary sewer system in accordance with City’s By-law, has extensive and long-lasting

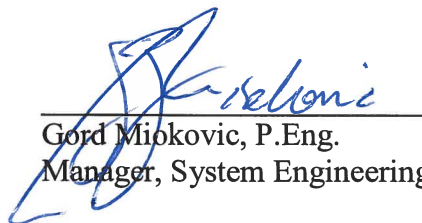
environmental benefits which include reduced inflow/infiltration into the sanitary sewer system, reduced energy costs for sanitary sewer pumping and treatment, ground water recharge, water conservation, reduced probability of sanitary sewer backups into basements, and reduced sanitary sewer overflows to receiving waters.

BUSINESS UNITS CONSULTED AND AFFECTED:

The Business units which will be affected most by the Sanitary System Downspout Disconnection Program include Environmental Service – Waterworks, Asset Management, and By-law Enforcement.

RECOMMENDED

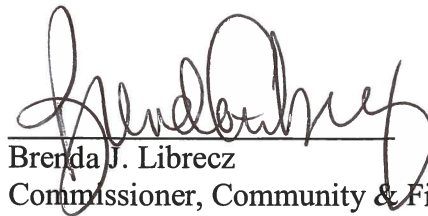
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ATTACHMENTS:

Attachment "A" – Citywide Multi-phase Sanitary System Downspout Disconnection Program

Attachment "B" – Phase 1 Area

Attachment "C" – Phase 2 Area

Attachment "D" – Downspout Disconnection Program Phase 2 Communication Strategy

Attachment "E" – Cost Breakdown for the Future Identified Program Areas