



Report to: General Committee

Meeting Date: May 22, 2018

| | |
|---------------------|---|
| SUBJECT: | Citywide Multi-Phase Sanitary System Downspout Disconnection Program – Annual Progress Update and 2018 Details |
| PREPARED BY: | Gord Miokovic, Manager-System Engineering Lijing Xu, Wastewater Hydraulic Engineer Celia Fan, System Engineer |

RECOMMENDATION:

- 1) That the report entitled “Citywide Multi-phase Sanitary System Downspout Disconnection Program – Annual Progress Update” be received; and
- 2) That the remaining funds of \$13,940 be returned to the original funding source from the following projects:
 - \$9,062 from project #15294 “Sanitary System Downspout Disconnection Program – Phase 3 and the project be closed”; and
 - \$4,878 from project #16238 “Sanitary System Downspout Disconnection Program – Phase 4”;
- 3) 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:

- i. Provide a status update on Phases 1 to 6 of the Citywide Multi-phase Sanitary System Downspout Disconnection Program (DDP); and
- ii. Provide Council with the proposed Phase 5B and Phase 6 area overall work plan.

BACKGROUND:

The Downspout Disconnection Program (DDP) goal is to:

- Reduce the risk of wastewater based basement flooding;
- Reduce the flow in the sanitary sewer system by reducing extraneous inflow; and
- Enforce the City of Markham Sewer By-Law #2014-71.

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

DISCUSSION:

1. Program Timeline and Status

The DDP is being delivered in 6 phases. Each phase involves the following elements and timing (see **Table 1**):

- | | |
|-------|---|
| PrM - | Modeling and evaluation of the existing flow monitoring data to assess the extent of extraneous flows in an area; |
| LS - | Lot survey identifying all downspouts connected to the underground system; |
| ST - | Sanitary and storm sewer smoke testing of all downspouts connected to the underground system; |

- RN - Resident notification for follow-up action required along with Financial Assistant Plan (FAP) information;
- ByL - Progressive By-law Enforcement for non-compliance with required corrections;
- PoM - Flow Monitoring of area after identified corrective action completed.

Table 1 - Downspout Disconnection Program Timing.

| Phase | Year | | | | | | | | | |
|-------|-----------|--------|--------|--------|---------|---------|---------|----------|------|------|
| | Pre- 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
| 1 | PrM | LS, ST | RN | CD | PoM | PoM | | | | |
| 2 | PrM | LS | LS, ST | RN | CD, ByL | PoM | | | | |
| 3 | PrM | | LS | LS, ST | RN | CD, ByL | PoM | | | |
| 4 | | PrM | | LS | LS, ST | RN | CD, ByL | PoM | | |
| 5A | | | PrM | | LS | ST | RN | ByL, PoM | | |
| 5B | | | | | | PrM, LS | ST RN | ByL | PoM | |
| 6 | | | | | | PrM | LS ST | RN | ByL | PoM |

A map overview is contained in **Attachment A** with detailed map per phase in **Attachments B to G**.

There are three possible outcomes from the program and **Table 2** indicates the outcome of each phase:

1. Private properties with downspout connection directly to City sanitary sewers
2. Other Sources of I/I (can be on public or private side): uncapped lateral cleanouts; damaged sanitary manholes; street/private catch basins, or driveway/stairwell/side /rear drains connected to sanitary sewer; sump pump connection; weeping tile connection; etc.
 - The private source of I/I identified would be the property owner's responsibility to investigate and address, the potential solutions vary in cost and may be quite expensive. Discussions with Legal and By-law Department, to determine how to resolve these private side issues and whether some types of Council Approved Assistance Programs should be offered, will need to take place.
3. Lateral interactions between the storm and sanitary system is identified when smoke comes out from the downspouts under both storm and sanitary sewer smoke testing. Since the two systems are fully separate, the smoke identified at the downspouts indicates that there may be cracks at the lateral pipe or some cross-connection.

Table 2: Test Results and Progress Summary

| Phases | Total no. of Properties | Private I/I Sources | | | | | Public I/I Sources |
|--------------|-------------------------|--------------------------------|-----------------------------------|---------------|---------------------------------|-----------------------------|--------------------|
| | | Connected Downspout Identified | Completed Downspout Disconnection | Other Sources | Lateral Interactions Identified | Lateral Inspection Schedule | |
| 1 | 2,256 | 21 | 21 | 19 | 65 | completed 2015 | 9 |
| 2 | 2,827 | 70 | 67 | 7 | 215 | completed 2015 | 30 |
| 3 | 3,690 | 4 | 3 | 12 | 6 | 2016-2020 | 10 |
| 4 | 2,305 | 6 | TBD | 11 | 109 | 2020-2025 | 34 |
| 5A | 1,992 | 28 | TBD | TBD | 55 | 2020-2025 | 9 |
| 5B | 2,934 | TBD | TBD | TBD | TBD | 2020-2025 | TBD |
| 6 | 5,832 | TBD | TBD | TBD | TBD | 2020-2025 | TBD |
| Total | 21,836 | 129+TBD | 91+TBD | 49+TBD | 450+TBD | | 92+TBD |

Note: TBD stands for "To Be Determined".

Phase 1 Status:

All testing and downspout disconnection works was completed. Post flow monitoring commenced in the Spring of 2016. As 2016 was a very dry year, the testing was extended for a further period of 12 months with work completed in the Spring of 2018.

Phase 2 Status:

All testing and most of the downspout disconnection work was completed. Three properties (located within the same townhouse complex) did not comply with the disconnection requirement and the By-law Department is addressing the issue. Post flow monitoring commenced in the Spring of 2017.

Phase 3 Status:

All testing and most of the downspout disconnection works was completed. One property did not comply with the disconnection requirement and the By-law Department is addressing the issue. Post flow monitoring is commencing in the Spring of 2018. Of the \$163,922 budgeted \$154,860 was spent and the remaining amount of \$9,062 can be returned to original funding source.

Phase 4 Status:

Letters were sent out September 2017 to 6 properties that requires downspout disconnection giving the property owners a period of 12 months to complete the disconnection works. Of the \$300,000 budgeted \$295,122 was spent/committed or returned to source to date and the remaining amount of \$4,878 can be returned to original funding source.

Phase 5 (Original Scope 5A) Status:

28 properties were identified as having downspouts directly connected to the sanitary sewers. Letters will be sent out summer / fall 2018.

Phase 5 (Expansion Area 5B) Status:

Through Council report titled "June-July 2017 Storm Events Review and Follow-Up Activities" dated September 18, 2017, Council approve the expansion of the program areas. Preliminary work commenced in the Fall of 2017, stopping for the winter period. Field work will start up again in May 2018 with anticipated completion date of August 2018.

Phase 6 Status:

Phase 6 work will commence with public education as per **Attachment H** starting May 2018. Lot survey and smoke testing will be starting June 2018 with an anticipated field work completion date of December 2018.

Post Phase 6:

After completion of the 6 phases, staff will continue to monitor and evaluate the City's wastewater flow monitoring data and other information in order to determine if there are any additional areas that have higher risk of wastewater based basement flooding. Based on the evaluation process, Environmental Services will confirm if there is a need for any future phase of the program.

Funding and detail cost breakdown of each phase is provided in **Attachment I**.

A Financial Assistant Plan (FAP), was approved by Council on March 19, 2013 under report, “Citywide Multi-phase Sanitary System DDP – Financial Assistant Plan”. The intent of FAP is to decrease the financial burden on property owners that need to disconnect the downspouts and covers:

- 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.

2. Other Related Programs to Reduce Basement Flooding Risks

Pilot Private Plumbing Protection Program

In April 2012, Council passed a by-law amendment prohibiting reverse slope driveways for new home construction. There are a number of properties that were constructed prior to 2012 that have reverse slope driveways and are in higher flood risk areas. Some of these driveways are in areas where the downspout disconnection program has taken place. These reverse slope driveways are installed with catch basins that are either connected to the storm sewer system or sanitary sewer systems. Those connected to the sanitary sewer system also are connected to the homes weeping tile system creating a significant flooding risk.

On March 26, 2018 Council approved “Pilot Private Plumbing Protection Program for Flood Risk Reduction” (5P) and associated By-law 2018-20. The by-law established a pilot rebate program for property owner initiating private plumbing protection measures. Amongst various measures, two of which have been identified in **Table 1** that would need to be addressed by the property owners, namely:

- disconnect weeping tiles from the sanitary sewer collection system and install a sump pump; and
- sanitary sewer lateral reline / repair.

Annual Sanitary Lateral Inspection Program

The properties identified as having lateral interaction through DDP have been added to the Annual Sanitary Lateral Inspection Program. The inspection program inspects and evaluates the condition of the sanitary service laterals on the public portion. If any structural defects / blockages that requires flushing are identified, the repair and flushing operations will be performed by Waterworks staff under their maintenance schedule.

Private side sanitary sewer lateral inspection are currently not undertaken due to various challenges such as ability to obtain a signed waiver from the property owner. If the inspection found private side issues, the property owner would have been instructed to have the lateral repaired at their cost so there has been significant resistance by homeowners to permit the inspection work on the private side.

FINANCIAL CONSIDERATIONS:

The remaining funds of \$13,940 will be returned to the original funding source from the following projects:

- 1) \$9,062 from project #15294 “Sanitary System Downspout Disconnection Program – Phase 3” and the project be closed.

- 2) \$4,878 from project #16238 "Sanitary System Downspout Disconnection Program – Phase 4";

HUMAN RESOURCES CONSIDERATIONS

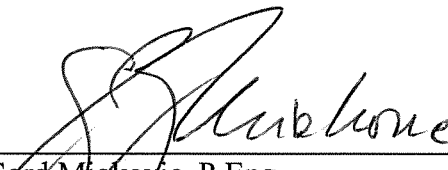
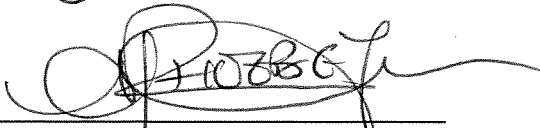

Resources are available within the Department.

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 I/I 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 DDP include Environmental Services – Waterworks & Environmental Assets, and By-law Enforcement. Finance Department has been consulted in the preparation of this report.

RECOMMENDED**BY:**
Gord Mirokovic, P.Eng.
Manager, System Engineering
Phoebe Fu, M.Eng., P.Eng., PMP
Director, Environmental Services
Brenda J. Librecz, Commissioner
Community & Fire Services**ATTACHMENTS:**

- Attachment "A" – Phase 1 Area
- Attachment "B" – Phase 2 Area
- Attachment "C" – Phase 3 Area

Attachment “D” – Phase 4 Area

Attachment “E” – Phase 5A and 5B Areas

Attachment “F” – Phase 6 Area

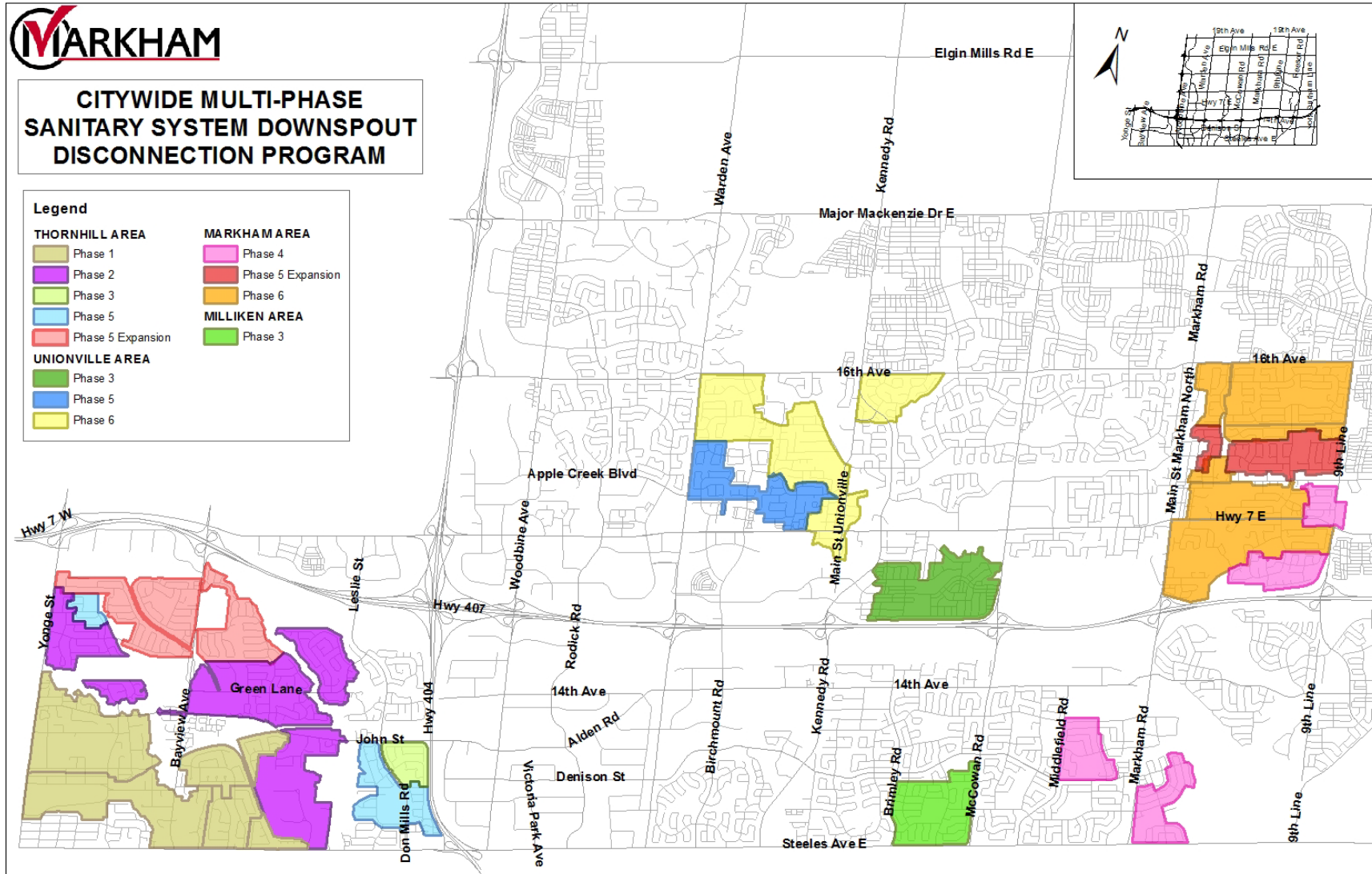
Attachment “G” – Citywide Multi-phase Sanitary System Downspout Disconnection Program Areas

Attachment “H” – Downspout Disconnection Program - Communication Strategy

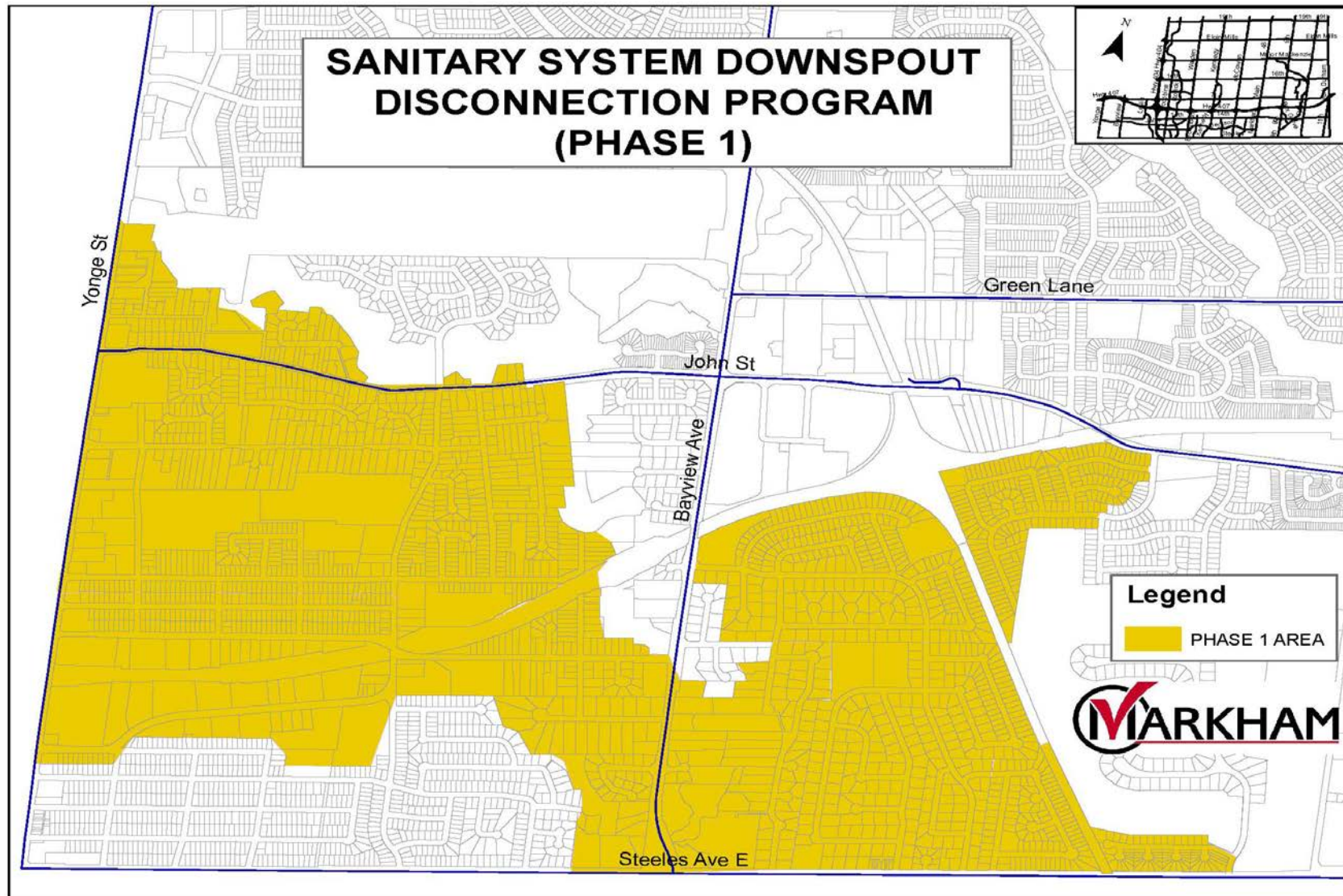
Attachment “I” – Financial Breakdown for Each Phase

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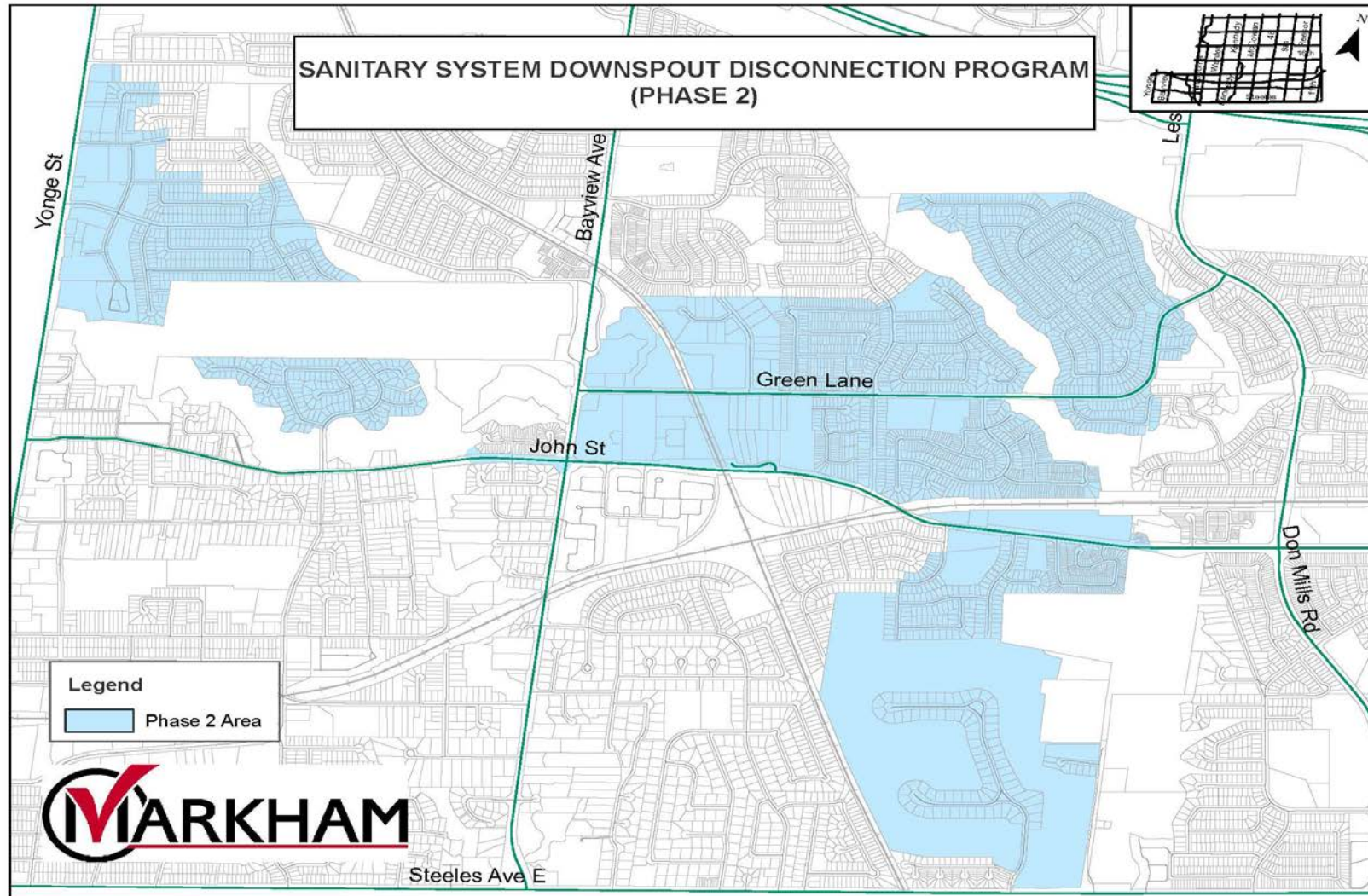
ATTACHMENT A



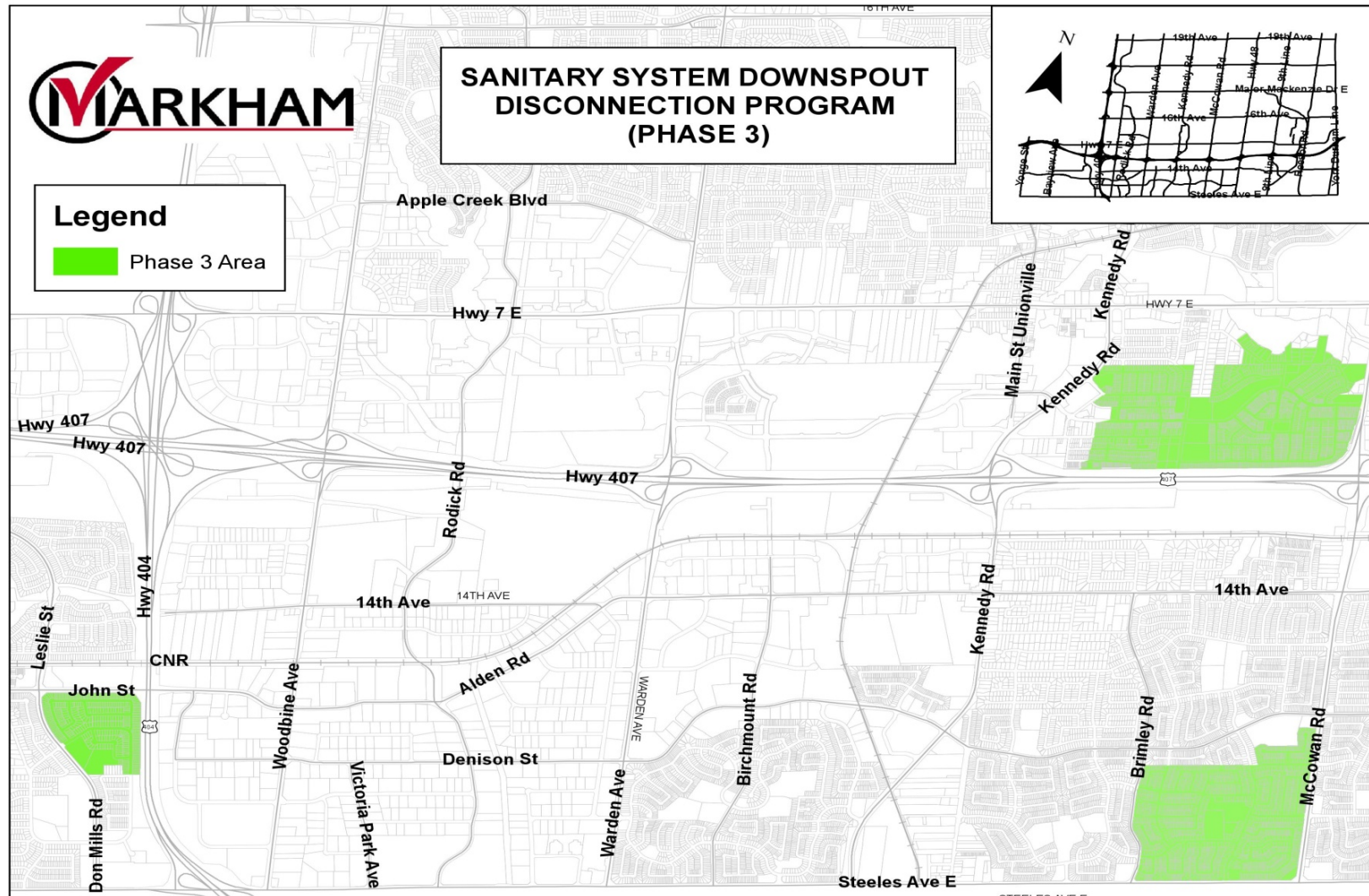
ATTACHMENT B



ATTACHMENT C



ATTACHMENT D



MARKHAM

Hwy 7 E

Main St Markham South

Hwy 407

9th Line

14th Ave

Box Grove Collector Rd

Steeles Ave E

9th Line

Markham Rd

Middlefield Rd

Denison St

Brinley Rd

McCowan Rd

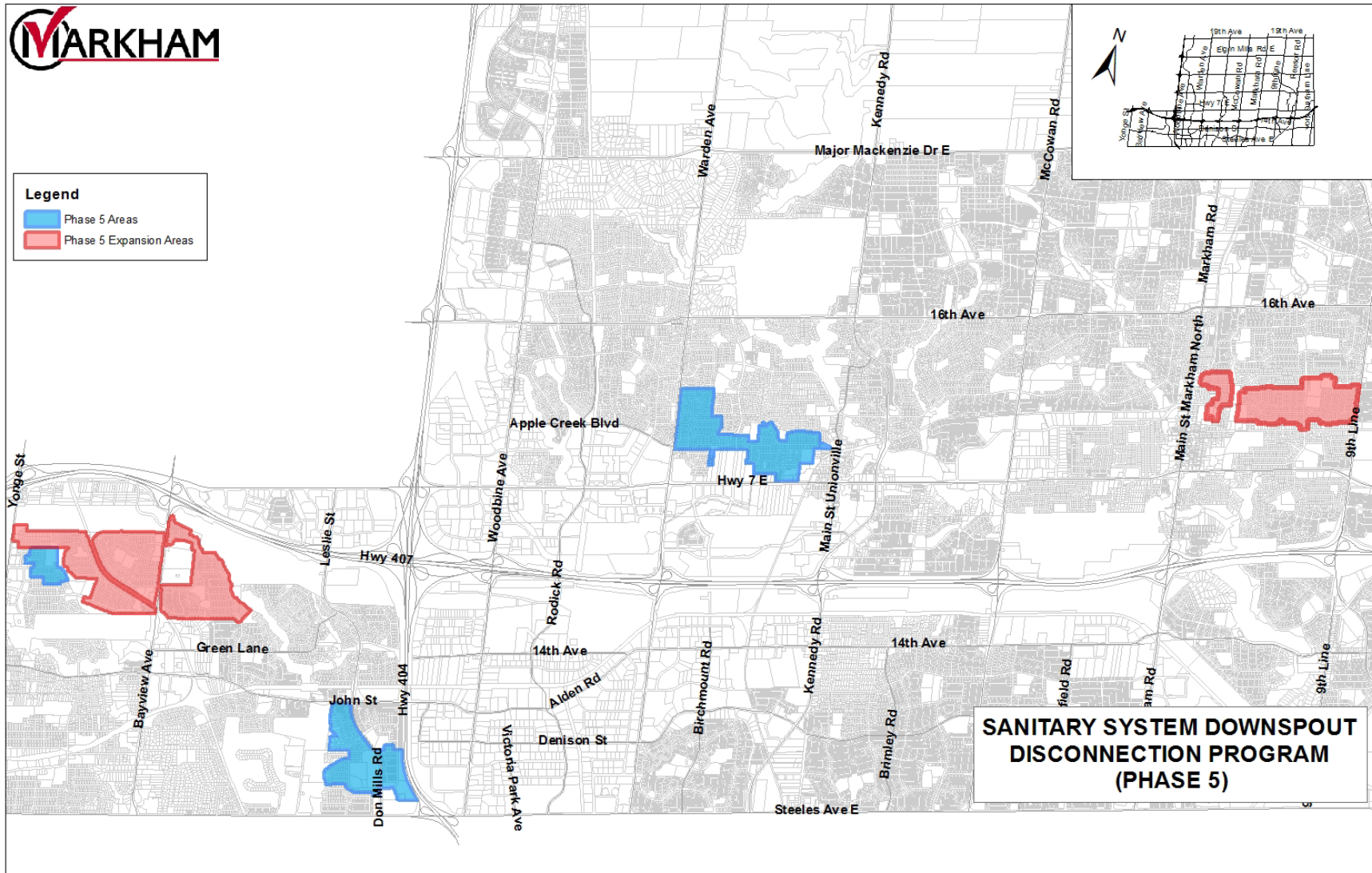
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PHASE 4 AREA

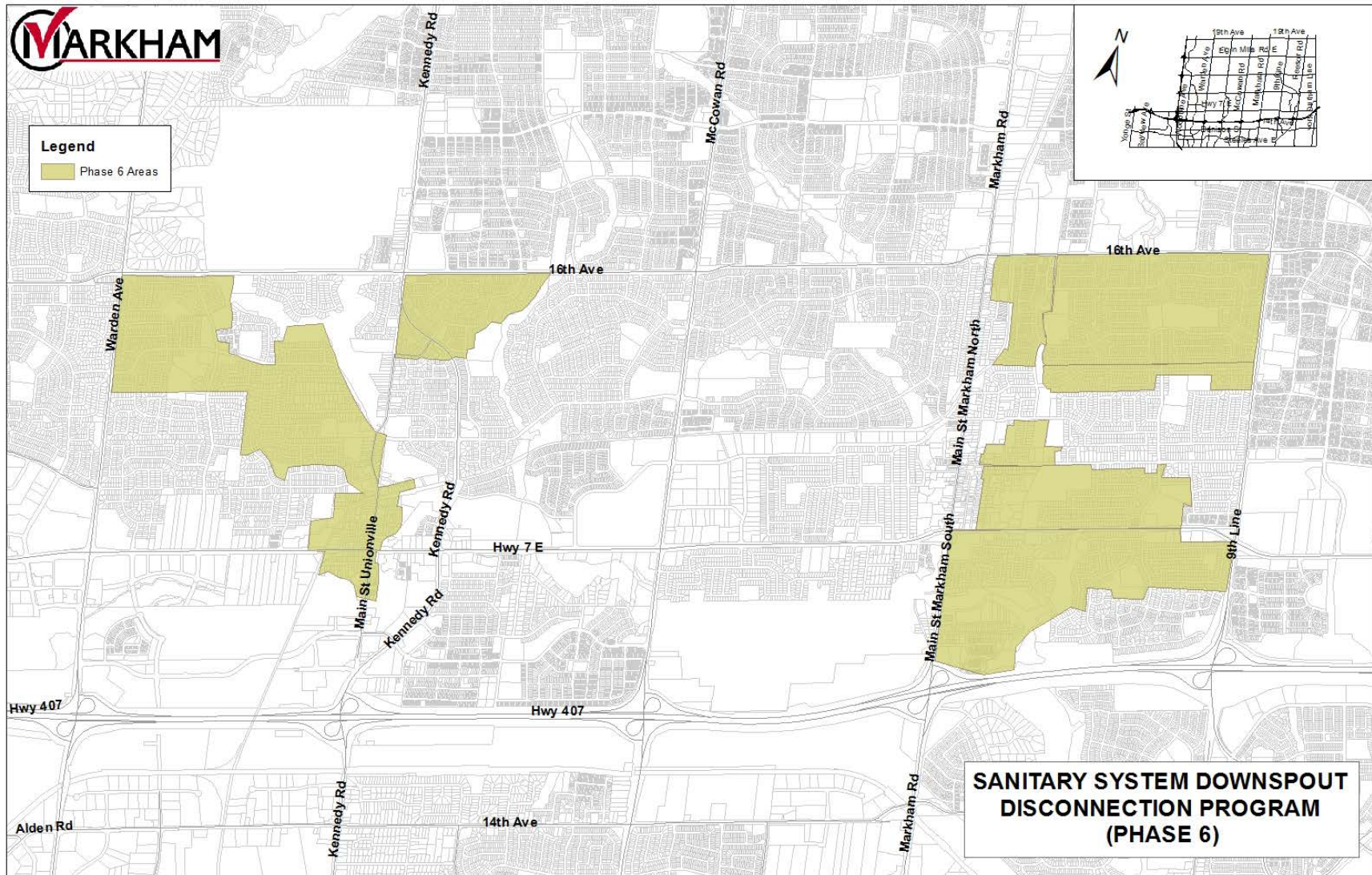
**SANITARY SYSTEM DOWNSPOUT
DISCONNECTION PROGRAM
(PHASE 4)**

Yonge St
Bayview Ave
Finch Ave
McCowan Rd
Kipling Rd
14th Ave
16th Ave
18th Ave
19th Ave
Hwy 404
Hwy 407
Hwy 401
Hwy 403
Hwy 405
Hwy 406
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ATTACHMENT F



ATTACHMENT G



ATTACHMENT H

DOWNSPOUT DISCONNECTION PROGRAM - COMMUNICATION STRATEGY

The Communications Strategy will make available a number of resources for the public to assist in addressing questions they may have regarding the City's Multi-phase Downspout Disconnection Program (DDP), the potential impact to homeowners and details of the financial assistance program, particularly in the Phase 5B and 6 Areas.

The Communications Strategy will, among other things, provide the Mayor, Council and Markham Residents with regular updates program progress and promote increased awareness of what all residents living in areas of Markham identified for participation in this program;

- **Provide residents with resources that explain:**
 - What the Multi-phase DDP is all about
 - What is going to happen, why and when
 - Financial assistance to homeowners
 - Who may be impacted
 - Area designated for Phase 5B and 6
 - Importance of protecting the City's sanitary sewer system
 - Benefits of disconnecting or redirecting downspouts to
 - Lawn
 - Garden
 - Rain barrel
 - How-to information to assist residents in the downspout disconnection process
- **Advise residents of what Markham is currently doing**
 - Pilot project undertaken and related results
 - Investigation/testing steps taken by the City
 - Lot survey
 - Smoke test
 - Program progress
- **Targeted contact with impacted homeowners** – letters/newsletters/brochures for distribution to homeowners with downspouts connected to the City sanitary sewer system – what, how, why, when
- **Leverage portal to allow residents to:**
 - Obtain information/updates on the Program phases, current status, planned next steps and results.
 - Find resources to assist with downspout disconnection and rain barrel acquisition.
 - Apply for DDP Financial Assistance.
 - Get answers to frequently asked questions
- **Social media** – Twitter, Facebook, YouTube to share information updates and drive residents to markham.ca for details - *ongoing*
- **Article(s) in Markham Life magazine that provide information and updates** – *ongoing*
- **Advertising on Markham city pages / other print media outlets** – inform & drive residents to markham.ca and social media sites for more information
- **Councillor newsletter articles(s)** – as required

ATTACHMENT I

Financial Breakdown for Each Phase

| Activities | Phase 1 (#11382) | Phase 2 (#14313) | Phase 3 (#15294) | Phase 4 (#16238) | Phase 5A (#17221) | Phase 5B (#17221) | Phase 6 (#18281) |
|---|--|--|--|--|--|--|--|
| | Thornhill | Thornhill | Thornhill, Unionville & Milliken | Markham | Thornhill & Unionville | Markham Village & Thornhill | Markham Village & Unionville |
| | Actual Expenditure (Account closed in 2015) | Actual Expenditure (Account closed in 2017) | Actual Expenditure (per end of 2017) | Actual Expenditure/ Commitment (per end of 2017) | Commitments (per end of 2017) | Approved Budget | Approved Budget |
| Public Communication and Education (A) | \$824 | \$2,387 | \$845 | \$840 | \$996 | \$1,467 | \$3,045 |
| Site Investigation (B) | \$130,101 | \$252,272 | \$68,878 | \$65,752 | \$54,204 | \$89,743 | \$193,773 |
| Financial Assistant Plan: Downspout Disconnection & Rain Barrel (C) | \$0 (Covered under Phase 2) | \$6,418 (Phase 1 Assistant - \$2,509; Phase 2 Assistant - \$3,909) | \$685 | Estimated \$4,200 (In Progress) | \$9,960 (start in 2018) | \$14,670 (start in 2018) | \$30,454 |
| Flow Monitoring Program (D) | \$0 (Perform under Sanitary Flow Monitoring Project #14300) | \$5,767 | \$0 (Perform under Flow Monitoring Program) | \$0 (Perform under Flow Monitoring Program) | \$0 (Perform under Flow Monitoring Program) | \$0 (Perform under Flow Monitoring Program) | \$0 (Perform under Flow Monitoring Program) |
| Total Spending/Commitment (Incl. HST) (E) = (A) + (B) + (C) + (D) | \$130,925 | \$266,844 | \$70,408 | \$70,792 | \$75,120 | \$105,880 | \$0 |
| Total Budget (Incl. HST) (F) | \$130,925 | \$266,844 | \$163,922 | \$300,000 | \$75,120 | \$105,880 | \$250,000 |
| Funds Previously Returned to Source (G) | ----- | ----- | \$84,452 | \$224,330 | ----- | ----- | ----- |
| Remaining Budget (H) = (F) – (E) – (G) | closed | closed | \$9,062 | \$4,878 | \$0 | \$0 | \$0 |
| Amount Return to Source | ----- | ----- | \$9,062 | \$4,878 | \$0 | \$0 | \$0 |