



Report to: General Committee

Meeting Date: May 22, 2019

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| <b>SUBJECT:</b>     | Citywide Multi-Phase Sanitary System Downspout<br>Disconnection Program – Annual Progress Update and 2019<br>Details |
| <b>PREPARED BY:</b> | Gord Miokovic, Manager-System Engineering<br>Lijing Xu, Wastewater Hydraulic Engineer<br>Celia Fan, System Engineer  |

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**RECOMMENDATION:**

- 1) That the report entitled “Citywide Multi-phase Sanitary System Downspout Disconnection Program – Annual Progress Update and 2019 Details” be received; and,
- 2) That the remaining funds of \$8,916 be returned to the original funding source from the project #16238 “Sanitary System Downspout Disconnection Program – Phase 4” and the project be closed; and further,
- 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 Phase 5 and Phase 6 area overall work plan progress.

**BACKGROUND:**

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

**Table 1 - Downspout Disconnection Program Timing.**

| Phase     | Year      |             |             |             |             |             |             |                |             |          |
|-----------|-----------|-------------|-------------|-------------|-------------|-------------|-------------|----------------|-------------|----------|
|           | Pre- 2012 | 2013        | 2014        | 2015        | 2016        | 2017        | 2018        | 2019           | 2020        | 2021     |
| <b>1</b>  | <i>a</i>  | <i>b, c</i> | <i>d</i>    | ♦           | <i>e</i>    | <i>f</i>    | <i>f</i>    |                |             |          |
| <b>2</b>  | <i>a</i>  | <i>b</i>    | <i>b, c</i> | <i>d</i>    | ♦, <i>e</i> | <i>f</i>    | <i>f</i>    |                |             |          |
| <b>3</b>  |           | <i>a</i>    | <i>b</i>    | <i>b, c</i> | <i>d</i>    | ♦, <i>e</i> | <i>f</i>    |                |             |          |
| <b>4</b>  |           |             | <i>a</i>    | <i>b</i>    | <i>b, c</i> | <i>d</i>    | ♦, <i>e</i> | <i>f</i>       |             |          |
| <b>5A</b> |           |             |             | <i>a</i>    | <i>b</i>    | <i>c</i>    | <i>c</i>    | ♦, <i>d</i>    | <i>e, f</i> |          |
| <b>5B</b> |           |             |             |             |             | <i>a</i>    | <i>b, c</i> | ♦, <i>d</i>    | <i>e, f</i> |          |
| <b>6</b>  |           |             |             |             |             | <i>a</i>    | <i>b, c</i> | ♦, <i>b, c</i> | <i>d, e</i> | <i>f</i> |

- a* - Modeling and evaluation of the existing flow monitoring data to assess the extent of extraneous flows in an area;
- b* - Lot survey identifying all downspouts connected to the underground system;
- c* - Sanitary and storm sewer smoke testing/analysis and reports of all downspouts connected to the underground system;
- d* - Resident notification for follow-up action required along with Financial Assistant Plan (FAP) information;
- e* - Progressive By-law Enforcement for non-compliance with required corrections;
- f* - Flow Monitoring of area after identified corrective action completed.
- ♦ - Council Updates.

There are three possible field discoveries from the program and **Table 2** indicates the findings of each phase:

1. Private properties with downspout connection directly to City sanitary sewers.
2. Other Sources of Inflow and Infiltration (I/I), which 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 other 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 Number 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                              | 4                                 | 12            | 6                               | completed 2017              | 10                 |
| 4            | 2,305                      | 6                              | 5                                 | 11            | 109                             | 2016-2020                   | 34                 |
| 5A           | 1,992                      | 12                             | TBD                               | 9             | 58                              | 2020-2025                   | 5                  |
| 5B           | 2,934                      | 34                             | TBD                               | 18            | 136                             | 2020-2025                   | 51                 |
| 6            | 5,832                      | TBD                            | TBD                               | TBD           | TBD                             | 2020-2025                   | TBD                |
| <b>Total</b> | <b>21,836</b>              | <b>147+TBD</b>                 | <b>97+TBD</b>                     | <b>76+TBD</b> | <b>589+TBD</b>                  |                             | <b>139+TBD</b>     |

Note: TBD stands for "To Be Determined".

### **Phases 1 to 3 Status:**

All downspout disconnection works and post flow monitoring were completed in 2018.

### **Phase 4 Status:**

All testing and 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 2019.

### **Phase 5 (Original Scope 5A and Expansion Area 5B) Status:**

36 properties were identified as having downspouts directly connected to the sanitary sewers. Letters will be sent out in the Spring of 2019 giving the property owners a period of 12 months to complete the disconnection works. Post flow monitoring will commence in the Spring of 2020.

### **Phase 6 Status:**

Lot survey and smoke testing commenced in the Spring of 2018, stopping for the winter period, and will be starting again in May 2019 with an anticipated field work completion date of December 2019. Letters will be sent out in the Spring of 2020 giving the property owners a period of 12 months to complete the disconnection works. Post flow monitoring will commence in the Spring of 2021.

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 H**.

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**

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 from the City for property owner initiating private plumbing protection measures. Amongst various approved eligible rebate measures, two can relate to “Other Source” as identified in **Table 2** that would need to be addressed by the property owners, and they can apply for financial support from this program, namely:

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

Below is a summary of the 5P program rebate status as of April 2019. Detailed 5P program results will be reported to Council in the summer of 2020.

|  | <b>Number</b> | <b>Rebate Amount Paid (\$)</b> |
|--|---------------|--------------------------------|
| <b>Backwater Valve Installation</b>        | 79            | 137,434                        |
| <b>Weeping Tile + Sump Pump</b>            | 32            | 128,546                        |
| <b>Sanitary &amp; Storm Lateral Repair</b> | 22            | 57,500                         |
| <b>Total</b>                               | <b>133</b>    | <b>323,480</b>                 |

In the Spring of 2019, letters will be sent out to the property owners whose properties have weeping tiles connected to the sanitary system or defective sanitary/storm laterals. They will be directed to conduct disconnection/repair works and informed of the rebate program from the City.

### **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 blockages are identified, flushing operations will be performed by the City contractor. If any structural defects are identified, the repair work on the public side will be conducted under the annual sanitary sewer rehabilitation program by the City contractor. At the same time, home owners will be informed about the approved private plumbing protection rebate program and encouraged to repair/reline the private side lateral at the same time at their cost initially. The home owner will be able to apply for the rebate from the City after the work is completed.

## **FINANCIAL CONSIDERATIONS**

The remaining funds of \$8,916 will be returned to the original funding source from the project #16238 “Sanitary System Downspout Disconnection Program – Phase 4” and the project will be closed.

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**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 Miokovic, 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" – Citywide Multi-phase Sanitary System Downspout Disconnection Program Areas

Attachment "B" – Phase 1 Area

Attachment "C" – Phase 2 Area

Attachment "D" – Phase 3 Area

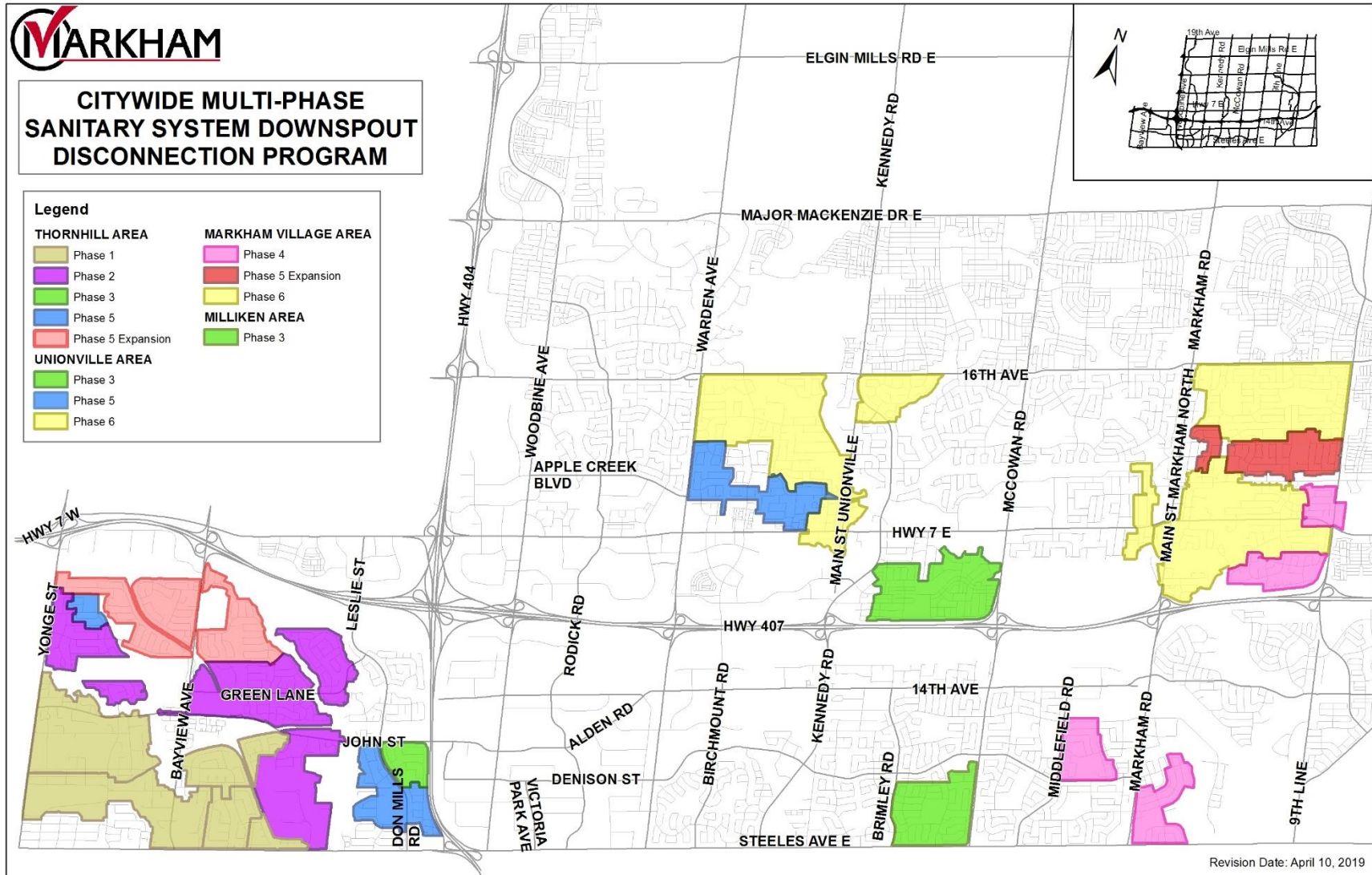
Attachment "E" – Phase 4 Area

Attachment "F" – Phase 5 Area

Attachment "G" – Phase 6 Area

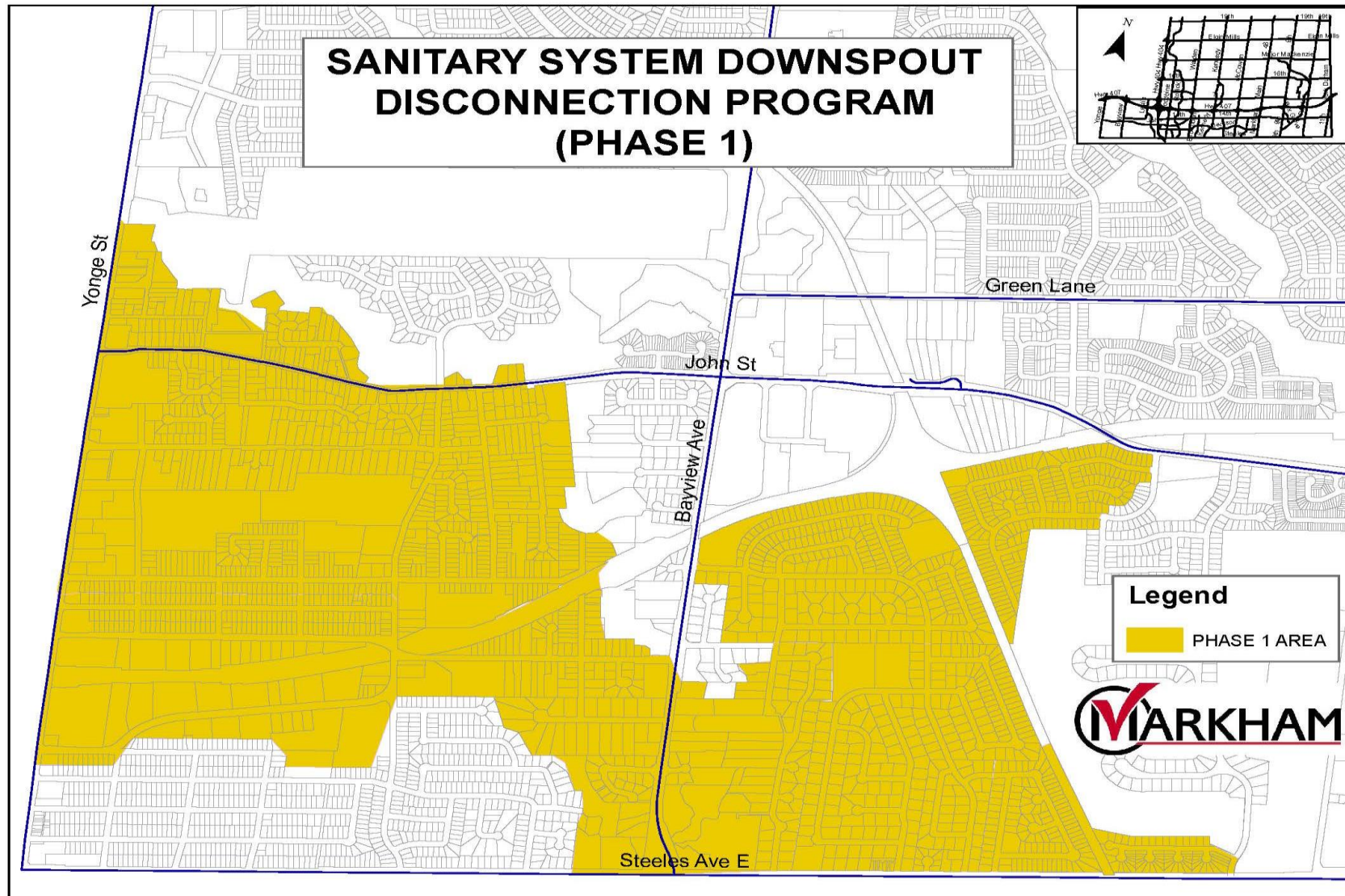
Attachment "H" – Financial Breakdown for Each Phase

# ATTACHMENT A

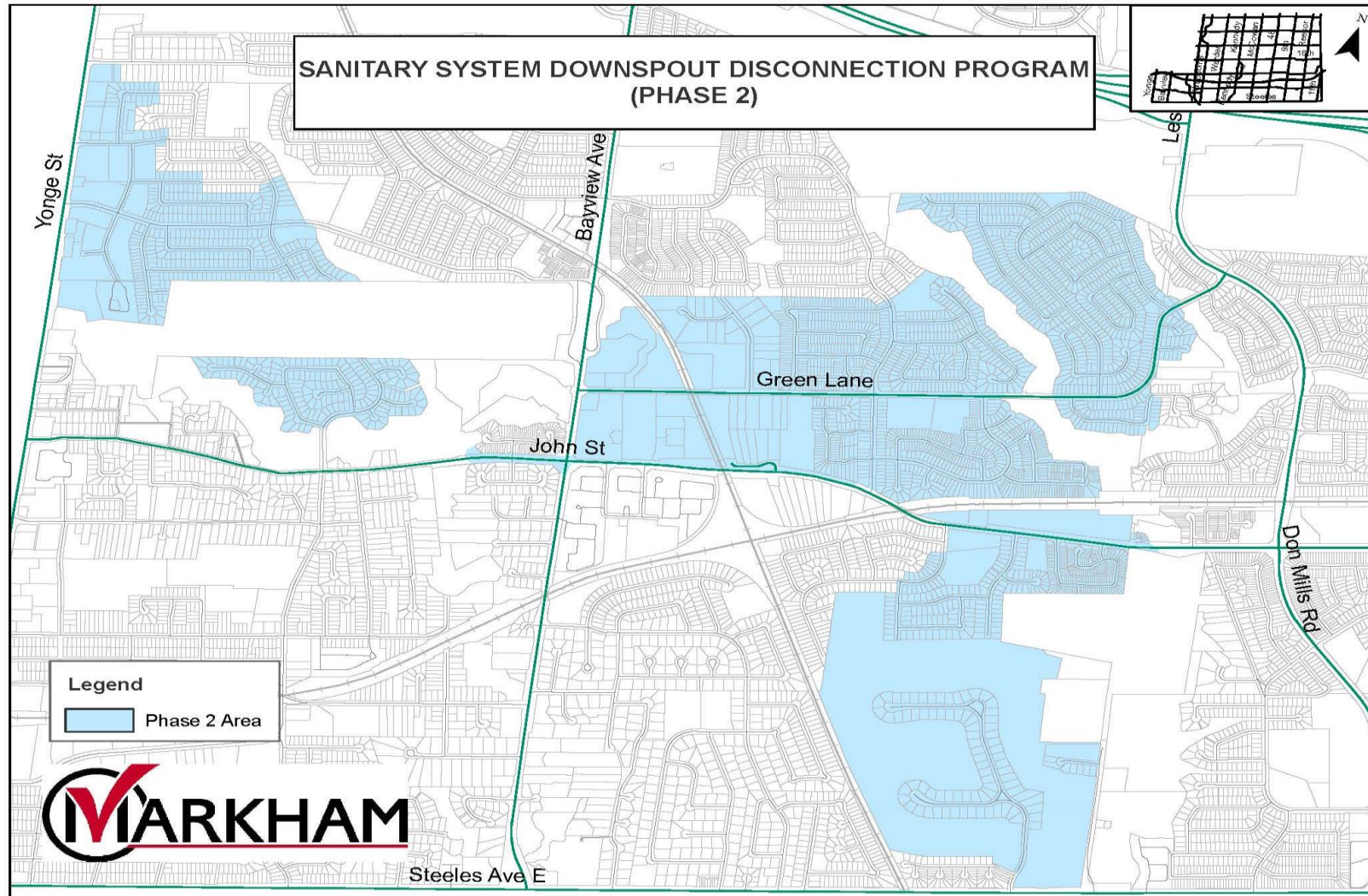




ATTACHMENT B

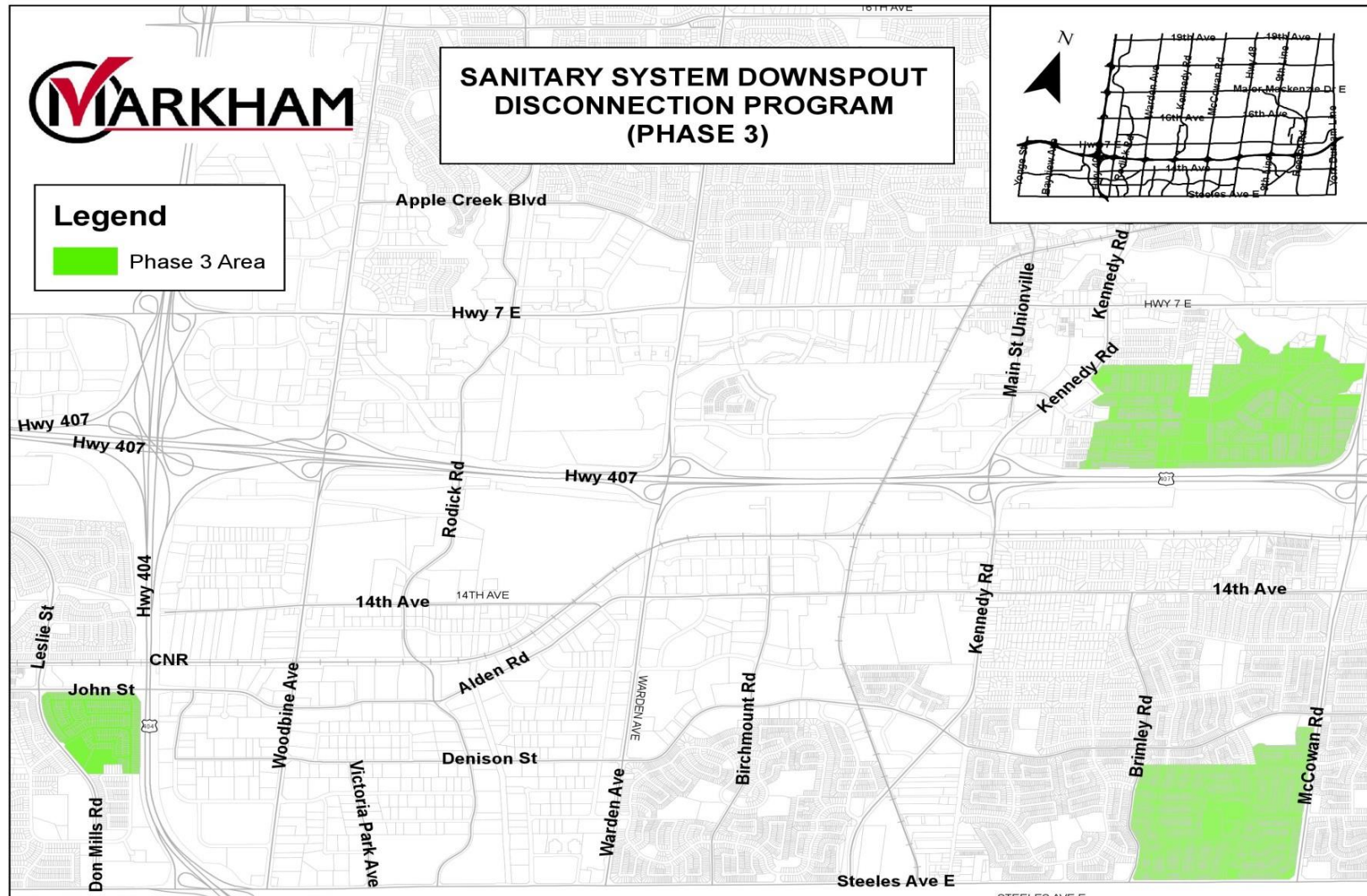


## ATTACHMENT C

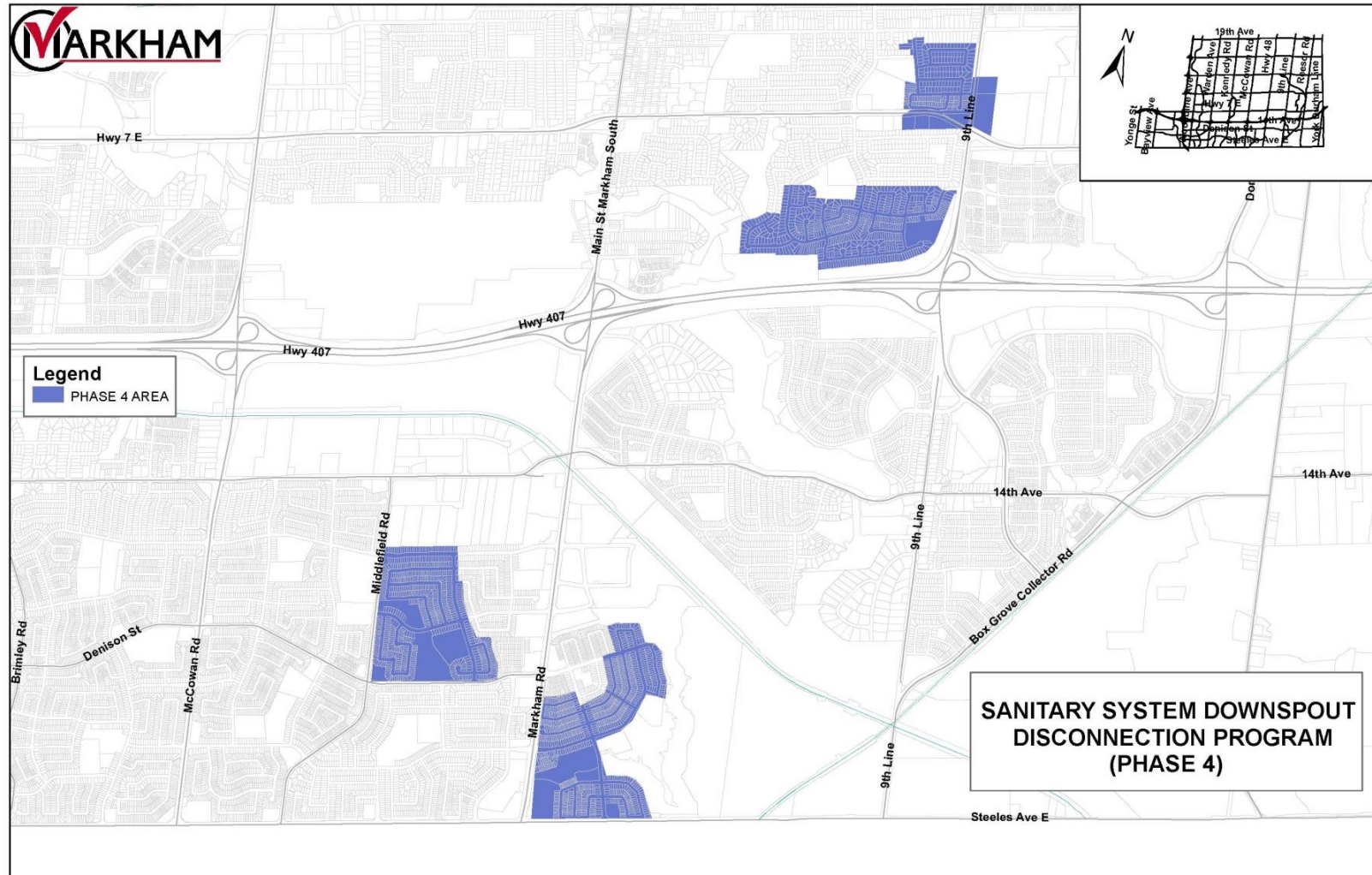




## ATTACHMENT D

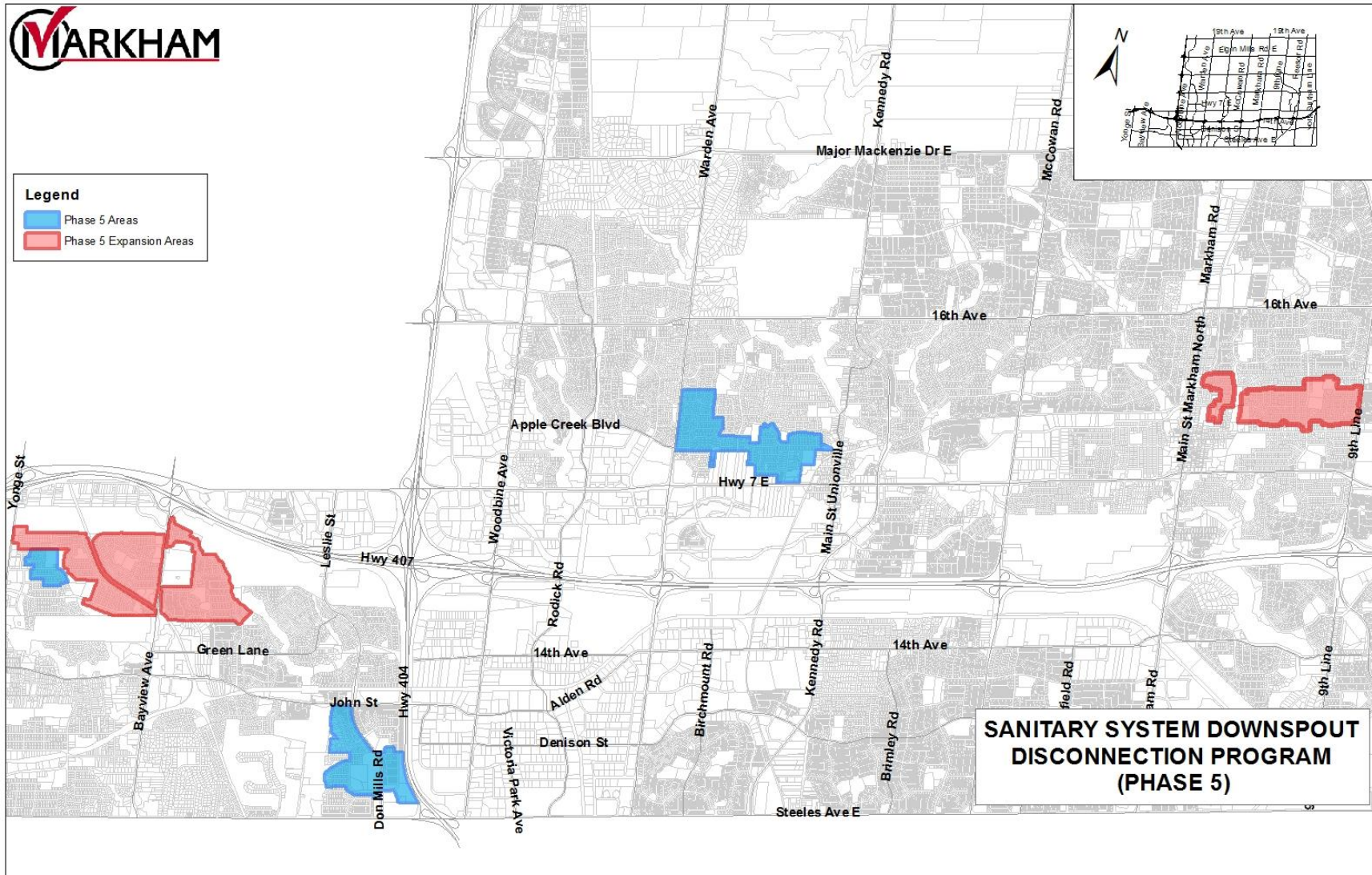


## ATTACHMENT E

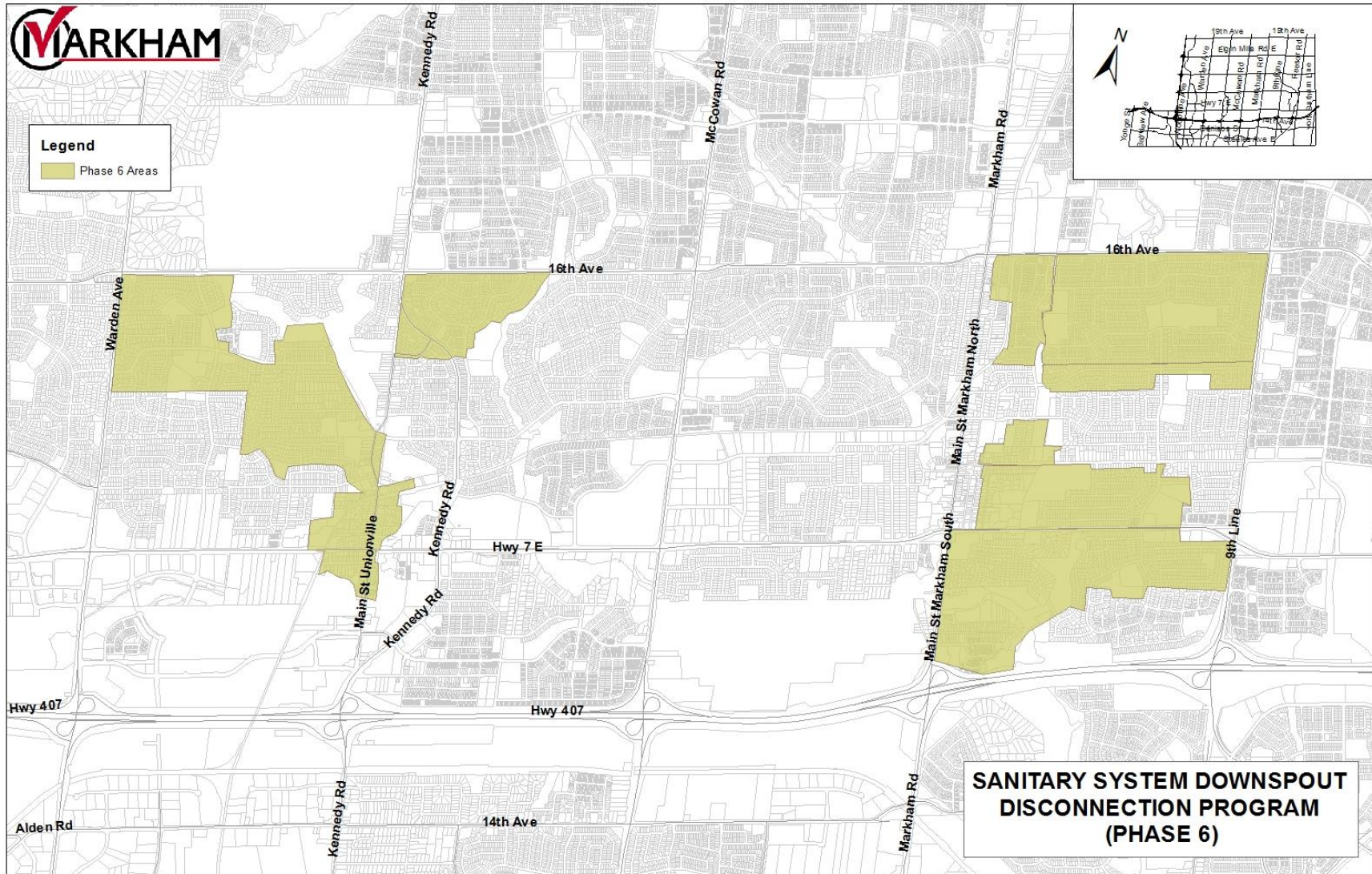




# ATTACHMENT F



## ATTACHMENT G





## ATTACHMENT H

### 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 (Account closed in 2018)    | Actual Expenditure (per end of 2018)           | Actual Expenditure/ Commitments (per end of 2018) | 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                                       | \$54,217  | \$94,283                                       | \$193,773                                      |
| Financial Assistant Plan: Downspout Disconnection & Rain Barrel (C) | \$0<br>(Covered under Phase 2)                                 | \$6,418<br>(Phase 1 Assistant - \$2,509;<br>Phase 2 Assistant - \$3,909) | \$685  | \$162  | \$19,907<br>(start in 2019)                       | \$10,130 (start in 2019)                       | \$53,182                                       |
| Flow Monitoring Program (D)   | \$0<br>(Perform under Sanitary Flow Monitoring Project #14300) | \$5,767  | \$0<br>(Perform under Flow Monitoring Program) | \$0<br>(Perform under Flow Monitoring Program) | \$0<br>(Perform under Flow Monitoring Program)    | \$0<br>(Perform under Flow Monitoring Program) | \$0<br>(Perform under Flow Monitoring Program) |
| Total Expenditure (Incl. HST) (E) = (A) + (B) + (C) + (D)           | \$130,925  | \$266,844  | \$70,408                                       | \$66,754                                       | \$75,120  | \$105,880                                      | \$250,000                                      |
| Total Budget (Incl. HST) (F)  | \$130,925  | \$266,844  | \$70,408                                       | \$75,670                                       | \$75,120  | \$105,880                                      | \$250,000                                      |
| Funds Previously Returned to Source (G)                             | -----  | -----  | -----  | -----  | -----   | -----  | -----  |
| Remaining Budget (H) = (F) – (E) – (G)                              | closed   | closed   | closed   | \$8,916  | \$0   | \$0  | \$0  |
| Amount Return to Source   | -----  | -----  | -----  | \$8,916  | \$0   | \$0  | \$0  |