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DATE: February 5, 2010

REPORT TITLE: **PHASE 1, INFLOW AND INFILTRATION REMEDIATION PROGRAM, CITY OF MISSISSAUGA - WARDS 1, 3, 4, 5, 6 AND 7**

FROM: Dan Labrecque, Commissioner of Public Works

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### RECOMMENDATION

**That the Basement Flooding Remediation and the Manhole Sealing Program be approved as Phase 1 of the Inflow and Infiltration Remediation Program in the City of Mississauga, Wards 1, 3, 4, 5, 6 and 7;**

**And further, that the balance of funds under Capital Project 07-2535 (Sanitary Sewer Inspection Program) in the estimated amount of \$370,000 and funds from Capital Project 10-2000 (Unallocated Funds) in the estimated amount of \$258,850, be transferred to Capital Project 09-2390 (Inflow and Infiltration Remediation), for a total of \$978,850 (excluding applicable taxes) available to cover the costs associated with the Program;**

**And further, that three contract Full-Time Equivalents (FTEs) to provide support for the implementation of the Phase 1 program, be approved.**

### REPORT HIGHLIGHTS

- The August 4, 2009 storm event resulted in basement flooding from multiple sources including: windows, cracks in basement walls, via garages with reverse sloping driveways and floor drains.
- Sanitary sewer investigations have confirmed that there are a number of legal, non conforming connections between the storm and sanitary sewers in Wards 1, 3, 4 and 5.
- A Basement Flooding Remediation Program is proposed to assist homeowners with home improvements that will help reduce the potential of future flooding by storm events.
- A Manhole Sealing Program is proposed to seal selected manholes to reduce the volume of storm water entering the sanitary system.
- An enhanced communications protocol and strategy is proposed to better serve the public.
- The recommendation of the transfer of surplus funds from Capital Project 07-2535 and from Unallocated Funds, Capital Project 10-2000 to Capital Project 09-2390 for ease of administration of Phase 1 of the Inflow and Infiltration Remediation Program and to offset costs associated with the implementation of Phase 1 related programs.

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**DISCUSSION**

**1. Background**

During the afternoon of August 4, 2009, heavy rainfall caused generalized creek, overland, roadway and basement flooding in several areas of Mississauga, mainly in and around the Cooksville Creek floodplain. The rain event was centered on or close to the Mississauga Valley Community Centre. The City of Mississauga rain gauge located at the community centre recorded 68mm (2.7 inches) of rainfall within one hour, which exceeds the 1 in 100 year storm event.

Region of Peel residents have experienced other high intensity localized storm events in 2009. These types of events are not unique to Peel and are being experienced across North America. They are being attributed to global climate change and may occur more frequently in the future. These types of high intensity, localized storms also impact Wastewater Operations as the extraneous storm water flows that enter the sanitary system have to be treated, increasing operational costs and the likelihood of the need for the bypassing of wastewater at the treatment facilities.

On August 4, 2009 basement flooding was reported to the Region of Peel and the City of Mississauga in isolated pockets of Wards 1, 3, 4, 5, 6 and 7, totaling 254 homes. These areas of Mississauga had not been flooded before with the exception of a few properties located within the Cooksville Creek flood plain. Residents reported overland flooding, with localized flooding up to three feet high on the streets. This huge storm surge resulted in basement flooding being reported from multiple sources in the home including: windows, cracks in basement walls, via garages with reverse sloping driveways and floor drains. The intensity of the storm exceeded the capacity of the minor storm system (the storm sewer) allowing the storm water to travel along the right of way (road). As a result, the excess water entered the sanitary sewer via a number of non-conforming interconnections between the storm and sanitary drainage systems and via the sanitary manhole covers.

A number of communication and outreach issues were also brought forward by the impacted residents. These were categorized into:

- Call Centre transfers and Call Centre knowledge of issue;
- Availability of key information through website; and
- Availability of educational information on the subject.

**2. Follow-up Actions**

As a result of this significant rainfall event, the Region of Peel in conjunction with the City of Mississauga and the Credit Valley Conservation Authority initiated an action plan to identify possible causes that contributed to the basement flooding and to formulate a remediation plan.

**Actions Taken to Date and Results of Investigations**

- i) Completed the closed circuit television (CCTV) inspections of 90 percent of the sanitary sewers on the streets that were flooded and confirmed the sanitary sewer to be in good working order.

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- ii) Completed smoke testing of 90 percent of the areas where the majority of basement flooding was reported. Any identified deficiencies have been reported to Regional operational staff for investigation and correction.
- iii) In conjunction with the City of Mississauga initiated a pilot project to conduct Household Drainage Surveys (private property drainage inspections) and TV inspections of the sanitary laterals. The pilot examined 21 homes to determine potential areas of interconnection between the storm and the sanitary sewer system. This representative sample of homes from the impacted areas was selected to provide staff with a cross-section of lateral conditions, plumbing and lot drainage configurations. The Region also reviewed plumbing and construction records. These records indicate that some of the homes were constructed with the private side storm water drainage system: weeping tiles, window well drains and downspouts connected to the sanitary lateral and sanitary sewer via the floor drain. One of the 21 homes inspected to date confirmed this plumbing configuration, though municipal records indicate more exist. This type of configuration would be a major contributor to the high storm water inflow into the sanitary system.
- iv) Performed Hydraulic Wastewater Modeling using data from the August 4, 2009 rainfall event. The modeling revealed that the sanitary system is performing as designed. However, inflow from the overland flow of the storm water systems and creek sources into the sanitary system through cross connections, weepers, and manhole aeration/lift holes, etc. impact the sanitary sewer's carrying capacity resulting in the potential for basement flooding.
- v) Discussions with City of Mississauga staff were initiated regarding developing a subsidy/rebate program to assist with the costs of remedial works on private property to remove extraneous storm water flows from the sanitary sewers (e.g. rainwater downspout disconnections, weeping tile disconnections) and the installation of back water valves.
- vi) City of Mississauga initiated the establishment of a Cooksville Creek Flooding Response Task Force, including the Region of Peel, Credit Valley Conservation Authority, Ministry of the Environment, Members of Council and impacted residents. This group is exploring immediate, interim and long-range flooding remediation options.

### **3. Proposed Phase 1 - Flooding Remediation and Action Plan**

As a result of the various investigative actions undertaken it is apparent that Peel's sanitary system was functioning according to design. However, there are opportunities to undertake measures that will serve to protect the integrity of the system and reduce the likelihood of future basement flooding events to Peel residents.

Staff is recommending that Phase 1 of the Flooding Remediation and Action Plan address the 254 homes that reported basement flooding as a result of the August 4, 2009 event. Staff anticipates that there will be a need to expand the program to other high risk areas in the future pending results of Task Force recommendations and field investigation results. A Council update will be presented in the fall of 2010.

#### **Rebate Program – Private Property**

In order to address the storm water contributions from private property to basement flooding, Peel staff initiated discussions with City of Mississauga staff to develop a pilot rebate

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program similar to those currently offered across the Greater Toronto Area (GTA) and in other communities across Canada. Based on the field investigations done through the pilot Home Drainage Surveys, three programs as depicted in Table 1 are being recommended at this time. This rebate program will be retro-active to August 4, 2009 in order to permit those residents impacted by the August 4, 2009 flood to participate in the program.

- Household Drainage Surveys – All except the 21 done through pilot program
- Sanitary Lateral Check Valve Installation – Expect 50 percent participation
- Downspout Disconnection Program – Expect all homes impacted

<b>Program</b>	<b>Approximate Cost per unit</b>	<b># of Homes</b>	<b>Peel %</b>	<b>Mississauga %</b>	<b>Homeowner %</b>	<b>Total Cost to Peel</b>
Household Drainage Surveys	\$750	233	50%	50%	0%	\$87,375
Check Valve Installation	\$1,350	127	50%	0%	50%	\$85,725
Downspout Disconnection	\$1,000	254	50%	50%	0%	\$127,000
Total Estimated Cost (excluding applicable taxes)						<b>\$300,100</b>

**Table 1****Household Drainage Survey**

The Household Drainage Survey is a critical component of the flooding remediation program. Performed by Regional staff at the request of the owner, the survey will investigate the property's lot drainage, including location of downspouts from the roof, condition of the sanitary lateral via a TV inspection and the plumbing configuration within the building. Upon completion of the survey, staff will complete a comprehensive report on the findings and provide recommendations for all corrective actions including sump pumps, lateral rehabilitations, and downspout disconnections. Staff will inform the homeowners of the subsidy programs they would qualify for and advise them of the process to participate.

**Check Valves**

Staff observations and recommendations are crucial to the programs' success especially in areas where the weeping tiles connect to the internal home sanitary system. If through the inspection, a backwater check valve is identified as beneficial, the valve would be installed by a qualified contractor on private property. The property owner would submit the bills to the Region of Peel but would only qualify for the rebate if it was recommended by the Household Drainage Survey. Recommendations for this non-conforming plumbing configuration could include the requirement for downspout disconnection and the possible installation of a sump pump to lessen the likelihood of future flooding.

**Downspout Disconnection**

The roof of a single 115 metre square (1,200 square foot) home can contribute upwards of 292 litres (65 gallons) of water per hour (assuming a rainfall of 2.5cm or 1" per hour).

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Multiply that over hundreds of homes and under extreme storm conditions, downspouts can be a large contributor to storm and sanitary sewer overload. The Region of Peel in conjunction with the City of Mississauga is recommending the disconnection of downspouts from the weeping tiles of homes that discharge into sanitary sewer. Property owners would qualify for the subsidy when a contractor was required to disconnect from the system. All downspouts would be required to discharge a minimum of 2 metres (6 feet) from the foundation. Downspout disconnection would be mandatory with all check valve installations.

**Manhole Sealing Program – Municipal Property**

Manholes are critical to provide access for various maintenance activities and to provide air flow into the sanitary system to ensure that flow velocities are maintained and odours and volatile gases are reduced. Degradation of the manholes occur over time allowing inflow and infiltration to occur increasing extraneous flows into the sanitary system. Also the aeration/lift holes and seating around the cover are an entry point for overland flow in high rainfall events, especially if the road becomes flooded.

Staff has explored new technologies to seal manhole covers. As this technology provides an extremely tight seal with no ventilation capability, not all manholes can be sealed because of the need for ventilation. The new technology will be employed in strategic locations in order to mitigate inflow potential. Staff will recommend the sealing of sanitary manholes based on elevation and location in the flooded areas. This will reduce inflows from storm events. It is recommended that approximately 250 manholes be sealed in the areas that were flooded on August 4, 2009 as part of the Phase 1 – Inflow and Infiltration Remediation Program. The cost to seal each manhole is estimated to be \$2,675 totaling, \$668,750 (excluding applicable taxes).

**Staffing Impacts**

In order to deliver these new services and still maintain Peel's current operational activities additional staff will be required. Staff recommends that three additional contract staff – Full-Time Equivalent (FTEs) (e.g. Project Manager, two Wastewater Operators) will be required to perform the field work associated with the rebate program and the project management work associated with Phase 1 programs. The costs of these staff have been included in Table 1. Contracted services will deliver the manhole sealing program.

**4. Communication Enhancements**

Overall communication improvements have been initiated to improve customer service and response time by staff:

- a) Emergency Contact - The Region of Peel and the City of Mississauga are improving information provided to respective Call Centres - increasing staff knowledge which will reduce the number of misdirected calls.
- b) Education and Outreach - Enhanced basement flooding information will be available via the internet on Peel's website effective March 3, 2010.
- c) A basement flooding information pamphlet will be distributed by Wastewater Operations and by Public Works Education and Outreach to all Peel residents who received the flooding questionnaire. The pamphlet will be available at future outreach events.

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Staff has identified a number of opportunities to communicate with impacted residents about the recommended actions, including:

- Working with local Councillors, the City of Mississauga, and Credit Valley Conservation Authority to conduct Public Information Sessions;
- A press release in the Mississauga News; and
- A mail drop to those residents that were impacted.

A follow-up progress report will be provided in the fall of 2010 to identify further actions, including an update from the Cooksville Creek Flooding Task Force, potential modifications to the home rebate program and potential expansion of program to other high risk areas.

**FINANCIAL IMPLICATIONS****Phase 1 - Funding**

In order to achieve the above outlined approach for 2010 the following funding is recommended for approval:

<b>Program</b>	<b>Estimated Costs</b>
Rebate Program	\$300,100
Manhole Sealing Program	\$668,750
Communication and Outreach	\$10,000
<b>Total</b>	<b>\$978,850</b>

**Table 2**

Currently there is \$350,000 available in Capital Project 09-2390, Inflow and Infiltration Remediation. As noted in Table 1 this is insufficient to deliver the anticipated program. As such, staff is recommending that approximately \$370,000 be transferred from Capital Project 07-2535 Sanitary Sewer Inspection to Capital Project 09-2390, Inflow and Infiltration Remediation. The entire funding identified in 2007 for CCTV inspection was not required leaving a surplus in this account. And that a further \$258,850 be transferred from Unallocated Funds, Capital Project 10-2000 to Capital Project 09-2390 for a total available funding of \$978,850 to undertake the Phase 1 Flooding Remediation Program in Mississauga.

**CONCLUSION**

The August 4, 2009 storm event resulted in basement flooding from multiple sources. Sanitary sewer investigations have confirmed that there are a number of legal, non-conforming connections between the storm and sanitary sewers in the City of Mississauga Wards 1, 3, 4, 5, 6 and 7.

In order to address the impact of storm events on property owners, the Region of Peel in conjunction with the City of Mississauga (pending City of Mississauga Council approval) is proposing a Phase 1 Inflow and Infiltration remediation program that is to include: a Basement Flooding Remediation Program to assist homeowners with home improvements to help reduce the potential of future flooding; a Manhole Sealing Program to seal selected manholes on

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municipal property to reduce the volume of storm water entering the sanitary system and an enhanced communications protocol and strategy to better serve the public.

It is recommended that the transfer of surplus funds from Capital Project 07-2535 and from Unallocated Funds, Capital Project 10-2000 to Capital Project 09-2390 to fund this program.

Staff will return to Council with a progress report in the fall of 2010 to identify further actions, including an update from the Cooksville Creek Flooding Task Force, potential modifications to the home rebate program and potential expansion of program to other high risk areas.



Dan Labrecque  
Commissioner of Public Works

**Approved for Submission:**



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D. Szwarc, Chief Administrative Officer

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