

**THE CORPORATION OF THE CITY OF WINDSOR
OFFICE OF THE CITY ENGINEER**

**MISSION STATEMENT:**

"The City of Windsor, with the involvement of its citizens, will deliver effective and responsive municipal services, and will mobilize innovative community partnerships"

LiveLink REPORT 15652 SW2012 AFB/11050	Report Date: May 24, 2012 (#3218-06/06/12:ebr)
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Author's E-mail: ocolucci@city.windsor.on.ca msonego@city.windsor.on.ca rslater@city.windsor.on.ca	CAPITAL BUDGET

To: Mayor and Members of City Council
Subject: 2012 Sewer Surcharge Budget Update / Measures to Mitigate Basement Flooding

1. RECOMMENDATION: City Wide: ☒ Ward(s): ____

- I. THAT Council RECEIVE the 2012 Sewer Surcharge Budget Update report from the City Treasurer and;
- II. THAT the updated 5-Year Sewer Surcharge Forecasts (2012-2016) BE RECEIVED for information as presented in *Appendix A* of the report and;
- III. THAT, effective July 1, 2012, the Sewer Surcharge Rates be increased in accordance with Option 3 as detailed in this report and set at the following levels:
 - Residential Fixed Rate..... 66%
 - Residential Consumption Rate..... 487%
 - Commercial Rate..... 167%
- IV. That Council **APPROVE** (in principle, subject to annual Capital Budget approval) \$2,000,000 in 2013, \$400,000 in 2014, \$220,000 in 2015 and \$330,000 in 2016 as part of the respective Capital Budget for expansion of the downspout disconnection program to be funded from the Sewer Surcharge; and
- V. That Council **AUTHORIZE** Administration to retain contractors and/or temporary staffing (if required) to disconnect and document downspout disconnections in accordance to the downspout disconnection program; and
- VI. That the City Engineer **BE AUTHORIZED** to proceed to issue an RFP for a consultant or firm to perform flow monitoring and hydraulic modelling of the City's sewer system which will help

in developing a Master Plan for storm and sanitary sewers; subject to meeting project specifications and being within the 2012 recommended budget of \$250,000 for capital project ECP 004-09 "Stormwater and Sanitary Master Plan"; and subject to the terms and conditions of the City's Purchasing By-law 400-2004 (as amended); and

- VII. That subject to the results of the hydraulic modelling and Master Plans that the City Engineer **REPORT** to Council, as part of a future Capital Budget deliberations, provide a report with recommendations for remedial works; and
- VIII. That Council **APPROVE** \$300,000 to be drawn from the Lou Romano Water Reclamation Plant Reserve (Fund 131) for the purpose of purchasing permanent flow monitoring equipment that will assist the City's treatment plants in making decisions which will optimize system capacity; and
- IX. That Council **PRE-COMMIT** \$200,000 in 2013, Capital Budget for smoke and dye testing to be used for assessing sewer conditions in targeted areas to be funded from Sewer Surcharge; and
- X. That Council **APPROVE** \$50,000 drawn from the Lou Romano Water Reclamation Plant Reserve (Fund 131) for the purpose of proceeding with updating the Rainfall Intensity Duration and Frequency (IDF) curves through the Essex Region Conservation Authority in partnership with interested local municipalities at a cost to the City not to exceed \$50,000; and
- XI. THAT the Chief Administrative Officer and City Clerk **BE AUTHORIZED** to sign any RFP's, RFT's, contracts or agreements arising out of recommendations V, VI, VII, VIII, IX and X approved as to technical content by the City Engineer, financial content by the City Treasurer and Chief Financial Officer, and as to legal content by the City Solicitor.

EXECUTIVE SUMMARY:

Council at its meeting of November 7, 2011, by way CR280/2011, requested that a report be brought forward to the 2012 Capital Budget deliberations regarding a five-year Sewer Surcharge model. This report will recommend a sustainable five-year Sewer Surcharge model.

Administration's Recommendation on Sewer Surcharge Rates

- 1) THAT, effective July 1, 2012, the Sewer Surcharge Rates be increased in accordance with Option 3 as detailed in this report and set at the following levels:

Residential Fixed Rate.....	66%
Residential Consumption Rate.....	487%
Commercial Rate.....	167%

Also, at its December 5, 2011 meeting Administration was asked to report back with specific additional recommendations to alleviate basement flooding. This report contains Administration's recommendations on mitigating measures which both the City of Windsor and its homeowners can undertake to alleviate future basement flooding events. This report describes the City's sewer network; provides an overview of the City's sewer maintenance practices; provides Council with an overview of Windsor's wettest year on record and the impact that it had on the City of Windsor's treatment plants;

identifies causes of basement flooding and identifies mitigating measures which can be taken both by homeowners and the City of Windsor to reduce the frequency and severity of basement flooding.

Administration's Recommendations to Alleviate Basement Flooding

- 1) Allocate \$2,950,000 (\$2,000,000, \$400,000, \$220,000 and \$330,000 in Capital Budgets 2013, 2014, 2015 and 2016 respectively) to expand downspout disconnections and proceed on a basis of offering it at no cost to homeowners.
- 2) Allocate \$300,000 to purchase and install live monitoring gauges at key locations on the sanitary trunk sewer system so that the City can react and vary flows from pump stations or other actions to control flow as needed.
- 3) Pre-Commit \$200,000 in the 2013 Capital Budget to carry out smoke and dye testing in specific areas.
- 4) Allocate \$50,000 for updating of IDF (Rainfall Intensity Duration and Frequency) curves.
- 5) Promote mitigating measures that homeowners can take to alleviate instances of basement flooding via the City's website and other social media sources.

2011 - A Record Year for Rainfall in Windsor

In 2011, Windsor received 1,568.2 mm of precipitation - **85%** above the average precipitation amount for the area. The wastewater treatment plants (combined) bypassed a portion of the treatment process for **3,767** million litres of wastewater compared to **840** million litres in 2010.

Basement Flooding relating to Homeowner Maintenance or Equipment Issues:

The following are reasons which often cause or contribute to basement flooding which homeowners can address:

- Poor lot drainage resulting in water flowing toward the home rather than away from it.
- Overflowing eaves troughs.
- Leaking/plugged downspouts.
- A leak in the home's foundation, basement walls, or basement windows and doors.
- Failure of the weeping tile system (foundation drains), resulting in water pressure building up around the foundation walls.
- Cross connections between weeping tiles and sanitary private drain connections.
- Sump pump failures due to power outages, overuse, or other mechanical malfunctions.

Basement Flooding relating to Infrastructure Issues:

The following are reasons which may cause or contribute to basement flooding arising from sewer infrastructure:

- A blockage in the sanitary sewer lateral between the home and the sanitary sewer main in the street from paper, grease, tree roots or other material.
- Inflow and infiltration into the collection system through leaking pipes or bad connections which reduces the pipes capacity.
- A blockage or failure at a pump station
- A backup of wastewater in the sanitary sewer system through the floor drain or other fixtures in the basement, (possibly a combination of sanitary sewer water from the sanitary sewer system and stormwater from the weeping tiles referred to as inflow and infiltration. (i.e. overwhelming of system).

This report also identifies mitigating measures that both homeowners and the City of Windsor can take to reduce basement flooding.

MITIGATING MEASURES TO ALLEVIATE BASEMENT FLOODING – HOMEOWNERS

- Take advantage of Basement Flooding Protection Subsidy Program
- Dispose fats / oils / grease properly
- Dispose of other household items properly
- Disconnect and maintain downspouts and eaves troughs
- Ensure proper lot grading
- Use rain barrels
- Repair leaks in home's foundation, basement walls and repair basement windows and doors
- Maintain weeping tiles and private drain connections
- Install green infrastructure (i.e. Rain gardens)
- Install a back-up sump pump system

MITIGATING MEASURES TO ALLEVIATE BASEMENT FLOODING - CITY OF WINDSOR (LONG TERM)

Sewer Works

Historically, the City of Windsor spends \$21.6 million annually on sewer works. Typically between \$10 and \$12 million annually is spent on sewer rehabilitation projects which reconstruct deteriorating sewers. The balance is spent on installing new sewers or replacing old sewers.

Some specific mitigating measures which can be taken to either help build additional capacity in the sewer system (i.e. delay entry of stormwater into the combined and sanitary sewer systems) or to ensure optimal functionality of the sewer network (i.e. flow monitoring, smoke & dye testing, etc.) are also described in this report.

I. IMPROVE PERFORMANCE OF THE EXISTING SEWER SYSTEM

- Downspout Disconnection Program
- Promote Mitigating Measures which Homeowners can Undertake to Alleviate Basement Flooding
- Sewer Modelling and Live Monitoring of Flows

II. ASSESS THE PHYSICAL CONDITION OF THE SEWER SYSTEM

- Smoke Testing in Specific Areas
- Dye testing in Specific Areas
- Separation of Combined and Over/Under Sewers
- Closed Circuit Television (CCTV) Inspection of Sewers
- Strategic Stormwater Strategy

III. DEVELOP AND IMPLEMENT A SYSTEM REMEDIATION/ IMPROVEMENT PLAN

- Update Current IDF Curves
- Storm and Sanitary Sewer Master Plans
- Permeable and Pervious Pavers
- Re-examine Sewer Surcharge Rate

The amount of Sewer Surcharge collected addresses the operating and capital budget needs of Pollution Control and Sewer Maintenance and Repair along with the administration of these programs. This report

provides a 2012 Sewer Surcharge Budget update and a recommended Sewer Surcharge rate option. It also provides information regarding the state of the City sewer system along with strategies to address basement flooding.

2. BACKGROUND:

At its meeting on November 7, 2011, Council approved the following resolution:

CR280/2011

*THAT Administration **BE DIRECTED** to continue development of the Administrative Phase of the budget based on the report of the CFO and City Treasurer, 2012 Proposed Budget Process & Timeline, as approved by CR236/2011 and;*

*THAT Council **PROVIDE DIRECTION** to Administration regarding any priority initiatives to be considered in the development of the 2012 budget and in the case of any initiatives requiring substantial research and analysis, any priority initiatives to be considered and reported upon in the development of the 2013 to 2015 budgets, including any increases or decreases to service levels and/or changes to the methodology of how the services are currently delivered and;*

*THAT the 5-year Capital Budget Plan **BE UPDATED** to include projects for the year 2016, balanced to projected available funding, and based on existing levels of contribution from the operating fund and updated revenue projections from the Sewer Surcharge and other funding sources and;*

*THAT an updated 5-Year Debt Reduction / Reserve Enhancement Model **BE PREPARED** and included in the 2012 budget documents and;*

*THAT an updated 5-year Sewer Surcharge model **BE DEVELOPED** and included in the 2012 budget documents and;*

*THAT the 2011 approved operating budget presented in a Program & Service view in Appendix A **BE RECEIVED** for information.*

This report provides an update on the impact of the sewer surcharge revenues now that the 2011 year-end has been closed and the Windsor Utilities Commission has set the water rates on which the sewer surcharge is applied.

It should be noted that there has been no sewer surcharge rate increase since August of 2007, although the sewer surcharge did benefit from a 3% water rate increase approved by the Windsor Utilities Commission in 2011.

Further, Council at its December 5, 2011 meeting asked Administration to report back with specific additional recommendations to alleviate basement flooding. This report contains Administration's recommendations on mitigating measures which both the City of Windsor and its homeowners can undertake to alleviate future basement flooding events. In addition, this report will describe the City's sewer network; provide an overview of the City's sewer maintenance practice; provide Council with an overview of Windsor's wettest year on record and the impact that it had on the City of Windsor's treatment plants; identify causes of basement flooding and mitigating measures which can be taken to reduce basement flooding. This report will also address other Council question(s) regarding specific instances of flooding.

3. DISCUSSION:

SEWER SURCHARGE

The Sewer Surcharge budget is usually updated annually and a 5 year projection, inclusive of the sewer surcharge rates, is approved in principle as part of the annual City budget.

Revised revenue projections from Windsor Utilities Commission (WUC) staff were recently received. These water projections reflect a decrease in water consumption as well as a consumption rate increase from \$0.297 to \$0.329 per cubic metre (10.8 % increase). Combined with status quo fixed charges, this translates to a 3% increase for the average water user. WUC's rate increase is scheduled to take effect July 1, 2012.

This current report illustrates three Sewer Surcharge rate options for Council to consider (discussed in detail in the Financial Matters section) when setting the sewer surcharge rates in 2012.

CITY OF WINDSOR'S SEWER NETWORK - OVERVIEW

Severe rain events, prolonged rain, or even rapid snow melts are all events which can overwhelm the City's sewer network and lead to basement flooding. Basements can flood with sanitary sewer water, stormwater, or a combination of both. The City's sewer network consists of approximately 1,700km of the following four types of sewers:

- 1) **Storm Sewers** carry stormwater runoff only. Storm sewers eventually drain to the Detroit River, untreated. There are 732 kilometres of storm sewers within the City of Windsor
- 2) **Sanitary Sewers** are designed to convey human domestic and industrial waste to the City's wastewater treatment facilities. The City of Windsor maintains approximately 675 kilometres of sanitary sewers.
- 3) **Combined Sewers** were constructed throughout the City until the 1950s. Combined sewers carry both stormwater and sanitary waste in a single pipe. Stormwater and sanitary water flow together to the City's wastewater treatment plants through 226 km of combined sewers.
- 4) **Over-and-Under Sewers** consist of a dedicated sanitary sewer pipe with a larger, separate storm pipe installed directly over it. There are 24.5 km of over-and-under sewers in Windsor which flow to the City's wastewater treatment plants.

Together, combined and over-and-under sewers represent 14.7% of the entire sewer system.

The City of Windsor also has two water treatment plants, Lou Romano Water Reclamation Plant (LRWRP) and Little River Pollution Control Plant (LRPCP). Drawing 3M-189 is attached as *Appendix B*. This drawing outlines the associated drainage areas for the two wastewater treatment plants. The Lou Romano Water Reclamation Plant drains approximately two-thirds of Windsor and accepts flow from Tecumseh and LaSalle.

From the drawing you can see that there are three main sewers that enter into the Lou Romano Plant:

- 1) Lands north of E.C. Row and West of Pillette feed by gravity to the C.M.H. Woods (formerly Caron Avenue) Pump Station and this flow is pumped to the LRWRP through the Riverfront Interception.
- 2) The Town of LaSalle pumps sanitary sewage to the Lou Romano Plant by agreement.
- 3) The Windsor area south of E.C. Row noted as area 3 in drawing 3M-189 flows by gravity to the LRWRP.

All three of the above flows enter the LRWRP at one location and are lifted into the Plant for treatment.

In addition to the two pollution control plants, the City has forty-three pumping stations (8 Sanitary, 29 Storm and 6 Combined). This is mainly due to the flat topography of Windsor. Pumping stations are a major component of the sewer network as they pump stormwater and sewage to the appropriate places for discharge or treatment. All sanitary pump stations have back-up power and all storm pump stations have overflows.

The City also has a newly constructed riverfront Retention Treatment Basin (RTB). The RTB is capturing, storing and treating combined sewer overflows that, before its construction, would otherwise discharge directly to the Detroit River. After a rain event, the solids retained by the RTB are conveyed by the sewer network to the LRWRP for further treatment.

As mentioned previously, there are 43 pump stations across Windsor. These pump stations are continuously monitored remotely from the LRWRP. There are a crew of 5 wastewater collection operators, licensed by the Ministry of the Environment, that ensure the pump stations are well maintained and operating efficiently. Staff are called out during wet weather events to ensure there are no problems with the pump stations. There were no significant problems with any pump station in 2011.

During this exceptional year for rainfall, the City's overall sewer network functioned properly but was often overwhelmed. Significant basement flooding of sanitary sewer water occurred simply as a result of *too much* rain water entering into the sewer system *too quickly*. However, parts of its 1,700km inventory have come from various expansions and annexations which have occurred throughout the years. As only 15% of the entire 1,700km of sewers have been examined using CCTV, anomalies, such as cross-connections, may exist in these sewers.

A properly designed, properly functioning sewer can still be overwhelmed in instances of significant rainfall - no matter how big the sewer is designed. As an example, the massive amount of rain Windsor received on November 29th, 2011(75mm) resulted in a **five-fold increase** in the volume of water pushing towards the City's sewage treatment plants which were *already* experiencing flows in excess of the plant's capacity due to rain received the previous day. In short, the system was overwhelmed. As a result, 311 received 355 calls for basement flooding (concentrated south of E.C. Row, west of Walker Rd.).

2011 - A RECORD YEAR FOR RAINFALL IN WINDSOR

According to Environment Canada, Windsor experienced its wettest year ever in 2011. The unusually frequent and often heavy rainfall in 2011 unfortunately resulted in many Windsor homeowners experiencing basement flooding. Some key 2011 Windsor weather facts are noted below:

- The average amount of annual precipitation for Windsor is 844 mm. In 2011, Windsor received 1,568.2 mm of precipitation - 85% above the average precipitation amount for the area.
- Windsor broke the previous recorded wettest year (1990, 1,227.5 mm) by October 19th (1,265 mm).
- 2011 was the wettest spring on record with 451.2mm of rain during March, April and May.
- September was the rainiest month of 2011 with 228 mm of rain falling, including 50.2 mm of rain falling on September 19th.
- The rainiest day of the year was November 29th. On that day, Windsor received 75 mm of rain.
- 2011 was the second snowiest winter for Windsor on record.

IMPACT OF RECORD RAINFALL ON TREATMENT PLANTS:

Lou Romano Water Reclamation Plant

In ideal conditions, the average daily flow to a pollution control plant is consistent and not impacted by wet weather. The reality is, during a wet weather event, the wastewater treatment plant can see a five-fold increase in plant flow because of rainwater entering the system. One problem with rainwater entering the sanitary system is that the rainwater is now conveyed to the wastewater treatment plant for treatment, rather than flowing untreated directly into the Detroit River. This has a significant economic effect on the treatment plant's Operating Budget. Additional costs are incurred for utilities, chemicals, labour and bio-solids disposal. A one day wet weather event can represent five days of dry weather flow treatment costs. This represents a significant portion of the plant's operating costs.

Last year, in comparison to 2010, saw a 42% increase in the number of weather events which exceeded the LRWRP's treatment capacity. The wastewater volume when compared to 2010 also increased by more than 17% in 2011. The volume of sewage which bypassed a portion of the treatment facility in 2011 also increased by 407% (compared to 2010). In 2010, all bypasses received primary treatment but in 2011, 5 events additionally bypassed primary treatment.

Please see the following chart for more detail.

LOU ROMANO WATER RECLAMATION PLANT							
	2010	No. Bypass	Bypass volume	2011	No. Bypass	Bypass volume	
	ML		ML	ML		ML	
Jan	5,087.30	-	-	4,125.73	1.00	11.30	
Feb	3,785.70	-	-	4,620.06	3.00	80.10	
March	5,608.10	3.00	35.00	7,652.40	5.00	380.60	
April	4,890.40	5.00	33.20	6,324.89	8.00	57.90	
May	5,991.30	6.00	56.80	6,284.03	3.00	103.31	
June	5,251.90	4.00	85.10	4,524.78	1.00	0.80	
July	5,496.80	6.00	37.00	5,378.43	8.00	77.82	includes 1 primary
Aug	4,411.10	-	-	5,079.89	3.00	66.70	
Sept	4,463.70	4.00	40.00	6,193.92	9.00	180.90	includes 2 primary
Oct	4,274.70	4.00	4.30	5,129.92	2.00	138.20	
Nov	4,553.30	5.00	35.20	5,953.20	6.00	545.70	includes 2 primary
Dec	4,027.80	1.00	0.10	6,309.31	5.00	12.40	
Total	57,842.10	38.00	326.70	67,576.55	54.00	1,655.73	
No primary bypasses in 2010							
Increase in flows			17%				
Increase in By passes			42%				
Increase in By Pass Volume			407%				

Little River Pollution Control Plant

The LRPCP saw an increase in flows of 24% and an increase of 311% of flows that bypassed a portion of the treatment process. In addition, there are flows that are not measured when the emergency bypass gate is opened when the plant reaches maximum pumping capacity. These flows are pumped to LRPCP via the Primore Pumping Station. This pumping station reaches its capacity and will need to be expanded if rainwater continues to enter the sanitary system.

LITTLE RIVER POLLUTION CONTROL PLANT							
	2010	No. Bypass	Bypass volume	2011	No. Bypass	Bypass volume	
	ML		ML	ML		ML	
Jan	1,050.70	-	-	1,141.89	1.00	53.25	
Feb	887.16	-	-	1,285.32	3.00	139.87	
March	1,518.23	3.00	9.20	2,294.67	9.00	358.58	
April	1,315.46	2.00	43.60	1,902.21	8.00	122.69	
May	1,773.38	9.00	101.40	1,930.34	3.00	221.06	
June	1,534.81	7.00	171.00	1,155.79	2.00	13.00	
July	1,569.48	7.00	96.30	1,407.36	5.00	140.47	
Aug	999.21	-	-	1,272.33	1.00	45.11	
Sept	1,154.66	2.00	27.90	1,799.19	6.00	267.29	
Oct	1,128.09	4.00	11.50	1,523.68	1.00	113.09	
Nov	1,255.27	8.00	53.30	1,447.82	4.00	398.45	
Dec	1,137.81	-	-	1,830.17	6.00	239.65	
Total	15,324.26	42.00	514.20	18,990.77	49.00	2,112.50	
Increase in flows			24%				
Increase in By passes			17%				
Increase in By Pass Volume			311%				

In 2011, the wastewater treatment plants (combined) bypassed a portion of the treatment process for 3,767 million litres of wastewater compared to 840 million litres in 2010. Annual reports outlining the plants' performance will be provided to Council in the near future.

SEWER WORKS

Historically, the City of Windsor spends \$21.6 million annually on sewer works. Typically between \$10 and \$12 million annually is spent on sewer rehabilitation projects which reconstruct deteriorating sewers. The balance is spent on installing new sewers or replacing old sewers.

Preventative Sewer Maintenance

Although the City of Windsor makes improvements annually to the complex system of underground pipes, sewers and catch basins, these improvements alone cannot completely protect a home from basement flooding. Given the volume of sewers to separate and/or repair it will take many years to completely accomplish.

There are eighteen employees in the sewer maintenance area who perform sewer maintenance on the City's 1,700km sewer network. The Sewer Maintenance Division has a preventative maintenance cleaning program wherein, subject to available resources, they routinely:

- Maintain sanitary sewers
- Clean storm sewers
- Clean catch basins
- Clean and grade municipal drains and roadside ditches.

Approximately \$1.3 million of the operating budget is spent annually on sewer maintenance as follows:

Sewer Flushing	\$ 400,000
Sewer Rodding	\$ 220,000
Sewer Bucketing	\$ 75,000
Private Drain (eel)	\$ 200,000
Catch Basin Cleaning	\$ 120,000
Interceptor Inspection	\$ 145,000
Miscellaneous	<u>\$ 140,000</u>
Total	\$1,300,000

This work is supported by the following equipment or crews:

- 4 flushers
- 1 rodder
- 1 set of sewer bucket machines
- 1 interceptor inspection crew
- 1 eel crew

Due to the volume and complexity (heavy sedimentation, roots, etc.), it takes more time to clean the City's 900km of sanitary/combined sewer network (approximately 5 years for one cleaning cycle, subject to attending to complaints and based on current resource levels) than it does to clean the stormwater sewers. Stormwater sewers which carry clear rain water are not as complicated as sanitary sewers to clean. Therefore, it only takes 3 years to complete a cycle of cleaning the City's stormwater sewer network, subject to attending to complaints and based on current resource levels.

Rodding of sewers in areas of the City known for root infiltration occurs continuously and takes approximately 2.75 years to complete one cleaning cycle.

CAUSES OF BASEMENT FLOODING

Basement flooding from a sanitary sewer backup can occur when too much rainwater enters the sanitary sewer system during wet weather events. When this occurs, residences without adequate backflow protection may experience a sewer backup into the basement from the floor drain or other plumbing fixtures.

Councillor Marra at Council's November 21, 2011 meeting through CQ73-2011 asked Administration to:

"Prepare a report with regards to the basement flooding that has occurred along Wachna and its abutting streets. The report is to include what infrastructure improvements are required for a permanent solution to stop the basement flooding in this area".

A grease obstruction was found in the sewer in this area following the June, 2010 severe weather event, which likely would have caused or contributed to flooding in that area. Further investigation continues as to whether a cross-connection exists. It is anticipated that flow monitoring, as recommended in this report, will assist Administration in determining the cause of basement flooding in this area.

Basement Flooding - Homeowner Maintenance or Equipment Issues:

The following are reasons which often cause or contribute to basement flooding which homeowners can address:

- Poor lot drainage resulting in water flowing toward the home rather than away from it.
- Overflowing eaves troughs.
- Leaking/plugged downspouts.
- A leak in the home's foundation, basement walls, or basement windows and doors.
- Failure of the weeping tile system (foundation drains), resulting in water pressure building up around the foundation walls.
- Cross connections between weeping tiles and sanitary private drain connections.
- Sump pump failures due to power outages, overuse, or other mechanical malfunctions.

With increasingly frequent and severe weather events related to climate change, it is essential that homeowners also take the appropriate action to reduce the risk of basement flooding on their own private property.

Basement Flooding - Infrastructure Issues:

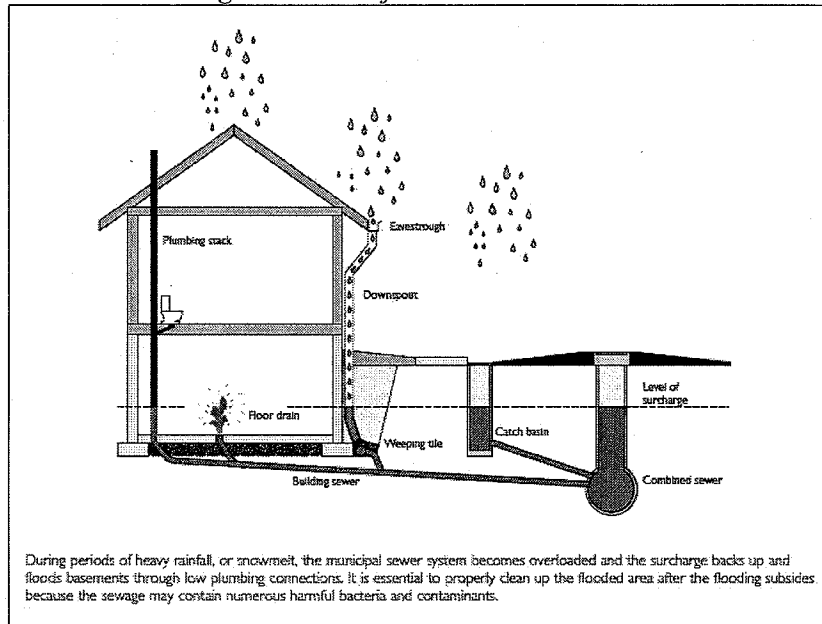
The following are reasons which may cause or contribute to basement flooding arising from sewer infrastructure:

- A blockage in the sanitary sewer lateral between the home and the sanitary sewer main in the street from paper, grease, tree roots or other material.
- Inflow and infiltration into the collection system through leaking pipes or bad connections which reduces the pipe's capacity.
- A blockage or failure at a pump station
- A backup of wastewater in the sanitary sewer system through the floor drain or other fixtures in the basement, (possibly a combination of sanitary sewer water from the sanitary sewer system and stormwater from the weeping tiles referred to as inflow and infiltration. (i.e. overwhelming of system).

Sewer Backup

When sewers are overloaded, the water level in the system rises to above normal design levels, and this condition is referred to as "surcharge." In such instances, basement flooding can occur if the home has sanitary fixtures or floor drains below the surcharge level.

Basement Flooding as a result of an overloaded sewer



Canada Mortgage and Housing Company. (2011). *Avoiding Basement Flooding*. Retrieved from: http://www.cmhc-schl.gc.ca/en/co/maho/gemare/images/figure2_lrg.jpg

Effective January 1, 2012, the Building Department implemented City-wide enforcement of the Ontario Building Code by mandating backwater valves on all newly constructed single family, semi-detached and townhouse dwellings. In addition, all lot grading plans for new developments are required to include details and notes on the provision of backwater valves.

MITIGATING MEASURES TO ALLEVIATE BASEMENT FLOODING -HOMEOWNERS

1. Basement Flooding Protection Subsidy Program

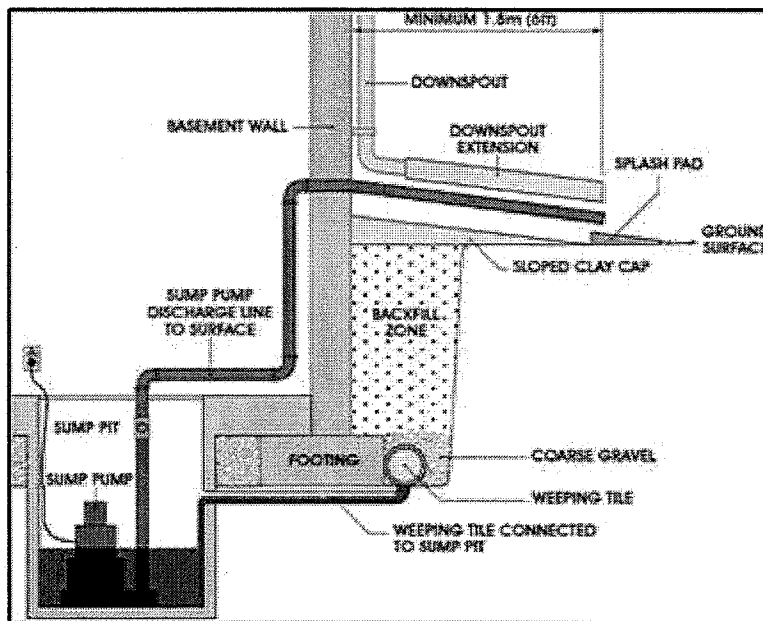
As a result of a previous major rain storm received in June 2010 which resulted in significant basement flooding (2,220 calls were received reporting basement flooding concentrated east of Pillette), Council, at its May 3rd, 2011 meeting approved Administration's recommendation to establish a Basement Flooding Protection Subsidy Program. Originally, the program offered financial assistance to homeowners in the three geographic areas of the City most adversely affected in this regard to undertake basement flooding risk mitigation measures. However, on July 18th, 2011, Council approved an extension of the boundary of the program to include all residential home owners in the City that have experienced basement flooding in the past, with all other program criteria remaining in effect. Through the Basement Flooding Protection Subsidy Program, the City offers homeowners a financial subsidy to install a sump pump and/or backwater valve(s) and/or to disconnect foundation drains from the floor drain.

Homeowners are encouraged to continue to take advantage of this subsidy program. More information about the program and its requirements can be found on the City's website at:

[http://www.citywindsor.ca/homeowners/maintenanceandfieldservices/sewers-/pages/basement-flooding-protection-subsidy-program-\(bfp\).aspx](http://www.citywindsor.ca/homeowners/maintenanceandfieldservices/sewers-/pages/basement-flooding-protection-subsidy-program-(bfp).aspx)

Why Install a Sump Pump?

A sump pump is a pump that is used to protect the basement from flooding by removing water from around the basement foundation. The sump pit (about the size of a beach ball), is usually positioned in a hole in the basement floor. Groundwater filters through the ground and is collected in the weeping tiles and directed to the sump pit. When water in the sump pit reaches a predetermined level (using a sump pump float) the sump pump will come on and discharge the excess water.



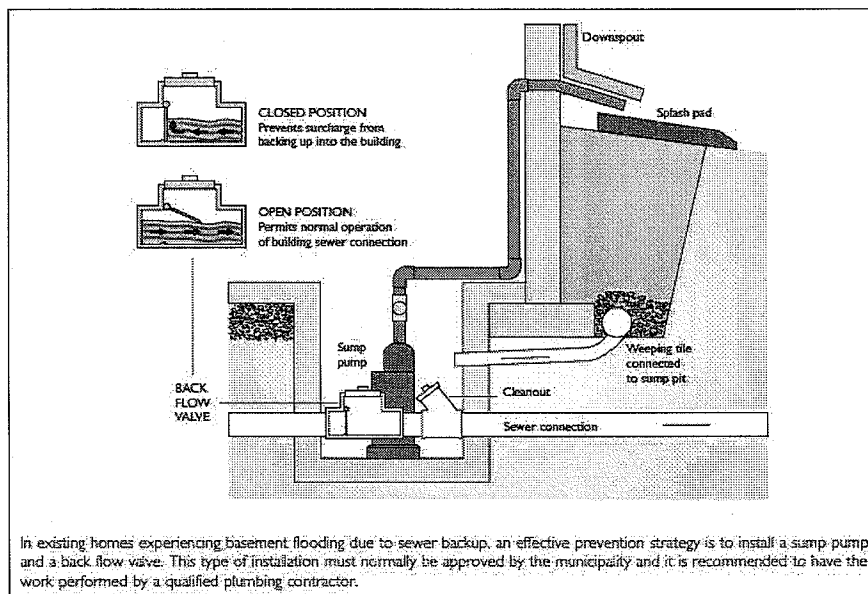
Canada Mortgage and Housing Company. (2011). *Avoiding Basement Flooding*. Retrieved from:
http://www.london.ca/d.aspx?s=/Sewer_and_Wastewater/Basement_Flooding_House/Element_10_Sump_Pump.htm

It should be noted that installation of a sump pump is often required in combination with a backwater valve to ensure that foundation drains are separated from floor drains. Otherwise, basements may still flood if this separation does not occur.

Why Install a Backwater Valve?

Installing a backwater valve can help prevent sewage in an overloaded main sewer line from backing up into your basement. The backwater valve automatically closes if sewage backs up from the main sewer. It is important to position the backwater valve so as to allow easy access in order to check it and remove any material that may prevent the backwater valve from operating properly. A backwater valve can be installed either inside or outside of your home.

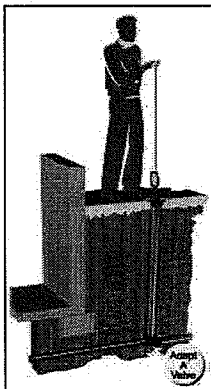
Example of an Internal Backwater Valve Installation



Canada Mortgage and Housing Company. (2011). *Avoiding Basement Flooding*. Retrieved from: http://www.cmhc-schl.gc.ca/en/co/maho/gemare/images/figure5_lrg.jpg

Retrieved from: http://www.cmhc-schl.gc.ca/en/co/maho/gemare/images/figure5_lrg.jpg

Example of an External Backwater Valve Installation



Mainline Backflow Products (2011) *Adapt-A-Valve™*. Retrieved from (<http://mainline.xeaservices.com/Upload/products/adapt-a-valve/adaptavalue.pdf>)

Basement Flooding Protection Subsidy Program Statistics

Program Funding:

- \$500,000 (2011 Capital Budget)
- \$250,000 (2012 Recommended Capital Budget) (not yet approved)
- \$1,000,000 (2013-2016 Proposed Capital Budgets)

Total = \$1,750,000 (Assumes approval of 2012-2016 amounts)

As of May 24, 1,046 Basement Flooding Protection Subsidy Program applications have been received. Of the 1,046 applications:

- 810 applications have had Courtesy Inspections completed by Building Inspectors and have determined that eligible work under the program exists and can be completed.
- 236 applications have not yet had a Courtesy Inspection to determine eligible work.

Of the 810 applications (above) which have had a Courtesy Inspection:

- 326 applications are complete meaning that building permits have been finalized and payments totalling \$569,672.45 have been issued.
- 247 applications have expired (greater than 60 days has elapsed since the initial Courtesy Inspection with no Building Permit for eligible work having been taken out).
- 187 Number of applications for which a Courtesy Inspection has been performed but for which a subsidy payment has not been issued. The estimated payment for this work is \$326,775.30
- 22 applications have been withdrawn/rejected/cancelled.
- 12 applications re-submitted and logged twice on the tracking spreadsheet
- 11 applications not processed due to taxes not being current.
- 5 applications not processed for other reasons.
- As of May 24th, payments and projected payments total \$896,447.75

If all applications proceed, funds may need to be advanced from future years; however, Administration has, and continues to monitor the program. The attached in camera memo (**Appendix C**) details issues regarding some plumbing contractors which have had to be addressed.

2. Dispose Fats / Oils / Grease Properly

Pouring fats, oils, and grease down the drain can block the main sewer lines as well as those on private property. Grease solidifies when it cools. A blockage or obstruction caused by fats, oils and grease can result in sewer backups, property damage and significant costs to homeowners and to the City. Homeowners are asked to store fats and grease in a disposable container. When it is full, it can be thrown out with other garbage.



Pipe clogged with fats, oil and grease

London, Canada. (2012). What the FOG? Retrieved from:
http://www.london.ca/d.aspx?s=/Sewer_and_Wastewater/Basement_Flooding_House/Element_2_FOG.htm

3. Dispose of Other Household Items Properly

Paper towels, diapers, rags, grease and other household items should not be flushed down toilets. Foreign objects can cause blockages or restrictions in plumbing and cause water to back-up into a home.

4. Disconnect and Maintain Downspouts and Eaves Troughs

When foundation drains are connected to floor drains much of the run off from the roof can end up in the basement if the sanitary sewers fill with rain water. Downspout disconnection, in tandem with proper downspout discharging methods (i.e. directed to front or rear yards – side yards are done where space and flow of drainage is available), will help delay entry of stormwater into the combined and sanitary sewer systems.



London, Canada. (2012). Rain, rain, go away! Retrieved from:
http://www.london.ca/d.aspx?s=/Sewer_and_Wastewater/Basement_Flooding_House/Element_3_Downspout.htm

In the City's current tender for downspout disconnection, the cost for each individual downspout disconnection is \$75. Therefore, per household, downspout disconnection costs between \$75 and \$500, depending on how many downspouts are to be disconnected. At approximately 70,000 households in Windsor, the cost to disconnect all downspouts in the City of Windsor could range anywhere from \$5.25 million to \$35 million. It is noted that some houses are already disconnected and not all downspouts can be disconnected due to physical restrictions.

Many houses even with separated sewer systems still have foundation drains connected to their floor drains, therefore, even in smaller rainfall events which do not create overflow conditions, extraneous flow (rainfall) enters the sanitary system via downspouts still connected to the sanitary sewer and are mixed with sanitary sewage which is carried to the City's wastewater treatment facilities for final treatment and disposal. The presence of extraneous flow creates an additional and unnecessary load on the treatment plants and also represents an additional expense to the corporation as this water is treated as though it were sewage. As reported by the City for OMBI (Ontario Municipal Benchmarking Initiative) in 2010, the total cost to treat and dispose of wastewater in the City of Windsor was \$364.17 per mega litre. In 2010, the wastewater treatment plants processed a total of 73,166 million litres of wastewater. There is no easy method to quantify how much of the total flow was attributed to combined sewer overflows, however, a conservative estimate of 10% equates to \$2.7 million a year to treat and dispose of rain water. Downspout disconnection will reduce but not eliminate the unnecessary treatment of rainwater at pollution control plants.

Maintaining eaves troughs in proper working order is still required even if they are disconnected from the foundation drain. Otherwise, the eaves may overflow and spill water out next to your foundation and ultimately end up in your basement.

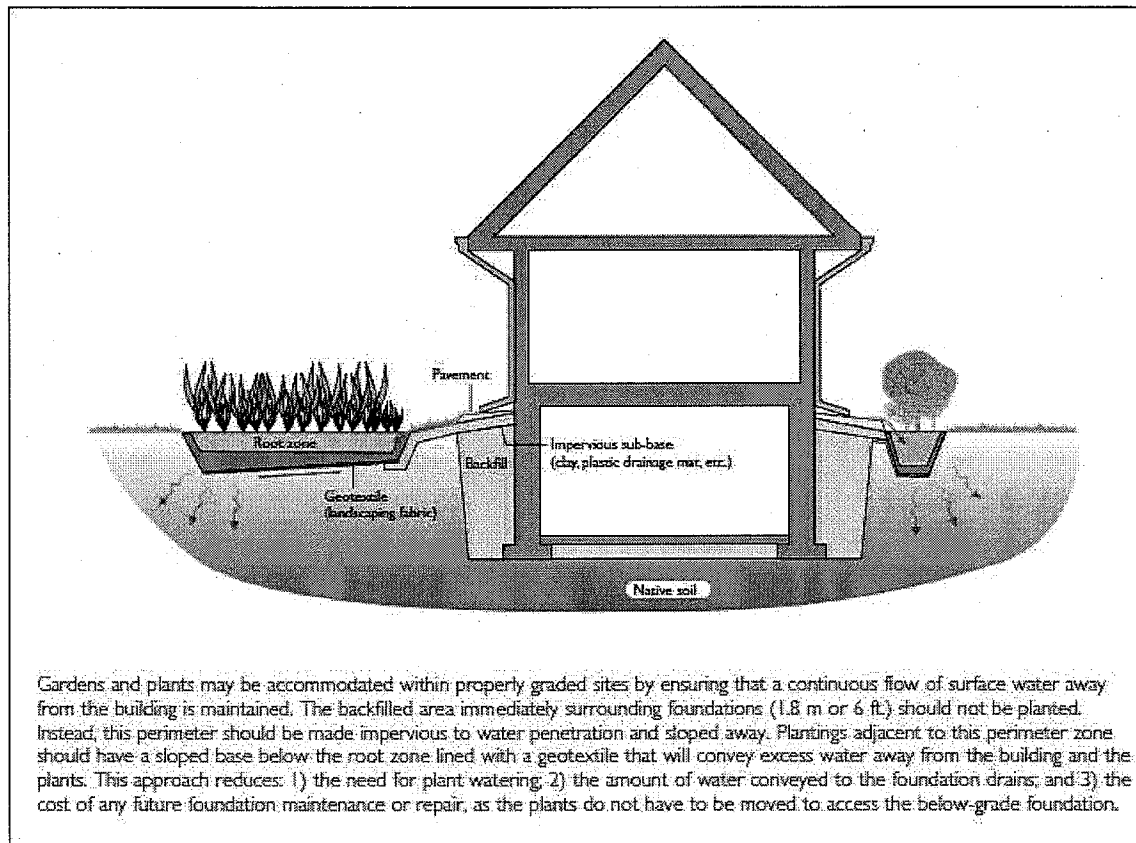
Downspout disconnection may lead to increased standing water complaints (from water from the downspout accumulating on the homeowner's surrounding property). Statistics from the Building Department indicate that, on average, 150-200 property flooding/grading complaints are received annually. While complaints/investigations in this area may increase, the benefits of reducing the amount of stormwater entering into the sanitary sewer system outweigh the risk of isolated backyard flooding.

It has been suggested that perhaps the City should offer a subsidy program to encourage people to install rear yard drainage in their yards to help water drain away. The City Engineer is not in favour of such a program as the goal is to slow stormwater from getting into the sewer system. It is recommended homeowners provide the solution at their cost. As such, the Building Department should only be responsible for investigating rear yard flooding complaints that are directly a result of poor grading of adjacent properties.

During wet years and spring thaws, water in rear yards will exist and needs to be accepted. However, in situations where rear yard standing water exists for more than two days, it should be addressed; it is recommended that this be the responsibility of individual homeowners.

5. Ensure Proper Lot Grading

Proper lot grading keeps rainwater away from your foundation and basement walls. This is an important element of preventing basement flooding.



Canada Mortgage and Housing Company. (2011). *Avoiding Basement Flooding*. Retrieved from: http://www.cmhc-schl.gc.ca/en/co/maho/gemare/images/figure3_lrg.jpg

6. Use Rain Barrels to Collect Rainwater

A rain barrel is a specialized stormwater storage container connected to an eaves trough downspout from a house or building. A typical 1/2-inch rainfall will fill a 50 to 55 gallon barrel. Approximately a half gallon of water per square foot of roof area can be collected during a 1 inch rainfall. A 2,000-square-foot roof can collect about 1,000 gallons of water (accounting for about 20 percent loss from evaporation, runoff and splash). The use of rain barrels for rainwater collection is also an effective way to reduce the demand for potable water during the peak summer season. It is estimated that lawn and garden watering make up nearly 40 percent of total household water use during the summer months.

7. Repair Leaks in Home's Foundation, Basement Walls and Repair Basement Windows and Doors

Homeowners are encouraged to check for leaks in their home's foundation, basement walls or around basement windows and doors and to waterproof any cracks they find.

8. Maintain Weeping Tiles and Private Drain Connections

Inflow and infiltration is a significant contributor to basement flooding and is something that individual homeowners can effectively address by assessing their property's drainage and removing improper stormwater connections from the sanitary sewer system.

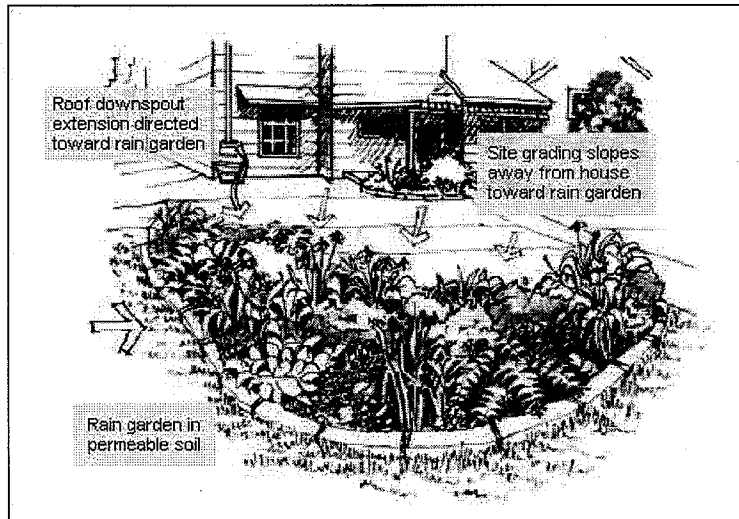
9. Install Green Infrastructure (i.e. Rain Gardens)

Some homeowners in other municipalities are using "rain gardens." The concept behind a rain garden is that a garden is designed with a central depression to retain rainwater runoff in order to give the rain time

to absorb into the soil. Apart from diverting this water from municipal infrastructure, this infiltration helps recharge groundwater and protects local water quality by reducing polluted runoff.

Brookston clay soil is prevalent throughout the region and is a significant challenge facing homeowners in Windsor wishing to install a rain garden. Brookston Clay soil is not known for its infiltration properties.

Another option for implementing some stormwater management in a clay-rich garden site is to replace turf grass with wet-tolerant native plants without creating a depression. Native plants will greatly improve the clay site by making the best use of water and soil resources.



Canada Mortgage and Housing Company. (2011). *Rain Gardens: Improve Stormwater Management in Your Yard*. Retrieved from: http://www.cmhc-schl.gc.ca/en/co/maho/la/la_005.cfm

10. Install a Back-up Sump Pump System

Since a sump basin may overflow if not constantly pumped, a backup system is important for instances where the main power is out for prolonged periods of time, as during a severe storm. Examples of back-up systems include battery backup or a water-pressurized powered sump pump.

MITIGATING MEASURES TO ALLEVIATE BASEMENT FLOODING - CITY OF WINDSOR (LONG TERM)

1. Improve Performance of the Existing Sewer System

The City's sewer systems (1,700kms) were constructed over a period of decades and several areas were inherited from the preceding municipalities which were subsequently amalgamated with and/or annexed by the City of Windsor (i.e. Town of Walkerville, Ford City, Town of Riverside, Sandwich East Township, and Sandwich West Township). The sewer systems were designed and constructed to the standards of the municipality at the time. As only 15% of the entire 1,700km of sewers have been examined using CCTV, anomalies, such as cross-connections, may exist in these sewers. As a result, there is more to learn about the condition of the sewer network.

Some ways to improve the performance of the existing sewer system include:

Expand the Downspout Disconnection Program

Downspout disconnections will reduce but not eliminate the unnecessary treatment of rainwater at pollution control plants. Subject to funds available, the City will expand the current downspout disconnection program with the goal being to further increase capacity in the sewer network by reducing or delaying the amount of stormwater entering the combined and sanitary sewer systems. This expanded downspout disconnection program would begin in Area 3 identified in *Appendix B* and migrate to Area 1. Downspout disconnection is already occurring in Area 2 as part of the current downspout disconnection program. This program will need to be resourced as our staff is already engaged as a result of the construction season.

Promote Mitigating Measures which Homeowners can Undertake to Alleviate Basement Flooding

The Office of the City Engineer will work with the City's Communications & Customer Service department and the Building Department to develop how-to videos, information, etc. wherever possible to promote through the effective use of social media and the City's website those mitigating measures which homeowners themselves can take to alleviate instances of basement flooding including:

- Take advantage of the City's Basement Flooding Protection Subsidy Program
- Proper disposal of fats / oil / grease and other household items, etc.

Sewer Modelling and Live Monitoring of Flows

Many municipalities are now creating a computerized model of their entire sewer system. Installing flow meters in manholes throughout the system allows the City to monitor the flows and determine how the system is actually performing. From the data collected by the flow monitoring equipment the computer model can then be developed and calibrated. The length of the data collection process is determined by the amount of precipitation and the amount of flow monitors installed in a given year.

In the City of Windsor's case, monitoring of flows in the sewer system will allow for an understanding and quantification of the components of the flow itself and help determine the volume of extraneous flow in the system (i.e. infiltration, cross connections). Extraneous flows occur in the form of relatively clean rain water or ground water that enters the sanitary sewers. This influx reduces the capacity of the sewer lines for sanitary inflow. The treatment plants are also overloaded by sudden inflows of relatively clean rain water. This overloading can cause problems with the sensitive biochemistry of the treatment plants and can also cause hydraulic problems within the plants and the collection system.

Quantification of flows can lead to the identification of the sources of extraneous flows, blockages or restrictions due to tree roots, grease, collapsed pipes, etc. Once identified, programs to eliminate the inflow sources can be derived. This is a proactive measure of identifying problems in the sewer system before homes are flooded. The Public Works Operations Department can use this data to schedule CCTV, sewer flushing, and maintenance. The Engineering Department can also use this information to schedule sewer replacements. The sewage treatment plant can use this data to look into ways to better control plant and pump station operation.

Some municipalities have developed in-house expertise once the computer model is completed. This includes engineers to perform the ongoing modelling, field technologists who install, clean and monitor the flow meters on a daily and weekly basis, and an analyst who reviews the data. Once the model is completed the City needs to determine if they have the internal resources to keep the model updated on a continuous basis or have a consultant provide this ongoing service.

Administration proposes purchasing 20 permanent flow monitors so that the City of Windsor can begin to collect valuable data. Administration also recommends hiring a consultant to undertake *additional* flow monitoring and development of the computerized hydraulic model of the City's sewer system in order to

assist and improve the overall sewer network functionality. This data collection and modelling work is also required for the sewer master planning process currently budgeted to begin in 2012.

2. Assess the Physical Condition of the Sewer System

Conduct Smoke Testing in Specific Areas

Smoke testing in specific areas is a quick and inexpensive method of inspecting a sewer system as it requires little equipment and manpower. Smoke testing has proven to be an effective tool for determining leaks/ the presence of broken pipes, improperly sealed laterals, illegal lateral drains, and cross connections between different systems. A non-toxic smoke device or liquid smoke is placed in a manhole along with a blower. The blower pushes the smoke through the system. Cracks or improper connections are exposed when the smoke is seen filtering out of the pipe. A contractor will need to be engaged to perform this testing as the City no longer has the staffing or expertise to conduct this testing. Co-ordination with Windsor Fire & Rescue along with public awareness is required for this type of testing.

Conduct Dye Testing in Specific Areas

Dye testing is used to trace the flow of effluent through the sewer system and to check if stormwater drains are connected to sanitary sewers through illegal or unrecorded connections. A non-toxic powder dye is added to drains and mixes with fluid carried by the pipe, giving it a highly visible colour that can be easily traced. The flow of the fluid through the sewer system is then monitored by inspecting manholes located downstream from the point of the dye application.

Increase Closed Circuit Television (CCTV) Inspection of Sewers

Certified CCTV operators use the video footage to record the type and location of defects. CCTV is an effective tool and common industry method for inspecting pipes/sewers. It provides visual data on leaks, location of service laterals, and sediment and debris accumulation and assists with maintenance, design and helps to identify both long and short term needs of the collection system. The inspection procedure involves moving a video camera through the sewer to record the condition of the interior surfaces of the sewer. This program began in 2009 with a funding level for a 25 year cycle. To date, only 15% of the City's sewer network has been examined by CCTV. As stated previously, the use of flow data from the computer model could assist in determining the priority of CCTV.

3. Develop and Implement a System Remediation/Improvement Plan

Update Current IDF Curves

Management of municipal water infrastructure (sewers, stormwater management ponds or detention basins, street curbs and gutters, catch basins, swales, etc.) is based on the use of local rainfall Intensity Duration Frequency (IDF) curves developed using historical rainfall time series data. IDF curves are a set of guidelines which informs the design and implementation of everything from pipe size to pump strength and construction practices.

The current IDF curves were developed in the early to mid-1970's. It is unclear what data or methodologies were used to develop the current curves. Discussion with surrounding municipalities has occurred with respect to cost-sharing the updating of IDF Curves. Updating the curves will introduce current, up-to-date IDF information and methodologies and will allow us to design sewers using the more current information, taking advantage of modern methods of modelling.

ERCA, at its April 12, 2012 Board Meeting approved \$80,000 to update the region's IDF curves and also recommended that ERCA's Administration coordinate the development and delivery of the Intensity

Duration Frequency curve update study with participation from all mainland municipalities. Administrations of surrounding mainland municipalities are agreeable to cost-sharing on this initiative. If ERCA is successful in getting these municipalities involved the City's share (\$50,000 maximum) may be reduced.

Develop the Storm and Sanitary Sewer Master Plans

The 2014 and 2015 Capital Budgets have funds available in them to complete the Storm and Sanitary Sewer Master Plans. The development of these plans will benefit from having flow monitoring and preliminary modelling completed if approved through this report.

The development of the Storm and Sanitary Master Plans should also include consideration of the updated IDF curves. It would be beneficial to have the updated IDF curves available prior to undertaking the Master Planning process.

Develop a Strategic Stormwater Strategy

Livelihood Report #15549, Update on the Climate Change Initiative, recommends that City Council approve the development of a comprehensive Stormwater Management Strategy. This strategy will look at the best management practices from other municipalities and will look at new innovative methods of handling stormwater. Some examples of new innovative methods may include the use of stormwater planters and pervious pavers.

Investigate Permeable and Pervious Pavers

Most paved areas are covered in impermeable surfaces such as asphalt and concrete and are graded towards catch basins. Runoff from these surfaces quickly enters the sewer system. Alternatively, pervious or porous paving has a certain amount of space that allows water to percolate through the surface, slowing and reducing the amount of runoff entering the sewer system.

Through the development of the strategic stormwater strategy, administration will investigate the feasibility of using stormwater planters and pervious pavers when new improvements are made.

Continue with Separation of Combined and Over/Under Sewers

The City of Windsor is working towards replacement of combined sewers and over/under sewers with a separated system (separate sanitary and storm) where practical. Unfortunately, due to the *significant* cost associated with this, it will not happen quickly. The estimated cost of separating combined and over-and-under sewers is \$500,000,000 to \$625,000,000 (2011 estimates). Based on current expenditure levels in the Sewer Rehabilitation budget (\$10 to \$12 million/year), it would take anywhere from 52 to 65 years to complete this separation of sewers.

As identified in the Windsor Riverfront Pollution Control Planning study, some type of combined sewer overflow storage west of C.M.H. Woods pumping station located at Caron Ave. is recommended. Possibly another retention treatment basin or in pipe storage could be considered. Long term solutions would result from the Storm and Sanitary Sewer Master Plans.

ADMINISTRATION'S RECOMMENDATIONS TO ALLEVIATE BASEMENT FLOODING

Administration recommends the following:

- 1) Allocate \$2,950,000 (\$2,000,000, \$400,000, \$220,000 and \$330,000 in Capital Budgets 2013, 2014, 2015 and 2016 respectively) to expand downspout disconnections and proceed on a basis of

offering it at no cost to homeowners. However, if downspout disconnection ever becomes mandatory at a point in time and the homeowner did not take advantage of this Program then disconnection would be at the homeowner's costs.

- 2) Allocate \$300,000 to purchase and install live monitoring gauges at key locations on the sanitary trunk sewer system so that the City can react and vary flows from pump stations or other actions to control flow as needed. These flow monitors would be permanent and would require maintenance. Currently, we have staff available which could be reallocated to get the equipment up and running and until a long term maintenance program is developed. Alternatively, a contractor could be engaged to maintain the equipment. In future years, operating costs would be part replacement or gauge replacement in the operating budget.
- 3) Pre-Commit \$200,000 in the 2013 Capital Budget to carry out smoke and dye testing in specific areas.
- 4) Allocate \$50,000 for updating of IDF curves.
- 5) Promote mitigating measures that homeowners can take to alleviate instances of basement flooding via the City's website and other social media sources.

Why is downspout disconnection important? If rain water entering the sanitary sewers can be delayed or directed to storm sewers, the level of surcharging on sanitary sewers can be reduced by 2 ft (the sanitary sewer on the Western main trunk is 30 feet deep and surcharged 24 feet). Had downspouts been disconnected during the previous major flood events, then most of the basements that flooded would not have. A 10% reduction in water volume heading to the sanitary sewer would greatly reduce instances of basement flooding.

Mandatory downspout disconnection is very effective but meets with resistance from many homeowners. In addition, the City cannot spend up to \$35 million for mandatory downspout disconnection as the bulk of available funds are required on sewer improvement.

4. RISK ANALYSIS:

SEWER SURCHARGE

There are a number of risks to be considered in conjunction with establishing the 2012 Sewer Surcharge rates some of which are summarized briefly below:

Expenditure Risks - The various options put forth are based on current estimates of the required expenditures relative to Pollution Control, Sewer Maintenance and Repair, Capital Expenditures, etc... These estimates are expected to be reflective of final actual costs, however there is the risk given that these costs will be incurred throughout the year that some fluctuations in the expenditures as compared to budget may occur.

Consumption Risk - In addition to the operating expenditure increases noted above, additional pressure on the sewer surcharge rate is projected to come from an estimated 3% sewer surcharge revenue decrease related to the reduced consumption of water. This component of the budget adds approximately \$1.6 million in budget pressures. Essentially, the decreased water consumption leads to a lower water bill (all

other things being equal) which in turn reduces the City's revenues from the sewer surcharge. At this point the consumption reduction is purely an estimate and may be subject to some variability.

Capital Project Risks - The capital budget items put forth, reflect the best estimate of the capital costs required to complete the various projects under the capital plan. As with all budgets, these represents management's best estimates of the expected capital costs however as with all capital projects there is always the risks that costs may increase due to unforeseen issues that could not have been reasonably predicted.

Risks from possible Reduction in Capital Program - Some options consider the possibility of reducing the Capital Budget component of the Sewer Surcharge. Any consideration to such options should consider significant reductions in the capital program may result in significant negative impacts on the infrastructure and the local construction industry. There could also be a resultant impact on the ability to maintain the existing sewers thereby reducing the pace of eliminating combined or leaky sewers.

Risks from Depleting the Sewer Surcharge Reserve - Some options consider fully depleting the sewer surcharge reserve in order to address the budgetary requirements. This would leave the Corporation without a dedicated reserve to fund any shortfall. This is especially risky given the trend of declining revenues due to decreasing water consumption

BASEMENT FLOODING

Basement flooding is a problem for homeowners and municipalities across Canada. Homeowners can take action to reduce their risk of flooding by limiting their homes' impact on sewer and stormwater management infrastructure. Many municipalities in Canada (Regina, Winnipeg, Toronto, Hamilton, St. Catharines, London, etc.) have developed comprehensive programs designed to increase homeowner involvement in reducing basement flooding through education campaigns, and subsidy and grant programs.

Climate change has and will continue to impact the occurrence of basement flooding. The City of Windsor is committed to undertaking maintenance, initiatives, and research within its fiscal limits and available resources to alleviate instances of basement flooding.

If no action is taken, status quo will remain, and the frequency or severity of flooding will not be reduced should Windsor experience another severe rainfall event.

5. FINANCIAL MATTERS:

SEWER SURCHARGE

2011 Year-End Results

The 2011 Sewer Surcharge Operating Fund ended the year essentially on budget with a slight surplus of \$104,000 (or 0.2%) of the total budget. This surplus was transferred to the Sewer Surcharge Reserve Fund. The balance in this reserve fund is approximately \$1.5 million net of current commitments.

Recommended 2011 Operating Expenditures

The sewer surcharge funded operating costs are very challenging to reduce in the short term. Many of the processes in the pollution control plants are provincially legislated and must meet ever increasing standards. The maintenance of the sewer system is also driven by required repairs, with most being

reactionary in nature due to the age of the City's sewer infrastructure. Failing to provide ongoing maintenance will result in more expensive future replacement costs.

The sewer surcharge funded operating budget was reviewed in detail as part of the 2012 Operating Budget process with an effort to reduce costs wherever possible. During the 2012 operating budget, management did review a number of areas for possible operating efficiencies. Budget adjustments were made wherever possible. Some of the areas considered include the reduction of landfill monitoring costs, a review of lab services and other service reductions some of which were accepted and others which were not.

Overall, the operating budget requirements have increased by approximately \$2.5 million as compared to 2011 (assuming status quo capital expenditures as discussed in the next section of the report). The table below reflects the nature of the various changes relating to the \$2.5 million increase. It should be noted however, given that there was a surplus to budget amount which was to be included in the 2011 estimates to be transferred to the reserve fund of approximately \$400,000, the net 2012 budget increase is \$2.1 million (\$2.5 million less \$400,000).

Description	Explanation	2012 Budget Change
Utilities Inflationary Adjustment (Hydro)	Administration has forecasted a 3% increase in electricity costs for 2012 based on available industry projections.	90,478
Utilities Usage Adjustment (Hydro, Water, Gas)	An account by account review was undertaken utilizing the most current available cost and consumption data.	451,522
Increase in Salary Recoveries	Increase related to negotiated salary contracts that are recoverable from the Sewer Surcharge.	194,266
Reduction in Sewer Replacement & Repairs	Reduction in the number of sewer replacement and repairs to be carried out in 2012.	(20,280)
Operating Costs Related to the Retention Treatment Basin	A firm estimate has yet to be received on the costs required to operate the new facility on an annual basis however, based on 2 months of operations, an initial increase of \$153,000 is being proposed.	153,000
Chemical Costs at the Lou Romano Water Reclamation Plant	Operational processes have been optimized, however, based on increases in primary sewage flows of 10% over a 3 year average a budgetary increase is required.	380,000
Property Tax Increase Related to New Pump Stations	This reflects a budgetary realignment for the property taxes associated with the current pumping stations. New facilities such as the RTB and the Howard & Walker underpass, have not been assessed and therefore are not reflected in this increase.	50,000

Reduction in Infrastructure Repairs at Landfill Sites	The majority of the budget required within the Landfill Sites Division is for landfill monitoring contracts with external consultants. This budget reduction is recommended by Administration.	(40,000)
Reduction in Laboratory Services	The contracting out of Metals Analysis, without staff reductions, results in a savings of \$16,800.	(16,800)
Security at Crawford Yard	Additional costs are related to the introduction of a security function at Crawford Yard.	80,000
Various Other Related Increases	Increased costs associated with items such as debt servicing, the overhead allocation and the 2011 budget adjustments from the corporate provision.	458,883
City of Windsor Increase		1,781,069
EnWin Utilities Administrative Fee*	Largely the result of various departmental cost drivers and estimates including a change in allocation to the City for meter reading costs, increase in OMERS contribution rates and increased collection costs. Other increases to depreciation expenses are related to Enwin Utilities' requirement to meet International Financial Reporting Standards (IFRS).	789,858
Total Net Operating Increases		2,570,927

*It should be noted that the EnWin Utilities Administrative Fee has increased by approximately \$500,000 as compared to 2011. However, the City's budget for this fee is increasing by \$789,858. This is due to the difference in timing that the two entities finalized their 2011 budget.

The new 2012 Sewer Surcharge Forecast (2012-2016) is attached as Appendix A to this report and provides three options for consideration.

Recommended 2012 Capital Expenditures

In addition to the operating expenditures the sewer surcharge budget currently includes \$21.6 million in annual capital funding that is used to fund sewer related capital projects. Total available sewer surcharge funding in 2012 is \$21.6 million, with \$10.35 million being used to fund new projects and \$11.25 million being used to fund previously approved ISF & accelerated capital sewer projects. In the recent few years, Council has steadily increased this funding to address basement flooding across the City and to chip away at the accumulated infrastructure deficit.

It is noted that sewer maintenance and repair, drain maintenance, capital budget construction of sanitary, storm, storm relief and combined sewer replacement, and the support required for the above are all funded in some percentage by sewer surcharge.

The impact of reducing the sewer surcharge funding in the 2012 capital budget by \$3.7 million would be the reduction or deferral of 2 to 3 Sewer Rehabilitation projects per year, or 10 to 15 over the 5-year planning period.

Impact of Projected Decrease Water consumption

In addition to the operating expenditure increases noted above, additional pressure on the sewer surcharge rate is projected to come from an estimated 3% sewer surcharge revenue decrease related to the reduced consumption of water.

This component of the budget adds approximately \$1.6 million in budget pressures. Essentially, the decreased water consumption leads to a lower water bill (all other things being equal) which in turn reduces the City's revenues from the sewer surcharge.

Rate Options for the Sewer Surcharge

A complete summary of these models, including 2011 actuals and 2012 budget are included as Appendix A to this report. It is important to note that the water consumption estimates provided by WUC reflect the continuing trend of lower water consumption. This trend is a province wide trend and is likely related to water conservation measures and technology as well as the slowdown in the economy.

It should be noted that the declining consumption puts upward pressure on the surcharge rate. The reason for this is that a significant portion of the costs related to wastewater are largely fixed and therefore reduced revenues from consumption cannot generally be offset by equal decreases in operating costs.

All models contained within this analysis also maintain approximately the 70% variable / 30% fixed sewer surcharge cost ratio previously approved by Council.

While all options are projected based on an effective date of July 1, 2012, City Council should be aware that dependant on when this matter is approved by City Council that there may be a slight delay in effecting the change to the billing process. All efforts will be made in conjunction with WUC to achieve the July 1st timeline.

Option #1- Reduce Sewer Surcharge Rates

The first model includes the revised water consumption rate and reduces the current sewer surcharge rates in order to completely offset the increase in the sewer surcharge costs that would result from the increase in the WUC water rates on July 1, 2012.

Under this option, the residential variable rate would decrease (starting on the assumed adoption date of July 1st) from 476% to 425%. The residential fixed rate would remain unchanged at 58%. The commercial rate would decrease from 150% to 146%. This would result in the average ratepayer paying roughly the same amount in 2012 as in 2011.

This model would produce projected surcharge revenues of \$52.7 million, resulting in a deficit of approximately \$3.7 million (Appendix A- Option 1) based on the recommended expenditures of \$56.4 million. Based on this projected deficit, this model is not recommended, because it would require either a decrease in operating costs – not practical to implement in the short term or advisable, or a decrease in annual capital costs- not advisable based upon current system needs.

Option #2- Maintain The Sewer surcharge Rates Unchanged

Under this scenario, the sewer surcharge rates would remain unchanged. However, they would be applied to the higher water rates approved by WUC. The net impact on the average residential ratepayer (see Appendix A- Option 2) is an increase of 7.8% in the monthly billing assuming an adoption date of July 1st and assuming stable consumption. The net increase for the full 2012 year based on a July 1 implementation date would be approximately 3.9%.

The net amount of revenue that is projected to be generated for the year under this scenario is \$54.5 million and would result in a deficit of approximately \$2 million. Given the noted deficit, this scenario is not recommended.

Option #3- Raise Rates to Fund The increased costs and to Offset Declining Consumption Revenues

Under this scenario the rates would increase to offset the increased operating costs as well as the decline in revenues due to declining consumption. The residential variable rate would increase from 476% to 487%. The residential fixed rate would increase from 58% to 66%. Finally the commercial rate would decrease from 150% to 167%. This scenario would result in an increase of 13.5% or \$6.87 (assuming stable consumption) in the monthly bill starting on the assumed adoption date of July 1st. On an annualized basis for 2012 this would result in an increase of approximately 6.75%. Given the declining consumption trend, actual increases could be much lower for those ratepayers that are conserving water.

This model would be expected to generate approximately \$56.5 million in revenues, the same amount as the expenditure budget. Based on the achievement of a balanced budget without a decrease in the capital funding available, this is the administrative recommended option.

Option #4- Balance the Budget By Reducing funding For Capital Projects

To avoid any rate increase the capital budget would need to be reduced by approximately \$3.7 million per year on a permanent ongoing basis. Over the 5-year capital budget period this reduction would total nearly \$19 million and given its magnitude may result in significant negative impacts on the infrastructure and the local construction industry. There would be resultant impact on the ability to maintain the existing sewers, and reduce the pace of eliminating combined or leaky sewer infrastructure. Therefore, this option is not recommended.

Option #5- Use of One-time Funds To balance the Budget

Another stop gap alternative to raising rates would be the use of the full amount of the sewer surcharge reserve (\$1.5 million) as well as currently projected surpluses in ongoing projects (\$1.6) million plus a reduction of \$600,000 from the capital funding contribution (\$3 million over the 5 year capital plan).

This scenario would fully deplete the sewer surcharge reserve and leave the Corporation without a dedicated reserve to fund any shortfall. This is especially risky given the trend of declining revenues due to decreasing water consumption. Additionally it would be utilizing surpluses that may not materialize in full once the projects are complete. Finally it would decrease capital funding on an ongoing basis by \$600,000 per year.

As these budget balancing measures are one time in nature, the funding shortfall problem would be merely shifted to future years. In fact, the problem would be magnified as it is estimated that it would require a rate increase of approximately 20% in 2013 to balance the budget. For this reason, this option is not recommended.

BASEMENT FLOODING

According to the 2010 data submitted to OMBI, it costs the City of Windsor \$364.17/Mega Litre to treat wastewater and a total cost of \$472.47/Mega Litre including collection, conveyance and treatment of wastewater. While it is very difficult to estimate, based on the average daily dry weather flow to the plants compared to the wet weather flow, it costs the City an estimated \$5 million to \$10 million per year to collect, convey and treat Stormwater at the wastewater treatment plants. Therefore, by reducing the amount of rainwater entering the sanitary sewer, we will save Operating Budget funds in the future.

As for the Capital Budget funds requested by way of this report, the following tables provide a breakdown of both the request and the schedule of when the funds are available. The projects outlined in the table below and their associated funding have been included in the 2012 Capital Budget 5 Year Plan.

<u>Capital Funds Requested</u>	<u>Amount</u>
Downspout Disconnection	\$ 2,950,000
Purchasing of Flow Monitoring Equipment	\$ 300,000
Smoke & Dye Testing	\$ 200,000
Updating IDF Curves	\$ 50,000
Total Funds Requested	<u><u>\$3,500,000</u></u>

<u>Capital Funds Available Over Next 5 Years</u>	<u>Amount</u>	<u>Funding Source</u>
2012	\$ 350,000	Fund 131 (LRWRP Reserve)
2013	\$2,200,000	Sewer Surcharge
2014	\$ 400,000	Sewer Surcharge
2015	\$ 220,000	Sewer Surcharge
2016	\$ 330,000	Sewer Surcharge
Total Funds Available	<u><u>\$3,500,000</u></u>	

6. CONSULTATIONS:

Windsor Utilities Commission staff

Operations (Mark Winterton, Pete Matheson, Ricardo Apolloni)

Pollution Control (Greg St. Louis, Karina Richters)

Engineering (Wes Hicks, France Isabelle-Tunks, Anna Godo)

Building Department (Lee Anne Doyle, Al Peach, Rob Vani)

Finance (Tony Ardovini, Natasha Couvillon, Victor Ferranti, Cindy Etmanski)

Essex Region Conservation Authority (Jeremy Wychreschuk)

Slobodan Simonovic, Professor of Civil and Environmental Engineering at the University of Western Ontario and Director of Engineering Studies with the Institute for Catastrophic Loss Reduction

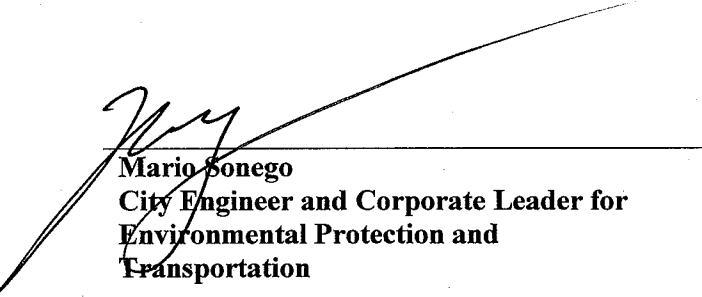
Further, the Office of the City Engineer will work with the City's Communications & Customer Service Department and the Building Department to develop how-to videos, information, etc. wherever possible to promote through the effective use of social media and the City's website those mitigating measures which homeowners themselves can take to alleviate instances of basement flooding.

7. CONCLUSION:

Given declining revenues due to water consumption decreases, as well inflationary pressures and the need to fund much needed basement flooding mitigation projects, it is recommended that sewer surcharge rates be increased for the first time since 2007.

As noted in the report above, basement flooding is not a problem that the municipality can unilaterally solve. Property owners have a significant role to play in preventing future basement flooding. They can do things such as: disconnect downspouts, install a sump pump, ensure that the sump pump is in good working order, install (and maintain) backwater prevention valves, install landscaping to create more soft surfaces, ensure their yard is properly graded, disconnect foundation drains from floor drains and ensure that their private drain connection is in good working order. The City has programs to assist property owners with backwater valves, sump pumps and downspout disconnection.

The City is committed to implementing measures which will improve the functionality of the overall sewer network. Expanding the Downspout Disconnection Program as well as investing in live flow monitoring equipment will reduce stormwater entering the sewer and provide real-time data on the status of the sewer network respectively.



Mario Sonego
City Engineer and Corporate Leader for
Environmental Protection and
Transportation



George Wilk
City Solicitor and Corporate Leader
Economic Development and Public Safety



Onorio Colucci
City Treasurer and Corporate Leader for
Finance and Technology



Mike Palanacki
Executive Director, Operations



Helga Reidel
Chief Administrative Officer

MS:rs

APPENDICES:

- A – Option #1 (Decrease Rate @July 1, 2012)-2011 Sewer Surcharge Forecast (2012 - 2016)
- A – Option #2 (Maintain Rate @July 1, 2012)-2011 Sewer Surcharge Forecast (2012 - 2016)
- A – Option #3-(Increase Rate @July 1, 2012)-2011 Sewer Surcharge Forecast (2012 - 2016)
- B – Drawing 3M-189
- C – Memo re: Basement Flooding Protection Subsidy Program Fraud Review
- D – Schedule of Capital Expenditures funded from Sewer Surcharge in the 5 year Capital Plan (2012-2016).
- E – Schedule of City Wide Sewer Rehabilitation (2012-2016)
- In-Camera Memo under separate cover

DEPARTMENTS/OTHERS CONSULTED:**Name:****Phone #:** 519 **ext.****NOTIFICATION:**

Name	Address	Email Address	Telephone	FAX
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APPENDIX A- Option 1

Sewer Surcharge Forecast (2012 - 2016)
Forecast Based on Decrease in Rate @ July 1, 2012

	2011 Budget (\$)	2011 Actual (\$)	2012 Budget (\$)	2013 Forecast (\$)	2014 Forecast (\$)	2015 Forecast (\$)	2016 Forecast (\$)
PUBLIC WORKS EXPENDITURES							
POLLUTION CONTROL							
Treatment Plants & Pump Stations	14,948,118	14,924,561	16,416,168	16,744,522	17,079,412	17,421,001	17,769,421
Depreciation (Transfer To Reserves for Equipment Replacement)	2,103,168	2,103,168	2,103,168	2,103,168	2,103,168	2,103,168	2,103,168
	17,051,286	17,027,729	18,519,366	18,847,690	19,182,580	19,524,169	19,872,589
SEWER MAINTENANCE & REPAIR							
PW - Operations	5,383,678	5,293,074	5,411,794	5,520,030	5,630,430	5,743,039	5,857,960
PW - Environmental Services	1,249,149	1,381,298	1,299,085	1,325,046	1,351,547	1,378,578	1,406,150
PW - Engineering & Corporate Projects	328,627	198,639	312,703	318,957	325,336	331,843	338,480
PW - Administration	71,488	87,064	87,064	88,805	90,581	92,393	94,241
	7,032,943	6,960,075	7,110,628	7,252,839	7,397,895	7,545,853	7,696,770
Total Public Works Operating Budget Expenditures	24,084,229	23,987,804	25,629,992	26,100,528	26,580,476	27,070,022	27,569,359
Total Public Works Capital Expenditures	21,600,000	21,514,000	21,600,000	21,600,000	21,600,000	21,600,000	21,600,000
TOTAL PUBLIC WORKS EXPENDITURES	45,684,229	45,501,804	47,229,992	47,700,528	48,180,476	48,670,022	49,169,359
OTHER EXPENDITURES							
Debt Servicing Costs - URWRP 20 Year Debenture	2,433,158	2,565,079	2,565,079	2,565,079	2,565,079	2,565,079	2,565,079
Environ Administration Fee	2,178,306	2,628,677	2,968,164	3,027,527	3,088,078	3,149,839	3,212,836
Overhead Allocation (Transfer to Current)	3,197,896	3,252,488	3,306,099	3,339,037	3,372,633	3,406,902	3,441,855
Appeal Refunds & General Expenses	379,778	474,924	375,000	375,000	375,000	375,000	375,000
TOTAL OTHER EXPENDITURES	8,189,138	8,921,168	9,214,342	9,306,643	9,400,790	9,496,820	9,594,770
TOTAL OF ALL EXPENDITURES	53,873,407	54,422,972	56,444,334	57,007,172	57,581,266	58,166,842	58,764,129
SURCHARGE REVENUES	54,266,996	54,527,401	52,751,106	53,278,617	53,811,403	54,349,517	54,893,012
NET CHANGE IN SEWER SURCHARGE OPERATING FUND #28	393,589	104,429	(3,693,228)	(3,728,555)	(3,769,863)	(3,817,324)	(3,871,117)
PROJECTED CUMULATIVE BALANCE OF SEWER SURCHARGE RESERVE FUND #153		1,496,799	(2,196,429)	(5,924,984)	(9,694,847)	(13,512,171)	(17,383,288)

NOTES:

A - Assumes general expenditures increase at a rate of 2% per annum (2013-2016) for inflation, except where specific projections are available.

B - Overhead expenditure allocation based on 7% of total Public Works expenditures.

C - Revenue projections are based on projected 2012 revenues received from WUC, increased annually thereafter by a 1% projected rate of inflation starting in 2013.

D - This model reflects the balance in the Sewer Surcharge Operating Fund which is transferred to the reserve fund on an annual basis. The final 2011 balance in the reserve fund is \$1,496,799

It should be stressed that both the Windsor Utility Commission's revenue and Public Work's expenditure figures are projections. As with all projections, they are based on a number of variables and assumptions that, if not achieved, may materially impact the results of this model. This is especially true for longer term projections such as this.

DOCUMENT
ENLARGED FOR
MAYOR & COUNCIL

APPENDIX A- Option 2

Sewer Surcharge Forecast (2012 - 2016)
Forecast Based on Maintaining the Existing Rate @ July 1, 2012

	2011 Budget (\$)	2011 Actual (\$)	2012 Budget (\$)	2013 Forecast (\$)	2014 Forecast (\$)	2015 Forecast (\$)	2016 Forecast (\$)
PUBLIC WORKS EXPENDITURES							
POLLUTION CONTROL							
Treatment Plants & Pump Stations	14,948,118	14,924,551	15,416,198	16,744,522	17,079,412	17,421,001	17,768,421
Depreciation (Transfer To Reserves for Equipment Replacement)	2,103,168	2,103,168	2,103,168	2,103,168	2,103,168	2,103,168	2,103,168
	17,051,286	17,027,729	18,519,366	18,847,690	19,182,580	19,524,169	19,872,589
SEWER MAINTENANCE & REPAIR							
PW - Operations	5,383,679	5,293,074	5,411,794	5,520,030	5,630,430	5,743,039	5,857,900
PW - Environmental Services	1,249,149	1,381,298	1,299,065	1,325,046	1,351,547	1,378,578	1,406,150
PW - Engineering & Corporate Projects	328,627	198,639	312,703	318,957	325,336	331,843	338,480
PW - Administration	71,488	87,064	87,064	88,805	90,581	92,393	94,241
	7,032,943	6,960,075	7,110,626	7,252,839	7,397,895	7,545,853	7,696,770
Total Public Works Operating Budget Expenditures	24,084,229	23,987,804	25,629,992	26,100,528	26,580,476	27,070,022	27,569,359
Total Public Works Capital Expenditures	21,600,000	21,514,000	21,600,000	21,600,000	21,600,000	21,600,000	21,600,000
TOTAL PUBLIC WORKS EXPENDITURES	45,684,229	45,501,804	47,229,992	47,700,528	48,180,476	48,670,022	49,169,359
OTHER EXPENDITURES							
Debt Servicing Costs - LRWRP 20 Year Debenture	2,433,198	2,565,079	2,565,079	2,565,079	2,565,079	2,565,079	2,565,079
EnWin Administration Fee	2,178,306	2,628,677	2,968,164	3,027,527	3,088,079	3,149,839	3,212,836
Overhead Allocation (Transfer to Current)	3,197,896	3,252,488	3,306,099	3,339,037	3,372,633	3,406,902	3,441,865
Appeal Refunds & General Expenses	379,778	474,924	375,000	375,000	375,000	375,000	375,000
TOTAL OTHER EXPENDITURES	8,189,178	8,921,168	9,214,342	9,306,643	9,400,790	9,496,820	9,594,770
TOTAL OF ALL EXPENDITURES	53,873,407	54,422,972	56,444,334	57,007,172	57,581,266	58,166,842	58,764,129
SURCHARGE REVENUES	54,266,996	54,527,401	54,473,794	55,018,532	55,568,717	56,124,404	56,685,648
NET CHANGE IN SEWER SURCHARGE OPERATING FUND #28	393,589	104,429	(1,970,540)	(1,988,640)	(2,012,549)	(2,042,437)	(2,078,481)
PROJECTED CUMMULATIVE BALANCE OF SEWER SURCHARGE RESERVE FUND #153		1,496,799	(473,741)	(2,462,381)	(4,474,930)	(6,517,367)	(8,595,848)

NOTES:

A - Assumes general expenditures increase at a rate of 2% per annum (2013-2016) for inflation, except where specific projections are available.

B - Overhead expenditure allocation based on 7% of total Public Works expenditures.

C - Revenue projections are based on projected 2012 revenues received from WUC, increased annually thereafter by a 1% projected rate of inflation starting in 2013.

D - This model reflects the balance in the Sewer Surcharge Operating Fund which is transferred to the reserve fund on an annual basis. The final 2011 balance in the reserve fund is \$1,496,799

It should be stressed that both the Windsor Utility Commission's revenue and Public Work's expenditure figures are projections. As with all projections, they are based on a number of variables and assumptions that, if not achieved, may materially impact the results of this model. This is especially true for longer term projections such as this.

APPENDIX A- Option 3

Sewer Surcharge Forecast (2012 - 2016)
Forecast Based on Increase in the Rate @ July 1, 2012

	2011 Budget (\$)	2011 Actual (\$)	2012 Budget (\$)	2013 Forecast (\$)	2014 Forecast (\$)	2015 Forecast (\$)	2016 Forecast (\$)
PUBLIC WORKS EXPENDITURES							
POLLUTION CONTROL							
Treatment Plants & Pump Stations	14,948,118	14,924,551	16,416,198	16,744,522	17,079,412	17,421,001	17,765,421
Depreciation (Transfer To Reserves for Equipment Replacement)	2,103,168	2,103,168	2,103,168	2,103,168	2,103,168	2,103,168	2,103,168
	17,051,286	17,027,729	18,519,366	18,847,690	19,182,580	19,524,169	19,872,589
SEWER MAINTENANCE & REPAIR							
PW - Operations	5,383,679	5,293,074	5,411,794	5,520,030	5,630,430	5,743,839	5,857,900
PW - Environmental Services	1,249,149	1,381,298	1,299,065	1,325,046	1,351,547	1,378,578	1,406,150
PW - Engineering & Corporate Projects	328,627	198,639	312,703	318,957	325,336	331,843	338,480
PW - Administration	71,488	87,064	87,064	88,805	90,581	92,393	94,241
	7,032,943	6,960,075	7,110,626	7,252,839	7,397,895	7,545,853	7,696,770
Total Public Works Operating Budget Expenditures	24,084,229	23,987,804	25,629,992	26,100,528	26,580,476	27,070,022	27,569,359
Total Public Works Capital Expenditures	21,600,000	21,514,000	21,600,000	21,600,000	21,600,000	21,600,000	21,600,000
TOTAL PUBLIC WORKS EXPENDITURES	45,684,229	45,501,804	47,229,992	47,700,528	48,180,476	48,670,022	49,169,359
OTHER EXPENDITURES							
Debt Servicing Costs - LRWRP 20 Year Debenture	2,433,193	2,565,079	2,565,079	2,565,079	2,565,079	2,565,079	2,565,079
EnWin Administration Fee	2,178,306	2,628,677	2,968,164	3,027,527	3,088,078	3,149,839	3,212,836
Overhead Allocation (Transfer to Current)	3,197,896	3,252,488	3,306,099	3,339,037	3,372,633	3,406,902	3,441,855
Appeal Refunds & General Expenses	379,778	474,924	375,000	375,000	375,000	375,000	375,000
TOTAL OTHER EXPENDITURES	8,189,178	8,921,168	9,214,342	9,306,643	9,400,790	9,496,820	9,594,770
TOTAL OF ALL EXPENDITURES	53,873,407	54,422,972	56,444,334	57,007,172	57,581,266	58,166,842	58,764,129
SURCHARGE REVENUES	54,268,996	54,537,401	54,488,375	57,053,259	57,623,791	58,200,029	58,782,830
NET CHANGE IN SEWER SURCHARGE OPERATING FUND #28	393,589	104,429	44,041	46,087	42,526	33,187	17,900
PROJECTED CUMULATIVE BALANCE OF SEWER SURCHARGE RESERVE FUND #153		1,496,799	1,540,840	1,586,927	1,629,452	1,662,640	1,688,540

NOTES:

A - Assumes general expenditures increase at a rate of 2% per annum (2013-2016) for inflation, except where specific projections are available.

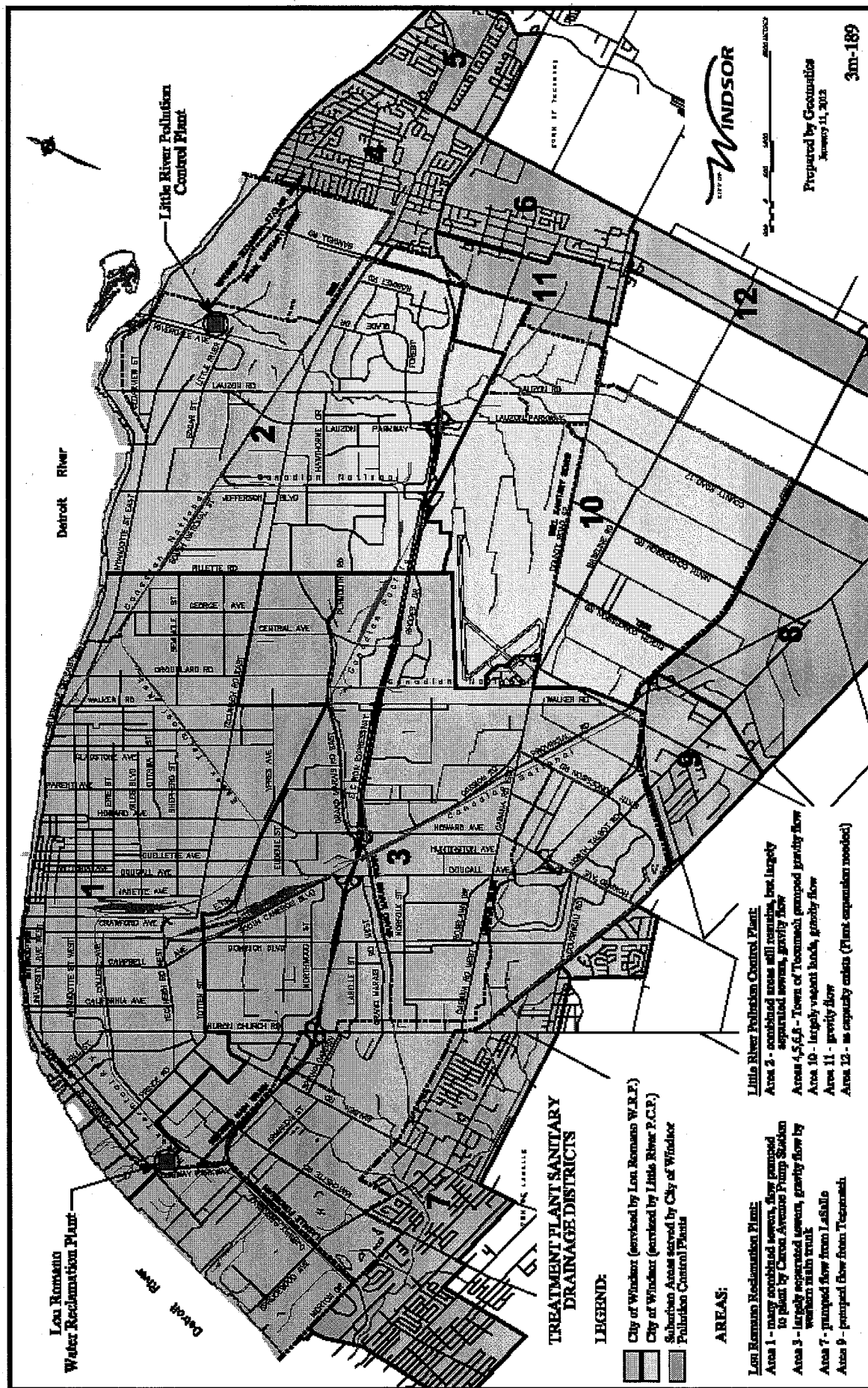
B - Overhead expenditure allocation based on 7% of total Public Works expenditures.

C - Revenue projections are based on projected 2012 revenues received from WUC, increased annually thereafter by a 1% projected rate of inflation starting in 2013.

D - This model reflects the balance in the Sewer Surcharge Operating Fund which is transferred to the reserve fund on an annual basis. The final 2011 balance in the reserve fund is \$1,496,799.

It should be stressed that both the Windsor Utility Commission's revenue and Public Work's expenditure figures are projections. As with all projections, they are based on a number of variables and assumptions that, if not achieved, may materially impact the results of this model. This is especially true for longer term projections such as this.

Appendix B - Drawing 3M-189





Appendix C

THE CORPORATION OF THE CITY OF WINDSOR

Memo

To: Mayor and Members of City Council
From: Melinda Munro
CC: Helga Reidel, Mario Sonego, Valerie Critchley, George Wilkki, Peter Breault, Shelby Askin-Hager
Date: May 28, 2012
Subject: Basement Flooding Protection Subsidy Program

In 2011, City Council approved the Basement Flooding Protection Subsidy Program [BFPSP] as a measure to assist Windsor homeowners to reduce the impact of flooding due to storm water.

The Program

The BFPSP provides homeowners with a subsidy of up to \$2,800 to install eligible plumbing components that reduce in home floods. To be eligible for the program the homeowner must make an application and obtain a courtesy inspection by a City of Windsor Building Inspector confirming that the plumbing work requested by the applicants is eligible work under the rules of the BFPSP for purposes of entitlement to receive the subsidy (eg. Supply and installation of sump pit/sump pump is eligible work only when there is no pre-existing sump pit/pump). They must then obtain two independent quotes from plumbers for the cost of the improvements. The homeowner can select the contractor they wish to do the work but the city subsidy will only be based on the lowest bid. Upon submission of the two quotes and confirmation of payment, the Engineering Department of the City reviews and approves payment to the homeowner. Peter Breault, Manager of Administration for the Office of the City Engineer is responsible for managing the program.

The sequence of events that are expected to be followed in the administration of an application submitted to the City for subsidy under the BFPSP are as follows:

1. Homeowner/applicant within the boundaries of the City of Windsor submits an application for subsidy
 2. The application is entered into our tracking spreadsheet by the Senior Counter Clerks in the Engineering Department
 3. Finance Dept enters property tax status information into the tracking spreadsheet
 4. If taxes/any other receivables are current or taxpayer is on a payment plan for taxes, the application is set up in the Amanda system by the Senior Counter Clerks
 5. The Building Dept schedules a Courtesy Inspection in which a Building Inspector attends the property and determines the eligible work (ie. backwater valve; sump pump; both backwater valve and sump pump); advises homeowner/applicant of outcome of Courtesy Inspection (Patti Lucier, Dispatcher in the Building Department, schedules the Courtesy Inspections)
-

Appendix C

6. Homeowner/applicant obtains quotations for the eligible work (two quotations are required to meet the requirements of the BFPSP),
7. Contractor chosen by the homeowner/applicant takes out the appropriate Building Permit and performs the work.
8. Homeowner/applicant pays the contractor in full and submits the two quotations along with the invoice indicating payment in full received by the contractor who performed the work.

Subsequent to # 8 above, the Manager of Administration reviews the documents and ensures that the liability waiver is on file with signatures from all owners of the property. If the required documents are filed and the Building Permit has passed the final inspection, he calculates the subsidy amount and approves the subsidy payment. The subsidy payment is recorded in the tracking spreadsheet.

Since the program began the Engineering Service has received 1032 applications and processed 322 for payment for a total of \$560,581.65.

Control Issues Arising in the Program

In the spring of 2012, the Manager of Administration noticed that there were some control issues arising in the maintenance of the program that required investigation. These control issues primarily arose from the actions of plumbing companies and contractors seeking ways to take advantage of the program to obtain business. Some companies and contractors have taken steps that undermine the city controls and may also be criminal in nature.

As soon as this issue was detected by the Manager of Administration it was referred to the City Engineer, the City Solicitor, the City Clerk and Licence Commissioner, the Manager of the Office of Continuous Improvement and the Auditor General's Office. All parties have been involved throughout.

The issues that have been observed to date can be grouped into three types:

1. Homeowners not complying with requirement for two *independent* quotes – in this scenario, two plumbing companies appear to act together where they trade which one gets the work;
2. Homeowners not complying with requirement for *two* independent quotes – in this scenario, one plumbing company arranges all of the quotes on behalf of the homeowner and it appears they may be falsifying one of the quotes;
3. Homeowners not complying with requirement for Courtesy Inspection by city prior to obtaining quotes for plumbing work, or more importantly in terms of the reason Courtesy Inspections are performed, prior to having the plumbing work performed.

Homeowners not complying with requirement for two *independent* quotes – in this scenario, two plumbing companies appear act together where they trade which one gets the work;

The first issue of concern noticed in the BFPSP was multiple occurrences when the same two plumbing businesses provided two quotations on plumbing work eligible for subsidy under the BFPSP. In this scenario we have observed quotes where both quotes are in the same handwriting and the signatures do not always reflect the signatures we have on file for the business licences of the companies or their master plumbers. However, both companies are winning some of the work which suggests that they are working together.

Appendix C

In order to stop this behaviour, the Licence Commissioner and Deputy have met with the contractors involved and reminded them of the laws related to collusion.

Homeowners not complying with requirement for two independent quotes – in this scenario, one plumbing company arranges all of the quotes on behalf of the homeowner and it appears they may be falsifying one of the quotes;

In this scenario we have identified a number of situations where we received two quotes where the signature on the losing bid appeared to be forged as it did not match the documents in the licensing files. However, in these cases, one plumbing company won all the business as the second company bid was always higher. On further investigation, in some of these cases, the homeowner confirmed that the first bidder offered to obtain the second quote and no second company ever came to the house to provide a bid. The homeowner was unaware that there had been a second bid.

These cases have now been referred to the Windsor Police Service for further investigation.

Homeowners not complying with requirement for Courtesy Inspection by City prior to obtaining quotes for plumbing work or having the plumbing work performed.

There have been a small number of cases where applications for payment have been submitted where the homeowner did not obtain a Courtesy Inspection before having the work completed. In the early days of the program this may have been due to a misunderstanding in the Building Department that has now been resolved. Additionally, due to the high incidence of basement flooding that occurred in the three geographic areas of the City to which the program was initially restricted, in the interest of fairness the program was structured to deem applicants who had eligible work performed going back to June, 2010 to be eligible for inclusion in the program. For applicants who had eligible work performed before the program was rolled out or shortly thereafter, the function of the Courtesy Inspection is to validate that eligible work was in fact performed. To be paid a subsidy, these applicants must take out a permit for the work performed and provide the City with the contractor invoice.

Apart from that situation, this scenario may arise in two ways: first, where a homeowner is having other renovation or construction work completed and the already engaged contractor notes that the homeowner may be eligible for the BFPSP funding for one component of a larger job. In this case it may be a hardship for a homeowner to get a second quote on a small part of the larger job in order to be eligible for the subsidy. In the second case, the homeowner is faced with an unscrupulous plumbing contractor who either advises that the inspection isn't needed or that they can arrange to have it done on the homeowner's behalf, but they fail to do so. We are not aware of any of the latter situation arising to date.

Exposure of the City to risk

The possible areas of financial risk to the City in this situation include:

- Paying a subsidy for ineligible work due to a Courtesy Inspection not being performed until after the plumbing work is performed
- Paying more subsidy than required due to collusion between plumbing contractors to inflate the price or not providing competitive quotes.

There are some non-financial risks associated with the issues that have arisen with these plumbing contractors:

Appendix C

- Reputational risk related to being “duped” by unscrupulous business owners
- Reputational risk related to the integrity of the business licencing enforcement process
- Risk that homeowners will rely on the City to ensure they are getting proper quotes

Financial Risks

Ineligible Work

In each case of an application for which it has been determined that there is eligible work for purposes of the subsidy, the City has performed a Courtesy Inspection to ensure that the work is necessary, or in those cases in which the eligible work was performed before the BFPSP was rolled out going back as far as June, 2010, was necessary to assist with basement flooding protection. Therefore, there is little to no risk that any subsidy will be paid for ineligible work. Where an application for payment is received without a Courtesy Inspection being completed before the plumbing work was performed, there should be a further investigation to ensure that the failure to obtain the Courtesy Inspection before the plumbing work was performed was justifiable. If it is a matter of an unscrupulous plumbing contractor or negligent homeowner, one option is for the City to refuse to pay the subsidy. The City Engineer is not in agreement with this recommendation due to his concern that it may penalize homeowners who were taken advantage of. It should be noted that we are not aware of any work that has been done improperly after installation and building inspection. The City also maintains its rights within the Building Permit process to require shoddy or non-conforming work to be replaced or repaired.

Inflated or non-competitive prices.

The maximum available subsidy is \$2,800. To some extent, the City is relying on competitive bidding between plumbing contractors to ensure that it is not overpaying under the subsidy program as the City only subsidizes the lowest bid. In addition, the City relies on the motivation of the homeowners to obtain appropriate quotes because the homeowners must contribute a portion of the cost. Unfortunately, if unscrupulous business owners are colluding to set the price for the work, these controls can be undermined. However, the City Courtesy Inspection noted above provides some assurance that the City is not overpaying by indicating the type of work that needs to be bid on. Therefore the quotes are based on an earlier independent assessment. Also, as the City reviews the large number of applications being submitted for BFPSP, it has become clear that there is a fairly narrow range of prices for the eligible work. Therefore, it is unlikely, though possible, that the City will pay the full \$2,800 subsidy for work that was not necessary. If this occurred, it would result in a financial loss to the city represented by payment of a portion of a subsidy for plumbing work not determinable in terms of its efficacy in remediating the flooding problem. The amount of financial loss in each case would be very small.

Non-financial risks

In respect of the first two non-financial risks, the fact that these BFPSP anomalies have been identified and responded to quickly reinforces the quality of the existing controls around both the BFPSP and the business licencing service. By comparing the documentation it was easy to establish that there was a problem with the quoting process.

In respect of the risk that homeowners will rely on the City to ensure that they are being properly quoted, the BFPSP documents are clear that the obligation to obtain the quotes rests with the homeowner and not with the City. Further, the application process requires the homeowner to waive any liability on the part of the City in relation to the work.

Appendix C

Control Recommendations

One recommendation to improve the controls over the program to further reduce both the financial and non-financial risks would be to amend the application for payment to require the homeowner to sign each Contractor Quote and certify that the plumbing contractor attended their home and provided the quote in person. This will enhance the controls on the program and improve the ease of detection of inappropriate contractor behaviour. **This has now been done and letters issued to all City of Windsor plumbing contractors. The new forms are available in hard copy and on the website.**

Further, there should be a new Public Service information program to remind the public of the requirements of the program and their responsibilities in order to obtain the subsidy.

Action Steps for Future Issues:

The Manager of Administration will continue to check for potential issues of lack of integrity, fraud or possible criminal behaviour by participants in the BFPSP, and will continue to refer questionable documents or practices to appropriate senior city administrators for consideration.

Any confirmed concerns or suspicions regarding contractor integrity or fairness will be referred to the Licence Commissioner for consideration of a hearing.

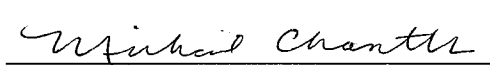
Any confirmed concerns or suspicions regarding fraud or criminal activity will be referred to the Windsor Police Services and the Auditor General's Office.



Mario Sonego
City Engineer



George Wilkki
City Solicitor



Michael Chantler
Deputy License Commissioner



Helga Reidel
Chief Administrative Officer

MM

Appendix D **Schedule of Capital Expenditures Funded from Sewer Surcharge in the 5-Year Capital Plan** **(2012-2016)**

City of Windsor

		2012	2013	2014	2015	2016	Total
Service Area: Office of the City Engineer (OCE)							
Department: Engineering							
Division: Development & Geomatics							
ECP-041-07 New Infrastructure Development	028 - Sewer Surcharge	0	0	0	0	75,000	75,000
ECP-046-07 Windsor Airport Improvements	028 - Sewer Surcharge	450,000	0	250,000	0	500,000	1,200,000
Division: Infrac. & Trans. Planning							
ECP-001-10 Upper Little River StormWater Facilities (Sandwich South Employment Lands)	028 - Sewer Surcharge	0	0	0	0	0	0
ECP-001-12 Basement Flooding Mitigation Measures	028 - Sewer Surcharge	0	2,200,000	400,000	220,000	330,000	3,150,000
ECP-002-08 Provincial/Division Corridor Improvements	028 - Sewer Surcharge	0	0	250,000	0	2,000,000	2,250,000
ECP-002-09 Sunset Avenue Storm Water Drainage	028 - Sewer Surcharge	1,300,000	0	0	0	0	1,300,000
ECP-004-08 Municipal Drains	028 - Sewer Surcharge	200,000	200,000	200,000	200,000	100,000	900,000
ECP-004-09 StormWater and Sanitary Master Plans	028 - Sewer Surcharge	250,000	200,000	500,000	500,000	0	1,450,000
ECP-005-08 Grand Marais Drain Improvements (Concrete Channel)	028 - Sewer Surcharge	0	0	0	0	250,000	250,000
ECP-010-07 East Riverside Planning District	028 - Sewer Surcharge	0	0	0	0	0	0
ECP-015-07 McDougall Avenue North-South Collector	028 - Sewer Surcharge	0	0	0	0	0	0
ECP-016-07 The Riverside Drive Vista Improvement	028 - Sewer Surcharge	0	0	0	0	370,000	370,000
ECP-017-07 Local Improvements Sanitary Sewer Program	028 - Sewer Surcharge	0	0	0	0	1,625,000	1,625,000
ECP-021-07 Downspout Disconnection	028 - Sewer Surcharge	100,000	100,000	100,000	100,000	600,000	1,000,000
ECP-022-07 Prince Road/Totten Street Storm Sewer Improvements	028 - Sewer Surcharge	0	0	0	0	0	0
ECP-023-07 Parent/McDougall Storm Relief Sewer	028 - Sewer Surcharge	0	0	0	0	200,000	200,000
ECP-025-07 Ford/Raymond Storm Relief Sewer	028 - Sewer Surcharge	0	0	0	1,700,000	0	1,700,000
ECP-028-07 Grand Marais Drain Improvements (Naturalized Channel)	028 - Sewer Surcharge	0	0	1,500,000	0	0	1,500,000
ECP-030-07 Riverside Flood Abatement Project	028 - Sewer Surcharge	0	0	0	3,856,000	0	3,856,000
ECP-031-07 Pileta/Semihole Storm Relief Sewer	028 - Sewer Surcharge	0	0	0	800,000	0	800,000
ECP-034-07 Grove/Campbell/McKay Storm Sewers	028 - Sewer Surcharge	0	0	0	1,144,000	0	1,144,000
ECP-035-07 Citywide Sewer Rehabilitation Program	028 - Sewer Surcharge	7,250,000	9,350,000	15,100,000	10,700,000	12,500,000	64,900,000
ECP-036-07 Ojibway Sanitary Sewer Rehabilitation	028 - Sewer Surcharge	0	0	1,900,000	0	0	1,900,000
EIT-002-11 Basement Flooding Prevention Subsidy Program	028 - Sewer Surcharge	250,000	250,000	250,000	250,000	250,000	1,250,000
Total for Department: Engineering		9,800,000	12,300,000	20,450,000	20,470,000	20,560,000	83,620,000
Department: PW Environmental							
Division: E.S. Environmental Services							
ENV-003-09 Odour Control Study for Seven Mile Sewer at LRWRP	028 - Sewer Surcharge	0	75,000	0	0	0	75,000
Total for Department: PW Environmental		0	75,000	0	0	0	75,000
Department: PW Operations							
Division: Field Services							
OPS-003-10 Small Sewer Repairs	028 - Sewer Surcharge	500,000	500,000	1,000,000	1,000,000	1,000,000	4,000,000
OPS-008-07 CCTV Program	028 - Sewer Surcharge	50,000	50,000	100,000	100,000	100,000	400,000
Total for Department: PW Operations		550,000	550,000	1,100,000	1,100,000	1,100,000	4,400,000
Total for Service Area: Office of the City Engineer (OCE)		10,350,000	12,925,000	21,550,000	21,570,000	21,660,000	87,995,000
		028 - Sewer Surcharge	10,350,000	12,925,000	21,550,000	21,570,000	87,995,000
Grand Total:		10,350,000	12,925,000	21,550,000	21,570,000	21,660,000	87,995,000

Appendix E **Schedule of Citywide Sewer Rehabilitation (2012 – 2016)**

Project Attachment **For: 2012**

Project # ECP-035-07

Project Name: City Wide Sewer Rehabilitation Program

							Allocation of 2012 Costs			
Project#	STREET	FROM	TO	Sewer Type	Ward	2012	Construction	Engineering	Land Acquisition	
Construction										
	Pierre Avenue	Assumption Street	Riverside Drive	combined	4	1,200	1,104	96	-	
	Belle Isle View	Edgar Avenue	Tranby Avenue	separated	6	2,150	1,978	172	-	
	Arthur Road	Seminole Road	Millroy Street	over/under	5	2,300	2,116	184	-	
	Fairview Avenue	Wyandotte Street	Riverside Drive	separated	6	1,000	920	80	-	
Engineering ONLY - For 2014 Projects							600	600		
Grand Total							\$ 7,250	\$ 6,118	\$ 1,132	\$ -

Revised Dec. 6, 2011

Appendix E

Schedule of Citywide Sewer Rehabilitation (2012 – 2016)

Project Attachment
For: 2012

Project # ECP-035-07

Project Name: City Wide Sewer Rehabilitation Program

Recommended Sewer Rehabilitation Program (2013 - 2016) *

STREET		FROM	TO	Sewer Type	Ward	Amt in '000			
						2013	2014	2015	2016
Construction									
Elm Street	Giles Boulevard	Tecumseh Road	combined	3	1,550				
Pierre Avenue	Assumption Street	Wyandotte Street	combined	4	1,200				
Fairview Avenue	Wyandotte Street	St. Rose Boulevard	separated	6	850				
Westcott Road	Metcalfe Street	Alice Street	over/under	5	2,900				
Aubin Road	Franklin Street	Seminole Street	over/under	5	2,500				
Engineering ONLY - For 2015 Projects						350			
Construction									
California Avenue	Wyandotte Street	College Avenue	combined	2	1,700				
Oak Street	Giles Boulevard	Tecumseh Road	combined	3	1,500				
	Chippawa Street								
	Chippawa Street	South Street	combined	2	1,500				
Cross Street	Chippawa Street								
Baby Street	Chippawa Street	South limit	combined						
Hall Avenue	Riverside Drive	Wyandotte Street	combined	4	2,100				
Hickory Road	Seminole Street	Metcalfe Street	over/under	5	1,000				
Cadillac Street	Alice Street	northerly to cul-de-sac	over/under	5	1,500				
Reginald Street	Cadillac Street	Drouillard Road	over/under						
Norman Road	Adstoll Avenue	Joinville Avenue	combined	8	1,700				
Fairview Avenue	St. Rose Street	Edgar Avenue	separated	6	1,800				
Edward Avenue	St. Rose Street	Edgar Avenue	separated	6	1,900				
Engineering ONLY - For 2016 Projects									
List of various projects for 2016 construction not yet developed.							400		
Construction									
Norman Rd	S. National	Alice St	separated	8				2,000	
King Street	Prince Road	South Street	combined	2				2,300	
Bruce Ave	West Grand Ave	Norfolk St	separated	1				2,250	
Rossini Blvd	Seminole St	CNR	over/under	5				2,100	
Vimy Ave	Elsmere Ave	Lillian Ave	combined	4				1,350	
South National Trunk Sanitary relining			separated	5, 8				300	
Engineering ONLY - For 2017 Projects									
List of various projects for 2017 construction not yet developed.								400	
Construction									
List of various projects for 2016 construction not yet developed.									12,000
Engineering ONLY - For 2018 Projects									
List of various projects for 2018 construction not yet developed.									500
Grand Total						\$ 9,350	\$ 15,100	\$ 10,700	\$ 12,500

* Project list for 2013 - 2016 is preliminary only and must be coordinated with the Windsor Utilities Commission.

Revised Dec. 6, 2011