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<b>TO:</b>	<b>CHAIR AND MEMBERS CIVIC WORKS COMMITTEE MEETING ON JULY 20, 2015</b>
<b>FROM:</b>	<b>JOHN BRAAM, P. ENG. MANAGING DIRECTOR, ENVIRONMENTAL AND ENGINEERING SERVICES AND CITY ENGINEER</b>
<b>SUBJECT:</b>	<b>UPDATE ON RAINFALL EVENT OF JUNE 23, 2015</b>

<b>RECOMMENDATION</b>
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That, on the recommendation of the Managing Director, Environmental and Engineering Services and City Engineer, this report on the Rainfall Event of June 23, 2015 **BE RECEIVED** for information.

<b>PREVIOUS REPORTS PERTINENT TO THIS MATTER</b>
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None.

<b>BACKGROUND</b>
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### **Purpose**

The purpose of this report is to provide the Municipal Council with a summary of the June 23<sup>rd</sup> and June 27/28 rainstorms, what we know about the impacts to-date, staff activities related to the event and some useful information for your ongoing communications.

### **Context**

On June 23, 2015, the City of London received a very significant rainfall event. All of the City received significant rainfall in a very short timeframe. Sanitary and storm sewer systems were overwhelmed by this intense rainfall, and as a result, there were many basements flooded along with surface flooding, both on City streets and on private property. On June 27 and 28, a more prolonged rainfall event was experienced that exacerbated recovery efforts from the earlier storm.

### **Rain Event Details**

**June 23:** The hardest hit areas included downtown, Old South and Lambeth, which received over 70mm of rainfall in roughly two hours. The historical average rainfall for the entire month of September rainfall is 82mm; during the event, London received an average month's rainfall in two hours.

For more detailed information regarding the rainfall distribution across the City, the rainfall intensity and location of rainfall recording gauges please see Appendix 'A'.

**June 27/28:** A significant volume of rain fell over an extended period on June 27<sup>th</sup> and June 28<sup>th</sup>. Upwards of 80mm fell on the 27<sup>th</sup> with an additional 10-15mm on the 28<sup>th</sup>. The highest rainfall recorded for the two day period was Lambeth at 92mm. Citywide average for the two days was 70mm.

### **What happens to the City's sewers during an intense rain event?**

#### **Sanitary sewers**

Some City sanitary sewers may become overwhelmed during a rain event. It is important to note that prior to 1985, all home weeping tiles (foundation drains) were connected to the

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sanitary sewer. This is the most common reason associated with our overloaded sanitary sewers. When a sanitary sewer becomes overloaded, the lowest basements on the street may experience basement flooding. The long term solution is challenging as the source of the 'extra' water in the sanitary sewer, in many cases, lies with the weeping tile connection which is on private property and are part of a home's plumbing.

### Storm sewers

Storm sewers are only designed to handle rainfall up to a certain point. During heavy rainfalls, such as the ones experienced in June, it is expected that storm sewers will become full. In areas built in the last thirty years, once the sewers are full the roads are designed to drain water away along overland routes towards the City's rivers and streams. In older areas of the City, we commonly see ponding areas where water temporarily collects at topographically low points. These low points can be visualized as 'bowls'. Properties and roads within these 'bowls' can become flooded. In most cases these areas will drain within 24-48 hours. However, in severe cases buildings can also be flooded and water ponding can remain in backyards for a week or more. As these older areas are fully established, reducing the risk of surface flooding can be very challenging.

### Flooding Calls

As of July 2 2015, the City has received 381 flooding calls (and rising) from Londoners related to the June storms. This includes calls for both surface flooding and basement flooding. The following is a brief overview of the common sources of flooding which the City has seen; noting that each individual flooding occurrence is unique and requires case by case analysis, including site visits and discussions with each homeowner. Due to a shortage of technical staff, investigations will be delayed.

- **Basement flooding through floor drain:**

In this circumstance, two common possibilities are present: 1) City sanitary sewer has become overloaded and 'backed up' into basements, or 2) homeowner's sanitary PDC has become overloaded due to a restriction (i.e. tree roots) and has backed up into their basement. In case 1), the City commonly sees multiple houses on the same street affected.

What can homeowners do? If the homeowner experienced basement flooding from an overloaded City sanitary sewer, we encourage the homeowner to take advantage of the City's Sump Pump Grant Program, which offers up to 75% funding for the retrofit of a backwater valve, disconnection of weeping tile from sanitary, and installation of a sump pump. The backwater valve will protect homeowners from future overloaded sanitary events. More information can be found on the City's website at the following:

[www.london.ca/sumppumpgrant](http://www.london.ca/sumppumpgrant)

If the homeowner experienced basement flooding from restrictions in their own sanitary PDC, it is recommended that they have a plumber video the PDC to determine the source of the blockage. In many cases, the restriction or blockage in the PDC only shows up in wet weather as the PDC cannot handle the extra weeping tile flows during an intense rain event. Further information can be found at the following: [www.london.ca/pdc](http://www.london.ca/pdc)

- **Basement flooding through wall or basement window:**

In this circumstance, surface flooding is the contributing source. Changes to homeowner's lot grading can help along with proper sealing of window wells. If the homeowner lives within a localized topographical low, it can be challenging to deal with the surface water drainage. Improvements to City storm drainage systems are larger scale, longer term and higher cost alternatives. These areas, once identified and investigated, can be worked into larger scale infrastructure replacement projects.

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- **Yard (surface) flooding:**

Yard flooding can occur due to localized topographical lows within backyards or due to homeowner, or their neighbour, changing the property's original lot grading (i.e. installing pools, sheds, gardens). Mitigating measures can vary greatly from case to case.

Standard prevention measures can be found at [www.london.ca/basementfloodinghouse](http://www.london.ca/basementfloodinghouse)

### **Who should homeowners call to report flooding?**

We strongly encourage homeowners to call the City to report all types of flooding. By receiving, compiling and investigating these reports, we gain valuable information that assists in understanding how the overall sewer systems are performing, and where improvements need to be made.

Monday – Friday 8.30am-4.30pm      call **519-661-4570**

After hours                                      call **519-661-4965**

Anytime    e-mail [es@london.ca](mailto:es@london.ca)

### **What happens when a flooding call is received?**

When a property owner places a call to the City, Sewer Operations staff are dispatched onsite to determine whether or not the City's sewer system fronting the flooded property is functioning properly. Recognize that during extreme rainfall events, Operations staff are often stretched beyond their capacity to provide timely responses to customers experiencing a flooding condition. Sewer Operations staff's goal is to provide our customers with the best information, in the shortest timeframe possible.

With the June 23rd event, Sewer Operations staff were dispatched at 2:39 a.m., shortly after the first calls about flooding were received. The rainfall ended before 3:00 a.m. Flood water receded in most affected areas quickly, including the Thames River, though it did not reach a flood level of concern. In past storms, extra field staff were brought in as the storm progressed. They check the sewer systems for blockages and try to mitigate property damage. In this instance, the storm was so short that it was over before field staff were mobilized after the first call.

Following a pre-planned emergency protocol, an incident command centre was set up to receive calls the morning following the June 23 storm. Operations staff are the first contact for these calls. They note location and some basic information in order to make a referral to engineering staff.

During the June 27/28 storm, the incident management system (IMS) was established with the initial on-call Supervisor addressing citizen concerns. As the workload increased due to the intensification of the late evening rainfall, additional supervisory staff were dispatched in an attempt to provide timely citizen responses. Though the City had received a significant volume of rain, the duration of the event was much longer than the previous June 23<sup>rd</sup> event. This allowed field inspections to be carried out between 9:00 p.m., June 27<sup>th</sup> through to 6:00 a.m., the following morning.

After the June 27<sup>th</sup>/28<sup>th</sup> rainfall event, and similar to the June 23<sup>rd</sup> rainfall event, the Supervisors had established a triage system where citizen concerns were received, categorized (basement flooding or surface flooding), prioritized and addressed in the appropriate manner. At a minimum, a telephone conversation, initiated by the Supervisors, had taken place with each of the concerned property owners. In most instances, property owners were encouraged to connect with the Wastewater & Drainage Engineering Division who could offer more specific detail pertaining to the City's Sump Pump Grant Program detailed above.

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In the IMS emergency protocol, engineering staff would collect more information and send staff out to assess problems, provide advice and promote City programs to protect basements and yards from flooding. Without field staff to provide this customer service, management staff were focused on call backs, data collection, and providing sump pump subsidy application forms and information. Analysing and reporting on the storm will occur at a later date.

### **Performance of Existing Basement Flooding Mitigation Infrastructure**

In the spring and summer of 2000 London experienced a number of back to back wet weather events that caused wide spread basement flooding across the city. The City received 397 basement flooding complaints after an April storm and 676 basement flooding complaints after a June storm.

A flooding task force was struck and a number of mitigations measures were developed and then implemented in the following years. The Sump Pump Grant Program, as discussed above, was one such measure. Another measure was the construction of a number of offline and inline storage pipes built along the trunk sanitary sewer system in strategic locations. Essentially these are large diameter pipes that provide additional capacity to reduce the likelihood of surcharged sanitary sewers, which in turn protects basements from flooding. A partial list of these facilities includes the following:

- White Oaks (north of Penny Cres.)
- Southwest Optimist Park
- Nicholas Wilson Park
- Stanhope Park
- Merlin Heights

Based on flooding calls received and a review of level monitors, these facilities worked as planned, protecting homes in their service areas.

The draw back with such storage facilities is that they have a finite storage volume. There is always the chance that a larger rainfall event will even overwhelm these storage facilities. Therefore staff has turned their efforts to removing the sources of excess rain water from getting into the sanitary sewer system in the first place. On that front we have recently completed a successful voluntary weeping tile disconnection program in the Sherwood Forest area, as reported to CWC on May 5, 2015. There have been no reported basement flooding calls in the participation area for the June 23 storm. Staff will determine if this voluntary disconnection program can be applied in any other areas of the City that experienced flooding during this last event. There may well be a greater desire from homeowners to take part in this voluntary program after this last rainfall event.

### **Continuous Improvement**

Since 2000, there is been much more invested in sewer systems, some specifically to resolve flooding. Flooding records and reasons for it are considered in sewer reconstruction projects; to set project priorities and to consider resolving within the project scope.

### **Follow up Activities to this Event**

Usually, City staff follow up with homeowners providing advice based upon the source of flooding. Each call is important and goes through a "CSI" type investigation to determine the causes/sources and the appropriate mitigating measures. The results of this investigative work is then freely discussed and shared with each homeowner. The information conveyed by residents provides staff with a better understanding of the City's sewer infrastructure, leading to more effective short and longer term solutions to flooding issues. Individual homeowner reviews for this event will not be possible and a review of system performance will be delayed.

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Environmental and Engineering Services staff will be meeting in the future to review and analyze all aspects of the event including how calls are received and logged in, response efforts, follow up, future mitigation measures and improvements on all of these. The recent event identified a number of positive aspects and challenges with respect to effective communication during a very brief event. Since effective communication is considered one of the greatest contributing factors to successfully managing a significant weather event, the upcoming meeting will extend the focus on this particular incident management element, with the intent of improving current processes.

City Sanitation Operations (garbage pickup) is being very flexible when it comes to additional bags of flood damaged items (i.e.: beyond the 4 container limit). In some cases calls have been received at the City so we know where these materials are located. In other cases, it has been obvious. Contacting 519 - 661- 4570 is helpful.

The Wastewater and Drainage Engineering Division continue to work with the Insurance Bureau of Canada and the Institute for Catastrophic Loss Reduction (<http://www.iclr.org/>) on ways municipalities can reduce the occurrences of basement flooding and more effective public education strategies and material.

### **City Liability**

Claims for damage to property on the belief the City may be responsible are received by the Risk Management Division. The City will not be held responsible for costs unless there is evidence that the City committed a negligent act or omission which resulted in damage. Like most Canadian municipalities, the City of London only compensates when it is legally liable for the damage sustained. This approach helps to reduce costs for the taxpaying public - who ultimately bear the cost of these claims. The home insurer should be contacted regarding damages. If the insurer believes the City is liable, it will deal with the City on the homeowner's behalf.

### **Sewage Treatment Plant Performance**

During and after the June 23 event, some of our plants and pumping stations overflowed: about 30,000 cubic metres of raw sewage, and 50,000 cubic metres of primary treated sewage. The largest bypass location was at Greenway. A contract award is about to be made to expand this plant and improve its wet weather capacity. The proposed improvements, if they were in place on June 23, would have eliminated the raw sewage bypass, stored 7,500 cubic metres and the remainder would have received chemically enhanced primary treatment.

During the June 27/28 event, bypass totals were 22,000 cubic metres of raw sewage and 109,000 cubic metres of primary treated sewage.

Our plant performance statistics have been updated and are published on line at:  
<http://www.london.ca/residents/Sewers-Flooding/Sewage-Treatment/Documents/bypasses-Jun30-2015-rev.pdf>

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### Thames River

The Thames River through London is visibly different during significant rainstorms. It takes on a brown colour from the sediment load discharged into it, and from the bottom sediments that are scoured with the higher flows. Water quality deteriorates as contaminants are washed into it from within the London urban area and surrounding agriculture fields. Flows in the Thames rose and fell quickly, consistent with the June 23 rainstorm. It rose again during the June 27/28 storm and received more gradually due to the prolonged rainfall.

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<b>SUBMITTED BY:</b>	<b>RECOMMENDED BY:</b>
<b>JOHN LUCAS, P.ENG. DIRECTOR, WATER &amp; WASTEWATER</b>	<b>JOHN BRAAM, P.ENG. MANAGING DIRECTOR, ENVIRONMENTAL &amp; ENGINEERING SERVICES &amp; CITY ENGINEER</b>

Attach:

Appendix "A" – June 23, 2015 Rainfall Information

Appendix "B" -- June 27/28, 2015 Rainfall Information



Appendix B  
June 27/28, 2015 Rainfall Information

