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TO:	CHAIR AND MEMBERS CIVIC WORKS COMMITTEE MEETING ON SEPTEMBER 22, 2014
FROM:	JOHN BRAAM, P. ENG. MANAGING DIRECTOR, ENVIRONMENTAL AND ENGINEERING SERVICES AND CITY ENGINEER
SUBJECT:	UPDATE ON RAINFALL EVENT OF SEPTEMBER 10, 2014

RECOMMENDATION

That, on the recommendation of the Managing Director, Environmental and Engineering Services and City Engineer, this report on the Rainfall Event of September 10, 2014 **BE RECEIVED** for information.

PREVIOUS REPORTS PERTINENT TO THIS MATTER
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None.

BACKGROUND

Purpose:

This information report is to update Council on the impacts experienced and corresponding actions resulting from the September 10, 2014 storm event.

Context:

On September 10th, 2014, the City of London received a very significant rainfall event. Parts 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.

Rain Event Details:

The hardest hit areas included downtown, Old South and Lambeth, which received upwards of 80mm of rainfall in roughly two hours. The historical average rainfall for the entire month of September rainfall is 82mm; during the event, London received a month's worth of 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'.

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 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.

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Storm sewers:

Storm sewers are only designed to handle rainfall up to a certain point. During heavy rainfalls, such as the one experienced on September 10th, 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 from private properties and towards the City's rivers and streams. In older areas of the City, we commonly see ponding areas where water temporarily collects at topographical low points. These low points can be visualized as 'bowls'. Homeowners within these 'bowls' can then become exposed to surface flooding. In most cases these areas will drain within 24-48 hours. However, in severe cases buildings can 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 the morning of September 16th, the City has received over 200 flooding calls (and rising) from Londoners related to the September 10th event. Over 150 of these calls are for 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. These investigations are currently underway.

- **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 (ie. 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

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

- **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.

- **Yard (surface) flooding:**

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

Standard prevention measures can be found at www.london.ca/basementfloodinghouse

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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

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.

During this particular event, Sewer Operations ramped up their field team until 1:00 a.m. The following day the division was inundated with a major volume of complaint calls. Staff organized an in-house call centre to reduce the backlog of calls in a timely fashion.

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 during an April storm and 676 basement flooding complaints during a June storm.

After these storm events 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 results of level monitors these facilities worked as planned, protecting homes in their service areas.

The draw back with such storage facilities however, 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 on 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 6, 2013. There were no reported basement flooding calls in the participating area for the September 10th 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.

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Follow up Activities to this Event:

City staff will continue to follow up with homeowners and will provide advice based upon the source of flooding. Each call is important to us and will go 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.

Environmental and Engineering Services staff will be meeting in the following weeks 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 September 10th event identified a number of positive aspects and challenges with respect to effective communication, specifically how critical information was conveyed, to whom and when. 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 on 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.

Acknowledgements:

This report was prepared by a team consisting of Tom Copeland and Kyle Chambers from the Wastewater and Drainage Engineering Division, Rick Pedlow form the Sewer Operations Division, Scott Mathers from the SWM Unit and Jay Stanford from the Environment, Fleet and Solid Waste service area.

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SUBMITTED BY:	RECOMMENDED BY:
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Appendix A
September 10, 2014 Rainfall Information

Rainfall Station	September 10 Rainfall (mm)	September 10 Peak 5-Min Intensity (mm/hr)
Oxford WTP (West)	45.75	66
Aquatic Centre (Northwest)	48.75	99
Lambeth (Southwest)	75.5	123
Southcrest Pool (Central)	78.5	108
AJ Tyler (Central)	80.5	117
Northridge Pool (Northeast)	68.75	105
Westminster WTP (Southeast)	41.75	30
Argyle Arena (East)	60.75	96
St. Jean de Brebeuf (East)	52.25	48
Environment Canada (airport – Northeast)	67.7	N/A

Average rainfall (mm) 62.0

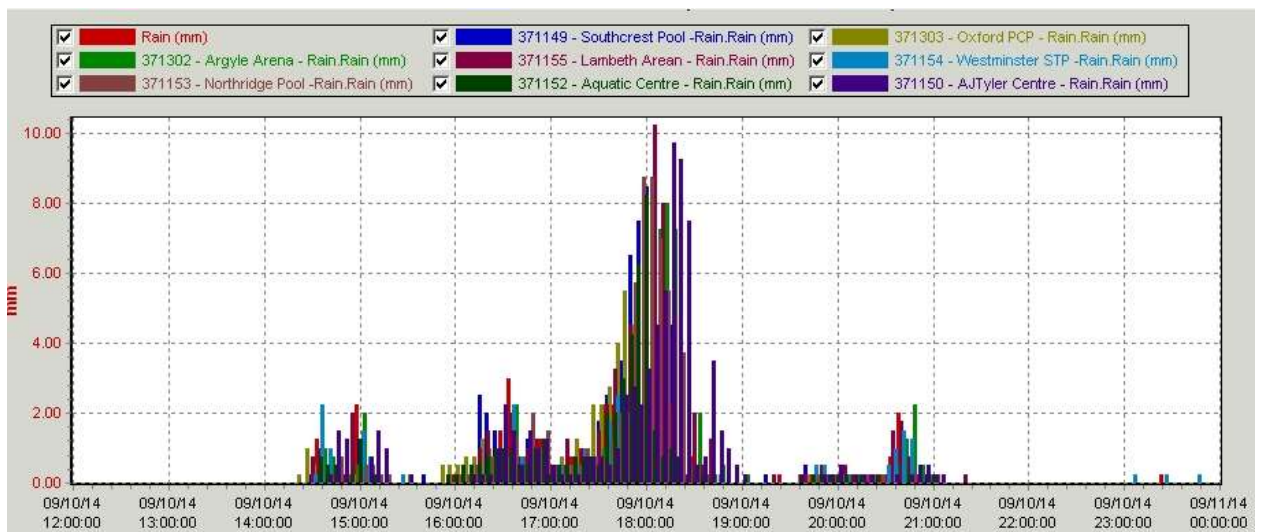


Chart showing rainfall distribution on September 10th 2014