Municipality of Lakeshore – Report to Council

Operations

Engineering & Infrastructure

To:	Mayor & Members of Council
From:	Krystal Kalbol, P. Eng., Corporate Leader, Operations
Date:	August 5, 2021
Subject:	Summary of Flooding Event on July 16, 2021

Recommendation

This report is for information only.

Background

This report is being presented to summarize the storm event that occurred on July 16th, 2021 (into July 17th, 2021).

This report will also provide Council a summary of actions and programs currently in place to address these types of events including impacts and outcomes to the stormwater system, impacts and outcomes to the sanitary system, programs and projects currently in place and underway to address the impacts and measures home owners must take in order to address their private infrastructure and connections to the public system.

Comments

July 16th and 17th Storm event

During the morning of July 16th and into the morning of July 17th, the Municipality of Lakeshore received approximately 85 - 90 mm of rain through a 24 hour period and approximately 75 mm through a 6 hour period. Essex Region Conservation Authority (ERCA) identified that these actual rainfall amounts and durations are roughly equivalent to a 1:25 year storm event (i.e. 4% chance of occurrence in a given year) and 1:50 year event (i.e. 2% of occurrence in a given year), respectively. A letter entitled Rainfall and Flood Event in the Municipality of Lakeshore on July 16, 2021 from ERCA has been attached for more detail related to the event.

It should be noted that the Municipality purchased 12 weather monitors from WeatherFlow earlier this year to assist with monitoring events and recording rain fall data in several locations within the Municipality. These monitors will assist with

mobilizing staff and resources to the affected areas that are experiencing higher rainfall. These monitors are expected to be installed by early Fall 2021.

Management and Staff Resources during Emergency Event

Although rainfall commenced in the early morning of July 16th, the intensity of the rainfall increased late morning into early afternoon. Operations staff were dispatched to various locations for inspection and action at approximately 12 pm (noon) on July 16th.

Several storm pumps and/or systems were under maintenance (as described below) at the time of the event and were identified as requiring immediate attention. Upon initial inspection, other areas were noted to be overwhelmed during the storm event. Below is a summary of these areas. These areas were identified as priority and managed accordingly at the onset and through the storm event.

System	Inspection and Mitigation Notes
Lefaive Drain - condition of storm outlet	The Lefaive Drain had significant deterioration at the outlet pipe and replacement (under maintenance) was scheduled for the week following the storm (which has since been completed). During the event, Operations had two additional axillary pumps on-site to assist with pumping the Lefaive Drain system down based on the condition of the outlet. Both axillary pumps remained active from 12:30 pm to 11:30 pm on July 16th, requiring one staff to monitor the pumps.
Little Creek Storm Pump - no hydro	Based on this area having no hydro during the storm event, this pumping station required an operator to pump the system down using an axillary pump. This pump was in place on July 16th and continued to remain in place until July 17th.
Vintage Oaks - storm pump out for repairs	At the time of the event, the Vintage Oaks storm pump was out for repairs. Two pumps were brought to the pumping station and were operating when the rain event had started. Pumping continued until late Friday evening on July 16th, staff were frequently visiting the site to monitor the pumps.
River Ridge - pond level high	The River Ridge pond level was extremely high during this event, even though the system bypass was being utilized. A tractor with an axillary pump was hooked up to assist with heavy flows and was utilized until the morning of Sunday July 18th.
Wallace Line Drain - outlet gates closed	The Wallace Line Drain outlet gates (Wallace Line, 4TH Con and Renaud Line Drain) were manually opened on July 16th at approximately 1:30 pm. The pumps were inspected and determined to be operational and continued to pump the heavy water flows in these drains during the event.

In total, six axillary pumps were utilized during this storm event as indicated above.

At approximately 2:30 pm (after storm pumps and systems were inspected and checked), Operations staff commenced with closing roadways in various locations (those that experienced higher roadway flooding levels) to stop traffic from causing wakes. Calls were received related to roadway flooding during the event and Operations staff proceeded to those areas. Barricades, road closed trailers and staff vehicles were used to assist with closure of roadways. Residents identified that people were not being cautious while driving down those roadways that experienced significant flooding.

Based on the duration of the storm event and the additional hours staff were required to work, it was necessary to call a State of Emergency at 11:25 pm on July 16th. A State of Emergency was called to allow staff to continue to work in accordance with the relevant collective agreements and *Employment Standards Act*. This was required to continue to assist with mitigation of the storm conditions into July 17th.

Operations staff worked from 7:00 am until 12:00 am (midnight) on July 16th, for a total of 17 hours. Staff returned on July 17th at 4:00 am and continued until 6 pm that evening, for a total of 14 hours.

Pumping stations (both storm and sanitary)

Stormwater pumping stations and systems are operated by the Municipality of Lakeshore staff and were managed during the storm event as indicated above. High water levels of these systems are alarm activated and calls are received through Security One when triggered. During significant events, this allows for immediate response to those areas experiencing higher levels. Routine inspections of the pumping stations occur twice a month as well as prior to upcoming known storm events. Outlet pipes are also inspected and cleaned, as required, during these routine inspections.

Sanitary pumping stations are operated by OCWA (Ontario Clear Water Agency). OCWA forces were on site at the sanitary pumping stations upon activation of the high water level alarms starting on July 16th and continuing into July 17th and July 18th. These pumps are also monitored through SCADA system and closely monitored. OCWA has recently implemented a mobile SCADA system so operators can have the information out in the field.

OCWA also conducts routine inspections of the sanitary pumping station regularly (performed 1-2 times a week at the minimum).

OCWA also monitors weather forecasts and inform our team of potential inclement weather to establish a schedule of who will come in after the first watch so to speak until the weather subsides.

Within the areas of flooding, the sanitary pump station high water alarms were activated between 12:01 pm and 1:22 pm on July 16th. Restoration of the high water alarms did not occur until (at the earliest) 12:39 am on July 17th, with the last alarm restoring at 6:39 pm on July 18th.

Treatment Plant Operation and Bypass

The area that experienced basement flooding is within the service area of the Denis St. Pierre Treatment Plant located on Rourke Line, south of County Road 22.

Based on the volume of stormwater received and the inflow experienced by the conveyance system, the plant went into bypass starting on July 16, 2021 at 2:31 pm. The plant flows reduced and bypass of the plant ended on July 18, 2021 at 2:15 pm.

The Denis St. Pierre treatment plan expansion is currently out for tender, is expected to be awarded in early Fall 2021, with construction to following after contract award.

Information gathering and flood survey results

As of July 29th, 2021 a total of 327 people completed the survey related to the event on July 16th. The below is a summary of the results related to the survey as well as calls that were received during the event:

- General Comments & Comments related to flooding (previous years) – 55
- Street Flooding – 69
- Crawl Space Flooding - 3
- Basement Flooding, unable to determine source (storm or sanitary) – 47
- Storm Sewer Flooding – 33
- Sanitary Sewer Flooding – 120

A total of 200 people reported basement flooding through the online survey and information obtained through calls. Areas of basement flooding and the associated numbers are identified in the attached map entitled Basement Flooding, Areas of Impact, July 16th, 2021 Storm Event.

Follow up meetings and debriefing

Management and Operations Staff debrief meetings were held on Sunday July 18th and again on Tuesday July 20th. This included discussions on the event and areas of improvement to assist with future events. Investigation and mitigation measures were also identified and summarized.

An overview of the sanitary sewer system model and capacity and a review of the flow monitoring results from the event were discussed on Wednesday July 21st with Jacobs Consulting to understand the areas that experienced flooding and the impact the storm event had on the sanitary sewer system.

Further, discussions with the IBEW Union occurred on Wednesday July 21st based on recommendations during debriefing related to hours worked by staff and minimal resources available for overtime hours. It was determined that additional staff should be available to assist (whether internal or external forces) during emergency events such as the July 16th event to assist.

Comments

The following outlines the existing municipal system, impacts and mitigation or incentive programs currently in place.

Storm water Systems and Management

The Municipality's storm drainage consists of one of the following systems within the area(s) of flooding:

1. Storm sewer pipes that are designed to convey the 1:2 year event (older areas of the municipality) or the 1:5 year storm event (now current standard) that are either pumped or consist of a gravity outlet directly to river and/or lake; and/or
2. Storm sewer pipes (1:2 year or 1:5 year design) that convey stormwater to a pond or retention system to hold/store the 1:100 year event, that are either pumped or consist of a gravity outlet directly to river and/or lake; and/or
3. Municipal drains (consisting of open and/or closed systems) that are either pumped or consist of a gravity outlet directly to river and/or lake.

It should be noted that in most cases, storm outlets have restricted flows and are designed to Ministry and Regional standards. Outlet restrictions are mandated to minimize impact to the receiving waters (i.e. restricted to pre developed flows, additional volume of storm water is required to be stored in roadways, rear yards, stormwater ponds/retention systems).

Initially, several residents called related to roadway flooding. It should be noted that during events over a 1:2 and/or 1:5 year storm event that roadway and rear yard storage is required and stormwater ponds and municipal drains will be full, as was the case on July 16th, 2021.

Through 2019 and 2020, the Municipality initiated a Stormwater Master Plan report in order to analyze and assess the existing stormwater systems across the Municipality. This study was broken down into two phases. Funding has been secured and work is underway as outlined below:

- Phase 1 of the Stormwater Master Plan was completed in June of 2020. Several recommendations were made in the report to assist with improving drainage conditions within key areas (at 14 locations). These improvements include:
    - Increase in outlet structures or discharge pipes;

  - Establish or re-establish overland flow routes to improve roadway flooding levels during extreme events;
  - Stormwater pumping station enhancements or replacements to increase peak discharge rates;
  - Installation of sluice gates to control flows; and
  - Stormwater Pond improvements.

  Budget was approved in 2021 to complete the recommendations made at 4 of the 14 locations (with an allocated budget of $1,650,000). The design for these projects are currently underway and are expected to be completed in 2021/2022. Note that modifications to stormwater systems require amended approvals from various agencies.

- Further, the Municipality had re-allocated $250,000 of budget from High Water Flood Mitigation Measures to be eligible for application to the Disaster Mitigation Adaptation Fund (DMAF) grant. This federal funding was approved in May of 2021 and the Municipality received an additional $250,000 (50%) towards Phase 2 of the Stormwater Master Plan. This study will be initiated/underway before the end of 2021.

In addition to the recommended improvements above (which will not accommodate the intensity of the storm event(s) that were experienced on July 16th), residents must take responsibility for their private infrastructure. The following are measures all home owners should be taking to mitigate and protect themselves from stormwater flooding:

- Disconnection of roof leaders from foundation drain within private property.
  - In newer areas, Lakeshore requires that roof leaders be splash padded, where possible, and not be connected into the storm sewer system. Roof leaders should splash onto surrounding lands around homes, as this flow contribution to the storm sewer system is unnecessary and by disconnection of roof leaders can relieve the system of flows. In older areas, disconnections of roof leaders should be completed and are encouraged to be done by residents. Disconnection of roof leaders on grassed surfaces will assist with slowing the flow of stormwater into the piped system.
- Overflow and/or back-up sump pump(s) on hand for more extreme events. Note that an additional pump outlet should be directed to discharge into rear yards or onto driveways. Residents should not pump stormwater into laundry tubs or floor drains as this will overwhelm the sanitary sewer system with stormwater flows.
- Although this storm did not experience hydro outages in most areas, a back-up power source is recommended to further assist if power outages are experienced during future events.
- Inspection and/or camera of storm piping on private property to ensure recirculation of stormwater is not occurring. Foundation drainage piping can come loose and/or be damaged or cracked over time causing the recirculation of stormwater and hence overwhelming private drainage systems.

Sanitary Sewer System and Surcharging

Since 2014, the Municipality has allocated budget to inspect and complete repairs related to Inflow and Infiltration (I & I) into the sanitary sewer system. This work included mainline sanitary sewer and manhole inspections with lateral launches (private drain connections from main line to clean out) as well as the associated repairs based on recommended findings.

The below represents the allocated budget dollars for the last few years related to the I & I program related to the sanitary sewer system:

- 2018 –$600,000
- 2019 - $500,000
- 2020 - $600,000
- 2021 - $300,000

Further, Lakeshore has been installing rain catchers in sanitary manholes over the last few years within flood prone areas. To date a total of 811 rain catchers in sanitary manholes (out of a total of 1986 manholes) have been placed. This program will continue and have now mandated that rain catchers be installed within areas of new developments.

The Municipality allocated $150,000 in 2021 to install monitors and calibrate the existing sanitary sewer system model (the model update is expected to be completed by August 2021). The flow monitors were in place during the July 16th event. After the July 16th storm event, a report was requested related to the results of the flows within the sanitary sewer system and details were requested related to the impact that stormwater has on the sanitary sewer system.

The attached memo received from Jacobs dated July 29th, Flow Monitoring Summary confirms that under normal conditions (daily flows) that the system is not surcharging nor is it operating over its design capacity. However, it does note that under storm events, the system experiences different levels of surcharging indicating that the sanitary sewer system is being used to convey stormwater and that inflow and infiltration is occurring in certain areas, some more extreme than others. This information along with the flood mapping will be useful in determining areas that require extensive investigation and mitigation.

After the storm event, inspections were undertaken (on July 17th) for those areas under development where new dwellings were under construction (basement foundations dug). In some cases, dry basements and an open connection to the sanitary system was observed (80 dwellings in total were noted). Warning letters were sent to those builders/landowners advising of the inspection results and that this practice of draining stormwater into the municipal sewage connection is in contravention of the Sewer Use

By-law and must stop immediately. Letters were sent to 4 builders and 2 private homeowners who are responsible for the 80 dwellings.

Following the outcome of the July 17th inspections on new dwellings, inspections will be undertaken, if feasible and safe to do so, during and after future storm events. The objective of the inspections is to ensure that this practice is stopped and if required, charges will be laid under the Sewer Use By-law.

Based on the results of the online survey that indicate areas of significant flooding as well as the results of the flow monitoring completed by Jacobs Consulting, Administration will be identifying those areas requiring more detailed analysis and areas recommended for smoke testing to determine sources of inflow and infiltration into the sanitary sewer system. A flood mitigation plan will be required to be developed to ensure these areas are repaired and/or rectified. It should be noted that it is expected that these areas will include private sources contributing to inflow and infiltration into the Municipal system.

In addition to the above, residents should also be reviewing and undertaking the below protection measures to assist with mitigation of sanitary sewer basement flooding and assume responsibility for their private infrastructure as follows:

- Control of sump pit overflow to eliminate overflow/pumping stormwater into sanitary systems during these events (i.e. overflow of sump pump draining into floor drains);
- Installation of and routine maintenance of sanitary backflow prevention devices (which are now required for all new builds). The Municipality offers incentive programs for installation of sanitary backflow preventers (outlined below);
- Understand the use of backflow prevention devices to ensure operation is not being impacted by the use of sanitary facilities within the home during extreme storm events;
- Coordination with the Municipality through smoke testing of key areas to identify private inflow and infiltration sources, including potential house inspections;
- Cooperation with the Municipality on repairing and rectifying these areas within basements and/or in private yards; and
- Mini-cam inspections can also be coordinated with the Municipality to identify concerns related to sanitary servicing on private property.

Municipal Incentive Programs

The Municipality offers the following incentive programs:

- Mini- Camera Inspections

  The Municipality offers free mini-cam inspections of private storm drainage systems around foundations drains to identify and confirm repairs. If residents

are experiencing, or suspect a problem with the sanitary or storm services, residents may contact the Municipality for assistance to identify the cause. The Municipality will schedule an appointment with a crew to camera inspect private connection(s). Note: This inspection can be made by appointment only, appointment times can vary depending on the requests received.

This service is provided one-time free of charge to Lakeshore residents.

- Sanitary Backwater Preventer

  Private home sanitary drains should be equipped with a functioning backwater valve in the event the private sanitary connection or the Municipality's sanitary sewer system is temporarily surcharged. The backwater valve connects to the sanitary sewer line of the home and protects from sanitary waste flooding into the basement.

  Backflow Preventers must be installed by a licensed plumber in order to be eligible for the subsidy. The amount of subsidy is 80% of the cost to a maximum of $750.

- Installation of Sump Pump Overflow

  A home is designed to carry rainwater and groundwater into the sump pit. If the sump pump does not have a discharge pipe discharging to an outside landscaped area, the water is being directed into the Municipality's sewer system. This extra water can lead to the Municipality's sewer system becoming surcharged and increase the risk of basement flooding. Installing a sump pump with an overflow to the outside landscaped area reduces the amount of water entering the sewer, reducing the risk of basement flooding. A sump pump overflow (check valve) releases the water in the sump pit onto the lawn or some area away from the building in the event that the private stormwater service is blocked or backing up.

  The overflow must be installed by a licensed plumber. This subsidy is up to a maximum of $225.

- Downspout Disconnection

  Disconnecting downspouts is an important measure that every Municipal property owner should undertake. Disconnecting downspouts redirects rainwater from the roof onto the grassed area surrounding the home, rather than to the sump pump. It also provides more capacity to both the private connections and the municipal sewers to help protect from basement flooding.

  Downspout disconnections are subsidized up to $75.

The below identifies the number of residents (per year) that utilized these programs over the last few years:

Subsidy Year	Mini-Camera Inspections (Storm and/or Sanitary)	Back water Valve (Sanitary)	Sump Pump Overflow (Storm)	Downspout Disconnection (Storm)
2019	63	13	11	Very low participation
2020	73	39	31	
2021 (to date)	62	2	3	

It is encouraged that these incentive programs continue to be utilized by residents to minimize the risk and impact of flooding.

Others Consulted

Essex Regional Conservation Authority, Jacobs Consulting and Ontario Clean Water Agency were consulted in regards to the event.

Financial Impacts

There are no additional financial impacts proposed for this report beyond the approved budgets mentioned above.

Attachments

Attachment 1: Rainfall and Flood Event in the Municipality of Lakeshore on July 16, 2021 letter, dated August 3, 2021, ERCA

Attachment 2: Basement Flooding – Areas of Impact July 16, 2021 Storm Event, Map

Attachment 3: Flow Monitoring Summary Memo, Jacobs, dated July 29, 2021

Report Approval Details

Document Title:	Summary of Flooding Event on July 16, 2021.docx
Attachments:	- Rainfall and Flood Event in the Municipality of Lakeshore on July 16, 2021 letter, dated August 3, 2021, ERCA.pdf - Basement Flooding – Areas of Impact July 16, 2021 Storm Event, Map.pdf - Flow Monitoring Summary Memo, Jacobs, dated July 29, 2021.pdf
Final Approval Date:	Aug 5, 2021

This report and all of its attachments were approved and signed as outlined below:

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