Basement Flooding Protection Program Study Areas 42, 44 and 62 (Downtown)

Virtual Public Meeting







Tuesday, June 25, 2024

Agenda

- 1. Purpose of our study
- 2. About the sewer system and flooding
- 3. Recommended solutions
- 4. Project timeline
- 5. What you can do to reduce basement flooding
- 6. How to contact City staff to ask questions or share your comments



Study Overview

- The City's sewer and drainage system was originally designed to handle average rainfall events and not extreme rainfall events (100-year storm).
- For study areas 42, 44 and 62, the City is creating a flood-risk reduction strategy that involves an:
- Examination of the City's sewer and drainage system.
- Identifying causes of basement and surface flooding.
- Identifying where the system does not meet the Basement Flooding Protection Program's Level-Of-Service targets.
- Evaluating options and recommending solutions to achieve the targets.



Study Areas 42, 44 and 62 (Downtown)

Three basement flooding study areas (42, 44, 62) have interconnected sewer and drainage systems that span several City wards.





City's Basement Flooding Protection Program

To reduce the risk of basement flooding, the City of Toronto has established a target "Level Of Service" (L-O-S) for the wastewater collection and storm drainage system it owns and operates. These program targets are to reduce the risk of property and roadway flooding.

Combined sewers and storm sewers:

• Ability to handle an extreme rainfall event of 90 mm rain within 6 hours, 40 mm of which falls in 10 minutes (100-year storm).

Sanitary sewers:

• Ability to handle an extreme rainfall event similar to the May 12, 2000 storm, which caused extensive basement flooding in the city.

Municipal roadways (maximum depth of ponding at road crown during 100-year storm):

- Arterial roads: ponding permitted on outer lanes; however centre lanes must be open for travel in each direction.
- Collector/local roads: ponding permitted within the City's right-of-way (depending on road design).

Performance is evaluated using a detailed computer simulation which identifies all locations where L-O-S targets are not met, and is then used to examine solutions.

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Level-Of-Service Exceptions

- While the City aims to achieve the Basement Flooding Protection Program's target Level-Of-Service (L-O-S) throughout the study areas, this is not always possible due to technical limitations. In study areas 42, 44 and 62, certain locations were exempted from meeting these targets based on the low level of flood risk to private property.
- Below are the types of areas with L-O-S target exceptions in study areas 42, 44, and 62:
 1. Areas with low risk of basement flooding.
 - 2. Areas where sewers discharge into Lake Ontario or the Don River and the sewers cannot be lowered below the lake or river level.
 - 3. Privately owned sewers, which are the responsibility of the property owner to manage.
 - 4. Areas where sewers flow beneath an existing bridge underpass that would be costly and technically unfeasible to address.





For each study area, the City is following the Municipal Class Environmental Assessment process, an approved planning process under the Ontario Environmental Assessment Act.





Understanding the Sewer System



Drainage Systems Design and Operation

- Combined and storm sewers ("minor" drainage system) were originally designed to drain runoff generated from extreme rainfall events.
- During extreme rainfall events, streets and overland flow paths ("major" drainage system) convey stormwater that exceeds the combined and storm sewer capacity.
- Temporary ponding on streets is expected during these extreme rainfall events.





Areas of Responsibility

The City is responsible for infrastructure within the public Right-of-Way. Homeowners are responsible for the operation and maintenance of drainage systems on their private property, including:

- Lot grading.
- Front and rear-yard or driveway drainage catch basins.
- Foundation drains.
- Sump pumps and backwater valves.
- Private tree roots and what you put down the drain (fats, oils, grease, etc.).
- Disconnecting downspouts.



Reports of Basement Flooding

Property flooding has been reported to the City after extreme rainfall events such as August 7, 2018 and July 8, 2013.

The map shows the locations of reported flooding after major storms since 2000.





Sewer System Terminology



Relief Sewers are like highways, they carry larger flows and local sewers connect into them.



Local Sewers are like local streets, they carry smaller flows and connect into relief sewers.



Assessment of Existing System



Some of the relief sewers follow a similar alignment to former creeks such as Garrison Creek which was filled in as urban development occurred



Causes of Flooding

- Much of the area is served by older combined sewers sewers that receive sewage from building plumbing systems as well as surface drainage.
- Combined sewers have limited capacity and become overloaded in extreme rainfall events.
- Over the decades, the City's sewer separation program has installed storm sewers on many streets to relieve the combined sewers. But these sewers also have limited capacity.
- During extreme rainfall events, when sewers become overloaded, sewage and drainage water can back up in the sewer line and enter buildings. Water can also accumulate on the surface if it cannot be drained into the sewer system.







Study Recommendations



Potential Solutions to Basement Flooding

Below are potential solutions to basement flooding in the study areas, which can be combined:

Sewer Inflow Reduction to Eliminate Sewer Overloading

- Catchbasin inlet controls to reduce the rate at which surface drainage water can enter the sewer system.
- Watertight manhole lids on sewers to reduce "leakage" of rainwater into sewer pipes.

More Conveyance Capacity

- New storm sewers and catchbasins on local roads.
- Replace existing sewers with larger pipes.
- New relief sewers to provide additional capacity to relieve the existing overburdened sewers.

Storage Facilities

- Underground tanks or "in-line" storage pipes in new or replacements sewers to store excess storm water during extreme rainfall events.
- Vertical storage shafts in relief sewers.



Recommended Approach

Sewer Inflow Reduction to Eliminate Sewer Overloading

More Conveyance Capacity

Storage Facilities

- A "hybrid" approach is recommended which would apply a variety of solutions to address flooding across all three study areas.
- Conveyance improvement is the central and most important element to a system-wide solution
- Provides relief to the existing overburdened sewer infrastructure.
- Increased conveyance capacity in the relief sewer system is required to relieve local flooding issues and achieve the Program's Level-Of-Service targets.
- Will reduce discharges of sewer overflow and untreated stormwater to the waterfront.



Recommended System-wide Solutions

New infrastructure to carry flows to the Lake and Don River are recommended:

- Garrison Relief Sewer and new outfall to Lake Ontario
- Cabbagetown Relief
 Sewer and new outfall
 to Don River
- Sunnyside Relief Sewer



Locations of sewers and shafts selected based on location opportunities, engineering feasibility and efforts to minimize impacts on transit routes and arterial roadways.



Recommended Local Solutions

Local solutions include catch basin controls, new inlets and new local sewers or replacement sewers.

The performance of local improvements depends largely on the new relief sewers to help carry the volume of stormwater collected.





System-wide and Local Solutions

The system-wide and local solutions would work together to:

Provide more conveyance capacity

- 12.7 km Garrison Relief Sewer.
- 3.1 km Cabbagetown Relief Sewer.
- 1.2 km Sunnyside Relief Sewer.
- 132.2 km of new or replacement sewers.

Reduction of sewer inflow to eliminate sewer overloading

- 5,550 new, replacement or relocated catch basins.
- 475 catch basin inlet-control devices.
- 875 combined sewer maintenance hole lid replacements.



Online Map of Recommended Solutions

View the recommended sewer solutions using our online map to see what is proposed in your neighbourhood.

Access online map at: Toronto.ca/DowntownBF





Relief Sewers

- Provide relief to the existing overburdened sewers.
- Carry large volumes of stormwater collected from local sewers to outfall into Lake Ontario or Don River.
- Contains vertical storage shafts for excess stormwater.

What Does it Involve?

- Would be constructed by tunnelling to avoid existing underground infrastructure and reduce disruption along roadways and neighbourhoods.
- A tunnel boring machine would be used to tunnel below ground to a depth of 20-80 metres.
- Rotating disc-shaped cutting wheels bore through soil and install pipe segments to create the tunnel walls.
- Tunnel shafts would be constructed to lower and retrieve the tunnel boring machine and facilitate tunnel construction.





New or Replacement Sewers

- Increase the size of the roadway storm sewer pipe by replacing it with a larger pipe.
- Install new storm sewer to relieve combined sewer ("sewer separation").
- Some sewers may contain underground tanks or "in-line" storage pipes to capture excess storm water.

What Does it Involve?

- Excavation and removal of the old sewer, maintenance hole and catchbasin and disconnection of sewer service line(s).
- A new sewer is then installed and connected to the system followed by restoration of the road and boulevard.





Catch Basin Inlet Controls

- Limit flow into combined sewers and storm sewers.
- Used in locations where more water can be kept on the surface.

What Does it Involve?

- Installation of a special insert (photo below) or metal plate inside the catch basin chamber.
- Requires minimal effort and time to install, but will impose more maintenance effort.









Design & Construction Considerations

- Where possible, the study recommendations aimed to minimize impacts to private properties by aligning sewer upgrades within the City's Right-of-Way. In some cases where impacts to private property could not be avoided, the proposed alignment for the new relief sewers and some local sewers may cross private property.
- The study has identified potential property requirements, which are preliminary and subject to change during more detailed engineering design work.
- Some impacts would be temporary for the purposes of construction and affected areas would be fully restored.
- Where the Relief Sewer would pass 20-80 metres beneath a property, the City would negotiate a sub-strata easement.
- The City is meeting with potentially affected property owners to review details and would continue to engage owners during future design work.





After Study Completion

- After the completion of the study, funding must be arranged and approved.
- All City basement flooding projects must be prioritized to benefit the greatest number of properties and coordinated with other construction work. Projects are prioritized based on a Council-adopted \$68,000 cost-per-benefitting-property threshold.
- Projects meeting the threshold at the completion of preliminary design may proceed to construction. Projects that exceed the threshold are moved into the deferred project list for future consideration, after projects under \$68,000 have been advanced.
- During detailed design, solutions would be refined and property impacts would be confirmed.





Reducing Impacts during Design & Construction

During Detailed Design

- Confirm property impacts and meet with affected property owners to negotiate easement agreements.
- Detailed designs would be reviewed by City departments including Parks, Forestry & Recreation and Transportation Services.
- Design of new outfall to the Don River would be reviewed by Toronto & Region Conservation Authority (TRCA).
- Design of outfall system for Garrison Relief Sewer would require review and approval by Ports Toronto, TRCA and possibly Federal Department of Fisheries & Oceans.
- Perform archaeological and cultural-heritage assessments as required.

During Construction

- Complete Traffic Management Plan.
- Notify impacted property owners prior to construction.
- Use best practices for dust control and vibration monitoring.
- Use low-noise equipment during construction, where possible.



Next Steps



finalize study report



What you can do to reduce flooding



At-source measures



Outside wal Four Ground an drain Typical foundation drain

Disconnect foundation drains from sanitary sewer and install/ maintain sump pumps



Improve lot grading



Disconnect downspouts





Subsidy Program

To assist homeowners, the City offers owners of single-family, duplex, triplex, and fourplex residential homes a financial subsidy of up to \$3,400 per property* to install flood protection devices including:

- a backwater valve
- a sump pump
- disconnection of a home's foundation drains (weeping tile) from the sewer system

For more information on the City of Toronto Basement Flooding Protection Subsidy Program, please scan the QR code:







Basement Flooding Protection Subsidy Program web: www.toronto.ca/water/sewers telephone: 3 1 1 email: basementflooding@toronto.ca

Municipal Licensing and Standards (Plumbing/contractor license information) web: www.toronto.ca/licensing telephone: 416-392-6700





Contact Us

Visit our webpage at toronto.ca/DowntownBF to view information and submit written comments before July 9, 2024 to:

Kelly Rahardja Senior Public Consultation Coordinator Phone: 416-397-5559 Email: floodingstudy@toronto.ca

