

# **Basement Flooding Study Area 64 Morningside Heights, Scarborough (Old Finch Ave between Morningside Ave and Baffin Crt)**

Municipal Class Environmental Assessment Study  
December 2022

# Learn about our Study

We invite you to read through this presentation to learn more about the City's study about basement flooding for Study Area 64 along Old Finch Avenue between Morningside Avenue and Baffin Court

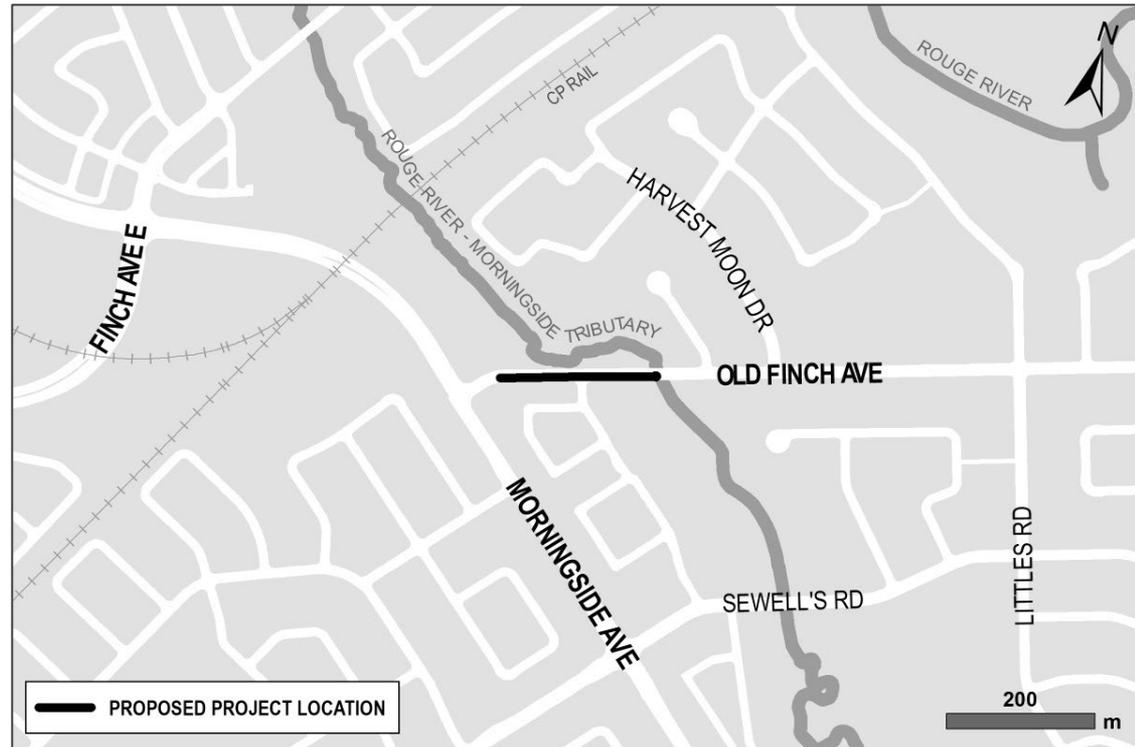
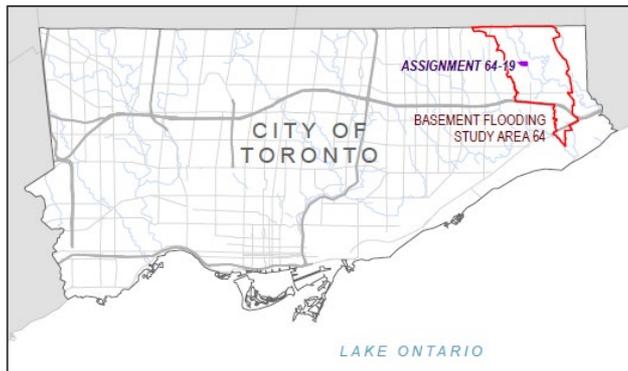
You will learn about:

- the purpose of the study
- what solutions have been considered and the recommended solution
- how impacts will be managed
- how to get in touch with City staff to ask questions or share your comments

# Study Area

Assignment 64-19 is located within Scarborough-Rouge Park along Old Finch Ave and is roughly bounded by:

- Morningside Avenue to the west
- Baffin Court to the east



Maps highlighting the extents of the proposed project for Assignment 64-19, and the location of Assignment 64-19 within Study Area 64 and the City of Toronto.

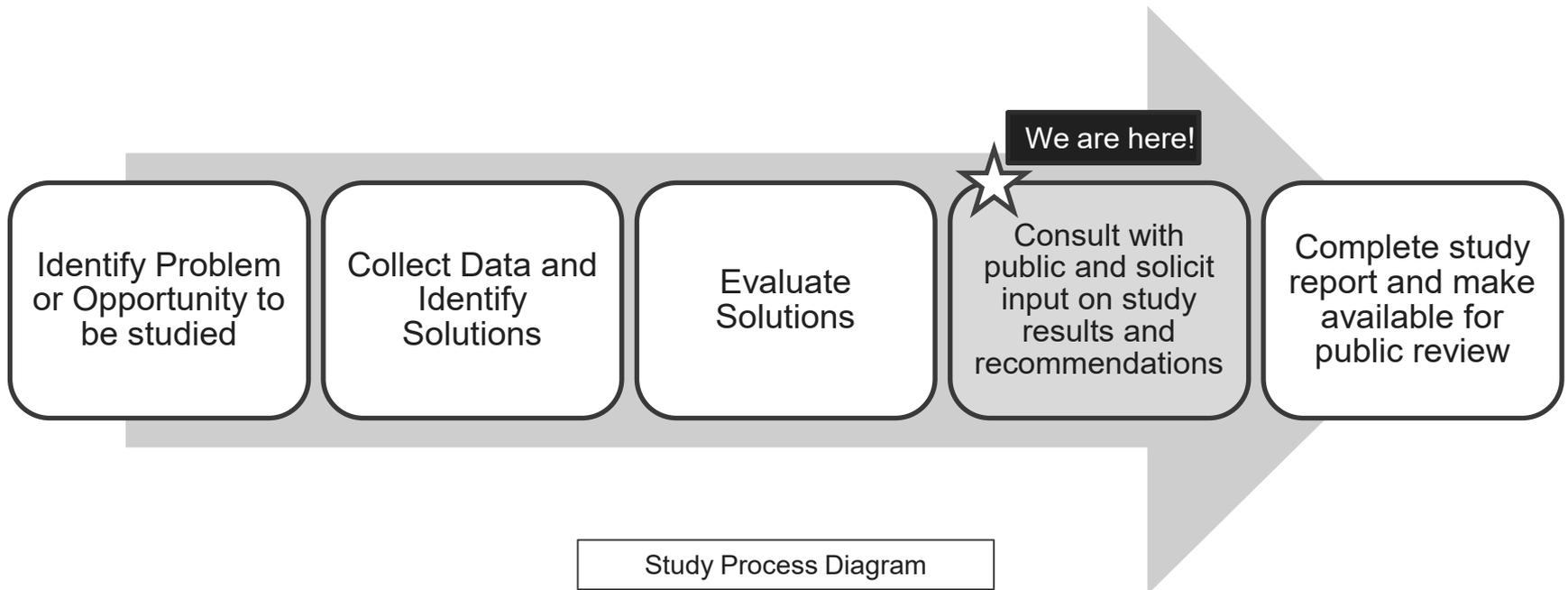
# Study Purpose

The City is undertaking a Basement Flooding Study to:

- examine the existing storm water drainage and sanitary sewer systems and identify the causes of basement flooding and/or surface flooding (severe ponding on streets during extreme storms)
- identify and evaluate solutions
- make recommendations to reduce the risk of future basement flooding in the area and increase capacity in the City's storm and sanitary collection and overland drainage systems

# Study Process

The study is being undertaken in accordance with the Municipal Engineers Association's Municipal Class Environmental Assessment process for Schedule B projects which involves completion of Phases 1 & 2 of the planning process as illustrated below:



# About Basement Flooding

# Flooding within the Study Area

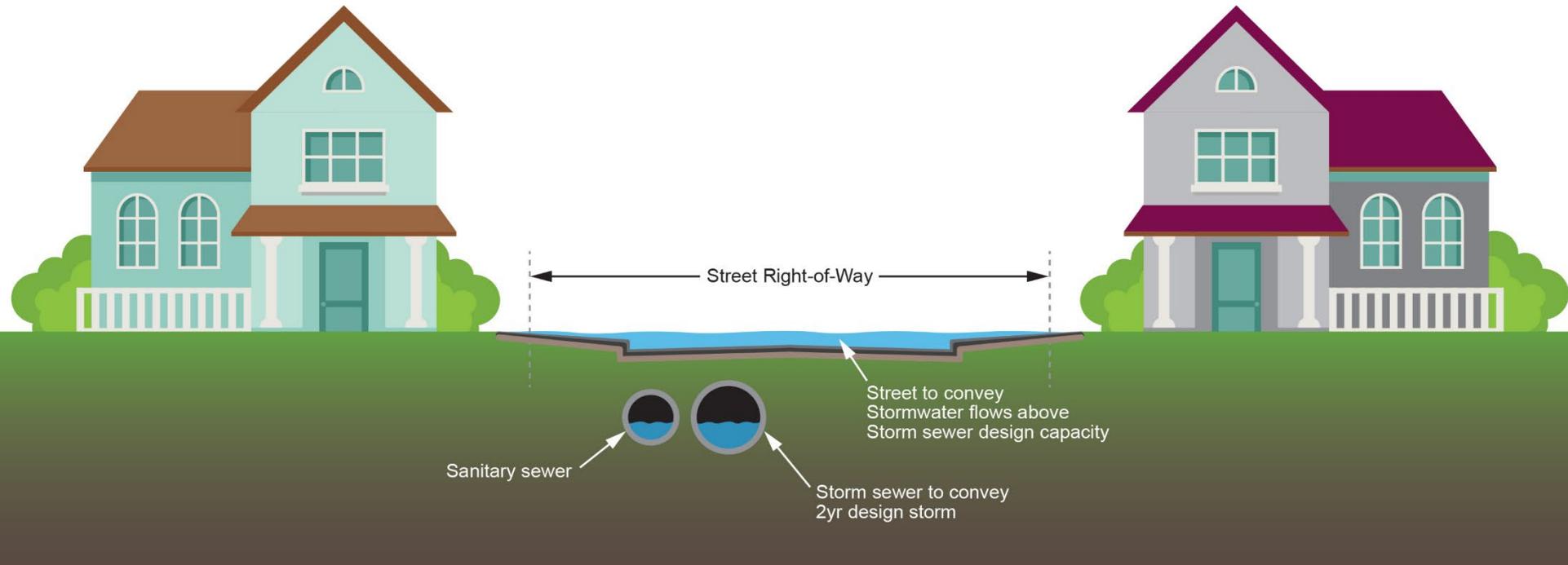
There are a number of factors contributing to flooding in the area, including:

- Sanitary trunk sewer aligned with major watercourses, offering potential for infiltration
- Capacity of pump stations to handle extreme wet weather events
- Elevated baseflows in the sanitary sewer taking up flow capacity
- Rural lot drainage and flow paths that breach private property
- Sewers not sized to handle high flows during extreme events
- Shallow sewers with less potential for freeboard from basements
- Large industrial-commercial-institutional sector with high imperviousness ratios

# Storm Drainage System

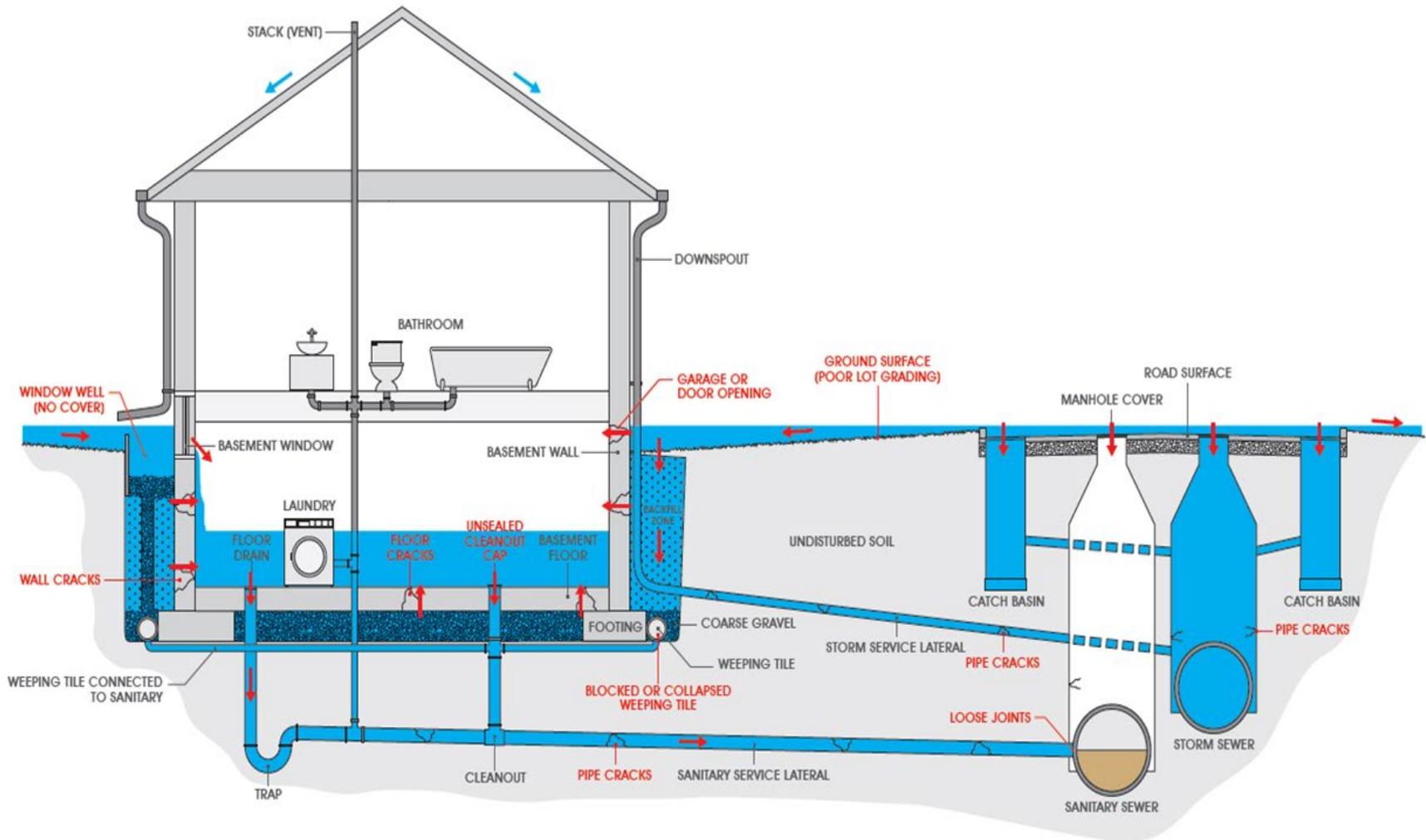
**Storm sewers** (or minor system) convey stormwater runoff from up to 2-year design storm.

**Streets** (or major system) convey major storms that exceed the storm sewer capacity. Temporary ponding on streets is expected during major rainstorms.



Graphic showing the conveyance of stormwater along the storm sewers (minor system) and streets (major system)

# Typical Causes of Basement Flooding

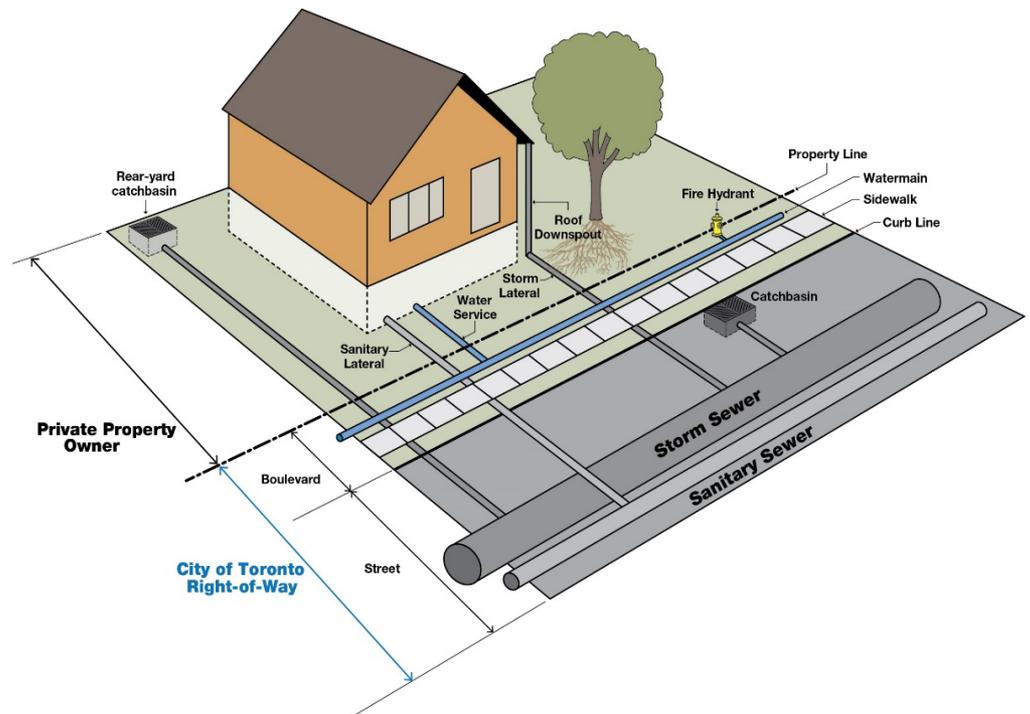


Graphic highlighting the typical causes of basement flooding for a house

# Area of Responsibility – City

The City is responsible for infrastructure within the public Right-of-Way and plans to achieve a higher than existing level of service for:

- Sanitary Sewers
- Storm Sewers
- Catchbasins within roadways
- Overland drainage within roadways

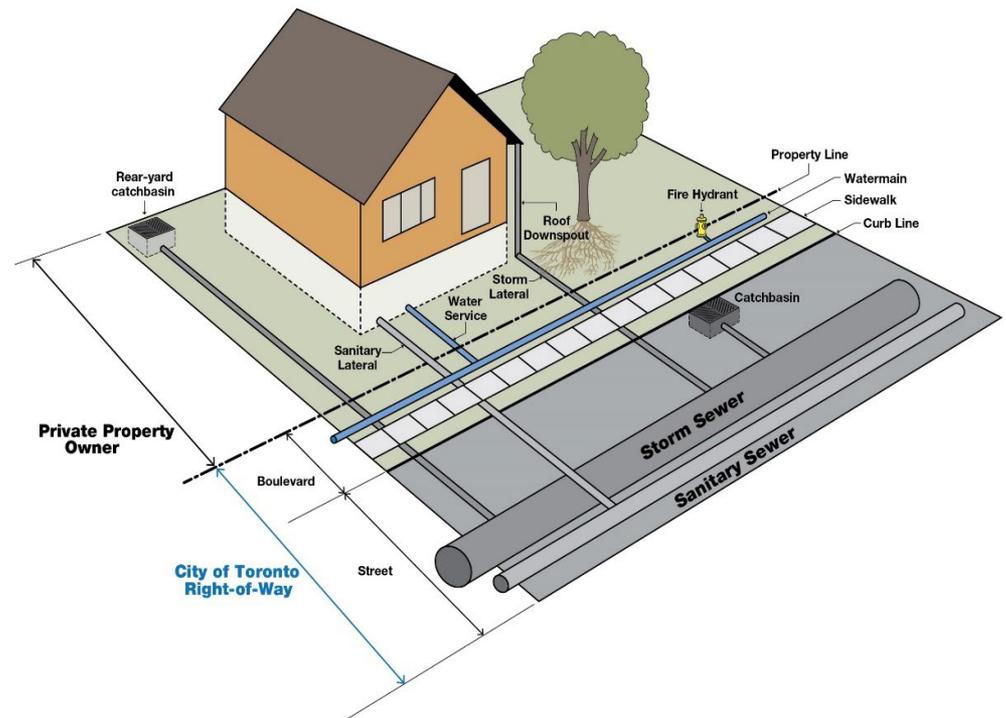


Graphic showing infrastructure within and outside of the Public Right-of-Way

# Area of Responsibility – Property Owner

Each homeowner is responsible for the operation and maintenance of drainage systems on private property including:

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



Graphic showing infrastructure within and outside of the Public Right-of-Way

# Property Owner – Potential Solutions

Solutions that can be implemented by property owners include:



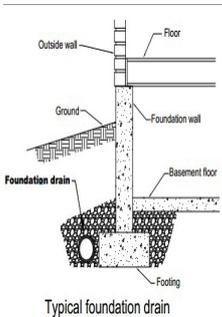
**Maintaining front and rear-yard drainage or driveway catchbasins**



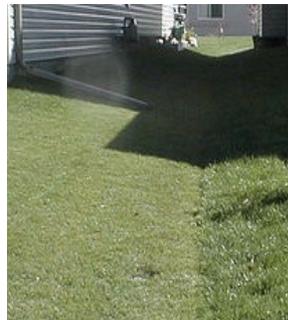
**Installing backwater valve**



**Installing permeable paving**



**Disconnecting foundation drains from sanitary sewer and installing / maintaining sump pumps**



**Improving lot grading**



**Disconnecting downspouts**



**Using rain barrels**

# Existing Flooding Conditions

# Existing Sewer System Conditions

The City and its consultants have examined the existing sewer system:

- Separated Sanitary and Storm sewer network, draining north to south
- The Storm sewer is tributary to the Morningside tributary of the Rouge River

Factors related to flooding include:

- Pump stations not sized to accommodate extreme events
- Sanitary subtrunks aligned with watercourses offering potential for infiltration, resulting in elevated baseflows in the sanitary sewer that take up flow capacity
- Pipes not sized to handle high flows during extreme events
- Presence of shallow sewers, providing less potential for freeboard from basements
- Storm outfall capacities influenced by creek water levels, resulting in backwater

# Existing Sewer Network

## Legend

-  Assignment 64-19 Area
-  Storm Manhole
-  Sanitary Manhole
-  Dual Manhole
-  Storm Sewer
-  Sanitary Sewer

In general, issues with the storm drainage system are due to pipes not being sized to handle high flows during extreme events.

The sanitary system and pumping stations are also overwhelmed under extreme events.



Map showing the existing network of Sanitary and Storm sewers

# Basement Flooding Solutions

# Solutions to Basement Flooding

To help reduce the risk of future basement flooding, the City has identified several solutions prioritized for implementation, which include:

- Overland controls
- Increasing the number of catchbasins
- Catchbasin inlet controls
- In-line storage pipes
- Replacing existing pipes with new larger pipes

Solutions are intended to improve drainage system capacity to the Council-approved Enhanced protection levels (100-year storm for the storm drainage system, and the historic May 12, 2000 event for the sanitary system).

# Storm Sewer Basement Flooding Solutions

## Overland Control

- This solution diverts stormwater away from low lying areas that have no direct outlet to reduce ponding on the surface

## What Does it Involve?

- Installation of a large inlet grate or “curb drain” (shown below) to intercept road or boulevard flows and direct the flow into the sewer system



# Storm Sewer Basement Flooding Solutions

## Increasing the Number of Catchbasins

- Where there is capacity in the storm sewer, the City will add more catchbasins to capture flow from the surface

## What Does it Involve?

- Minor excavation of the road to install the new catchbasin(s) and connect to the storm sewer and restoration of the curb and road



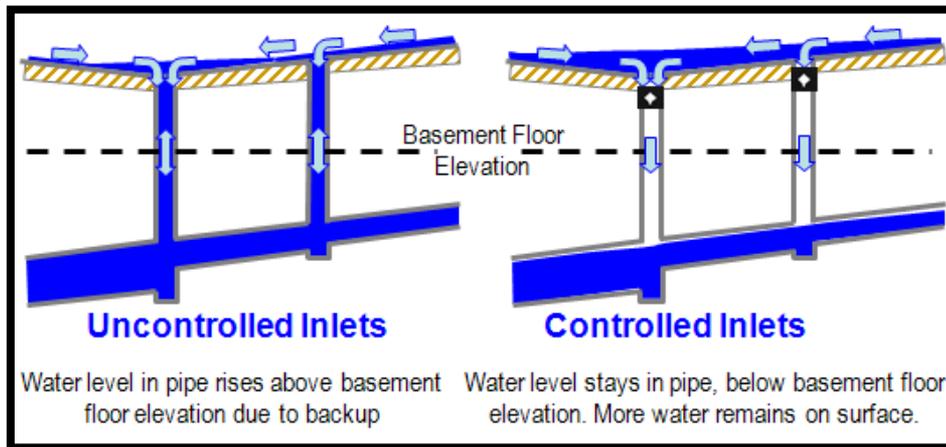
# Storm Sewer Basement Flooding Solutions

## Catchbasin Inlet Controls

- Can limit flow into the storm sewer system to control back-up
- Used in locations where more water can be kept on the surface

## What Does it Involve?

- Installation of a plastic or metal plate / device inside the catchbasin outlet and is not visible
- Requires minimal effort and time to install



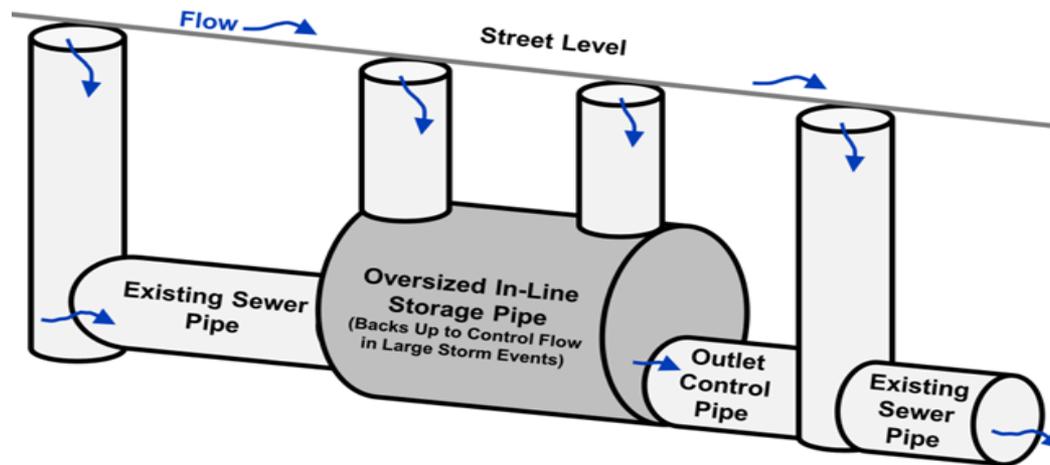
# Storm / Sanitary Sewer Basement Flooding Solutions

## In-line Storage Pipes

- New oversized pipes are constructed to temporarily store water and help relieve overloading of the sewer system

## What Does it Involve?

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



# Storm / Sanitary Sewer Basement Flooding Solutions

## Replacement of Existing Storm and/or Sanitary Sewers

- Increase the size of the sewer pipe by replacing the old sewer with a larger pipe (upsize), installing underground storage tanks

## 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



Image of storm sewer replacement in road during construction

# Evaluation of Alternatives and Recommended Solutions

# Alternative Solutions

Three alternative solutions have been identified to mitigate surface and basement flood risk within the study area.

Each involve pipe improvements, with the following main differences:

## Alternative 1

- Conveyance upgrades
- Tie-in to existing box culvert
- Cost: \$1.1M

## Alternative 2

- In-line storage to avoid modifying existing box culvert tie-in
- Cost: \$6.6M

## Alternative 3

- Reduced inlet capacity to decrease in-line storage size and avoid modifying existing box culvert tie-in
- Cost: \$4.3M

# Alternative 1

## Legend

-  Upgrade Outfall
-  Remove Catchbasin
-  Upgrade Storm
-  Storm Inline Storage
-  Other Storm Solution
-  Other Sanitary Solution
-  Existing Storm
-  Existing Sanitary

Conveyance Upgrade and Upgrade Outfall in Creek Crossing (tie-in to existing box culvert)



# Alternative 2

## Legend

-  Upgrade Outfall
-  Remove Catchbasin
-  Upgrade Storm
-  Storm In-line Storage
-  Other Storm Solution
-  Other Sanitary Solution
-  Existing Storm
-  Existing Sanitary

In-line Storage, No Outfall Upgrade at Creek Crossing

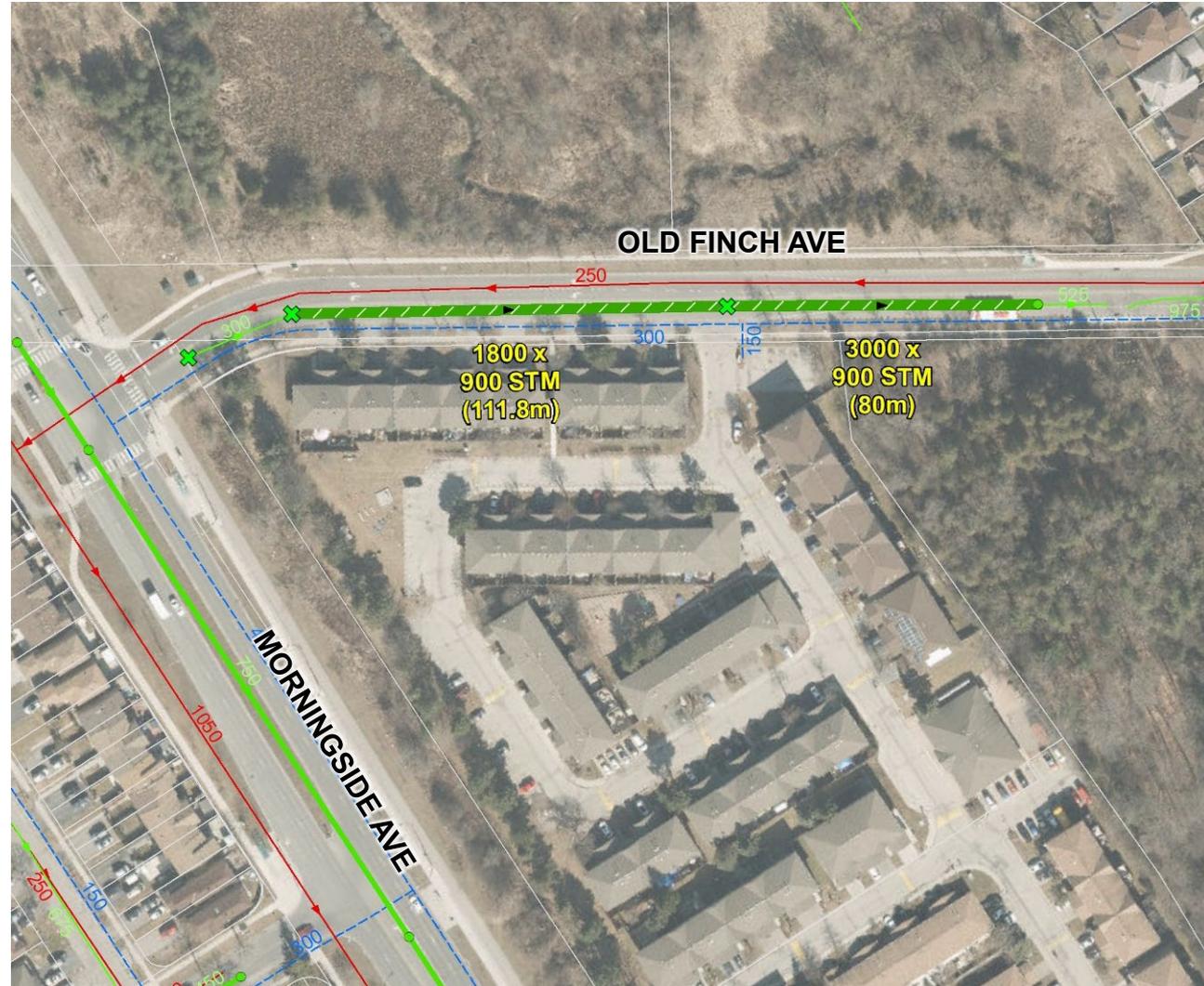


# Alternative 3

## Legend

-  Upgrade Outfall
-  Remove Catchbasin
-  Upgrade Storm
-  Storm In-line Storage
-  Other Storm Solution
-  Other Sanitary Solution
-  Existing Storm
-  Existing Sanitary

Reduced Inlet Capacity, Smaller In-line Storage, No Outfall Upgrade at Creek Crossing



# Evaluation Criteria for Alternatives

Each alternative solution was evaluated based on their ability to address the Study's purpose and to compare their relative impact based on the criteria below:

## Natural Environment

- ✓ Terrestrial systems (vegetation, trees, wildlife)
- ✓ Aquatic systems (aquatic life and vegetation)
- ✓ Surface and groundwater
- ✓ Soil and geology
- ✓ Receiving water quality
- ✓ Stream erosion

## Socio-Cultural

- ✓ Land use impacts (parks, ravines, open spaces)
- ✓ Community disruption during construction (traffic, noise, construction in easements)
- ✓ Community disruption after construction (visual impact, odour, safety)
- ✓ Potential impacts to archaeological and cultural resources
- ✓ Impacts to Indigenous Communities

## Technical

- ✓ Effectiveness in reducing surface and basement flooding
- ✓ Improvement to runoff quality
- ✓ Feasibility of implementation (available space, accessibility, constructability, easement requirements, approvals)
- ✓ Potential impacts on upstream/downstream and surrounding area infrastructure
- ✓ Impacts on operating and maintenance requirements

## Economics

- ✓ Capital cost
- ✓ Operating and maintenance costs

# Recommended Improvements

Based on the evaluation of alternative solutions, the preferred solution is **Alternative 3**

- Alternative 1 requires a tie-in to the existing box culvert crossing of the watercourse, resulting in constructability challenges and work around the watercourse. Alternatives 2 and 3 avoid this work.
- Alternative 3 has a lower capital cost compared to Alternative 2, avoids work around the watercourse, and takes advantage of available overland flow capacity while achieving enhanced protection levels.

# Recommended Improvements

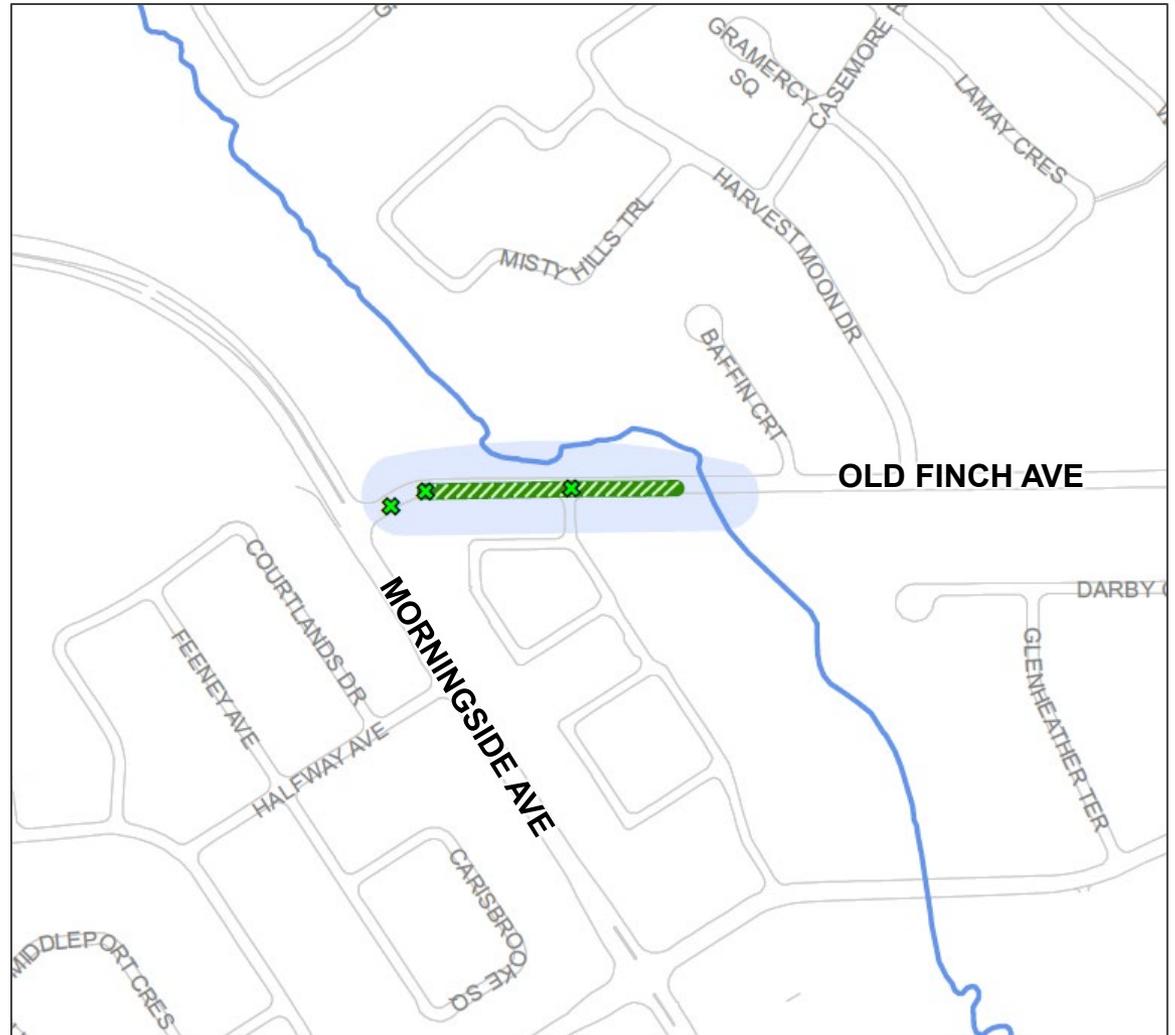
## Legend

 Assignment 64-19 Area

## Proposed Storm Solution

 Remove Catchbasin

 Inline Storage



Map showing the Recommended Improvements for Assignment 64-19

# Mitigation of Potential Impacts and Next Steps

# Mitigation of Potential Impacts

Mitigation measures will be reviewed and refined during the detailed design

## Habitat and Trees

- Vegetation removal to occur outside of the breeding bird season of April to August
- If stockpiles of gravel and sand are required during the active turtle season (April to October), install turtle exclusion fencing around stockpiles prior
- Implement erosion and sediment control mitigation measures
- Spill Prevention and Contingency Plan to be developed prior to construction
- Prepare tree removal and protection plans, along with tree protection barriers and signage where required
- Prepare tree compensation plans for tree removals
- Any damaged trees will be pruned through the implementation of proper arboricultural techniques, under supervision of a certified arborist
- On-site inspection during construction

# Mitigation of Potential Impacts

## **Sediment and Watercourse Protection**

- Prior to the installation of a new outfall, determine increase in outlet velocities and flows and design energy dissipation measures as required to prevent erosion
- Consider flow path and outlet orientation with existing bank and potential for bank hardening to prevent erosion

## **Construction Measures**

- Complete Traffic Management Plan
- Conduct a field review to confirm the result of archaeological potential
- Use of Best Management Practices for dust control and vibration monitoring during construction
- Use of low noise equipment during construction, where possible
- Notify impacted property owners prior to construction
- Maintain access to fronting properties

# From Study to Construction

- All City basement flooding projects are prioritized and scheduled to protect the greatest number of properties as soon as possible, within approved budgets and coordinated with other construction work as per Council approved criteria
- Projects are also prioritized for implementation based on a City Council adopted \$68,000 cost per benefitting property threshold
- Once a project progresses to preliminary design, if there is a cost-benefit less than \$68,000 per property, the project may proceed to construction
- Projects that exceed the \$68,000 cost per benefitting property threshold will be moved into the State-of-Good-Repair's long term capital plan

# Contact Us

## Thank you for viewing the study information

- Contact us if you have any questions or submit comments by email or phone
  - Mae Lee, Senior Public Consultation Coordinator
  - 416-392-8210 or [FloodingStudy@toronto.ca](mailto:FloodingStudy@toronto.ca)
- The study team will review your feedback
- A project file report will then be completed in 2023 and made available for a 30-day public review

[www.toronto.ca/BF64](http://www.toronto.ca/BF64)