# Basement Flooding Study Area 47

## Ionview, Scarborough

### (Kennedy to Birchmount Road, north of Eglinton Avenue)

Municipal Class Environmental Assessment Study

November 2022

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# 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 47 in the neighbourhoods extending from Kennedy to Birchmount Road, north of Eglinton Avenue.

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

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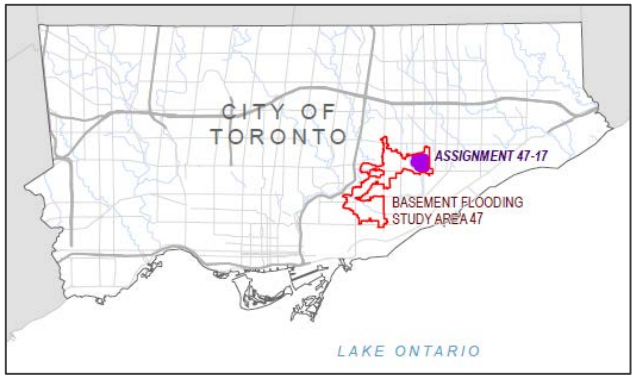
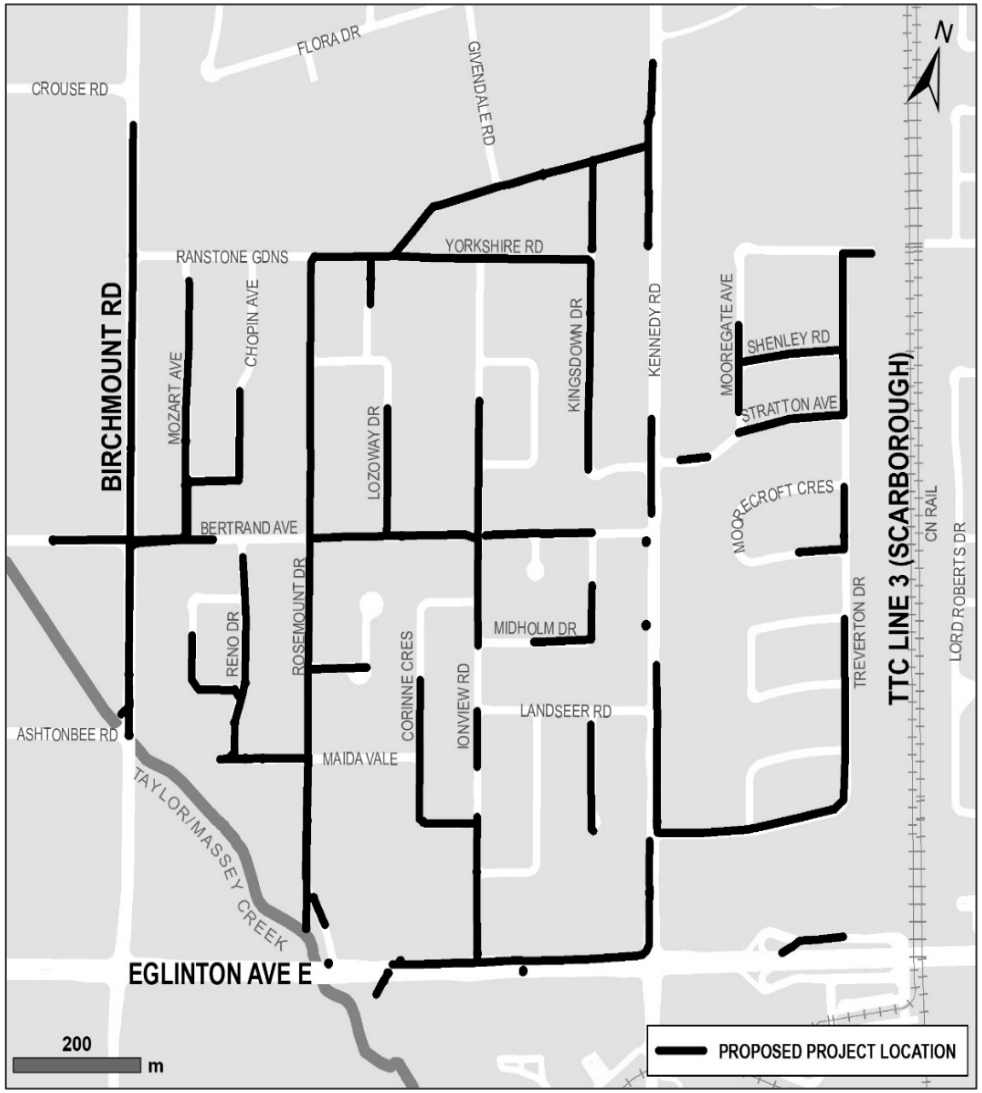
# Study Area

The Study Area is located within west Scarborough, roughly bounded by:

- Birchmount Road to the west
- TTC Line 3 / CN Rail corridor to the east
- Hydro-electric power corridor (HEPC) to the north
- Eglinton Ave E to the south
- Taylor/Massey Creek to the south-west




Maps highlighting the extents of the proposed project for Assignment 47-17, and the location of Assignment 47-17 within Study Area 47 and the City of Toronto.

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# 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

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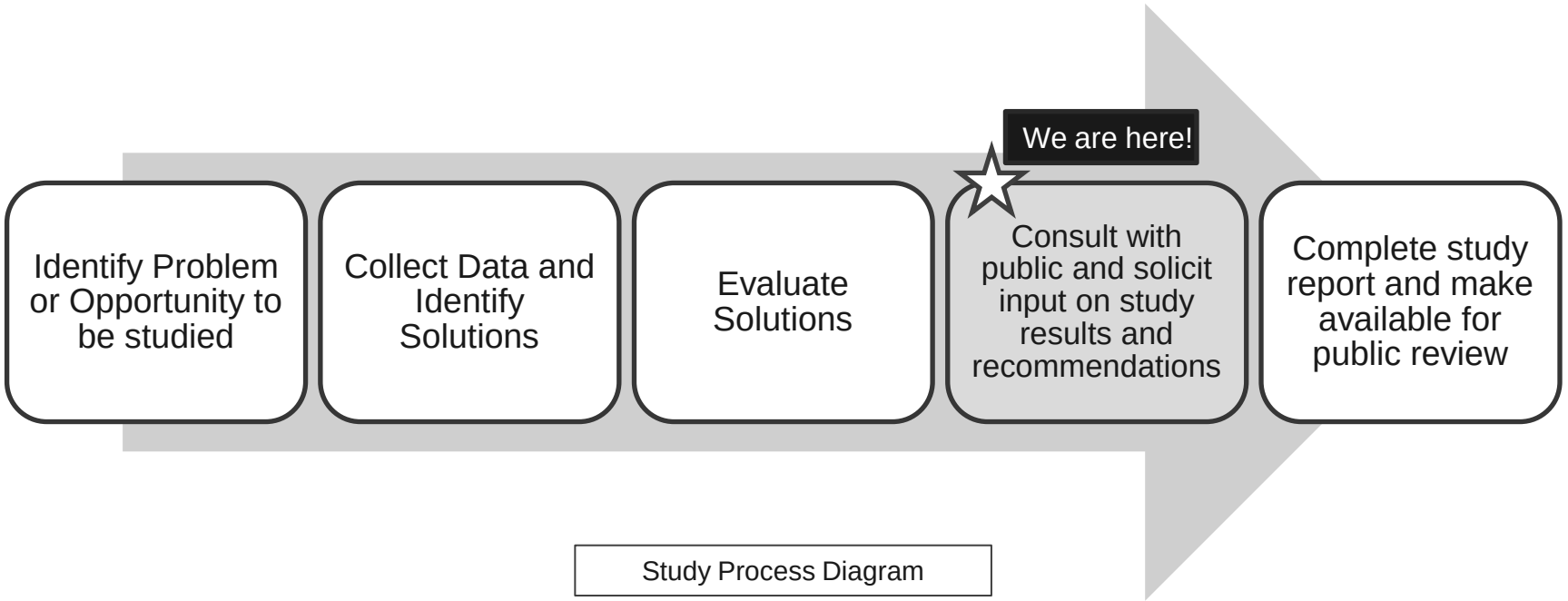
# Study Process

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:




Study Process Diagram

# About Basement Flooding

# Flooding within the Study Area

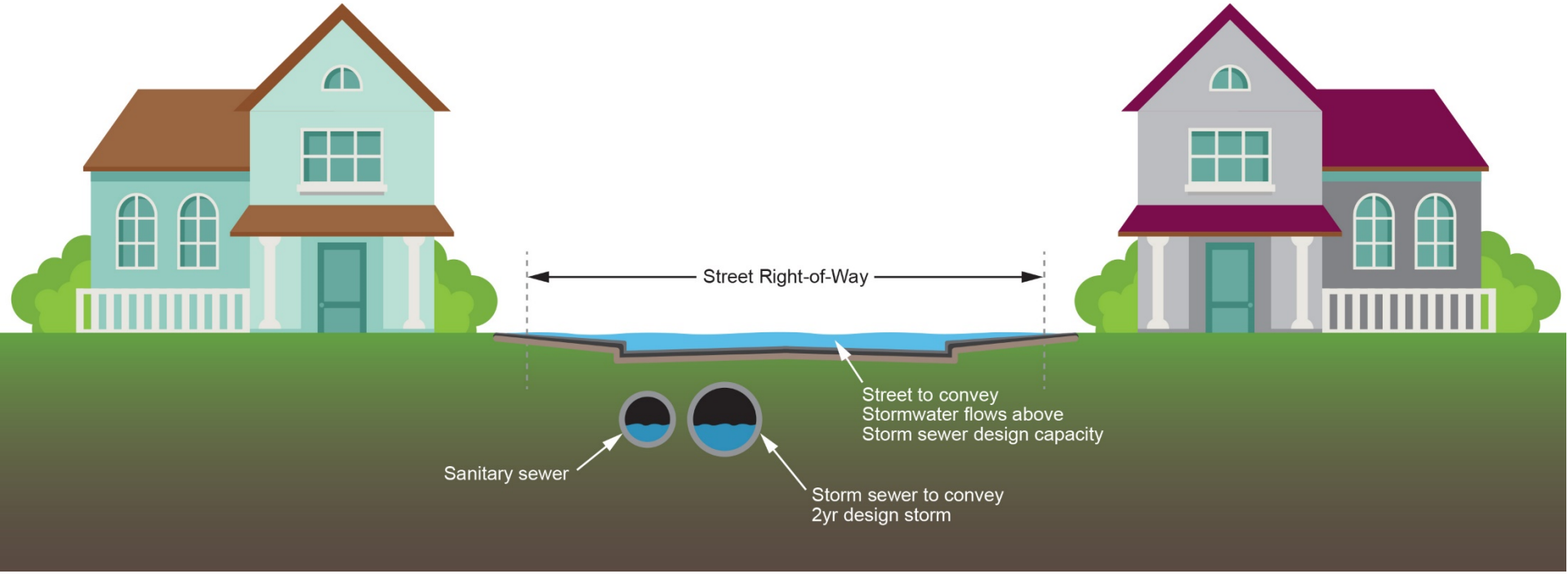
There are a number of factors contributing to flooding in the area, including:

- Surcharge (overflow) of the sanitary sewer during heavy rainfall
- Surcharge of the storm sewer system, which may result in increasing the flow to the sanitary sewer system through potential interaction between the two systems
- Backup from sewer outfall due to high creek levels and/or accumulation of sediment in the outflow conduit (channel)
- Accumulation of surface rainwater runoff in low-lying areas
- High overland flow depth on the right-of-way (roadway)
- Undersized storm sewer and/or catch basins resulting in high overland flow
- Blocked/broken storm and sanitary sewers, maintenance holes and catch basins

# 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)

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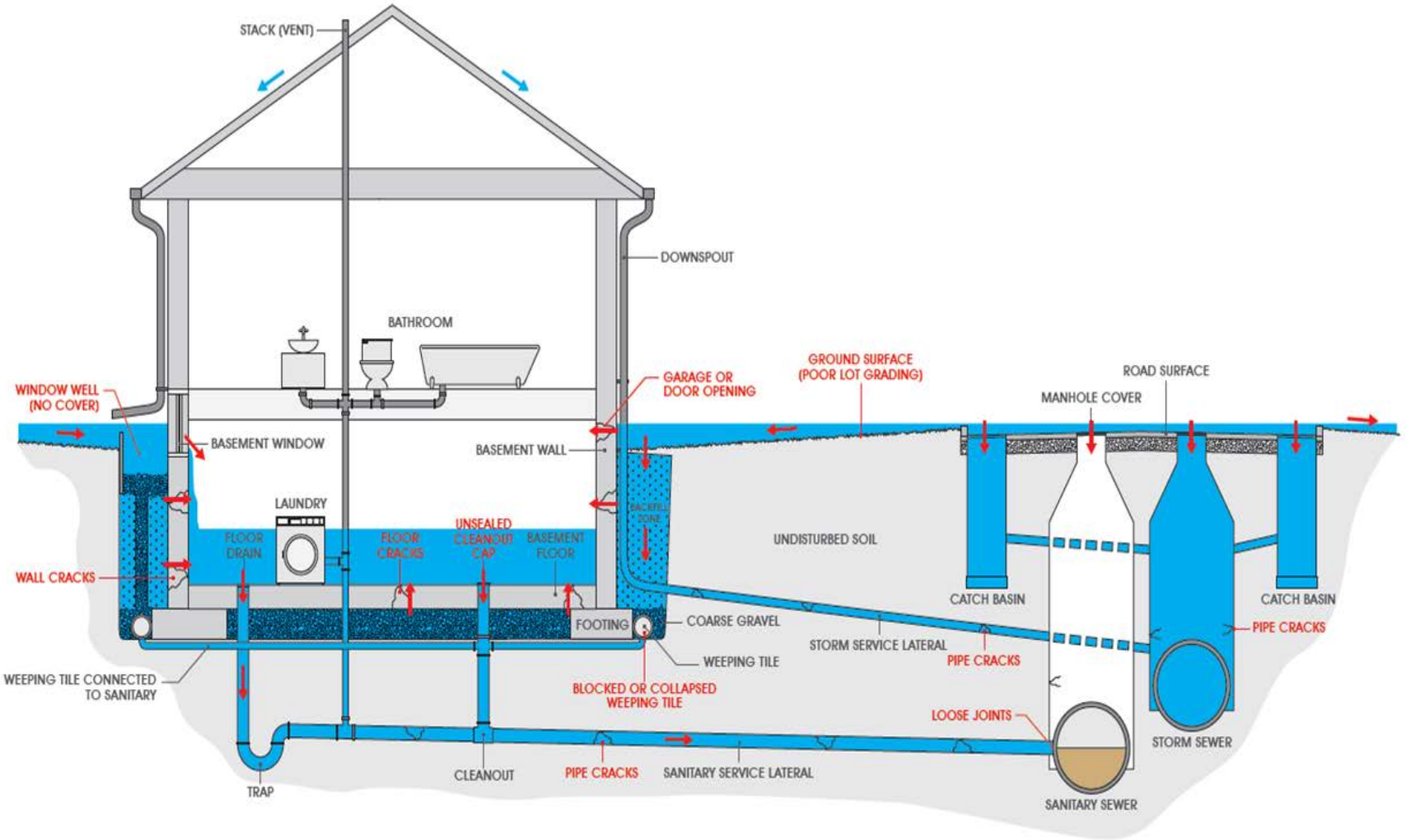
# Typical Causes of Basement Flooding




Graphic highlighting the typical causes of basement flooding for a house

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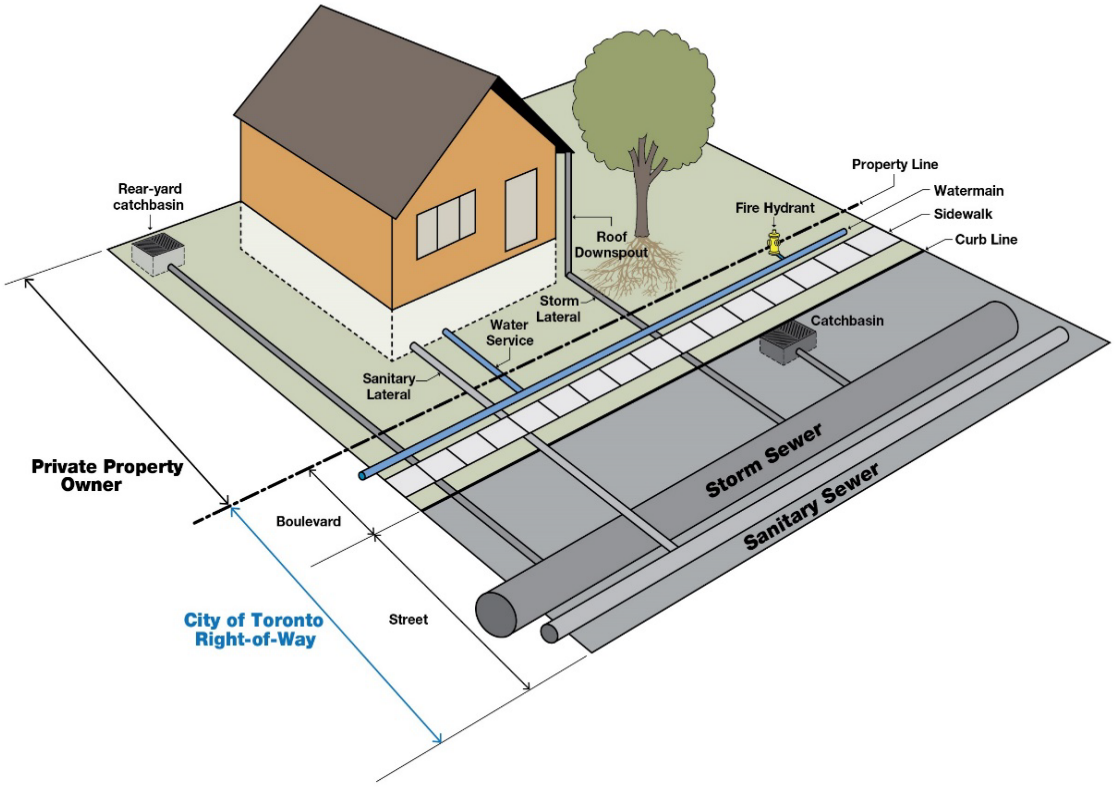
# Area of Responsibility – City

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
- Catch basins within roadways
- Overland drainage within roadways

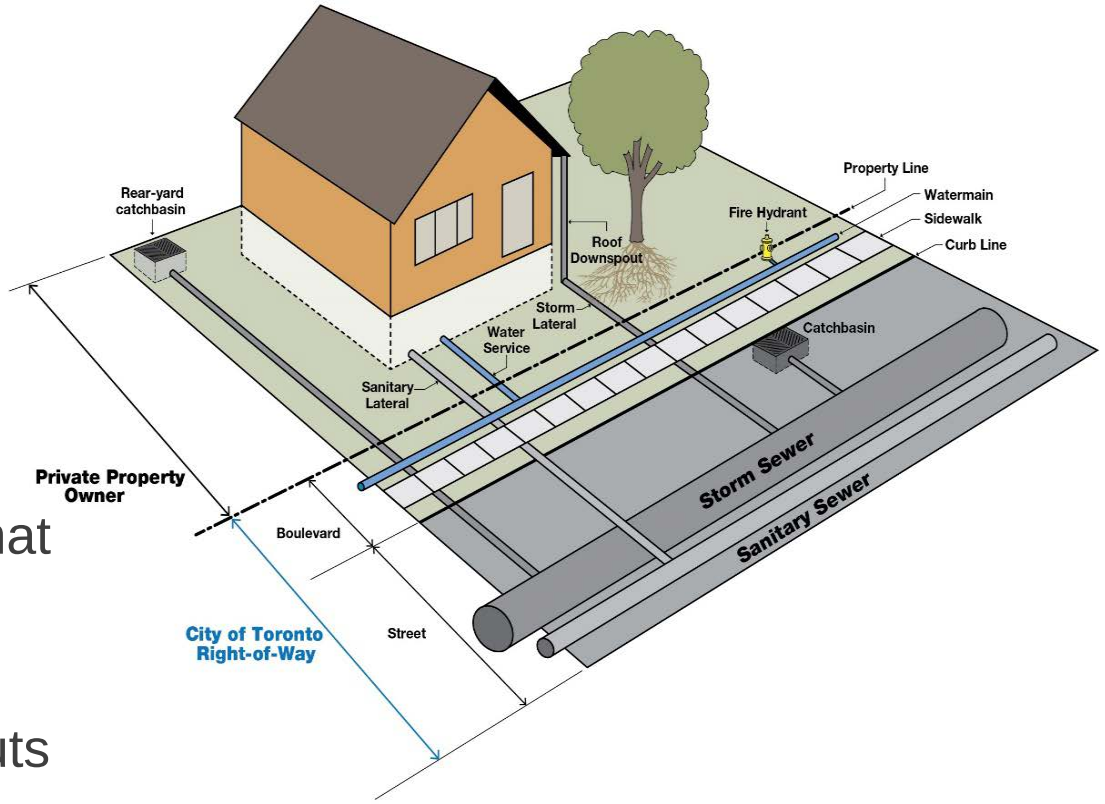



Graphic showing infrastructure within and outside of the Public Right-of-Way

# 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 catch basins
- 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

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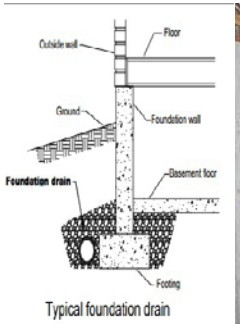
# Property Owner – Potential Solutions

Solutions that can be implemented by property owners include:

**Maintaining front and rear-yard drainage or driveway catch basins**

**Installing backwater valve**

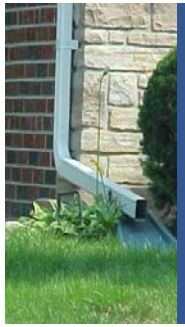

**Installing permeable paving**



Typical foundation drain

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

**Improving lot grading**



**Disconnecting downspouts**

**Using rain barrels**

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# 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 Taylor/Massey Creek

Factors related to flooding include:

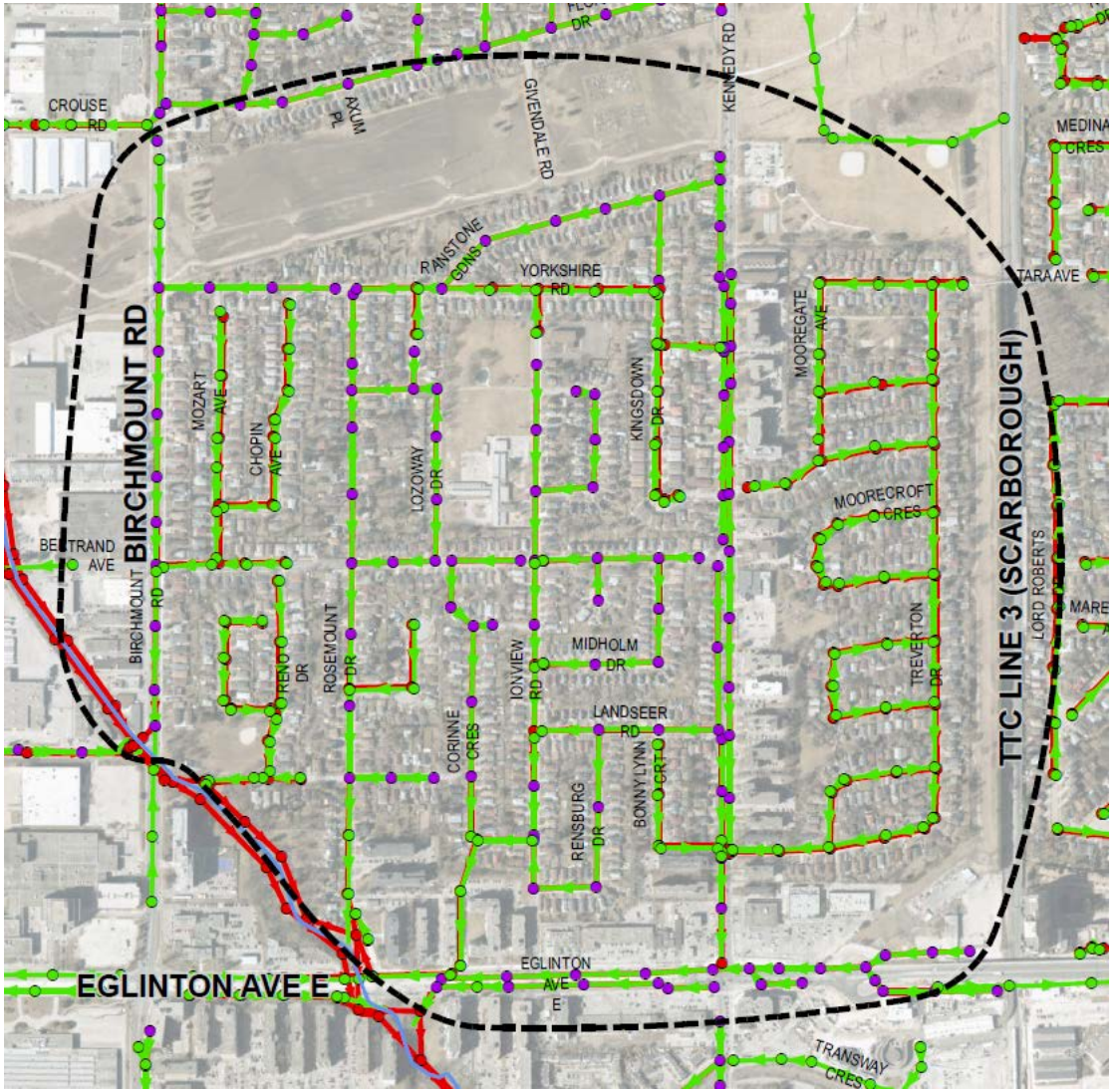
- Several common chambers (Dual MH) between the two systems, with potential to transfer wastewater between
- High levels of wastewater run-off that exceed the existing design capacity, impacted by high creek water, causing surface ponding and sewer surcharge (overflow) in extreme storm events

# Existing Sewer Network

Legend

- Assignment 47-17 Area
- Storm MH
- Sanitary MH
- Dual MH
- Storm Sewer
- Sanitary Sewer

In general, the storm drainage system is overwhelmed under extreme storm events and is affected by the Taylor-Massey Creek water levels, which contributes to extra flow to the sanitary sewer through existing Dual Maintenance Holes.




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 in the area, the City has identified several solutions prioritized for implementation, which include:

- Overland controls
- Increasing the number of catch basins
- Catch basin 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).

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# 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

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# Storm Sewer Basement Flooding Solutions

**Increasing the Number of Catch Basins**

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

**What Does it Involve?**

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

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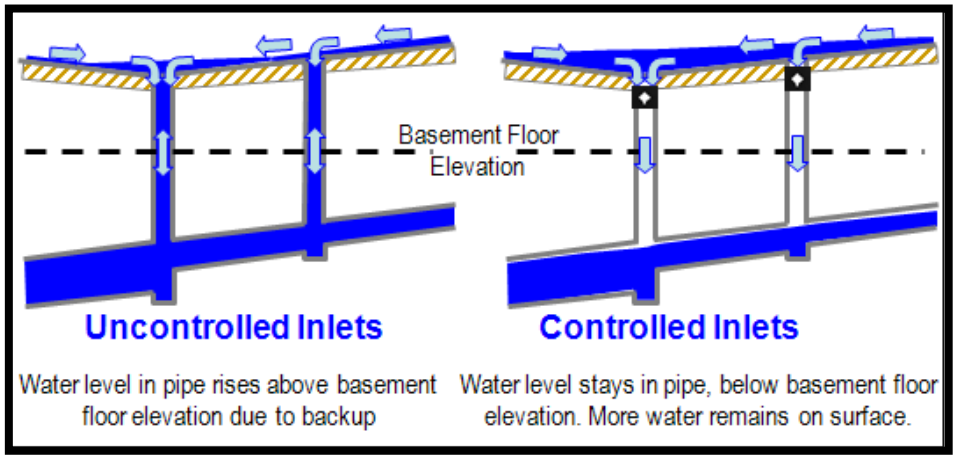
# Storm Sewer Basement Flooding Solutions

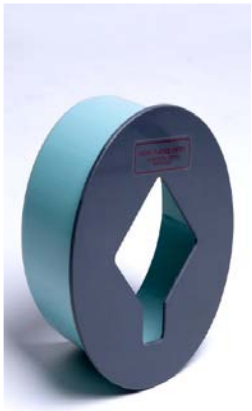
**Catch basin Inlet Controls**

- 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 catch basin outlet and is not visible
- Requires minimal effort and time to install



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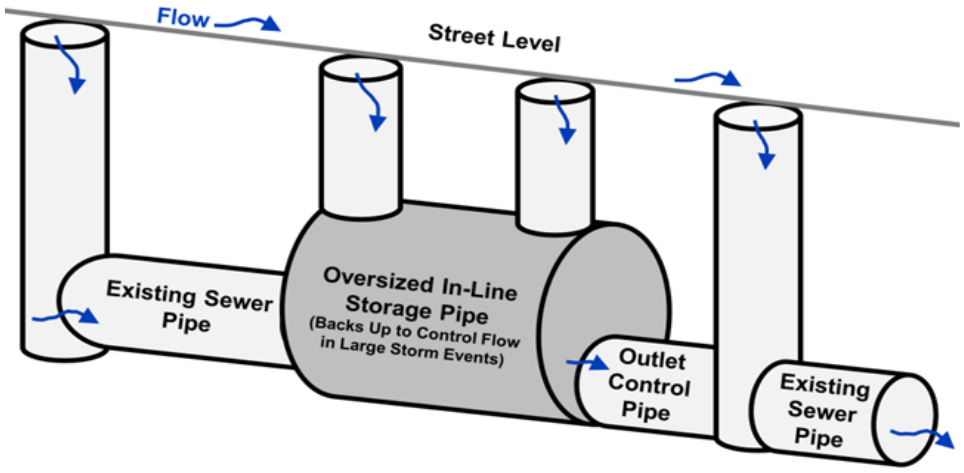
# Storm / Sanitary Sewer Basement Flooding Solutions

**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, manhole and catch basin 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

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# Storm / Sanitary Sewer Basement Flooding Solutions

**Replacement of Existing Storm, Combined 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, manhole and catch basin 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

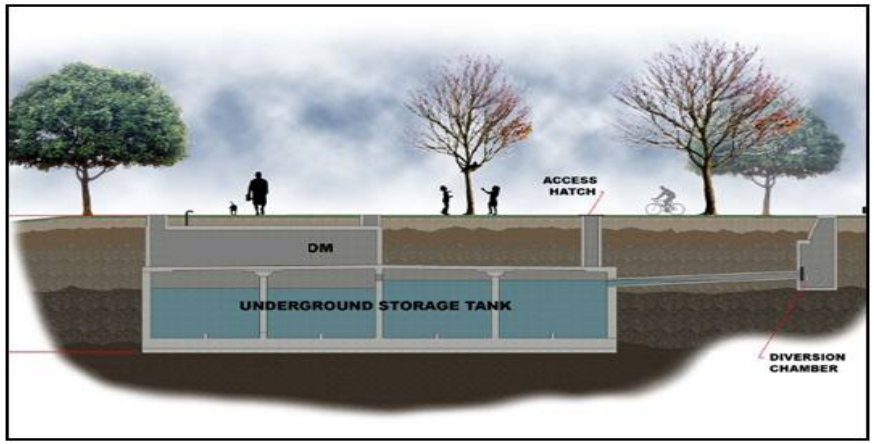


Image of storm sewer replacement in road during construction

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# 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 involves a combination of pipe and inlet capacity improvements strategically located throughout the study area, with the following main differences:

### Alternative 1

- Upgrade of 2 storm outfalls to Taylor/Massey Creek
- Cost: $243M

### Alternative 2

- No upgrade to storm outfalls or disturbance to watercourse
- Large inline storage tank in Maidavale Park
- Cost: $307M

### Alternative 3

- Hybrid of Alternative 1 and 2
- Upgrade of 1 storm outfall
- Smaller inline storage tank in Maidavale Park
- Cost: $236M

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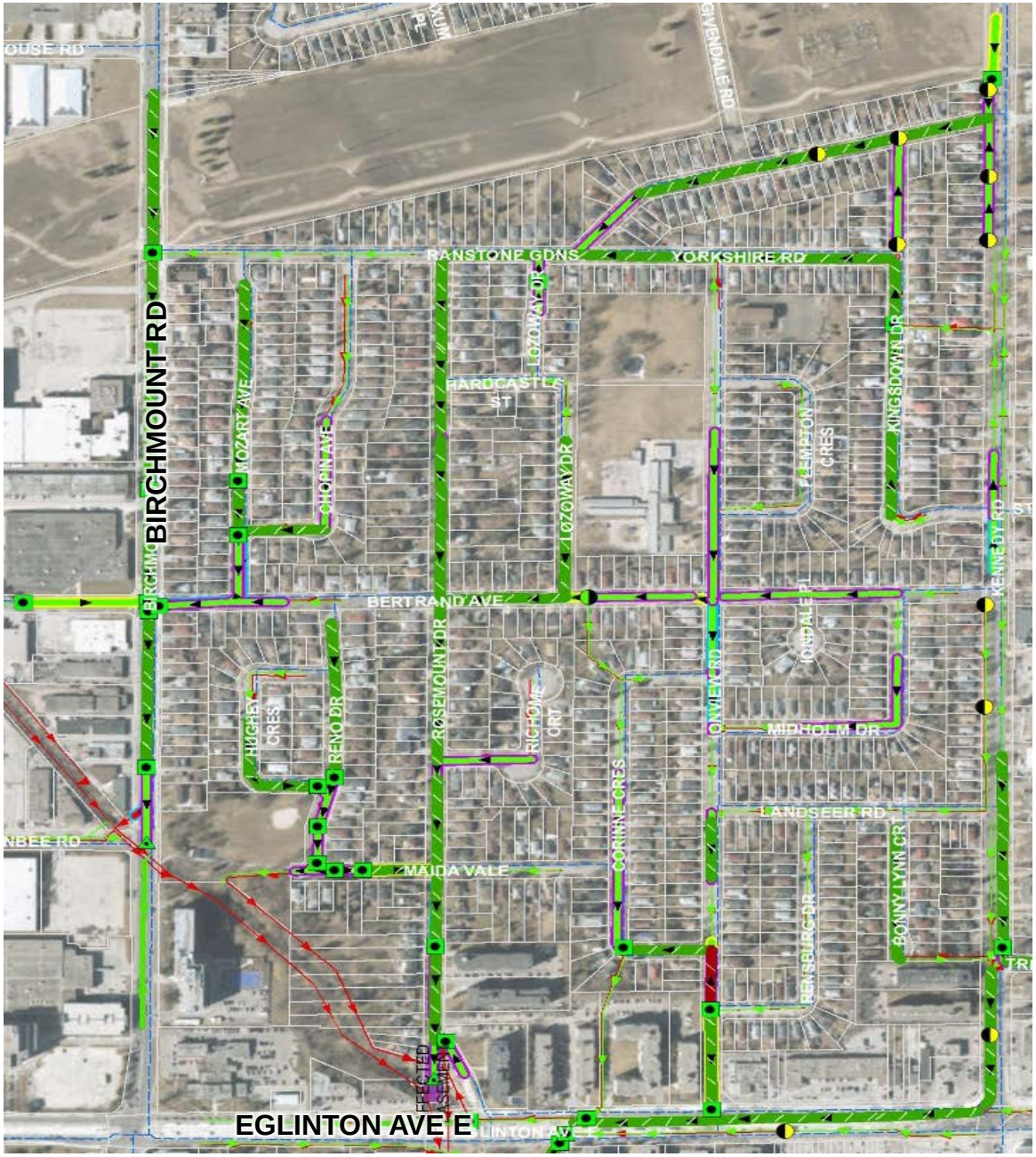
# Alternative 1

## Legend

- Bulkhead Dual MH
- Increase Inlet Capacity
- Isolate MH
- Upgrade Outfall
- New Storm
- Realign Storm
- Replace Storm
- Upgrade Storm
- Realign & Upgrade Storm
- Storm Inline Storage
- New Storm Inline Storage
- Replace Sanitary
- Upgrade Sanitary
- Sanitary Inline Storage
- Other Storm Solution
- Other Combined Solution
- Other Sanitary Solution
- Existing Storm
- Existing Combined
- Existing Sanitary
- Problem Area
- Affected Easement
- Affected Park

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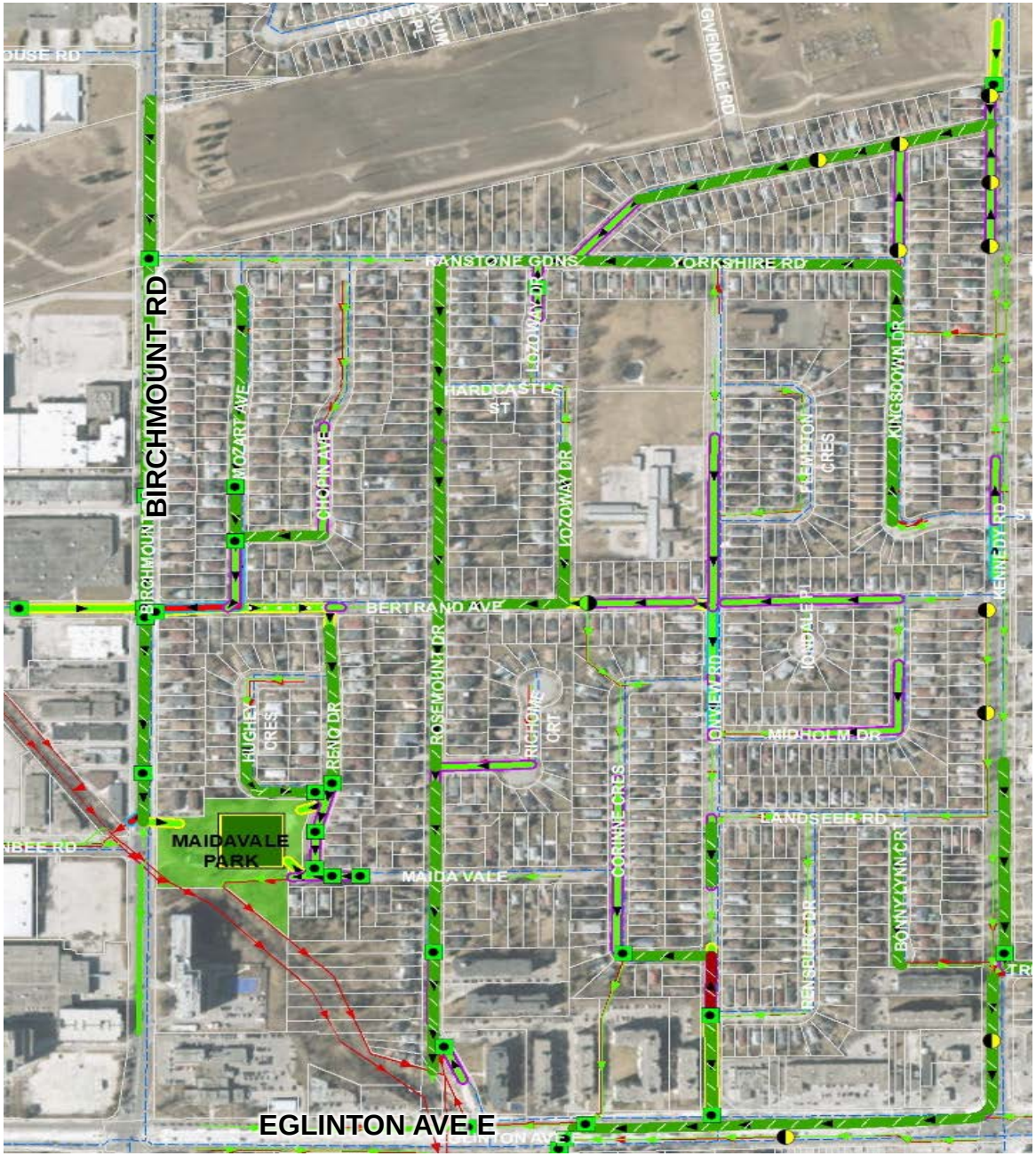
# Alternative 2

## Legend

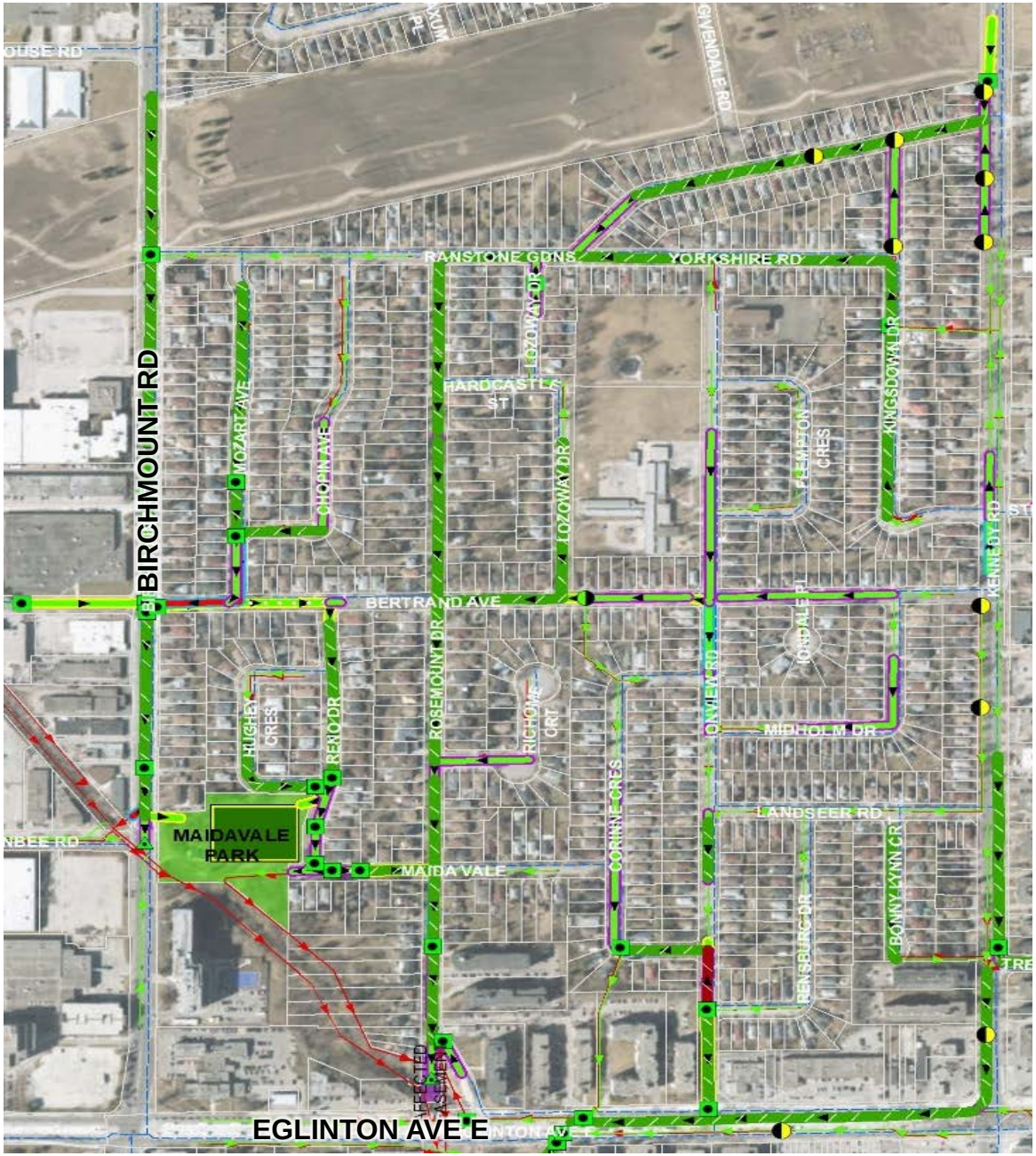
- Bulkhead Dual MH
- Increase Inlet Capacity
- Isolate MH
- Upgrade Outfall
- New Storm
- Realign Storm
- Replace Storm
- Upgrade Storm
- Realign & Upgrade Storm
- Storm Inline Storage
- New Storm Inline Storage
- Replace Sanitary
- Upgrade Sanitary
- Sanitary Inline Storage
- Other Storm Solution
- Other Combined Solution
- Other Sanitary Solution
- Existing Storm
- Existing Combined
- Existing Sanitary
- Problem Area
- Affected Easement
- Affected Park



# Alternative 3

## Legend

- Bulkhead Dual MH
- Increase Inlet Capacity
- Isolate MH
- Upgrade Outfall
- New Storm
- Realign Storm
- Replace Storm
- Upgrade Storm
- Realign & Upgrade Storm
- Storm Inline Storage
- New Storm Inline Storage
- Replace Sanitary
- Upgrade Sanitary
- Sanitary Inline Storage
- Other Storm Solution
- Other Combined Solution
- Other Sanitary Solution
- Existing Storm
- Existing Combined
- Existing Sanitary
- Problem Area
- Affected Easement
- Affected Park



# Maidavale Park Storage

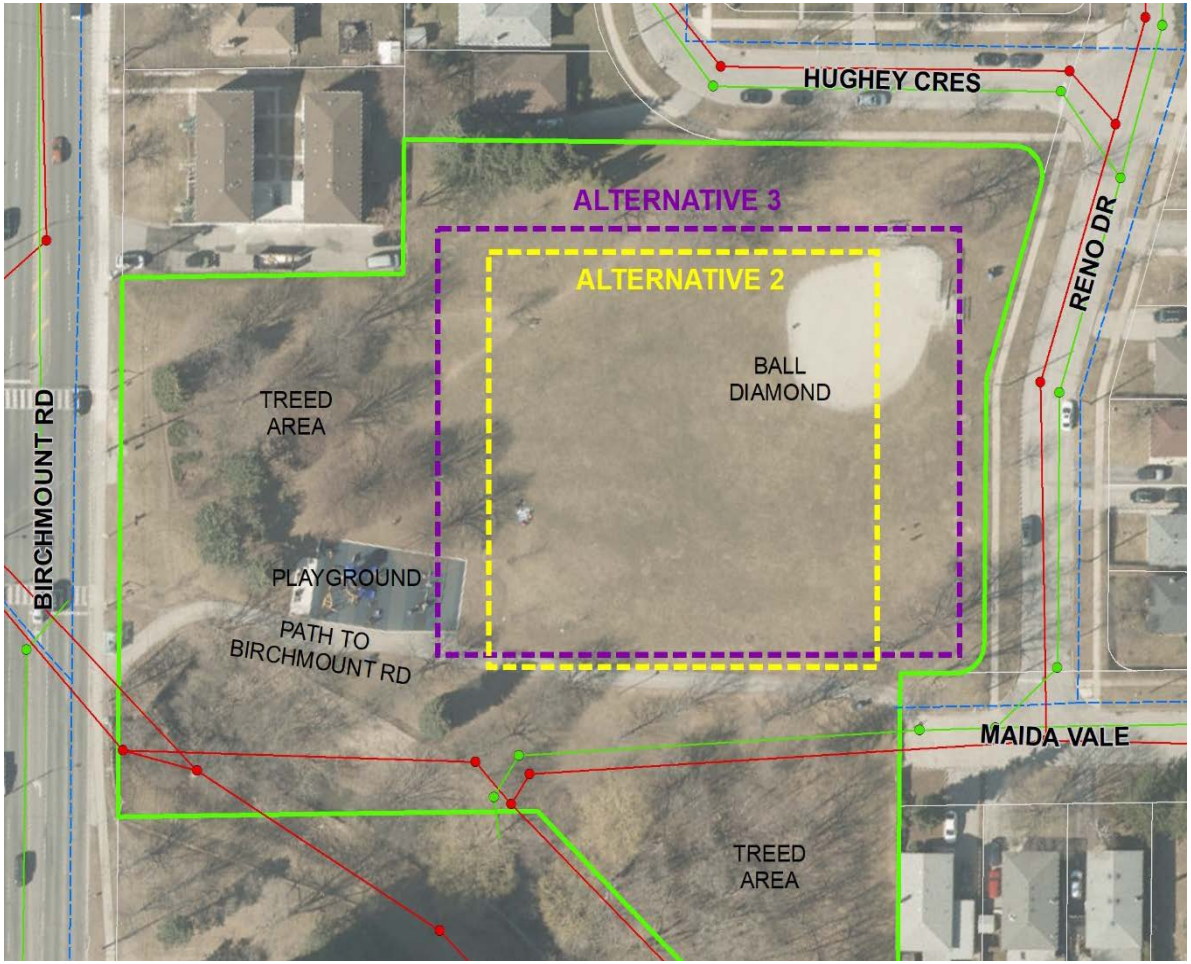



Figure showing the storage options in Maidavale Park (Birchmount Rd north of Eglinton Ave E)

- **Alternative 1** avoids impact to the park
- **Alternative 2** requires storage within the park with approximate dimensions of 63m x 63m x 5m
- **Alternative 3** requires storage within the park with approximate dimensions of 65m x 85m x 2.6m

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# 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

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# Recommended Improvements

Based on the evaluation of alternative solutions, the preferred solution is **Alternative 1**

- Alternative 2 and 3 involve a large storage facility within the highly used Maidavale Park, affecting trees, open space and active amenity space
- The technical operation of the tank is complicated due to the location within the Highland Creek floodplain, reducing functionality
- Alternative 1 is anticipated to have the lowest capital cost, as well as long-term operations and maintenance cost
- Alternative 1 also replaces the existing storm outfall and incorporates improved energy mitigation measures for discharge to the watercourse

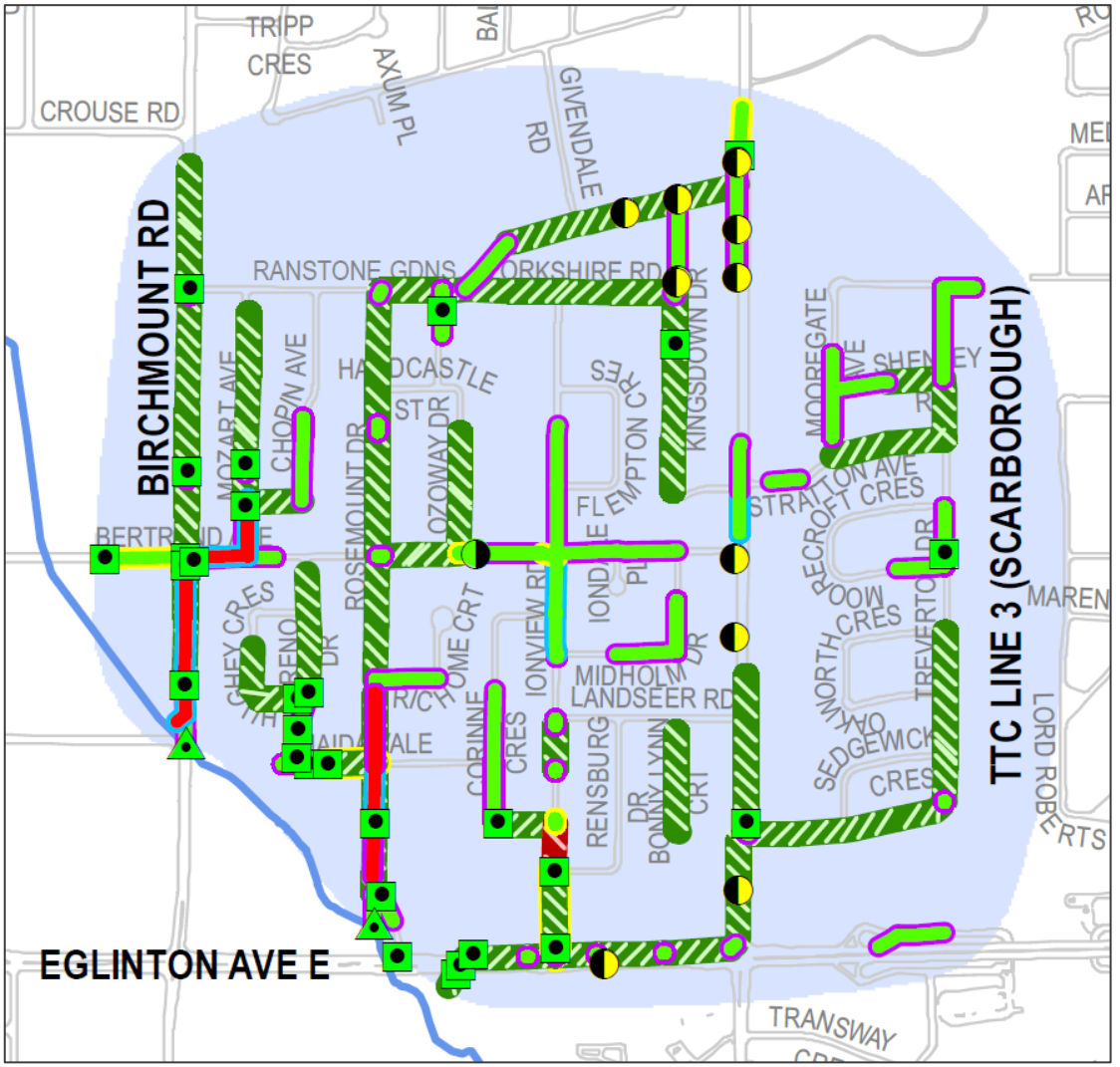
# Recommended Improvements

Legend

Assignment 47-17 Area

**Proposed Solutions**

- Bulkhead Dual MH
- Increase Inlet Capacity
- Isolate MH
- Upgrade Outfall
- New Storm Sewer
- Replace Storm Sewer
- Upgrade Storm Sewer
- Realign and Upgrade Storm Sewer
- Storm Inline Storage
- New Storm Inline Storage
- Replace Sanitary Sewer
- Upgrade Sanitary Sewer
- Sanitary Inline Storage




Map showing the Recommended Improvements for Assignment 47-17

# 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

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# 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
- Projects with a cost-benefit less than $68,000 per property at the preliminary design stage 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
- 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/BF47**

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