

City of Mississauga: Flood Control Evaluation Study - Municipal Class EA

Welcome

The City of Mississauga is undertaking a Flood Evaluation Study on Cooksville Creek. The study is being completed as a Municipal Class Environmental Assessment and the study area is shown in the figure to the right.

Background

The Cooksville Creek watershed has an area of about 34 km² with its headwaters originating north of Highway 401. The watercourse flows to the south and drains to Lake Ontario. The watershed is long and narrow and is fully developed with the exception of a few vacant parcels of land.

Cooksville Creek exhibits varying conditions throughout its length, ranging from a natural state to significant portions which have undergone some degree of channelization.

Numerous homes and properties have flooded over the years, most notably on August 4, 2009. It is estimated that approximately 120 buildings would flood for the 100 year storm and approximately 300 buildings would flood for the Regional storm (Hurricane Hazel).

Cooksville Creek also has a considerable history of erosion problems along the watercourse. The City has spent approximately \$8 million since the mid 1990's to remediate erosion problems. There are also other issues related to degraded water quality, lack of base flow and aquatic resources.

The current study is being undertaken as a flood control Municipal Class Environmental Assessment (EA) with a study area extending from Highway 401 to Lake Ontario. Through the EA process, alternatives have been developed to address the flood prone sites which have been identified. The EA process provides an opportunity for the public to offer comments and insight to the study, and to discuss related concerns with the study team.

Objectives of Tonight's Meeting

The objectives of tonight's meeting are to present the identified problems and alternative solutions and to provide an opportunity to the public to review this material and provide input. Attendees are asked to fill out the questionnaire provided to help establish public acceptance of each of the alternatives.

Objectives of the Study

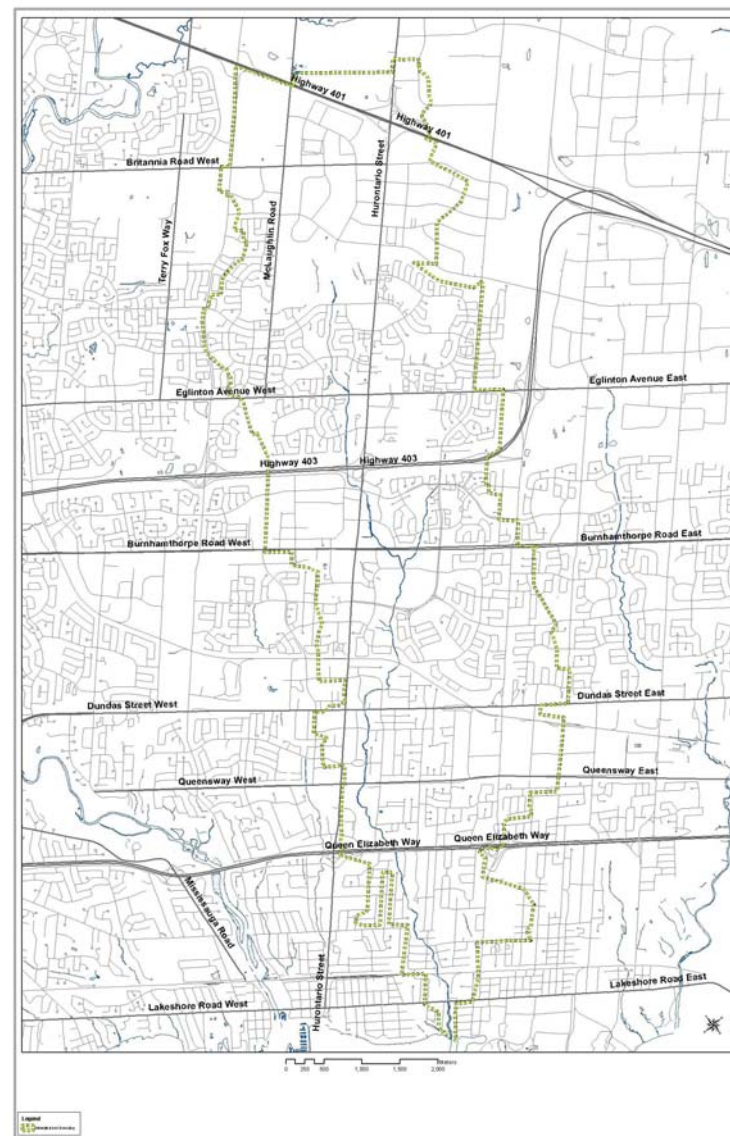
The objectives of the study are as follows:

Primary Objective:

- Reduce occurrence of riverine flooding for dwellings and properties adjacent to Cooksville Creek

Secondary Objectives:

- Reduce extent and frequency of erosion
- Improve water quality conditions within Cooksville Creek
- Improve aquatic habitat conditions



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Problem and Opportunity Identification

PROBLEMS

Flooding

- Approximately 300 dwellings are located within the Regulatory floodline.
- Flooding of dwellings has occurred several times, most recently as a result of the August 4, 2009 storm.

Erosion

- City has undertaken restoration works at 12 sites over the past 20 years.
- Approximately 10 priority erosion sites remain.

Water Quality

- Existing water quality conditions are such that Provincial Water Quality Objectives are not met a majority of the time. This results in loss of aquatic life and degradation of aesthetic conditions.

Aquatic Resources

- Only tolerant fish species reside in the creek as a result of degraded water quality, poor habitat conditions and instream barriers.

OPPORTUNITIES

- Reduction in flooding could occur as a result of expanding the capacity of existing culverts or bridges, reducing the amount of flow getting into the stream and/or expanding the capacity of the floodplain.
- Some of the above measures could be used to reduce erosion problems, improve water quality conditions and improve aquatic habitat conditions.



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Existing Environmental Conditions

The existing environmental conditions within the study area are summarized below.

Flooding

- A total of 300 dwellings are located within the Regulatory foodline. As noted in the accompanying figure a majority of the flood susceptible homes are located downstream of Burnhamthorpe Road.
- The area most susceptible to flooding is located between Burnhamthorpe Road and Dundas Street. Dwellings in the King Street and Paisley Boulevard area could experience flooding every 5 - 10 years, on average.

Erosion

- Cooksville Creek has experienced significant erosion over the last 20 years as a result of urbanization, lack of stormwater management measures and the unique characteristics of the stream which consists of shale and limestone in the lower reaches.

Fishery

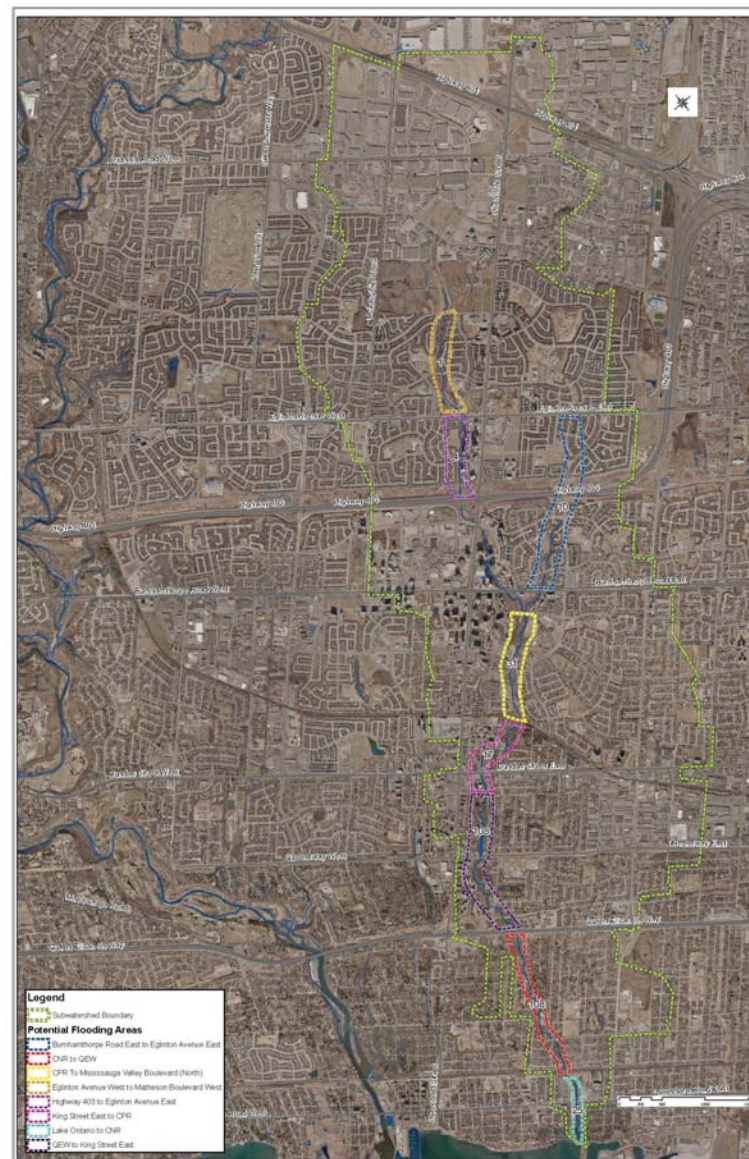
- Generally, there are poor quality habitats along Cooksville Creek due to unstable substrates, lack of instream cover and extreme variation in flows from dry to wet weather periods.
- A few warmwater fish species that tolerate poor water quality conditions have been identified.

Terrestrial Habitat

- The terrestrial habitat along the stream corridor generally consists of manicured properties or a narrow band of culturally influenced and heavily disturbed riparian woodland.
- There are approximately 12 Natural Areas (wetlands, woodlands) located within the watershed.

Infrastructure

- A sanitary trunk sewer runs adjacent to Cooksville Creek in the lower reaches. At times, the sewer or manholes have been exposed as a result of stream erosion.

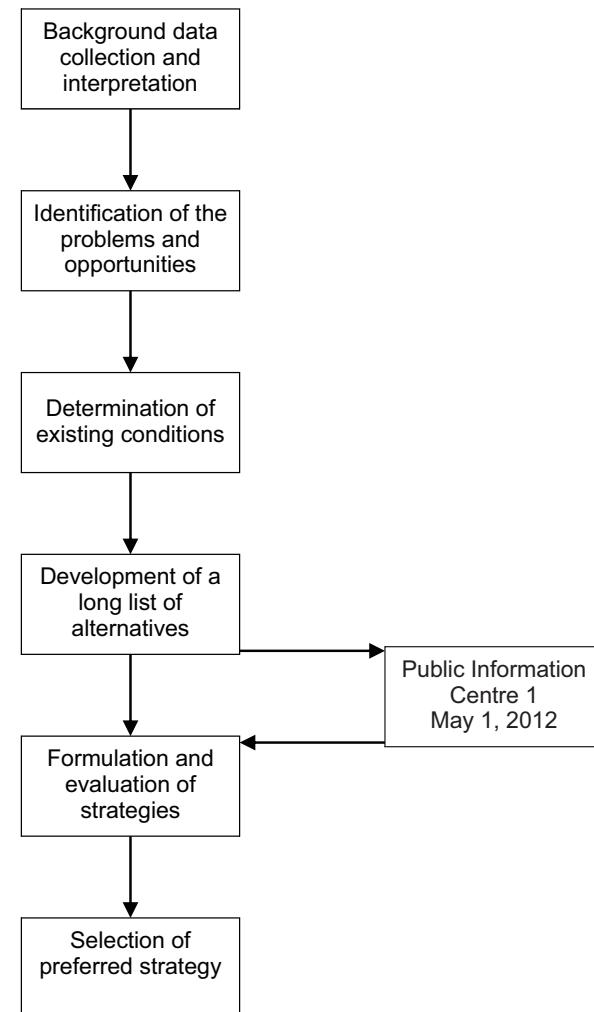


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Environmental Assessment Process

Many projects related to municipal systems are similar in nature, are carried out routinely, and have predictable and mitigatable environmental effects which are investigated according to the Municipal Engineers Association "Municipal Class Environmental Assessment" (October 2000, as amended in 2007).

This study is being carried out according to the requirements of a Master Plan. The flow chart to the right illustrates the key steps to be undertaken as part of the EA Process.



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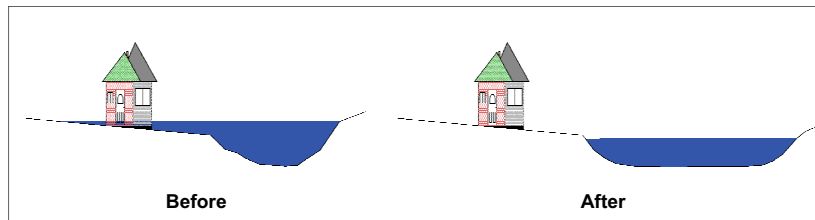
Development of a Long List of Alternatives

The long list of alternatives that were developed may be divided into two general categories (Traditional and Non Traditional). Each alternative was assessed based on criteria (see accompanying table) consistent with the Environmental Assessment Process. The alternatives which received a favourable rating were brought forward and will form the basis of the Preferred Strategy. Each of the alternatives that were considered are described below.

TRADITIONAL ALTERNATIVES

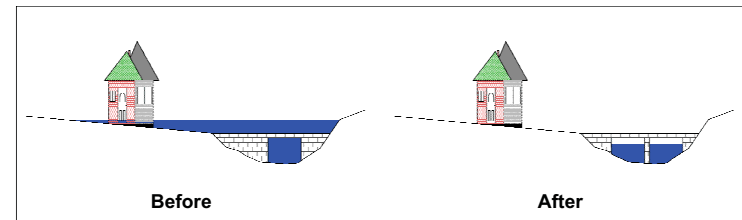
Watercourse Capacity Enlargement

- Increasing the capacity of the existing watercourse may reduce flood levels.



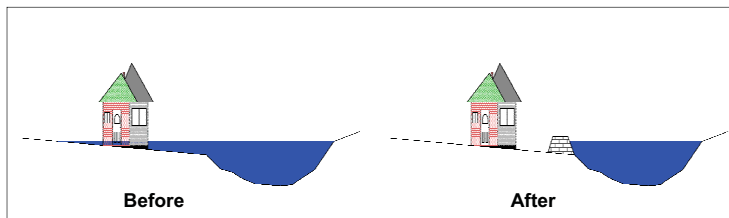
Crossing Capacity Enlargement

- Increasing the capacity of existing culverts or bridges may reduce water levels.



Dykes / Berms

- Dykes or berms are built adjacent to dwellings in order to contain flows within the floodplain.



Flood Proofing

- Landowners can floodproof buildings by sealing or filling in openings which are susceptible to flooding.



Land Acquisition

- Flood susceptible properties could be purchased by the City or Credit Valley Conservation and then removed.

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NON TRADITIONAL ALTERNATIVES

Storage in Upstream Locations

- Storage in upstream lands within parks or vacant properties could be used to reduce flood levels in Cooksville Creek.



In-Channel Storage

- Storage within Cooksville Creek could be used to reduce flood levels.



Source Control Measures

- These measures, which are implemented on private property, include roof downspout disconnection, use of rain barrels, pervious driveways and rain gardens.



Conveyance Control Measures

- These measures, which are implemented within the municipal right-of-way may include bioretention units or perforated pipes. The measures encourage infiltration or evapotranspiration, thereby reducing runoff and flood levels.



Tunnel

- Construction of a tunnel, which would divert flows above levels which cause flooding could be considered.



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Description of the Natural Environmental Criteria Used for Selecting the Preferred Criteria

Evaluation Criteria	Description of Criteria
Potential to Reduce Riverine Flooding	<ul style="list-style-type: none"> • Potential to reduce flooding of properties along Cooksville Creek floodplain
Potential to Reduce Erosion	<ul style="list-style-type: none"> • Potential to reduce erosion within Cooksville Creek
Potential to Improve Water Quality	<ul style="list-style-type: none"> • Potential to improve water quality based on existing water quality conditions
Potential to Improve Aquatic Habitat	<ul style="list-style-type: none"> • Potential to improve aquatic habitats by improving baseflows, or stream habitat

Description of Social/Cultural Criteria used for the Selection of the Preferred Alternatives

Evaluation Criteria	Description of Criteria
Aesthetics / Recreation	<ul style="list-style-type: none"> • Potential for the alternative to be an asset to the community by integrating the alternative into existing site activities (walking, jogging, park usage) and/or improve aesthetics; or to impact existing park usage or detract from aesthetics
Compatibility with Adjacent Land Use	<ul style="list-style-type: none"> • There are potential impacts associated with construction of retrofit facilities, or future maintenance particularly with respect to adjacent land use • Access/egress also needs to be considered
Community Disruption	<ul style="list-style-type: none"> • The potential of the alternative to disrupt the community, more specifically given the surrounding land use – business activities during, or after the construction process
Public/User Acceptance	<ul style="list-style-type: none"> • Public/user acceptability of proposed alternative including construction impacts, property value, lifestyle changes, noise/odour issues

Description of the Economic Criteria Used for Selecting the Preferred Alternatives










Evaluation Criteria	Description of Criteria
Construction Costs	<ul style="list-style-type: none"> • The relative cost of the alternative
Operation and Maintenance	<ul style="list-style-type: none"> • The relative cost of operating and maintaining the alternative based on factors such as overall maintenance frequency and intensity, equipment needs and future permit requirement
Infrastructure Protection	<ul style="list-style-type: none"> • Potential to protect existing or proposed infrastructure including storm outfalls, sanitary sewers, pedestrian bridges, etc.

Description of Implementation Criteria used for the Selection of the Preferred Alternatives

Evaluation Criteria	Description of Criteria
Timing to Implement	<ul style="list-style-type: none"> • Length of time required to implement the proposed alternative
Technical Feasibility	<ul style="list-style-type: none"> • The feasibility of implementing the proposed alternative











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Evaluation Matrix for Traditional Alternatives

Evaluation Criteria	Watercourse Capacity Enlargement	Crossing Capacity Enlargement	Dykes / Berms	Flood Proofing	Land Acquisition
Natural Environment	<ul style="list-style-type: none"> Good potential to reduce riverine flooding 	<ul style="list-style-type: none"> Good potential to reduce riverine flooding 	<ul style="list-style-type: none"> Moderate potential to reduce riverine flooding 	<ul style="list-style-type: none"> Limited potential to reduce riverine flooding 	<ul style="list-style-type: none"> Limited potential to reduce riverine flooding
Economic	<ul style="list-style-type: none"> Moderate construction cost Low operation and maintenance cost 	<ul style="list-style-type: none"> Moderate construction cost Low operation and maintenance cost 	<ul style="list-style-type: none"> Low to moderate construction cost Moderate to high operation and maintenance cost 	<ul style="list-style-type: none"> Low to moderate construction cost Moderate to high operation and maintenance cost 	<ul style="list-style-type: none"> Moderate to high construction cost Low operation and maintenance cost
Social / Cultural	<ul style="list-style-type: none"> Generally accepted by public and agencies Limited disruption during construction Compatible with adjacent land uses 	<ul style="list-style-type: none"> Generally accepted by public and agencies Limited disruption during construction Compatible with adjacent land uses 	<ul style="list-style-type: none"> Generally accepted by agencies, may be issue if constructed on private property Limited disruption during construction Compatibility with adjacent land uses to be assessed on site by site basis 	<ul style="list-style-type: none"> Generally accepted by agencies Acceptance by homeowners site specific 	<ul style="list-style-type: none"> Last resort alternative by agencies Generally does not meet with landowner approval
Technical	<ul style="list-style-type: none"> Technically feasible Short implementation period 	<ul style="list-style-type: none"> Technically feasible Short implementation period 	<ul style="list-style-type: none"> Technically feasible Moderate implementation period 	<ul style="list-style-type: none"> Feasibility dependent upon site conditions and flooding extent Short implementation period 	<ul style="list-style-type: none"> Technically feasible Moderate implementation period
Overall Alternative Rank					
Comment	<ul style="list-style-type: none"> Brought forward 	<ul style="list-style-type: none"> Brought forward 	<ul style="list-style-type: none"> Brought forward, but limited to public lands or with homeowner consent 	<ul style="list-style-type: none"> Not brought forward, but to be implemented independently by homeowner 	<ul style="list-style-type: none"> Not brought forward except for vacant properties
Most Preferred     Least Preferred					

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Evaluation Matrix for Non Traditional Alternatives

Evaluation Criteria	Storage in Upstream Locations	In-channel Storage	Source Control Measures	Conveyance Control Measures	Tunnel
Natural Environment	<ul style="list-style-type: none"> Good potential to reduce riverine flooding, limited for basement flooding Good potential for reducing erosion, improving water quality and aquatics 	<ul style="list-style-type: none"> Moderate potential to reduce riverine flooding Moderate potential to reduce erosion 	<ul style="list-style-type: none"> Good potential to reduce riverine flooding, limited for basement flooding Good potential for reducing erosion, improving water quality and aquatics 	<ul style="list-style-type: none"> Good potential to reduce riverine flooding, limited for basement flooding Good potential for reducing erosion, improving water quality and aquatics 	<ul style="list-style-type: none"> Good potential to reduce riverine flooding
Economic	<ul style="list-style-type: none"> Moderate construction cost Moderate operation and maintenance cost Moderate benefit in protecting existing infrastructure within floodplain 	<ul style="list-style-type: none"> Moderate construction cost Moderate operation and maintenance cost 	<ul style="list-style-type: none"> Low construction cost Low to moderate operation and maintenance cost Moderate benefit in protecting existing infrastructure within floodplain 	<ul style="list-style-type: none"> Moderate construction cost Moderate operation and maintenance cost Moderate benefit in protecting existing infrastructure within floodplain 	<ul style="list-style-type: none"> High construction cost High operation and maintenance cost
Social / Cultural	<ul style="list-style-type: none"> Generally accepted by public and agencies Low to moderate community disruption Potential to be an asset to community 	<ul style="list-style-type: none"> Generally accepted by public and agencies Low to moderate community disruption Potential to be an asset to community 	<ul style="list-style-type: none"> Generally accepted by public and agencies Low community disruption Potential to be an asset to community 	<ul style="list-style-type: none"> Generally accepted by public and agencies Low community disruption Potential to be an asset to community 	<ul style="list-style-type: none"> Compatibility with adjacent land uses unknown Questionable agency acceptance Considerable community disruption
Technical	<ul style="list-style-type: none"> Technically feasible Short to moderate implementation period 	<ul style="list-style-type: none"> Feasibility dependent on site conditions Short to moderate implementation period 	<ul style="list-style-type: none"> Technically feasible Short implementation period 	<ul style="list-style-type: none"> Technically feasible Short to moderate implementation period 	<ul style="list-style-type: none"> Feasibility dependent upon site conditions Long implementation period
Overall Alternative Rank					
Comment	<ul style="list-style-type: none"> Brought Forward 	<ul style="list-style-type: none"> Brought Forward 	<ul style="list-style-type: none"> Brought forward, but to be implemented as part of City Wide Water Quality Study Implementation 	<ul style="list-style-type: none"> Brought forward, but to be implemented as part of City Wide Water Quality Study Implementation 	<ul style="list-style-type: none"> Not brought Forward
Most Preferred      Least Preferred					

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Description of the Preferred Strategy

The alternatives that received a favourable rating were brought forward and will form the basis of the Preferred Strategy. A description of the Preferred Strategy is provided below.

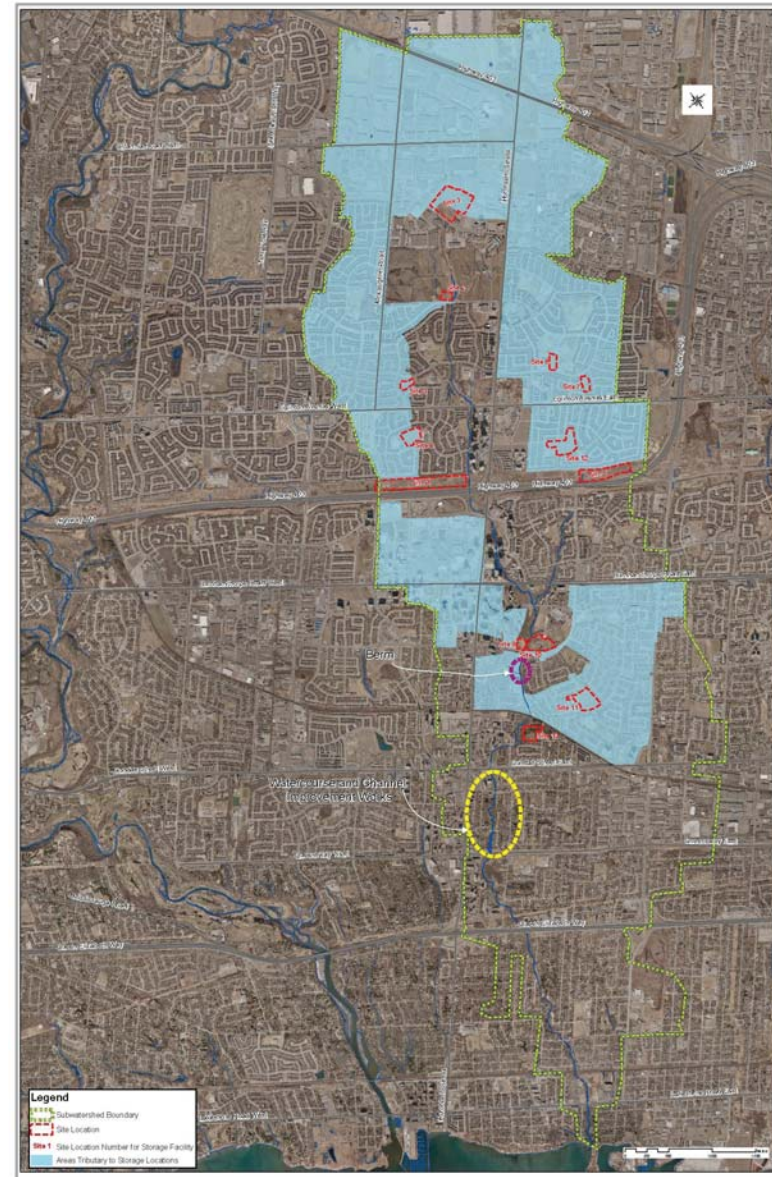
Description of the Preferred Strategy

The Preferred Strategy involves a combination of:

- Storage in upstream locations to reduce flows within Cooksville Creek to acceptable levels.
- Watercourse and channel capacity enlargements together with creation of a berm in the King Street and Paisley Road areas where homes are more susceptible.
- Construction of a berm adjacent to Cooksville Creek to protect homes along Rhonda Valley.
- Implementation of source and conveyance control measures (to be considered as part of the City Water Quality Strategy Update Study).

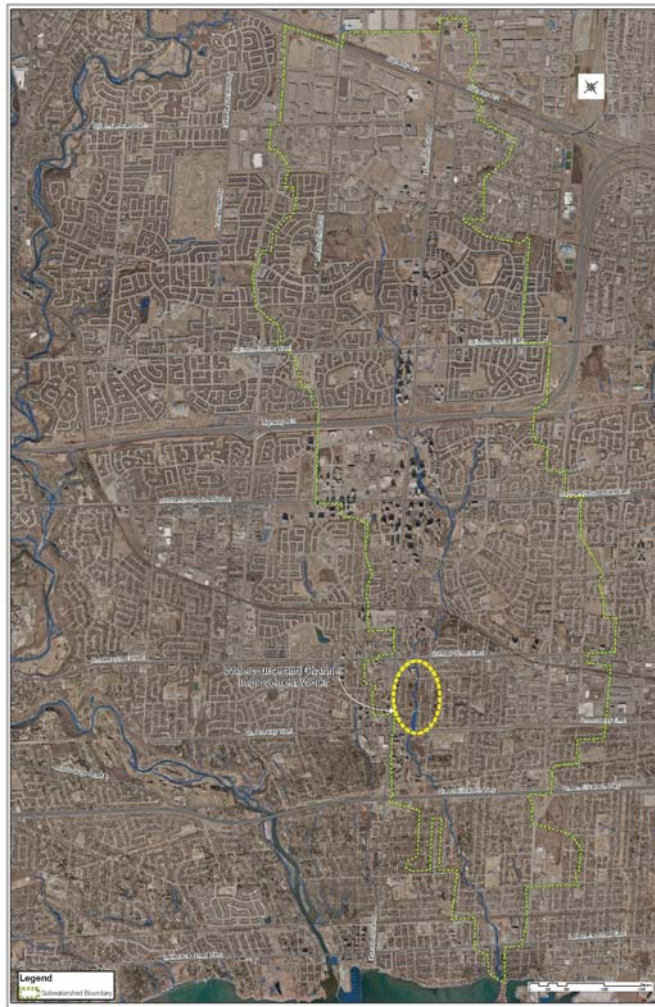
Benefits

- Collectively, implementation of the above measures will provide flood protection for all properties for the 100 year storm.
- Issues related to ongoing erosion, degraded water quality and poor aquatic habitat conditions will also be improved.



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PREFERRED STRATEGY COMPONENTS: Watercourse Crossing and Channel Improvements



Paisley Boulevard



Before



After



King Street



Before

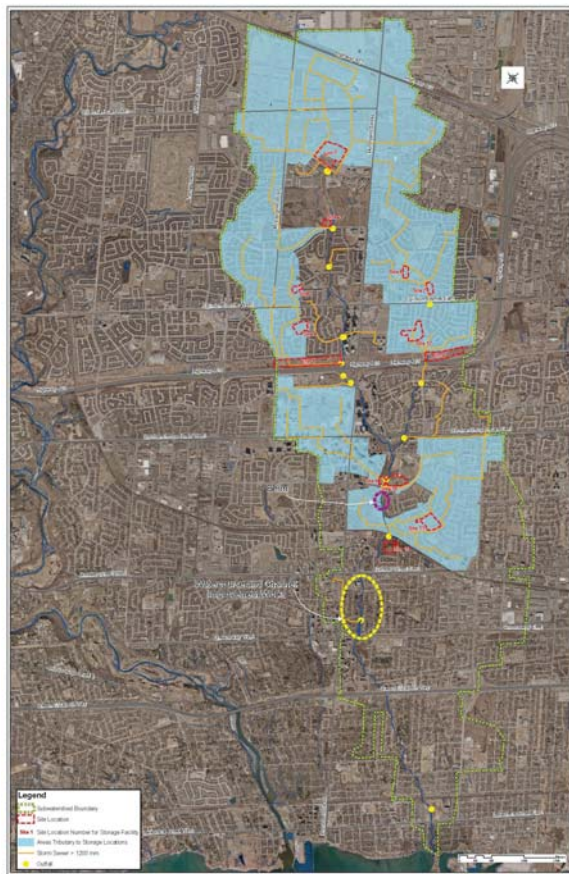


After



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PREFERRED STRATEGY COMPONENTS: Storage



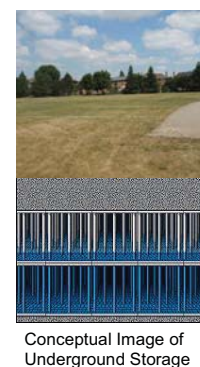
Potential Areas Where Storage Could be Implemented

Type	Number
Existing Parks	9
Vacant Land	2
Hydro Corridor	2

Sites

1. Site 317	6. Frank McKechnie Park	11. McKenzie Park
2. Offline Britannia Farm	7. Eastgate Park	12. Huron Heights
3. Greyscale Park	8. Hydro Corridor - East	13. Given Road
4. Heritage Hills Park	9. Adjacent to Metro (food)	
5. Hydro Corridor - West	10. Central Parkway East	

A total of 13 potential sites have been identified. All but one of these sites would involve the construction of underground facilities to reduce peak flows and erosion, improve water quality and increase flows during dry periods.



Eastgate Park

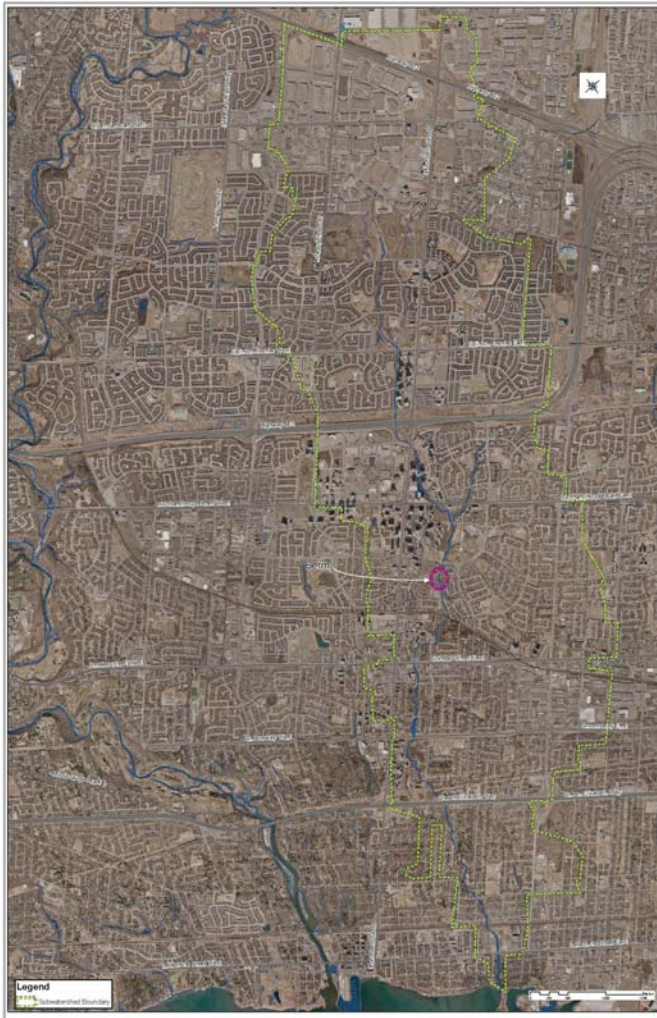


Park 317

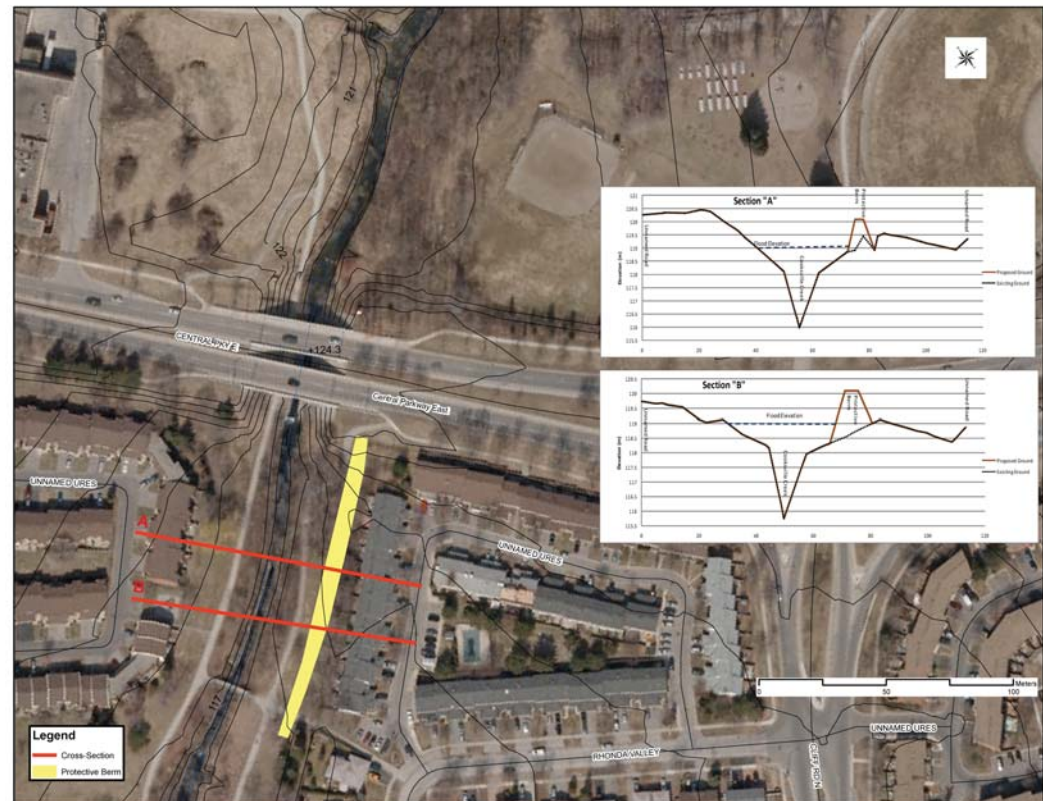


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PREFERRED STRATEGY COMPONENTS: Construction of Berm



Rhonda Valley



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Thank you for your participation!

Next Steps

After tonight's meeting, we will undertake the following Steps:

- Gather your comments
- Review feedback
- Finalize alternative ranking
- Prepare conceptual designs for the preferred strategy components
- Complete the EA document
- Prepare a notice of completion and have the EA document available for review

For additional information, please contact one of the study team members:

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