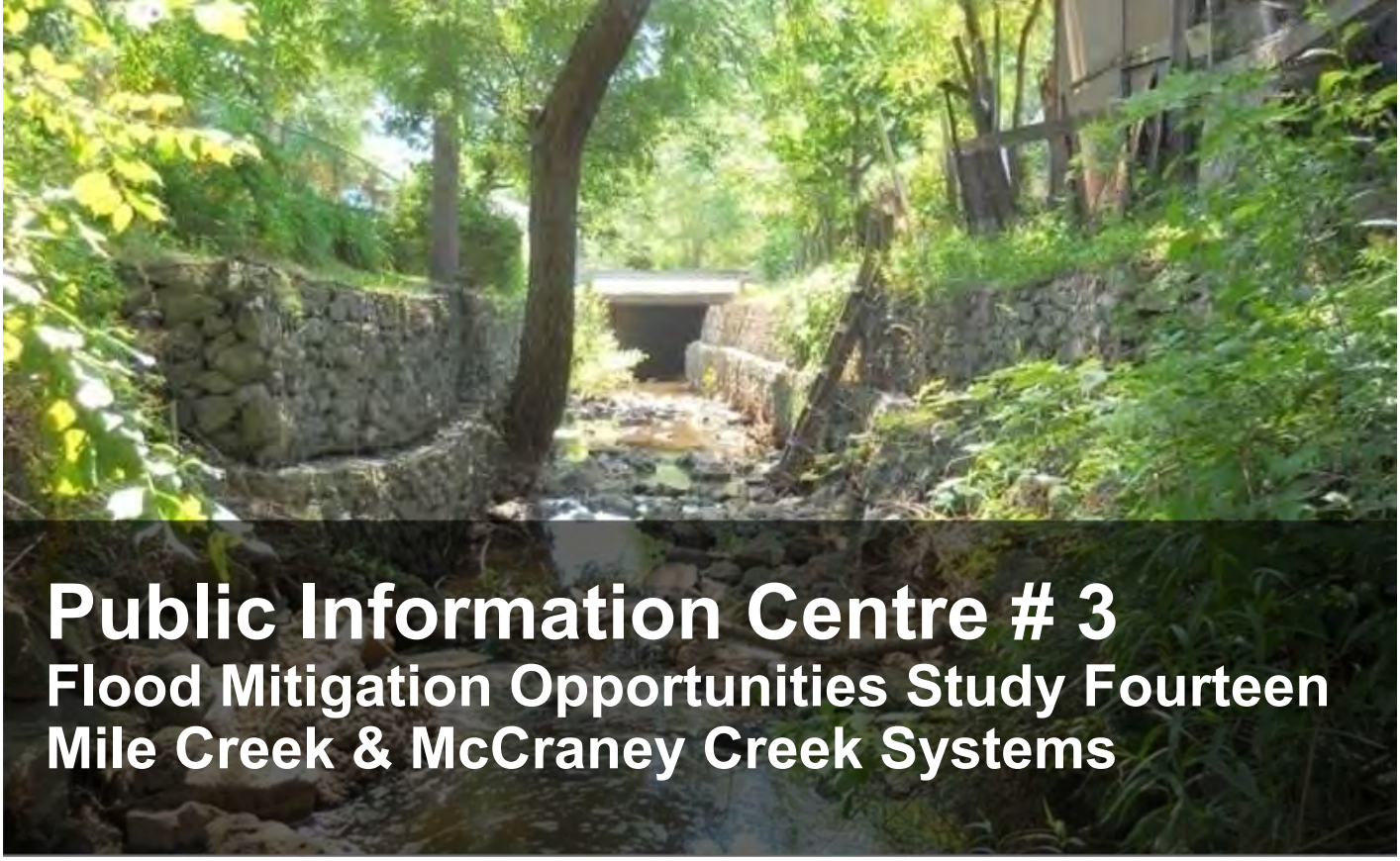

# Public Information Centre # 3
## Flood Mitigation Opportunities Study Fourteen Mile Creek & McCraney Creek Systems

## Municipal Class Environmental Assessment
November 6, 2025

The Study Team would like to thank you for taking the time to review the information presented as part of this Public Information Centre. We invite you to submit any questions or comments by **November 20th, 2024,** via e-mail to one of the following Study Team Members or in the forms provided.


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# Honouring the Land and Territory

Town of Oakville – Canoe Garden (Courtesy of Halton Environmental Network)

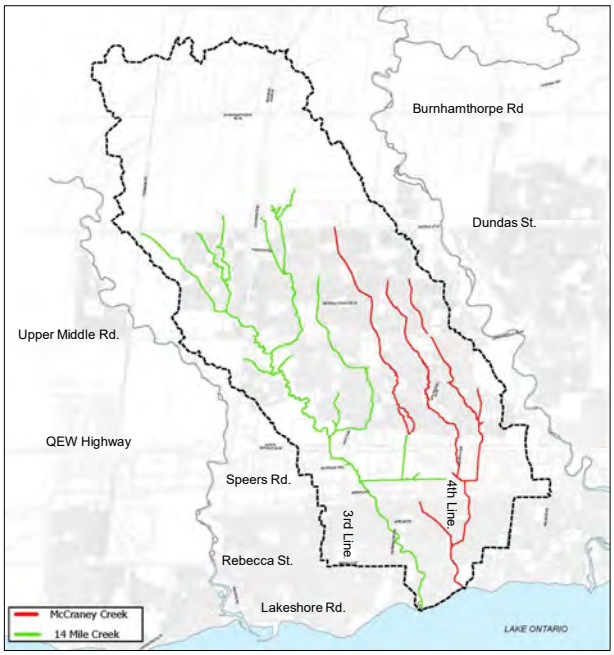
Halton, as we know it today, is rich in the history and modern traditions of many First Nations and the Métis. From the lands of the Anishinaabe to the Attawandaron, the Haudenosaunee, and the Métis, these lands surrounding the Great Lakes are steeped in Indigenous history. As we gather today on these treaty lands, we are in solidarity with Indigenous brothers and sisters to honour and respect the four directions, lands, waters, plants, animals and ancestors that walked before us, and all of the wonderful elements of creation that exist.

We acknowledge and thank the Mississaugas of the Credit First Nation for being stewards of this traditional territory.

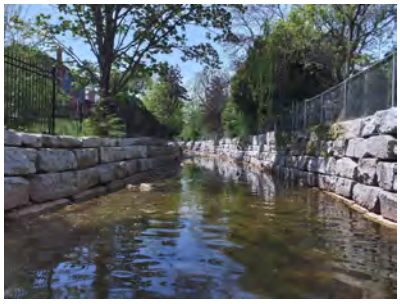
# Study Area

## Description of Study Area:

- The limits of the study area extend from Lake Ontario to Dundas Street
- Both Fourteen Mile Creek and McCraney Creek watersheds originate north of Dundas Street and include small portions of lands within Burlington and Milton.




- McCraney Creek has two main tributaries north of the CNR tracks: Taplow Creek and Glen Oak Creek.
- Land use is predominantly residential north of the QEW, commercial along the QEW corridor and residential south of Speers Road down to Lake Ontario.
- Fourteen Mile Creek is Redside Dace habitat, which is listed as an endangered fish species under Ontario's Endangered Species Act, 2007.



# Study Background

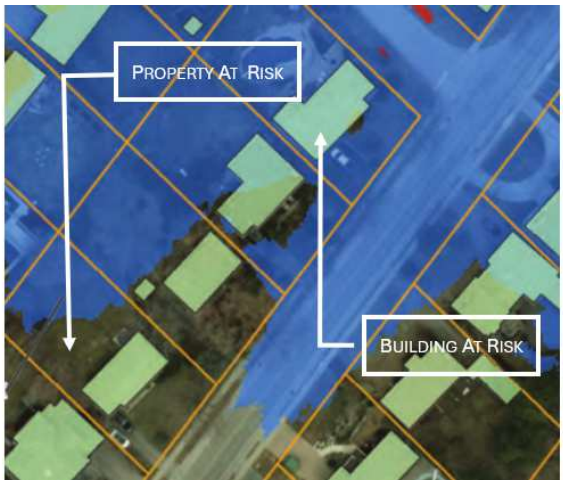
## Why is the Study being conducted?

- The Town of Oakville 2008 Town-wide Flood Study established (on a priority basis), creek reaches that should be evaluated in detail to determine opportunities for flood mitigation; Fourteen Mile Creek and McCraney Creek were identified for further evaluation


- The Town is undertaking a Class Environmental Assessment (Class EA) Study as a Master Plan to determine preferred flood mitigation opportunities along Fourteen Mile Creek and McCraney Creek
- A Master Plan is a broad scope and level of assessment on a system-wide scale. Recommended alternatives may require future detailed investigations through subsequent Class EAs.

# What is Riverine Flood Risk?

- Riverine Flooding is when creeks overflow their banks and spill into adjacent low-lying areas during heavy rainfall events.
- Flood risk occurs when waters spill beyond creek banks and extend onto property or possibly enter buildings.
- Flood risk is quantified into two categories for properties: “Property at Risk” and “Building at Risk




### Property at Risk

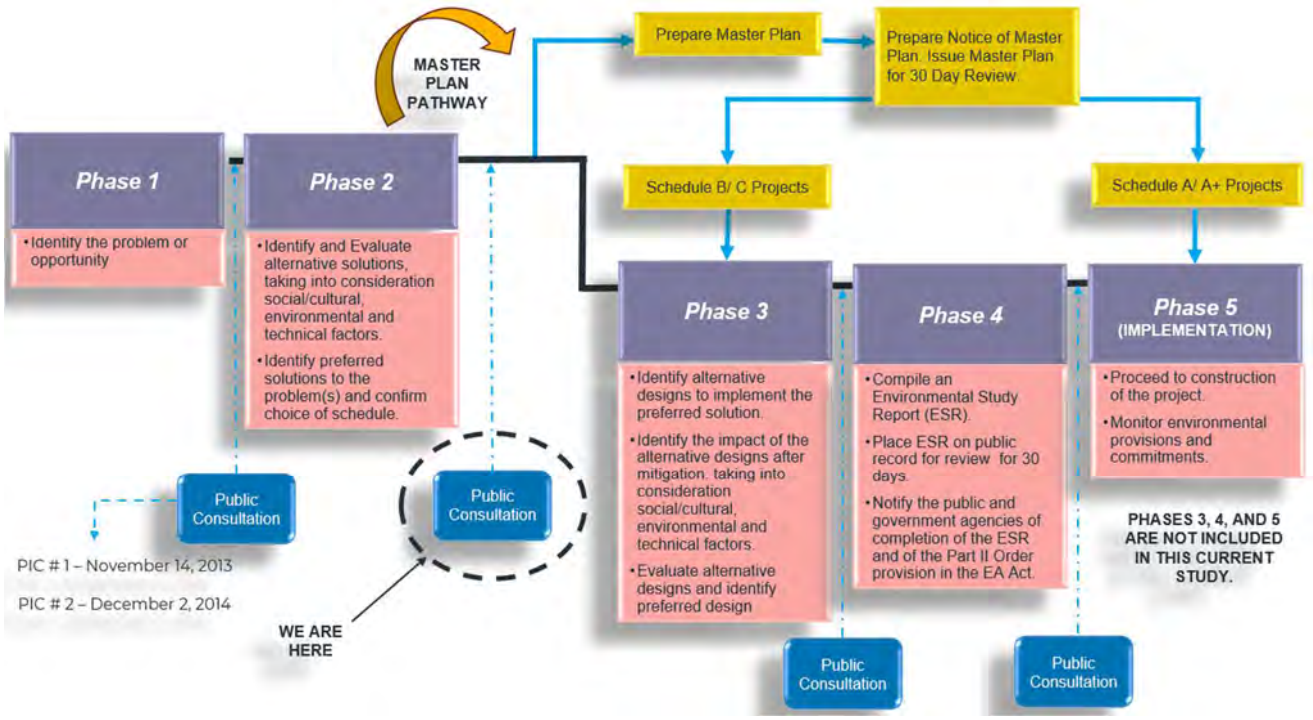
- Flooding risk on property, no flooding in the building
- Flooding risk on property, no buildings (vacant property)

### Building at Risk

- Flooding risk on property, flooding risk in the building.

# Study Process

## Municipal Class EA Process – MASTER PLAN




- Master Plans provide a strategic framework for planning and justifying infrastructure projects
- Master Plans cover Phase 1 and 2 of the Municipal Class EA process. These phases involve identifying problem and opportunities and considering alternative solutions.
- Public consultation is critical component, ensuring community involvement and feedback throughout the planning process

# Study Process

**The following steps have been carried out through Phases 1 and 2 of the Municipal Class EA Process to determine preferred flood mitigation opportunities:**

## STEP 1: Flood Risk Assessment

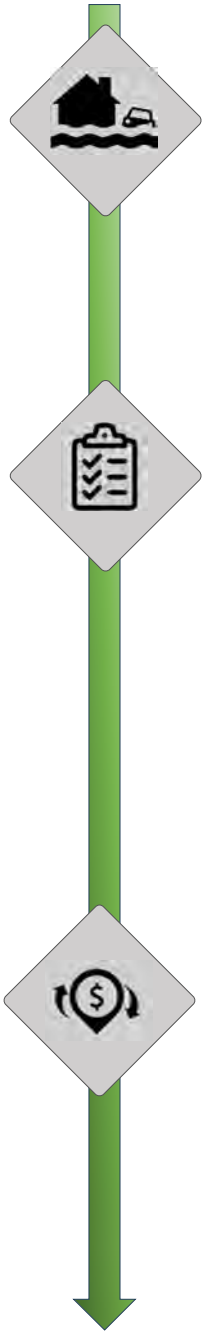
- Gathering information such as land use, topography, historical flood data, environmental factors, etc.
- Input information into creek models to simulate flood scenarios.
- Identify assets and areas at flood risk.

## STEP 2: Alternatives Assessment

- Flood mitigation alternatives were developed to address the flood risks identified.
- Alternatives were screened based on technical feasibility to develop a short list of alternatives for further evaluation.
- Preferred alternatives were then evaluated based on effectiveness in meeting the study objectives, impact to natural environment, social/cultural environmental and economic considerations.

## STEP 3: Cost Benefit Assessment

- Models were run to determine level of flood risk reduction achieved through implementation of the preferred flood mitigation alternatives.
- Cost estimates were determined.
- A comparison between costs and benefits were carried out to determine if there were preferred mitigation alternatives that should be carried forward to implementation.



# STEP 1: Flood Risk Assessment

- Design storms are used to determine the extent of flooding for different scenarios. A 10-year storm event has a 10% chance of occurring each year, whereas a 100-year storm has a 1% chance of occurring each year. The 100-year storm has higher rainfall volumes and intensities than a 10-year storm.
- The Regional Storm condition is used to determine the most extreme storm event that can be expected in our region and is based on historical data from Hurricane Hazel which caused significant flooding in Toronto (1954).
- For the study area flood risk is possible during both frequent and less frequent storm events, with the greatest risk occurring during Regional Storm conditions.

| Storm Event | Properties at Flood Risk | | Buildings at Flood Risk | |
|---|---|---|---|---|
| | Fourteen Mile Creek | McCraney Creek | Fourteen Mile Creek | McCraney Creek |
| 10 Year | 92 | 96 | 12 | 48 |
| 100 Year | 130 | 96 | 46 | 86 |
| Regional Storm (Hurricane Hazel) | 132 | 131 | 140 | 149 |

# STEP 2: Alternatives Assessment

### 1. Do Nothing

- Maintain creek(s) in present condition, with regular maintenance.
- Do Nothing" must be included in the Study as a benchmark for evaluating other alternatives.
- ***Screened from further consideration as alternative does not reduce existing flooding conditions and risk***

### 2. Low Impact Development (LID)

- Low impact development (LID) measures to promote infiltration, evaporation, harvesting, filtration, and detention of stormwater.

### 3. Culvert/Bridge Upgrades

- Replacing or adding capacity to existing culvert/bridge crossings to reduce upstream flooding.

### 4. Floodplain /Channel Improvements

- Improve channel and floodplain flow capacity by widening the channel, local grading improvements, removal of flow obstructions and channel lowering.
- ***Screened from further consideration due to limited space availability to widen channel and floodplain.***

### 5. Flood Proofing Buildings

- Buildings can be flood proofed by sealing low building openings or alternatively by constructing localized berms and/or flood walls.

### 6. Modify Culvert Inlets

- Change existing culvert inlets to prevent debris from blocking the inlet.
- ***Screened from further consideration as it was proven not effective at reducing flooding for larger storm events (i.e., flows greater then a 2-year storm event.***

# STEP 2: Alternatives Assessment

## 7. Roadway Profile Modifications

- Modify roadway profiles to reduce the upstream channel flooding by lowering the road, allowing more water to flow over the road and create less back-up upstream.
- ***Screened from further consideration as lowering roadway profile would negatively impact vehicle movement over roadways***

## 8. Flood Storage (Off-Line/On-Line)

- Store flood waters to reduce peak flows using off-line and/or online surface ponds and underground storage tanks.

## 9. Flow Diversions

- Divert creek flows from one location to another to reduce downstream flooding conditions.

## 10. Over Control North of Dundas Street

- Provide additional flood storage within planned stormwater management facilities (SWMF) north of Dundas Street to reduce flows within Fourteen Mile Creek.
- ***Screened from further consideration as it was determined that storage would provide minimal flow reduction south of QEW.***

## 11. Reinforce/Optimizing Crossings

- Modifying and reinforcing existing crossings to optimize flood storage.
- ***Screened from further consideration as it was determined culverts were already optimized to the full extent to provide flow reduction south of QEW.***

## 12. Combination of Alternatives

- When standalone alternatives do not provide beneficial flood remediation, combinations of alternatives may provide improved flood level reductions.

# STEP 2: Alternatives Assessment

## Criteria Screening of the Long-List of Flood Mitigation Alternatives:

### Functional

- Potential to reduce flooding risk and to increase public safety and protect public and private property and infrastructure.

### Environmental

- Potential to improve aquatic and terrestrial habitats and expected temporary disturbance to existing habitats

### Social

- Ability to improve public safety. Degree of impacts on private and public lands

### Economic

- Capital costs and operation and maintenance costs

### Constructability

- Ease of construction and accessibility

## Alternatives Carried Forward:

2. **Low Impact Development (LID):** LIDs as a standalone alternative are not designed to provide flood control for severe flood events, such as a 100-year storm and therefore cannot be considered a standalone solution. However, LIDs for the detention of runoff from more frequent storms will be incorporated during the detailed design phase and is a part of the town's 'green first' approach for all stormwater improvement projects.
3. **Culvert/Bridge Upgrades**
5. **Flood Proofing Buildings**
8. **Flood Storage (online/offline)**
9. **Flow Diversions**
12. **Combinations**

# 2. Low Impact Development (LID)

**Town Council passed motion on July 11, 2023, that Green Infrastructure (GI) be preferred, and grey infrastructure only where necessary and will be adopted under the town's Climate Action Plan.**

**Green Infrastructure (GI):** Means natural and human-made (engineered) elements or systems that help to protect, restore, or mimic the natural water cycle while delivering environmental, social, and economic benefits

**Low Impact Development** (**LID):** is a stormwater management strategy, system, or facility, that seeks to mitigate the impacts of increased runoff and stormwater pollution by managing runoff as close to its source as possible

## Green Infrastructure Opportunities for 14-Mile Creek and McCraney Creek

- The study looked at Green infrastructure in the form of Low Impact Developments (LIDs) as an option to reduce flood risk. However, LIDs aren't meant to handle severe floods like a 100-year storm as a standalone solution. Instead, integrating GI practices during detailed design could offer environmental benefits. Possible GI practices may include:

**Natural Channel Design Elements**

Watercourse restoration that mimics the natural physical form of a stream.

**Tree Preservation**

Provides long-term stormwater benefits by intercepting and absorbing rainfall.

**Soil Amendments**

Allows soil to absorb and hold more moisture.

**Water Quality Devices**

Filters stormwater runoff when installed within a pipe conveyance system.

**Infiltration**

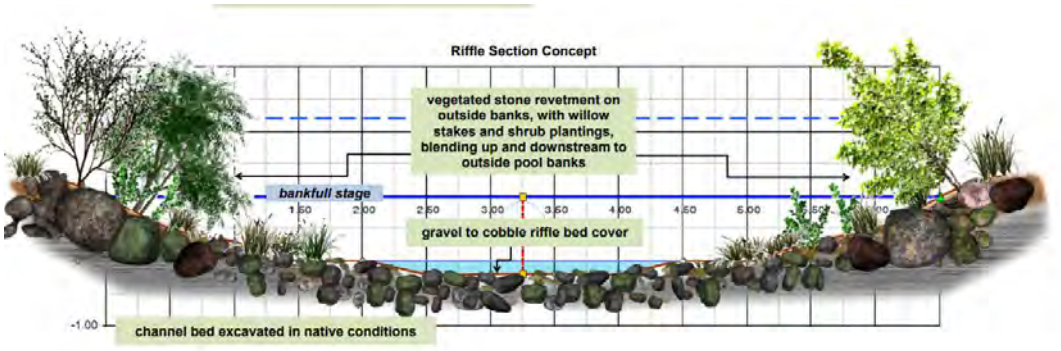
Allows stormwater to infiltrate into underlying native soils.

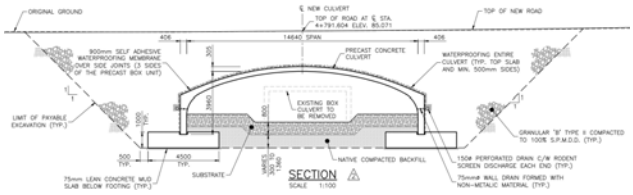
# 3. Culvert and Bridge Upgrades

## Culvert upgrades provide localized reduction of flooding immediately upstream of the improved crossing.

- ### McCraney Creek at Lakeshore Road Culvert Upgrades
  - McCraney Creek Lakeshore Road 24 m by 14.64 m span by 3.96 m rise.
  - Further assessment carried out through the Town's McCraney Creek Bridge Replacement EA Study.
  - Construction costs – $6 million (approx.)

- ### McCraney Creek at CNR Culvert Upgrades
  - McCraney Creek CNR Crossing 15m by 9.0m span by 2.4 m rise.
  - Metrolinx owned infrastructure.
  - Construction costs - $21 million (approx.)





Preliminary McCraney Creek Culvert Design (excerpt from McCraney Creek Bridge Replacement EA Study)

# 5. Flood Proofing Building (Berming)

- Berming locations and configuration optimized based on maximum flood protection for the Regional Storm event and reduced impact on trees.
- General size of berms would be between 60 to 150cm in height with a 3:1 slope.

McCraney Creek – South of Pinegrove St.

McCraney Creek – North of Rebecca St.

Fourteen Mile Creek – South of Speers Rd.

Fourteen Mile Creek – South of Bridge Rd.

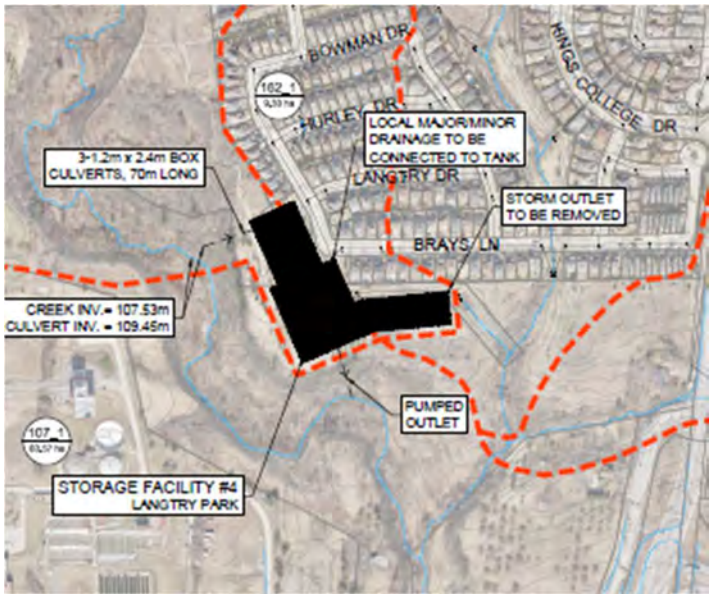
Fourteen Mile Creek – South of Rebecca St.

- Berms help mitigate flood risk but do not reduce the Regulatory flood plain limit based on Provincial technical guides.
- Berm locations prioritized on town-owned lands with exception of a few locations where excluding work on private lands would impact the feasibility and constructability of the berms.
- With input from Conservation Halton, compensatory work within the floodplain may be required to limit impact to flood storage and water surface elevations.
- The town would require permission from private landowners prior to proceeding with berm construction for both berms entirely on private property and berms adjacent to private property as grading may extend into private property.
- Berms will require on-going maintenance from both the town and landowners, including inspections, repairs and vegetation management.
- Construction costs: $1.5 million (approx.)

# 8. Flood Storage (Off-Line)

## Langtry Park Off-line Storage Tank:

- Constructing large underground tanks with pumping systems integrated.
- The Langtry Park tank would be designed to store 95,000 cubic metres of floodwater during significant storm events and cover an area of 19,000 square metres.
- Further study required through a subsequent Municipal Class EA to refine design options, including park use impacts.
- Construction costs: $31 million (approx.)

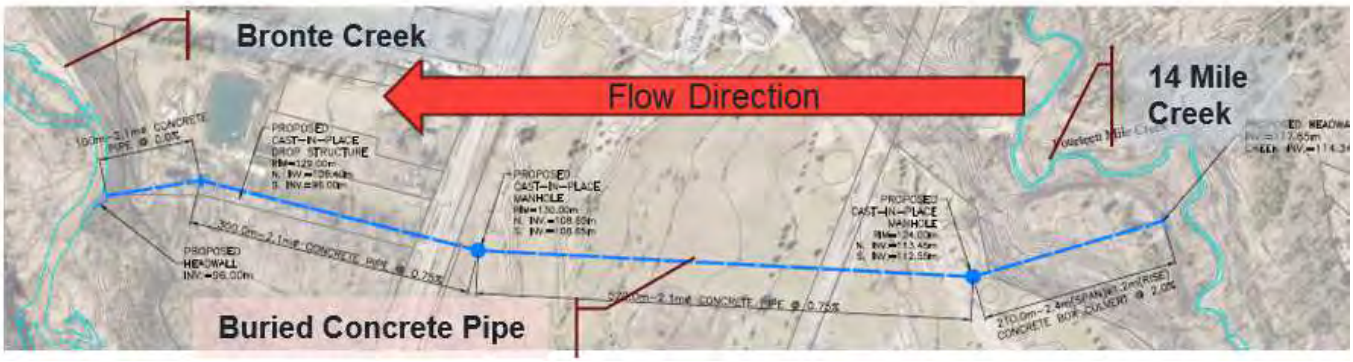




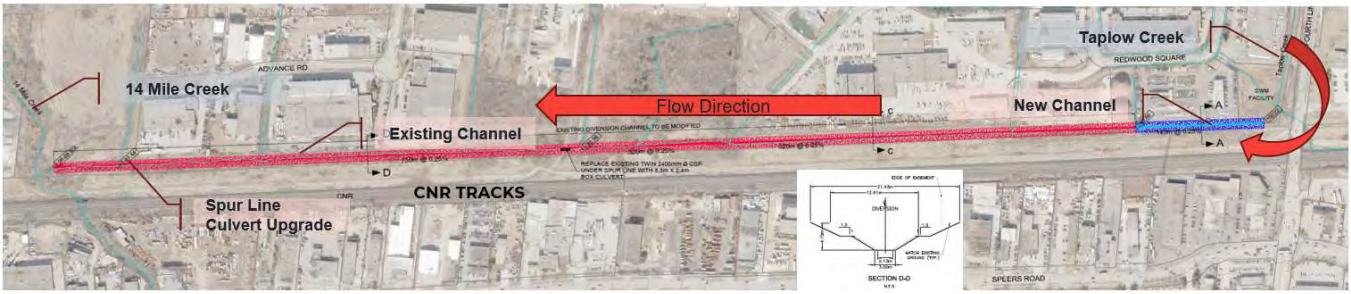
Langtry Tank: 95,000 $m^3$ flood storage (N of QEW)

# 9. Flow Diversions

## Piped Diversion Fourteen Mile Creek to Bronte Creek (North of QEW, Near Deerfield Golf Club):




## Open Channel Diversion Taplow Creek to Fourteen Mile Creek (South of QEW, West of Fourth Line)




- During significant storms (greater than a 10-to-25-year event), flow is transferred from one creek system to another. The goal is to manage flood risk without increasing it in either system.
- Taplow Creek would divert water to Fourteen Mile Creek, which then offsets flow to Bronte Creek—a larger system capable of handling extreme storm events.
- Further study required through subsequent Municipal Class EA to refine design options.
- Construction costs: $28 million (approx.)

# 12. Combinations

**The following flood mitigation combinations have been carried forward to Step 3. Cost Benefit Assessment:**

## Smaller Scale Improvements

Offers the possibility of reducing flood risk in a targeted area.

**3. Culvert/Bridge Upgrades**

- McCraney Creek at Lakeshore Road Culvert Upgrades (Culvert/Bridge Upgrade)
- Fourteen Mile Creek at CNR Culvert Upgrades (Culvert)

**5. Floodproofing**

- Localized Flood Protection Berming

## System Wide Improvements

Offers the possibility of reducing peak flows system wide, which could lower flood risk on a broader scale.

**8. Flood Storage**

- Langtry Park Off-line Storage Tank, north of QEW (flood storage)

**9. Flood Diversion**

- Piped Diversion of flow from Fourteen Mile Creek to Bronte Creek
- Flow Diversion via a Channel from Taplow Creek to Fourteen Mile Creek, including the Railway Spur Line Culvert Upgrade

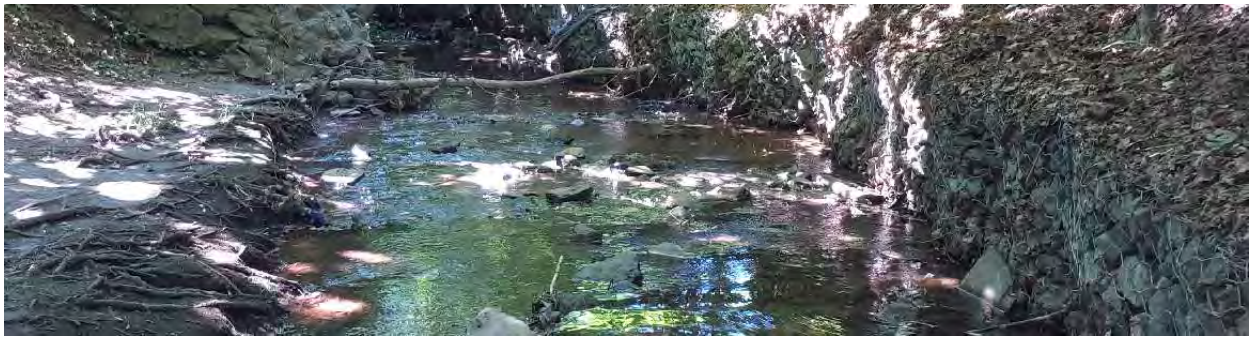
# STEP 3. Cost Benefit Assessment

**The results below show the number of properties and buildings that would be expected to be removed from flood risk with local improvements in place and then with system wide improvements in place during Regional Storm conditions:**

| Number of Properties and Buildings Removed from Flood Risk During the Regional Storm Conditions | | |
|---|---|---|
| **Smaller Scale Improvements (Alternatives 3 and 5)** *$28 Million | 263 Existing Properties at Risk | 289 Existing Buildings at Risk |
| | Properties Removed | Buildings Removed |
| | 35 | 34 |

*21 Million (Approx.) for CNR Culvert Upgrade

| Number of Properties and Buildings Removed from Flood Risk During the Regional Storm Conditions | | |
|---|---|---|
| **System Wide Improvements (Alternatives 8 and 9)** $58 Million | 263 Existing Properties at Risk | 289 Existing Buildings at Risk |
| | Properties Removed | Buildings Removed |
| | 20 | 9 |



# STEP 3. Cost Benefit Assessment

- The system-wide improvements **(8. off-line storage; and 9. diversions),** are expensive and yield a low return on investment. As a result, the alternatives are not recommended for further consideration.
- Smaller scale improvements **(3. Culvert upgrades and 5. floodproofing - berming)** offer a better return on investment and are recommended for consideration with some modification due to implementation challenges:
    - The proposed culvert upgrade at the CNR Track is owned by Metrolinx. Consequently, any upgrades, improvements, or replacements to the structure fall outside the town's jurisdiction. Also given the high cost and minimal reduction of flooding as a result, the culvert upgrade is not recommended for further consideration.
    - Berming along McCraney Creek and 14 Mile Creek will require full participation from landowners. It may impact property use and require significant tree removal. Notably, some of the identified berming areas coincide with future creek erosion mitigation projects (as identified in the Town's 2021 Creek Inventory and Assessment). Therefore, it is recommended to assess berming feasibility during the erosion mitigation works, considering that the area will need to be disturbed at that time.

# Conclusions and Next Steps

## STEP 1: Flood Risk Assessment

- Flood risk is possible during both frequent and less frequent storm events, with the greatest risk occurring during Regional Storm conditions.

## STEP 2: Alternatives Assessment

- Address the flood risks were evaluated based on technical merit, impact to natural environment, social/cultural environmental and economic considerations.

## STEP 3: Cost Benefit Assessment

- Costs vs. benefits were assessed to develop a list of recommended projects:
  - Low Impact Developments (LIDs)
  - McCraney Creek at Lakeshore Road culvert upgrades
  - Berming (where feasible) when carrying out creek erosion mitigation projects.

**Anticipated Study Completion January 2025**

# Rainwater Management Financial Plan

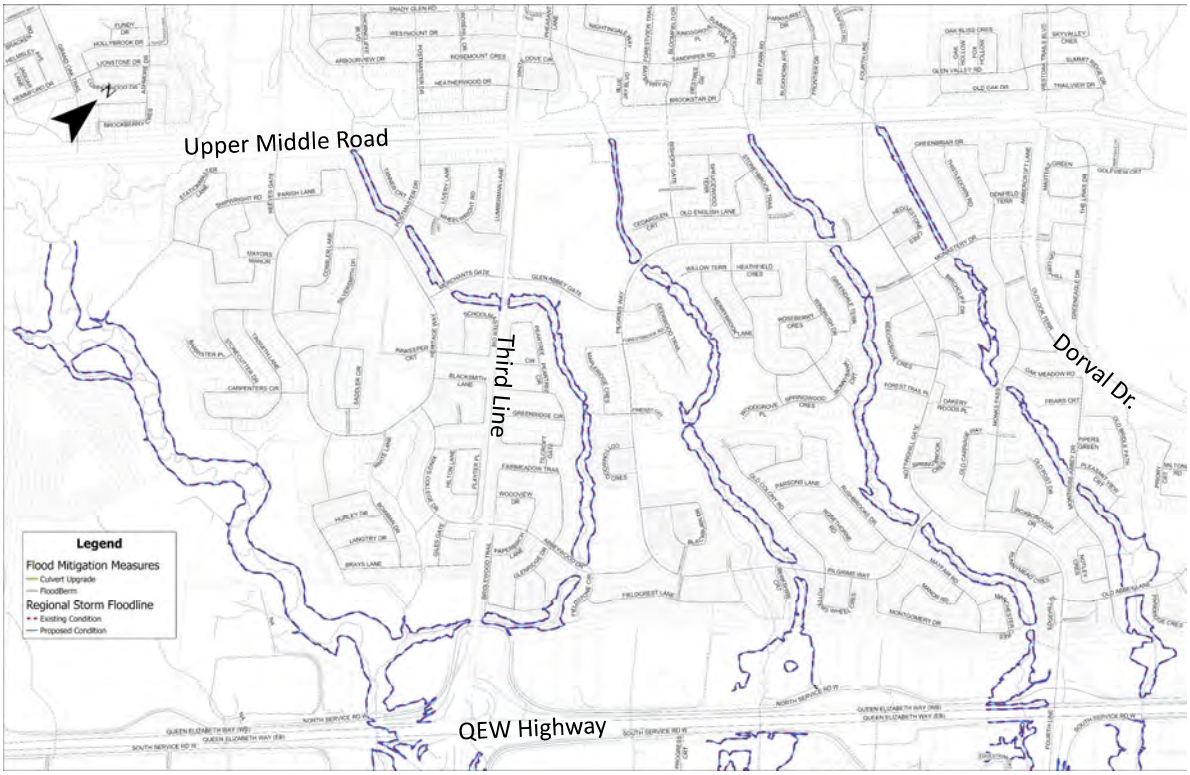
## STEP 4: Rainwater Management Financial Plan

- Recommendations will be assessed through the lens of the Rainwater Management Financial Plan (RWMP) to prioritize recommendations along with all other stormwater town initiatives.

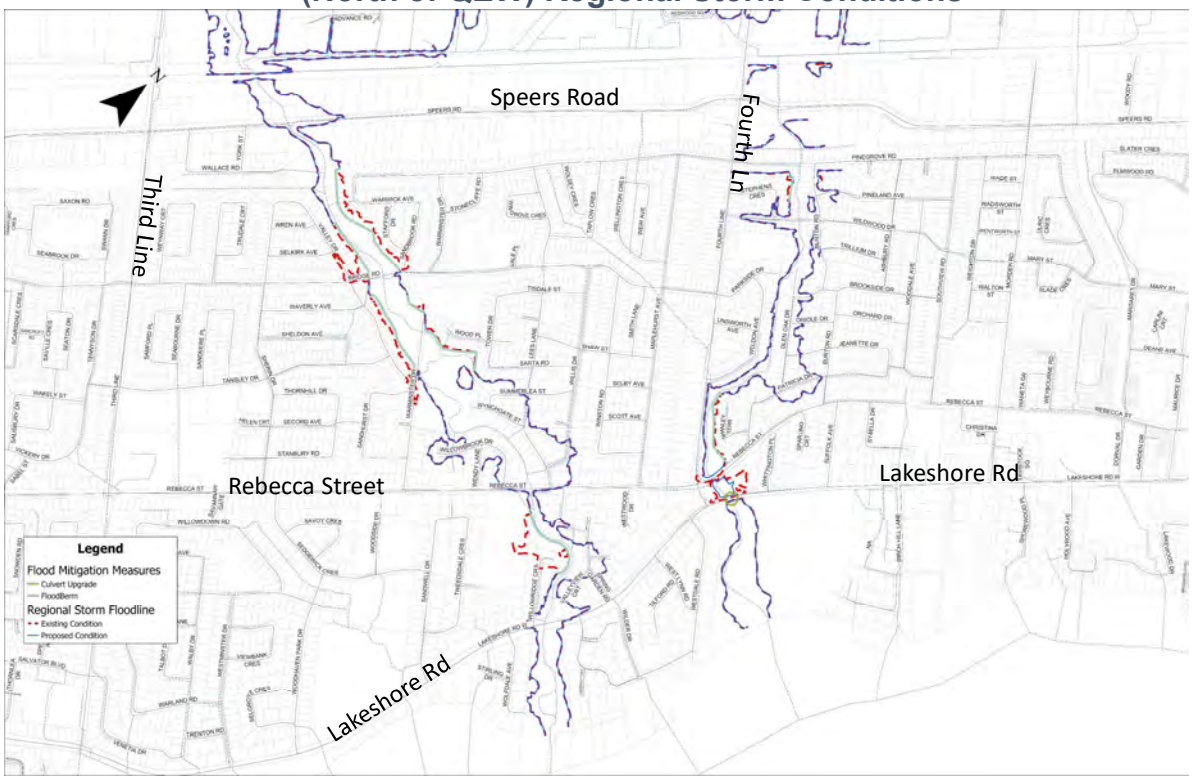
**Click Link For More Information on the RWMP**

- The Rainwater Management Financial Plan (RWMP) takes a comprehensive approach to integrate the state of good repair and increase resiliency of the town's stormwater network based on various studies and assessments completed to date.
- The multi-phase RWMP will deliver a financing plan that provides an all-inclusive approach to planning and implementing stormwater-related infrastructure renewal and improvement projects into the future.
- Study recommendations will be assessed through the lens of the Rainwater Management Financial Plan (RWMP) to prioritize recommendations along with all other stormwater town initiatives.

# Flood Risk Reduction Results




(North of QEW) Regional Storm Conditions




(South of QEW) Regional Storm Conditions

# Flood Emergency Preparedness

- Following implementation of the recommended mitigation measures, flood risks will persist in areas. Therefore, flood emergency preparedness is important to help minimize impacts should flooding occur.

- There are several resources available to Oakville residents to help ensure their safety and minimize property damage due to flooding. This includes the Town of Oakville's 'Flooding' webpage and the Region of Halton's Community Hazards webpage. Additional flooding resources are available through Conservation Halton's webpages and the University of Waterloo Intact Centre on Climate Adaptation.

## Stay safe and informed!

When it comes to flood preparedness, homeowners play a crucial role in safeguarding their property and well-being. Here are some essential steps:

1. Keep track of your community's flood risk and response plans.
2. Assemble an emergency kit that includes essentials like water, non-perishable food, medications, flashlights, batteries, and important documents.
3. Create a household evacuation plan that accounts for family members, pets, and any special needs. Identify safe routes and meeting points.

Halton Region

Oakville

Intact Centre on Climate Adaptation

Conservation Halton

**Click Links For More Information**