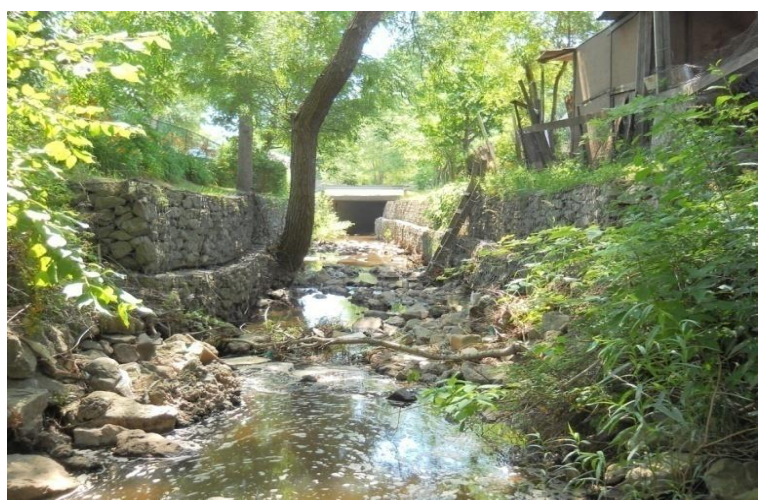
Public Information Centre # 2

Flood Mitigation Opportunities Study
Fourteen Mile Creek & McCraney Creek Systems

Town of Oakville

December 2, 2014

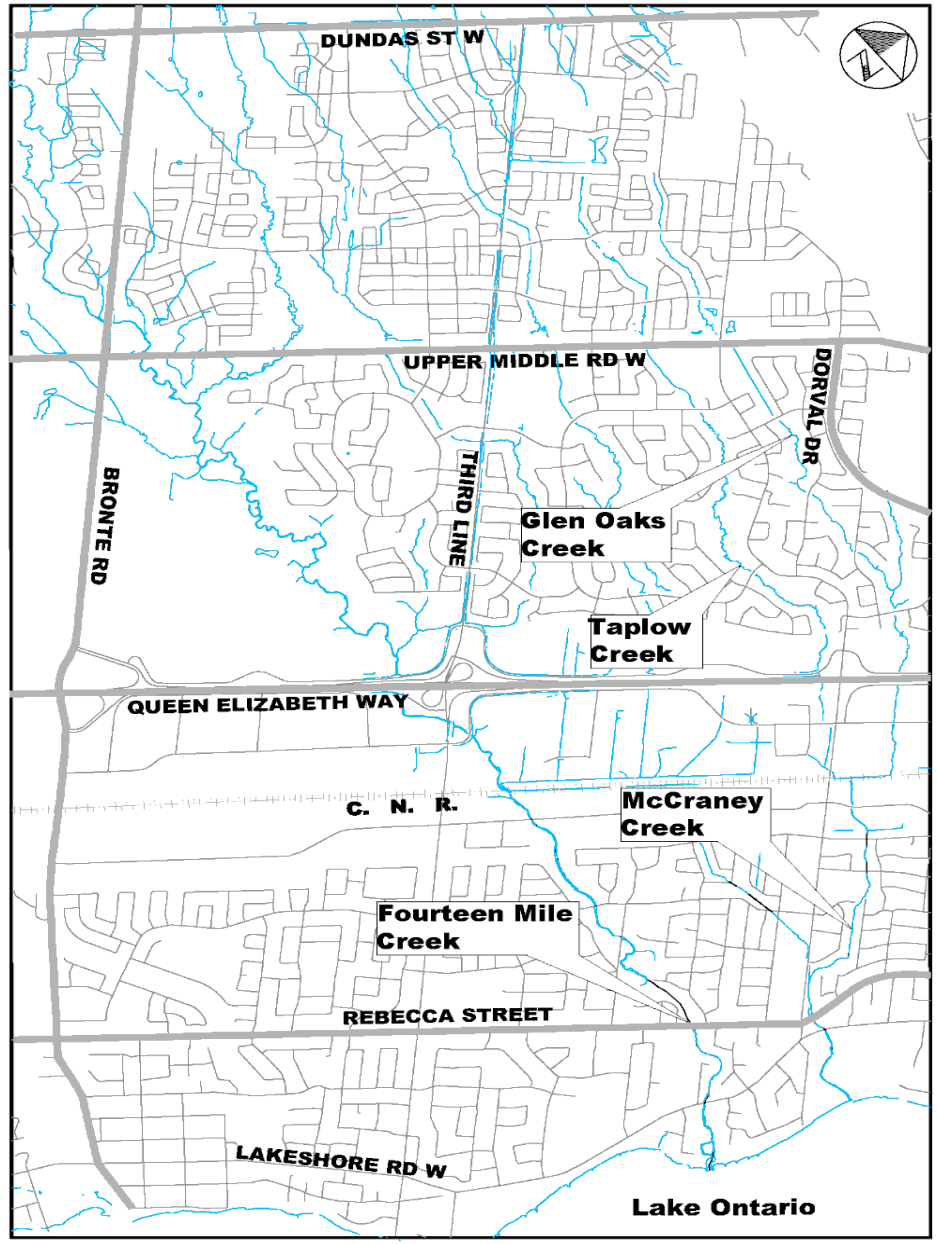
Municipal Class Environmental Assessment


Study Area

- The limits of the study area extend from Lake Ontario to Dundas Street.
- McCraney Creek has two main tributaries Taplow Creek and Glen Oak Creek north of the CNR tracks.
- Land use is predominantly residential north of the QEW, commercial along the QEW corridor and residential south of Speers Road down to Lake Ontario.

City of Hamilton - Rosedale Area (July 26, 2009)



Purpose

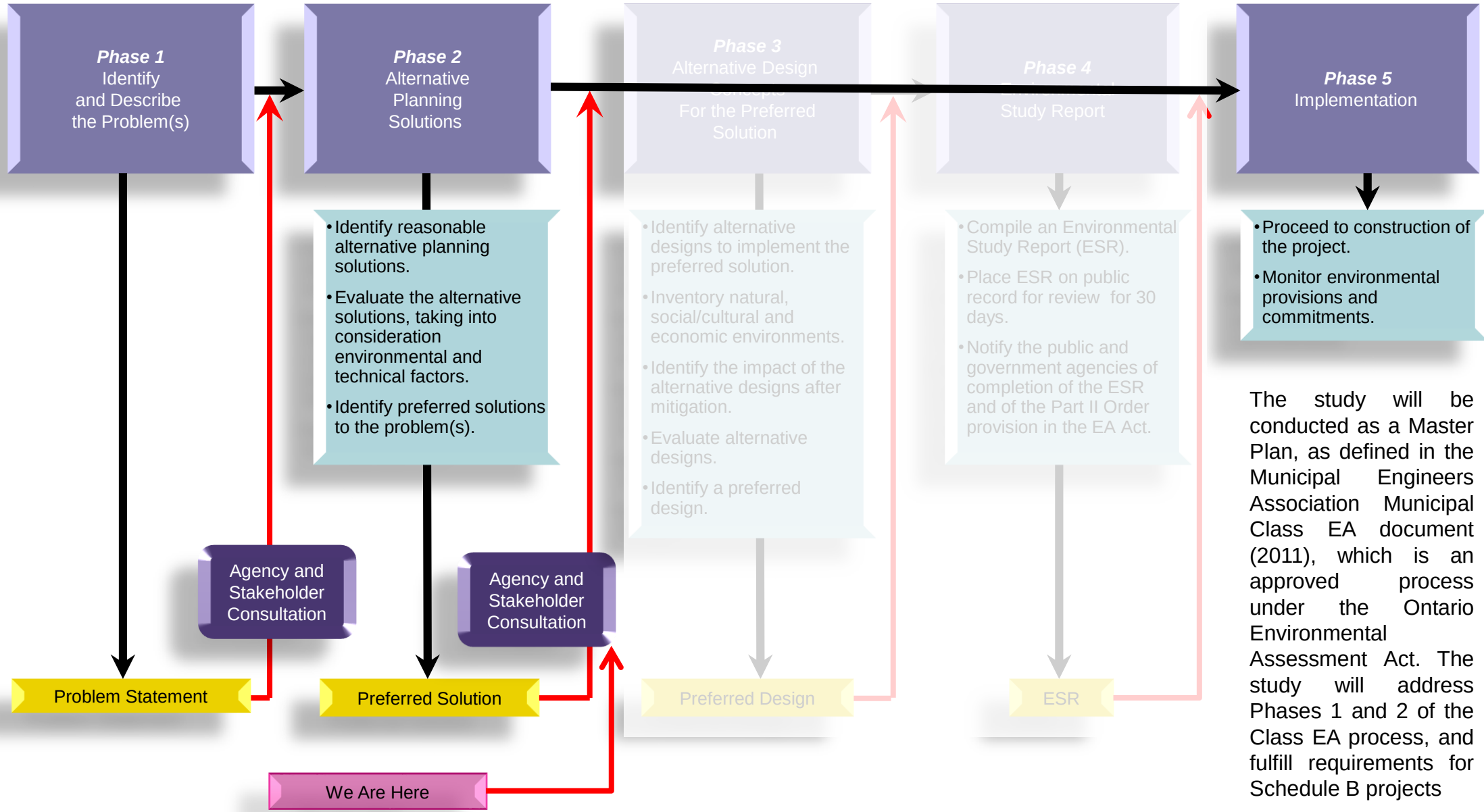
Why We're Here

- The Town of Oakville Town-wide Flood Study, 2008, established (on a priority basis), creek reaches that should be investigated in detail to determine opportunities for flood mitigation; Fourteen Mile Creek and McCraney Creek were identified as the highest priorities
- The Town is undertaking a Class Environmental Assessment (Class EA) Study to determine preferred flood mitigation opportunities along Fourteen Mile Creek and McCraney Creek
- The first Public Information Centre (PIC) was held November 14, 2013 to obtain input from the public on flooding risks within the study area
- The purpose of this second PIC is to present the alternative assessment and resulting preliminary preferred solutions and receive input from the public

Problem Statement

- The Town of Oakville Town-wide Flood Study identified seven (7) creek reaches on Fourteen Mile Creek and McCraney Creek where flood risk to both private and public property was determined to be significant. Various flood mitigation opportunities have been assessed using the Municipal Class EA process with the objectives of protecting public safety, private property and municipal infrastructure on Fourteen Mile Creek and McCraney Creek, Dundas Street to Lake Ontario.

Municipal Class EA Process



The study will be conducted as a Master Plan, as defined in the Municipal Engineers Association Municipal Class EA document (2011), which is an approved process under the Ontario Environmental Assessment Act. The study will address Phases 1 and 2 of the Class EA process, and fulfill requirements for Schedule B projects

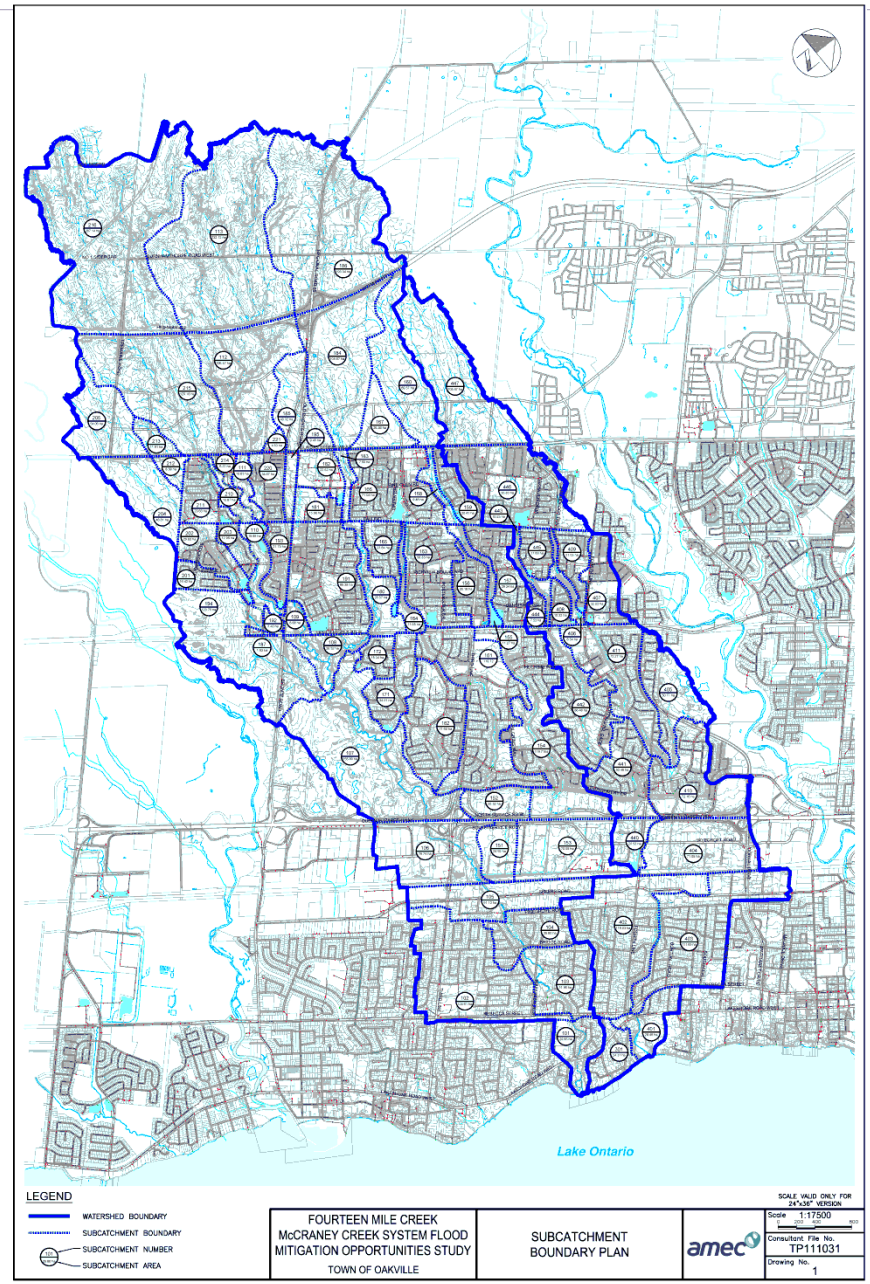
Baseline Inventory Summary

Hydrology (Rainfall-Runoff)

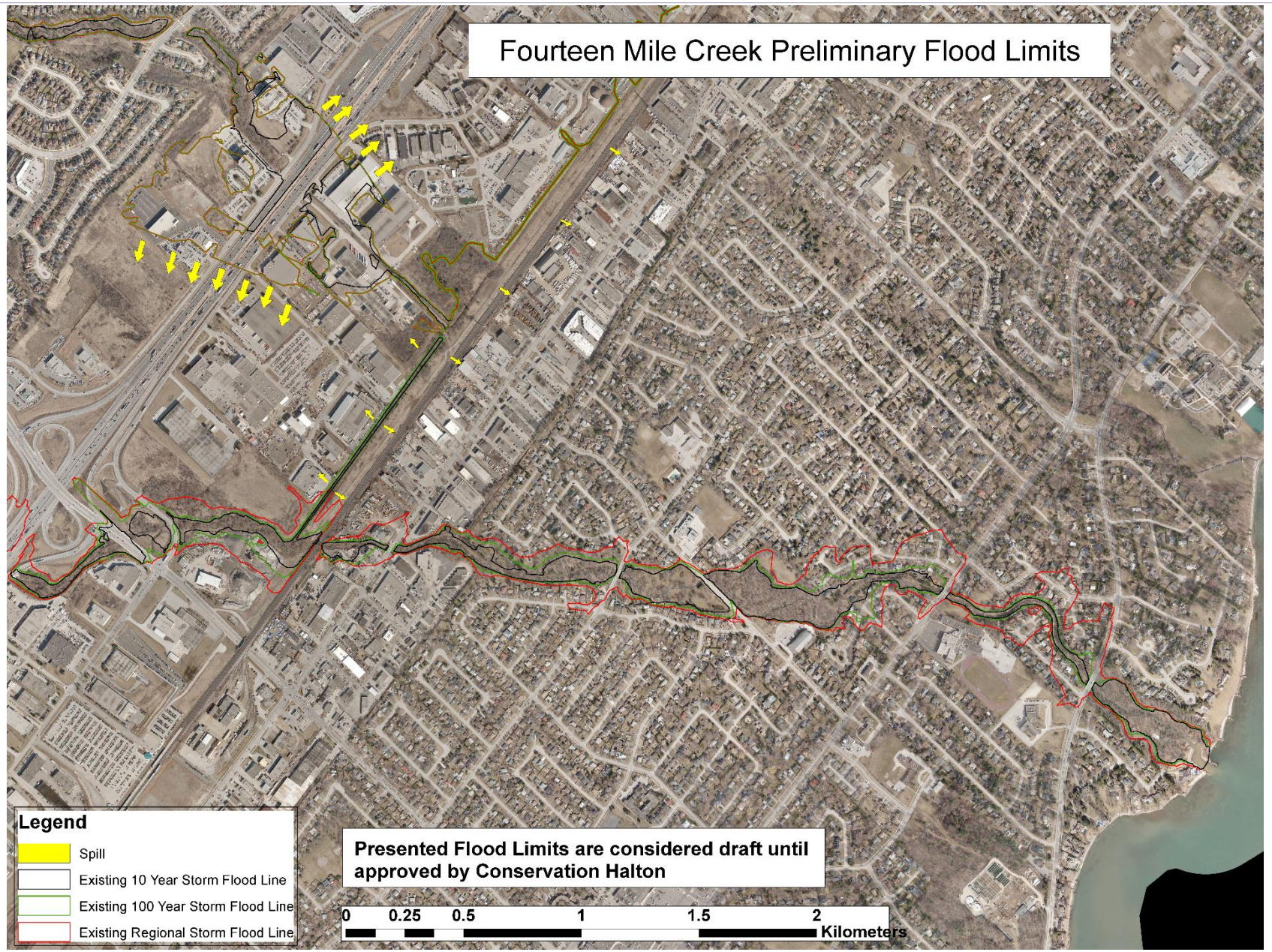
- Updated hydrologic models have been used to determine runoff rates from various land uses in response to severe rainfall events. The models have been validated using observed flows based on local rainfall and stream flow gauging.

Hydraulics (Movement of Water)

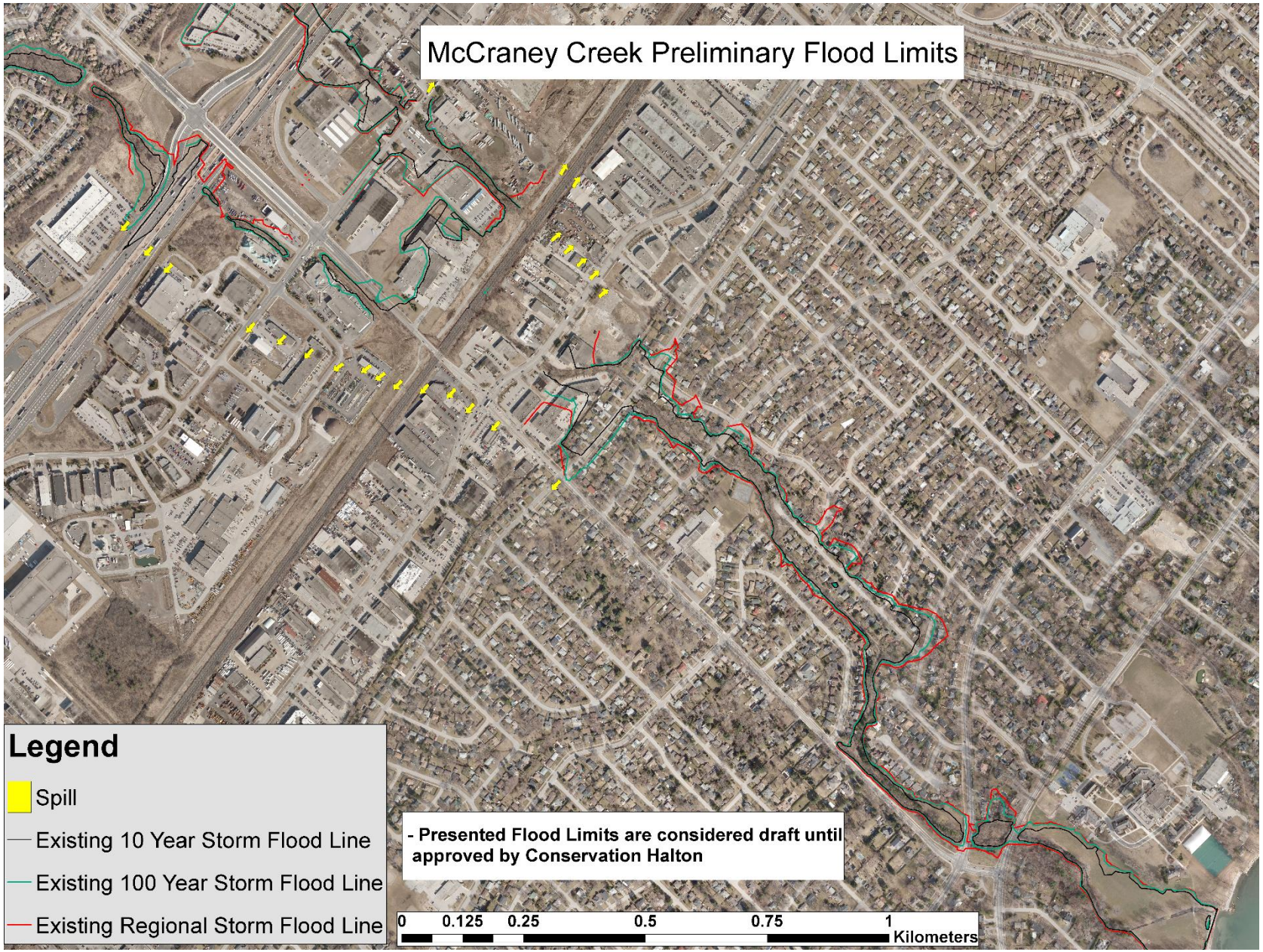
- Hydraulic performance provides an indication of the velocity and depth associated with various flow rates within the creek system.
- Approximately 160 buildings are at risk for the 100 year storm event.
- Approximately 210 buildings are at risk for the Regulatory event (Regional Storm – Hurricane Hazel), considered to be a 500 year (+) storm event.



Baseline Inventory Summary



Baseline Inventory Summary

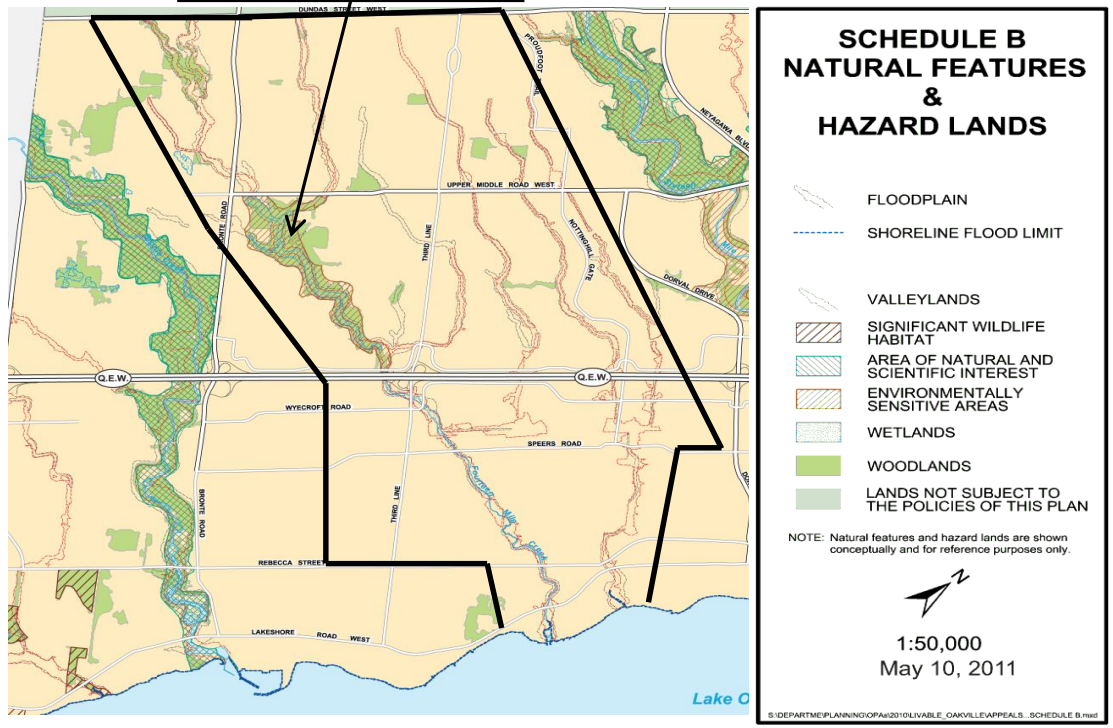


Natural Systems

- Fourteen Mile Creek is Redside Dace habitat, which is listed as an endangered fish species under Ontario's Endangered Species Act, 2007.

- Fourteen Mile Creek Valley is a 70 ha mature mixed forest and valley feature; Environmentally Sensitive Area (ESA) between Upper Middle Road and the North Service Road.

Fourteen Mile Creek Valley Environmentally Sensitive Area



Long List of Flooding Alternatives: Structural Measures

"Do Nothing": *Maintain creek(s) in present condition, with regular maintenance. This alternative does not reduce existing flooding conditions and risk.*

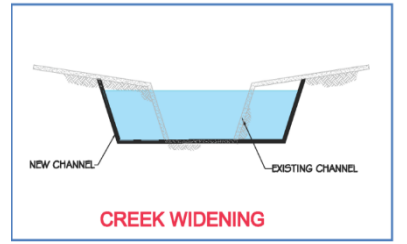
Alternative 1: Culvert/ Bridge Upgrades: Replacing or supplementing the capacity of the existing culvert/bridge crossings to reduce upstream flooding conditions.

Alternative 2: Floodplain/ Channel Improvements: Improve channel and floodplain flow capacity by widening the channel, local grading improvements, removal of flow obstructions and channel lowering.

Alternative 3: Roadway Profile Modifications: Roadway profiles can be modified to reduce the amount and extent of upstream flooding through lowering, allowing more water to flow over the road and less back-up upstream.

Alternative 4: Flood Proofing Buildings:
Buildings can be flood proofed by sealing low openings or alternatively local berming and/or flood walls.


City of Hamilton - Red Hill Valley Parkway (July 26, 2009)



Long List of Flooding Alternatives: Structural Measures

Alternative 5: Eliminate/Reduce Culvert Blockages: Manage debris and sediment to reduce potential for blockages.

Alternative 6: Flow Diversions: Locally divert runoff from one location to another to reduce flooding conditions.

Alternative 7: Stormwater Flood Storage (Off-line or On-line Flood Storage or Low Impact Development (LID): Store flood waters upstream of existing or proposed crossings to reduce peak flows. LID measures to reduce peak flows for frequent storm events (e.g., bioswales, pervious pavers, infiltration trenches, etc.).

Alternative 8: Combinations of Alternatives: When a stand-alone alternative does not provide fully adequate flood remediation.

Long List of Flooding Alternatives: Non-Structural Measures

Alternative 1: Regulation (updated): Conservation Halton applies regulations to ensure that flooding conditions are not negatively impacted by creek or floodplain alterations/development.

Alternative 2: Flood Forecasting and Warning: Conservation Halton maintains a Flood Status System that advises Town of Oakville staff of potential flooding conditions within the Conservation Authority's jurisdictional area.

Alternative 3: Emergency Preparedness: Both Conservation Halton and Town of Oakville staff to assist in determining where flooding conditions may require emergency services.

Alternative 4: Creek Maintenance: Regular inspection of all creek reaches to determine possible flooding issues such as erosion, debris accumulation and culvert blockages.

Alternative 5: Property Acquisition: At risk properties located within the floodplain, could be purchased and modified to improve upstream flooding conditions or to eliminate or reduce the threat to life or property. Acquisition of property would typically be the last alternative to be selected, due to the high social and economic considerations involved.

Screening of the Long List of Flooding Mitigation Alternatives

The long list of flooding mitigation alternatives has been screened to a short-list of alternatives based on the following evaluation factors and evaluation criteria:

1. Functional:
   - *Potential to reduce flooding*
   - *Potential to reduce erosion*
   - *Potential to protect municipal infrastructure*
2. Environmental:
   - *Potential to improve aquatic habitat*
   - *Potential to improve terrestrial habitat*
3. Social:
   - *Ability to improve public safety*
   - *Impacts on private lands*
   - *Impacts on public lands*
4. Economic
   - *Capital costs*
   - *Operation and maintenance costs*
5. Constructability
   - *Ease of construction and accessibility*
   - *Expected temporary disturbance to existing habitats*

Based on the evaluation criteria, *Alternative 5 – Eliminate/ Reduce Potential Culvert Blockages* has been screened from further assessment as it is a maintenance requirement and does not increase the culvert's flow capacities.

Short-Listed Flood Mitigation Alternatives

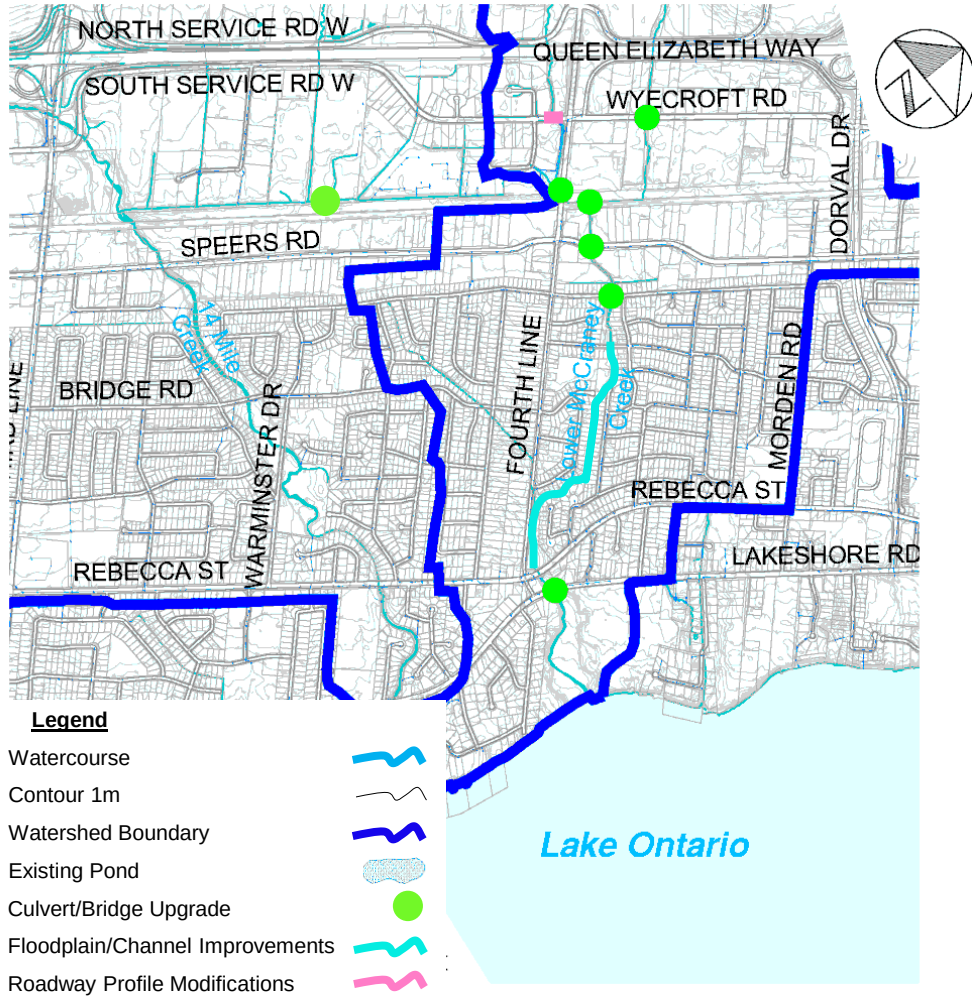
The following alternatives have been short-listed based on the screening assessment:

Alternative 1: Culvert/Bridge Upgrades – Replace/ Supplement:

- *Fourteen Mile Crk - Spur line culvert*
- *McCraney Crk – CNR*
- *McCraney Crk – Speers Road*
- *McCraney Crk – Pinegrove Road*
- *McCraney Crk – Lakeshore Road*
- *GlenOaks Crk – Wyecroft Road*
- *Taplow Crk – Fourth Line*
  (as part of future grade separation)

Alternative 2: Floodplain/Channel Improvements: McCraney Creek (Rebecca St. to Wildwood Dr.) channel improvements include the removal of the drop structure, lowering of the channel and potential widening.

Alternative 3: Roadway Profile Modifications: The South Service Road on Taplow Creek could be lowered to reduce upstream flooding.

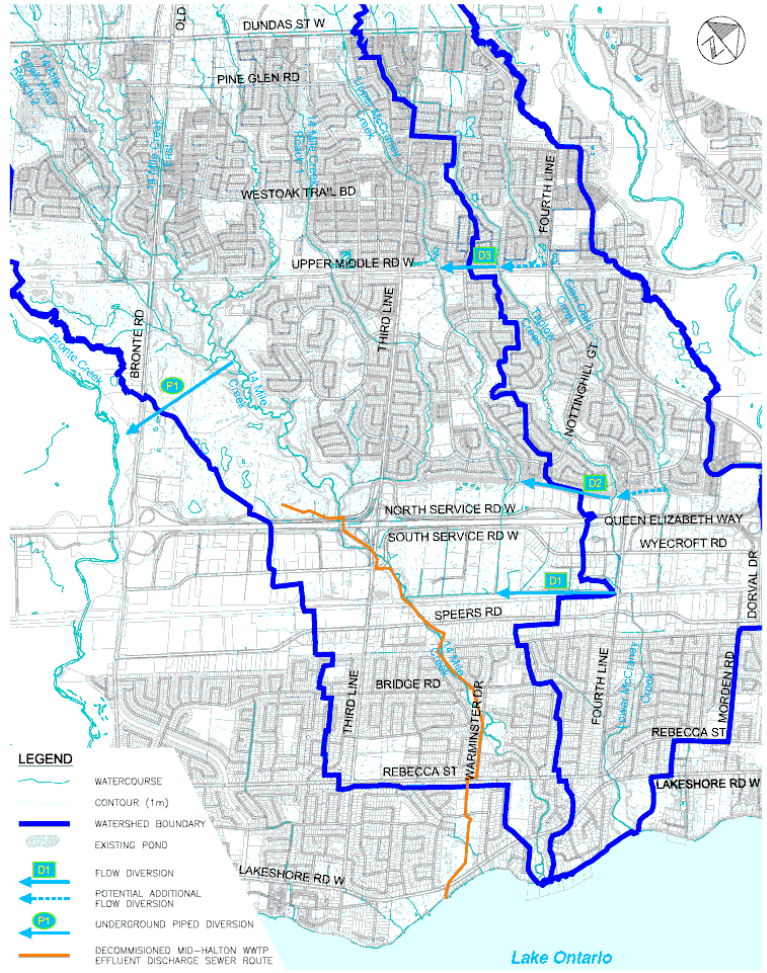


Short-listed Alternatives

Alternative 4: Flood Proofing Buildings: Based on updated modelling 24 homes could potentially benefit from flood proofing using flood protection berms.

Alternative 6: Flow Diversions: Diversions considered include:

1. *Taplow Creek to Fourteen Mile Creek along the north side of the CNR tracks. 20 homes (+/-) removed from Regulatory floodplain.*
2. *Taplow Creek to Fourteen Mile Creek north of the North Service Road along the Indian Ridge Trail. 15 homes (+/-) removed from Regulatory floodplain*
3. *Taplow Creek to Fourteen Mile Creek along Upper Middle Road. 15 homes (+/-) removed from Regulatory floodplain.*
4. *Fourteen Mile Creek north of the QEW. Diversion using abandoned Mid Halton WWTP outlet pipe.*
5. *Fourteen Mile Creek to Bronte Creek just north of QEW. Diversion using box culverts. 2 homes (+/-) removed from Regulatory floodplain. Offsets flows diverted from Taplow Creek.*

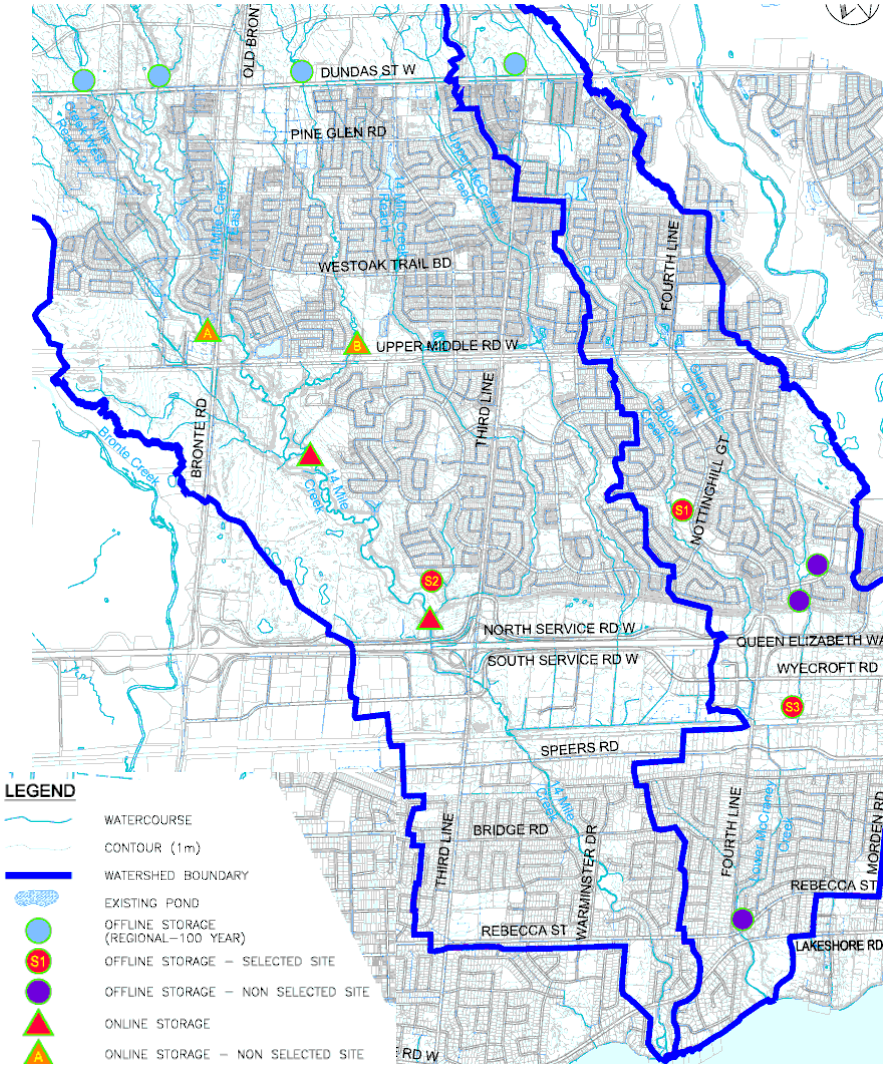


Short-Listed Flood Mitigation Alternatives

Short-listed Alternatives

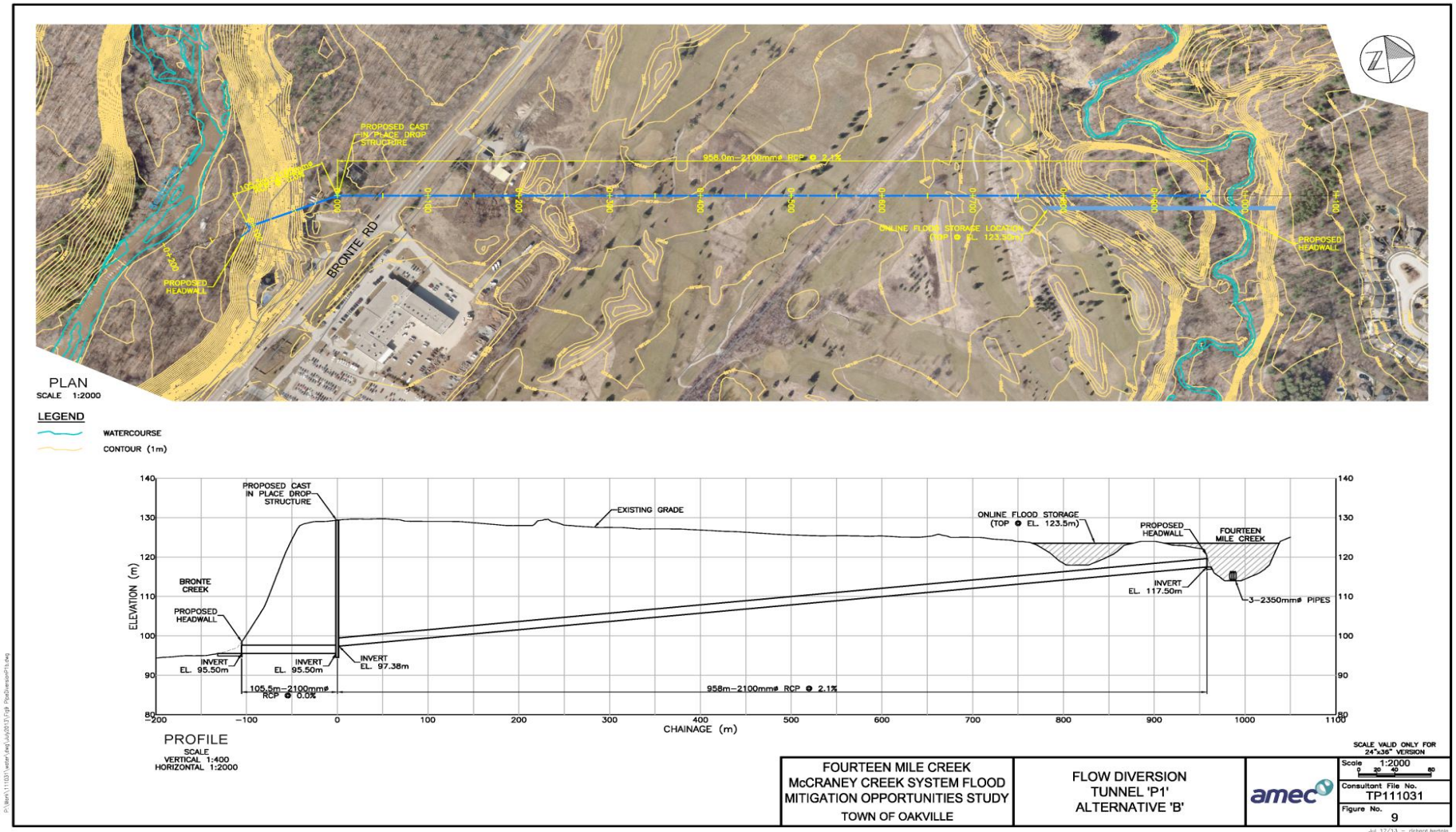
Alternative 7: Flood Control via Stormwater Storage Measures (Off-line and On-line Flood Storage, Low Impact Development (LID) Best Management Practices (BMPs):

1. *Over control (Regional Storm to 100 Year Storm) for North of Dundas lands at Fourteen Mile Creek, Taplow Creek and Glen Oak Creek along north side of Dundas St.*
2. *Online North Storage Site north of the QEW at confluence of East and West Branches or just north of the North Service Road*
3. *Online Flood Storage on West and East Branches of Fourteen Mile Creek at Upper Middle Road*
4. *Flood storage within open spaces:*
   - McCraney Creek at Westgate Park
   - Glen Oaks Creek at Montrose Park
   - Glen Oaks Creek at Old Abbey Park
   - Taplow Creek, at Nottinghill Park north of the QEW
   - Fourteen Mile Creek, north of QEW, east of Langtry Park
   - Glen Oak Creek, at the abandoned Town of Oakville Transit Facility on Wyecroft Road
5. *Low Impact Development best management measures applied to all development, with 15 mm of runoff abstraction*
6. *Flood storage upstream of all bridges/culverts with controllable gate systems.*



Short-listed Alternatives

Alternative 8: Combinations: Online flood storage north of the QEW at the confluence of the east and west Fourteen Mile Creek branches; 960m piped diversion to Bronte Creek.



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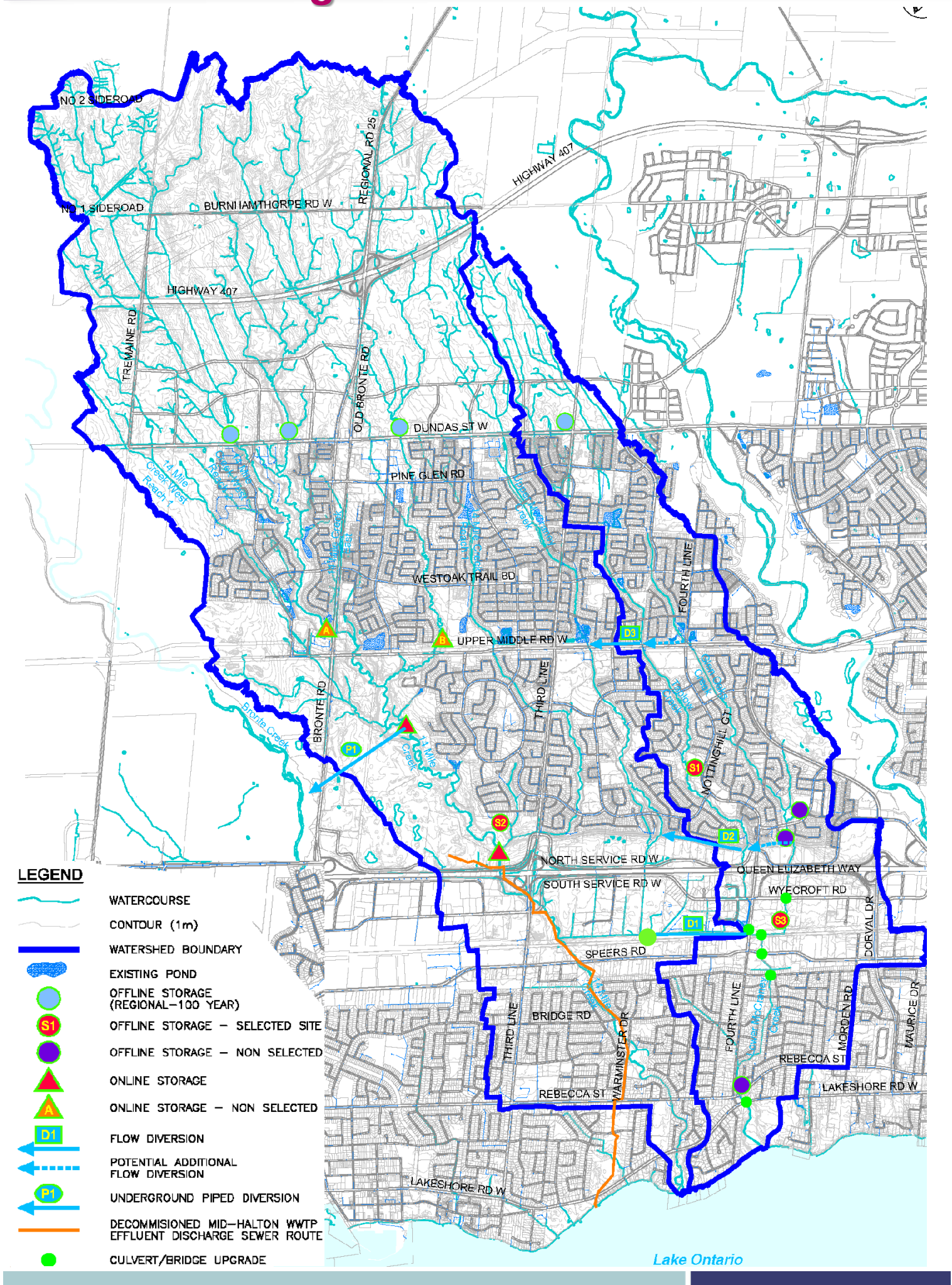


Short-Listed Flood Mitigation Alternatives

The short-listed alternatives have been assessed primarily on functionality and the ability to reduce flooding potential. The following constitute the preliminary preferred solutions:

Alternative 1: Culvert/Bridge Upgrades – Replace/ Supplement

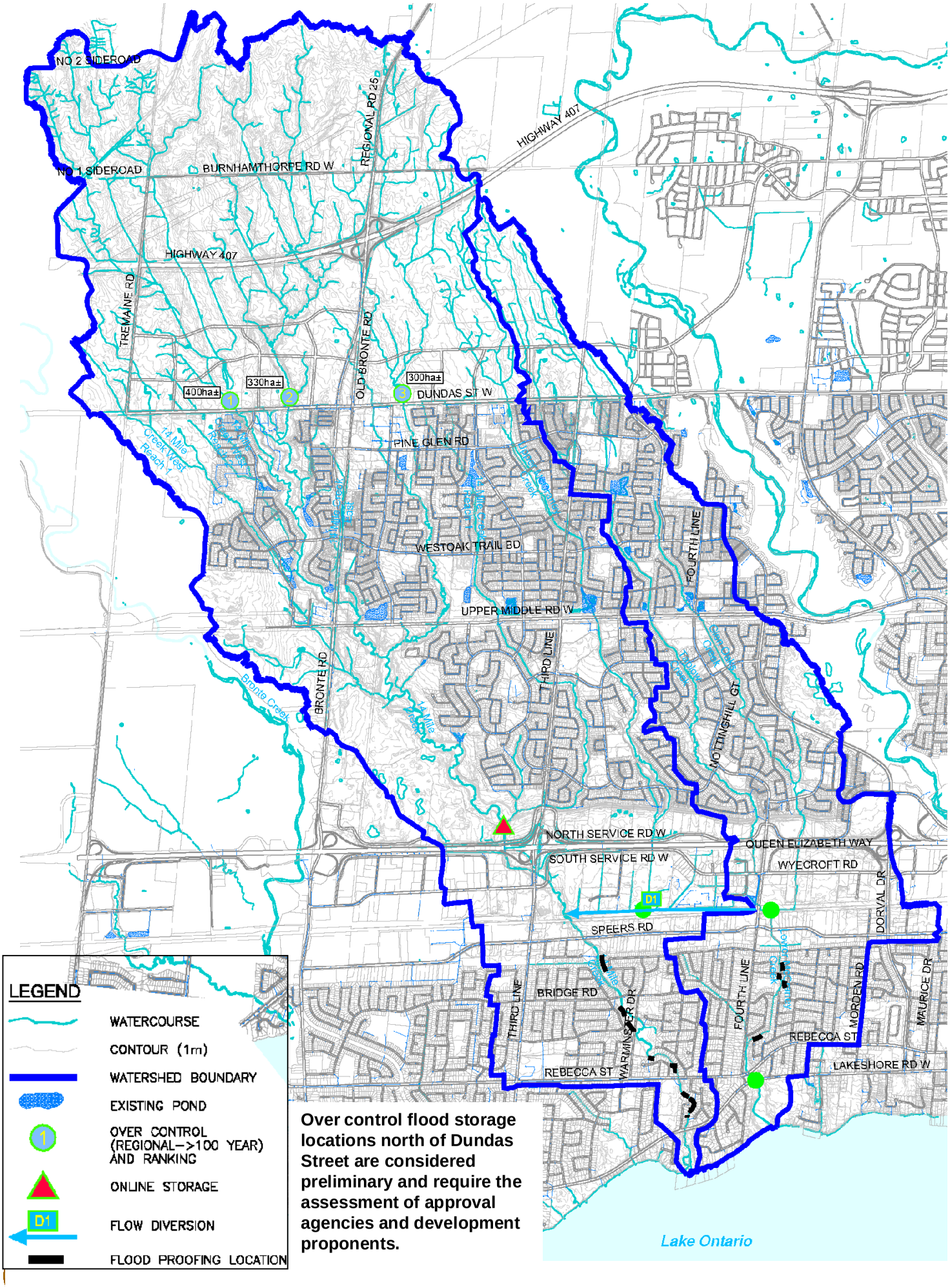
Alternative 4: Flood Proofing Buildings: 24 homes could potentially benefit from flood proofing using flood protection berms.

Alternative 6: Flow Diversions: Implement flow diversion(s) from McCraney Creek to Fourteen Mile Creek by constructing diversion channels and implementing flood storage upstream of the QEW on Fourteen Mile Creek to offset the influence of the diversion.

Alternative 7: Flood Control via Stormwater Storage Measures: (Off-line and On-line Flood Storage, Low Impact Development (LID) Best Management Practices (BMPs)

Alternative 8: Combinations

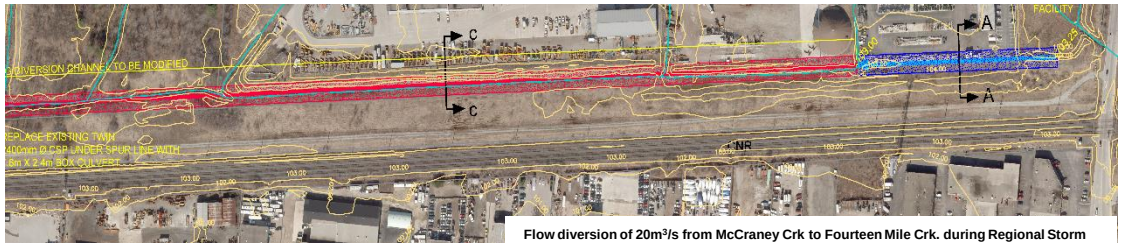
Summary of Preliminary Preferred Solutions



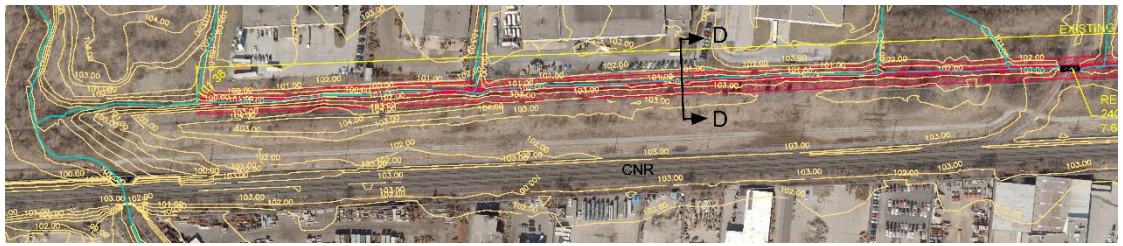
Over control flood storage locations north of Dundas Street are considered preliminary and require the assessment of approval agencies and development proponents.

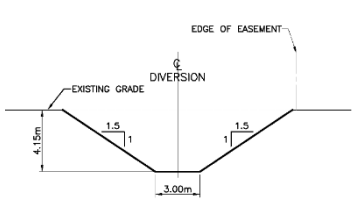
Summary of Preliminary Preferred Solutions

- Flow diversion from McCraney Creek to Fourteen Mile Creek. Requires the upgrade of a privately owned CN spur line culvert. Results in 132 properties with reduced Regional Storm flooding risk.

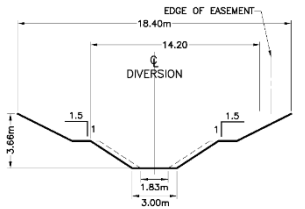


Flow diversion of 20m³/s from McCraney Crk to Fourteen Mile Crk. during Regional Storm

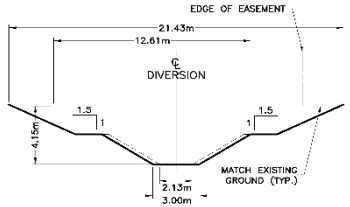




SECTION A-A
N.T.S

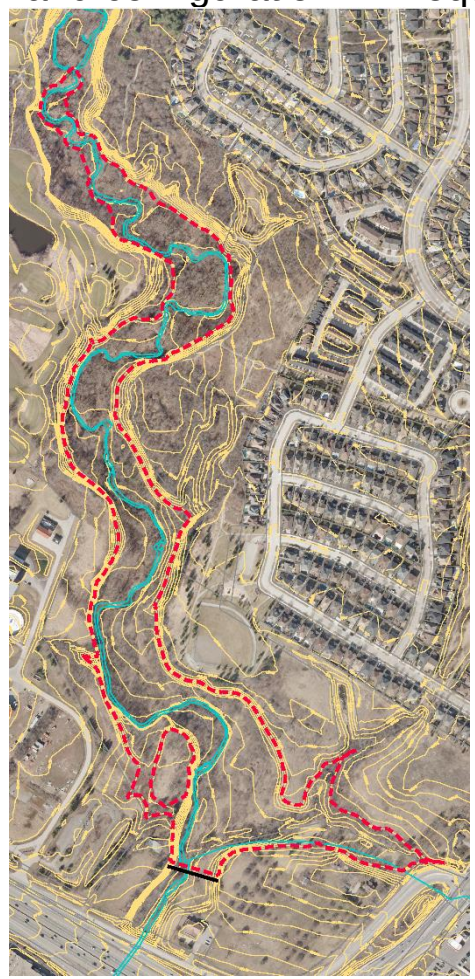


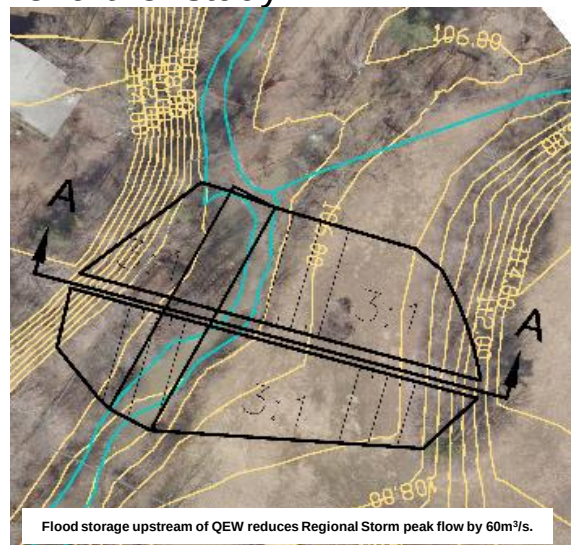
SECTION C-C
N.T.S



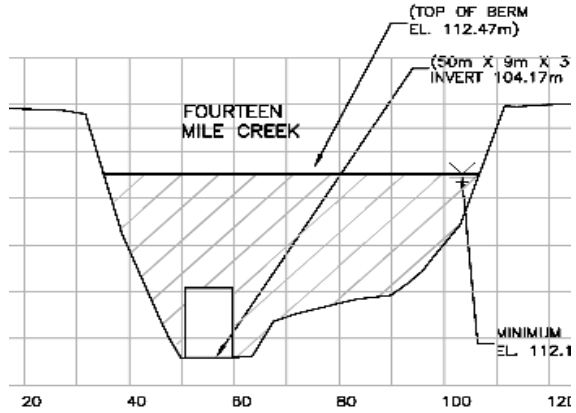
SECTION D-D

- Flood storage upstream of QEW Highway on Fourteen Mile Creek reduces Regional Storm peak flow, and exceeds the flow to be diverted from McCraney Crk, resulting in a net flow decrease and 173 properties with reduced Regional Storm flooding risk. Storage location and configuration will require further study.



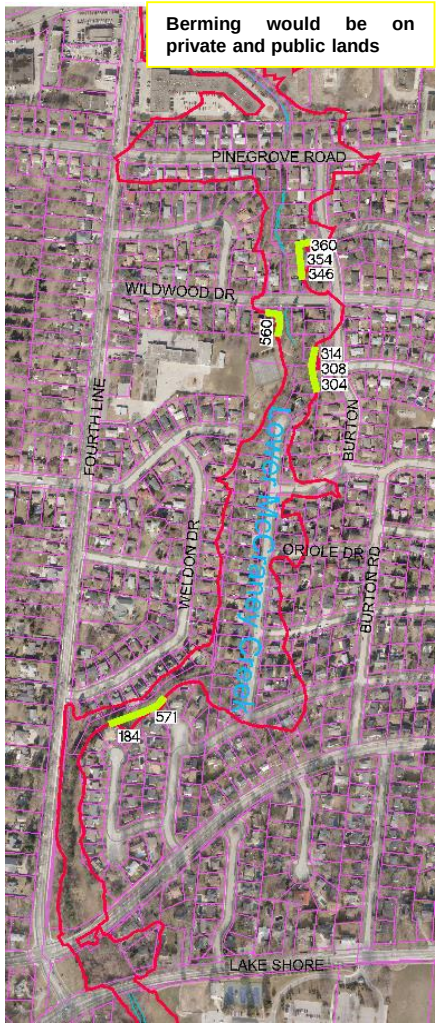


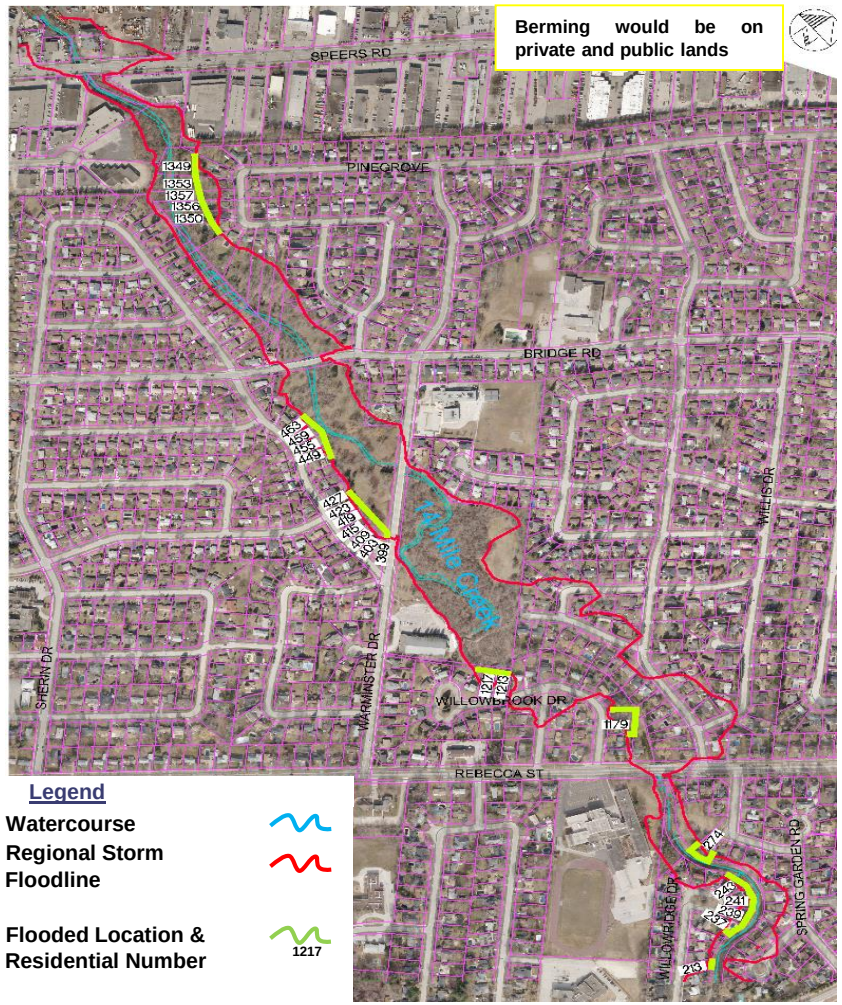
Flood storage upstream of QEW reduces Regional Storm peak flow by 60m³/s.



Summary of Preliminary Preferred Solutions

- Localized flood protection using berming on McCraney Creek would protect 7 homes
- Localized flood protection using berming on Fourteen Mile Creek would protect 25 homes
- Three (3) flow capacity culvert upgrades:
  - *Fourteen Mile Creek Culvert*
  - *CNR McCraney Creek Culvert*
  - *Lakeshore Rd. Culvert*





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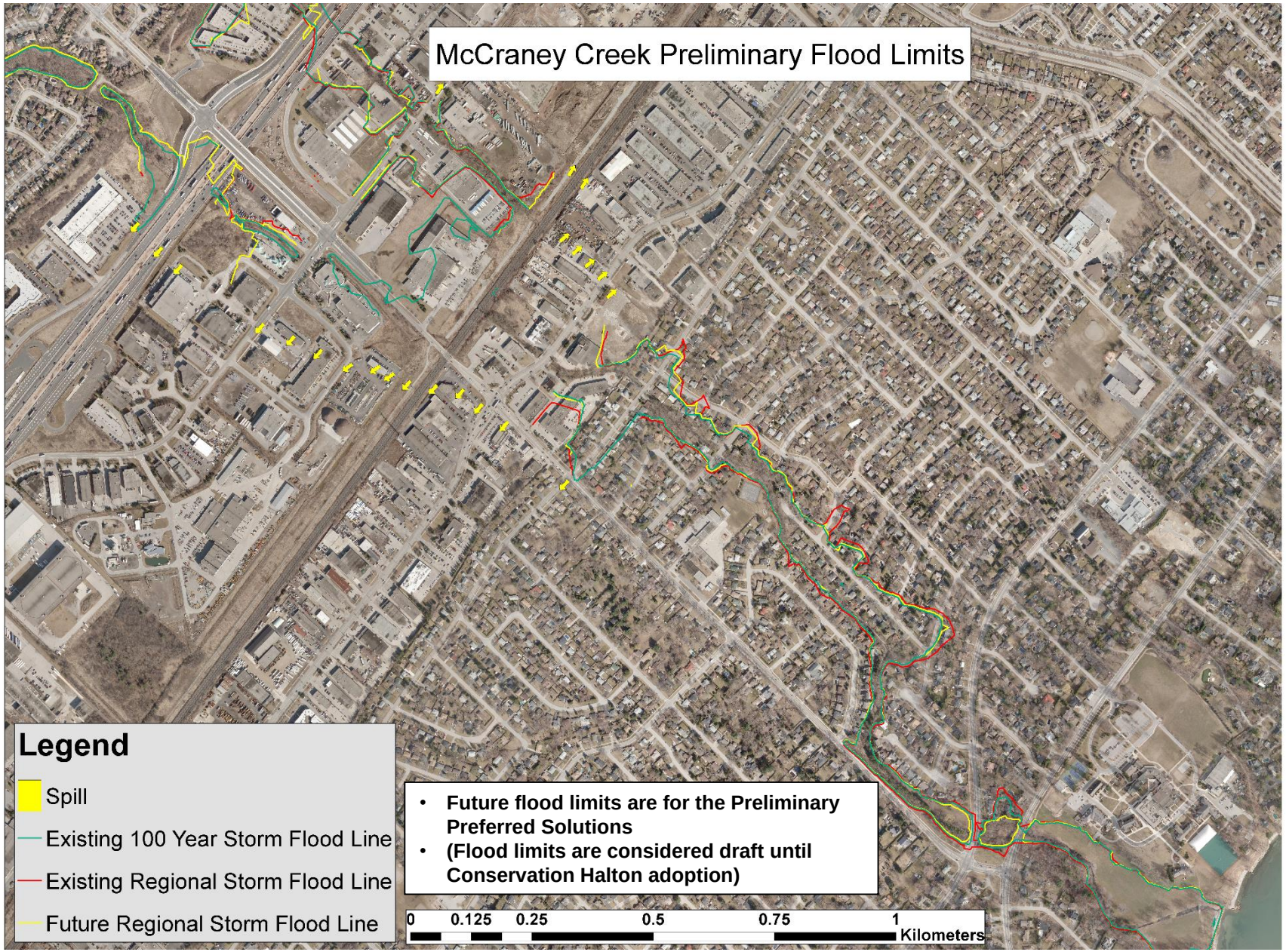

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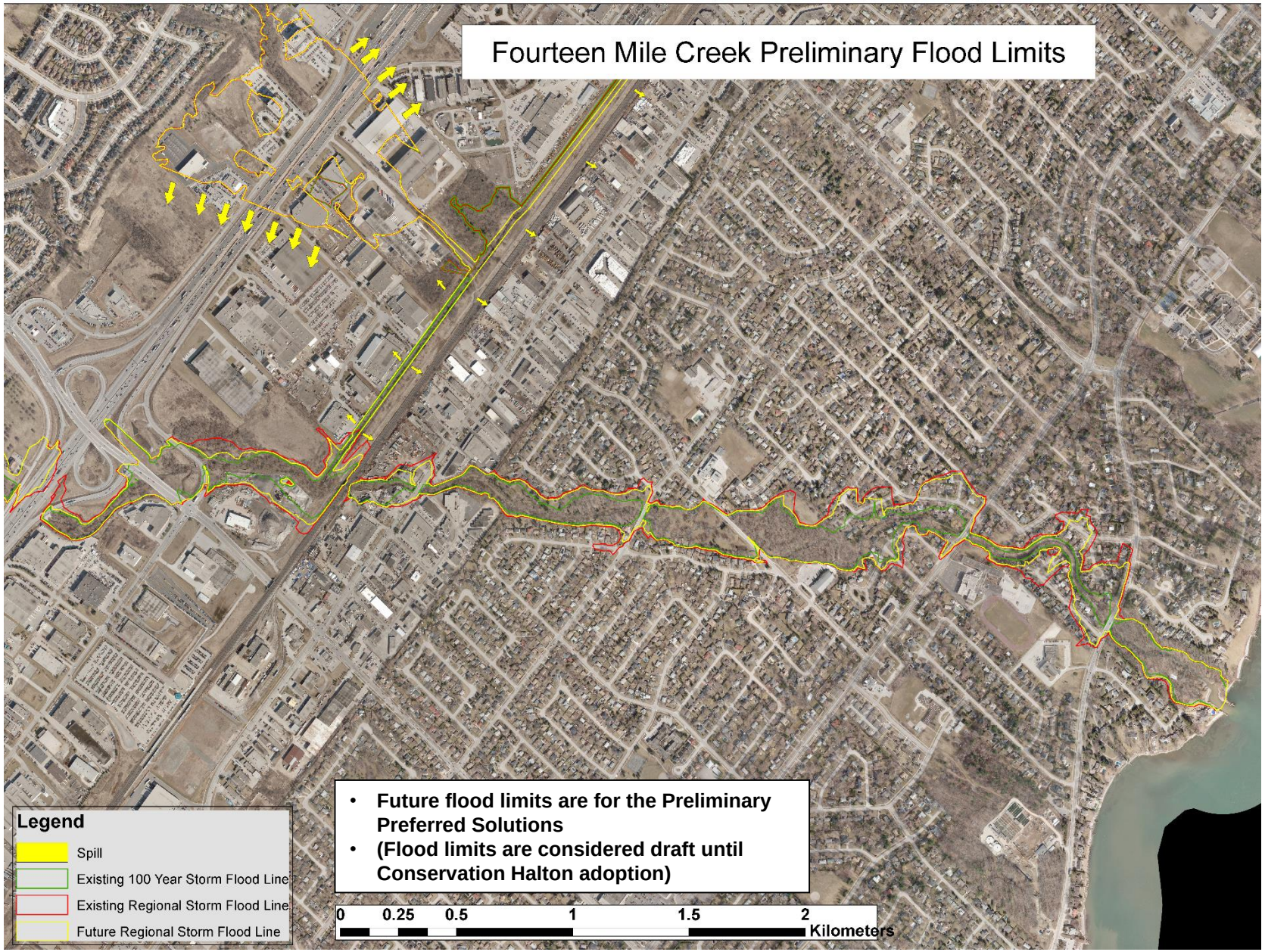


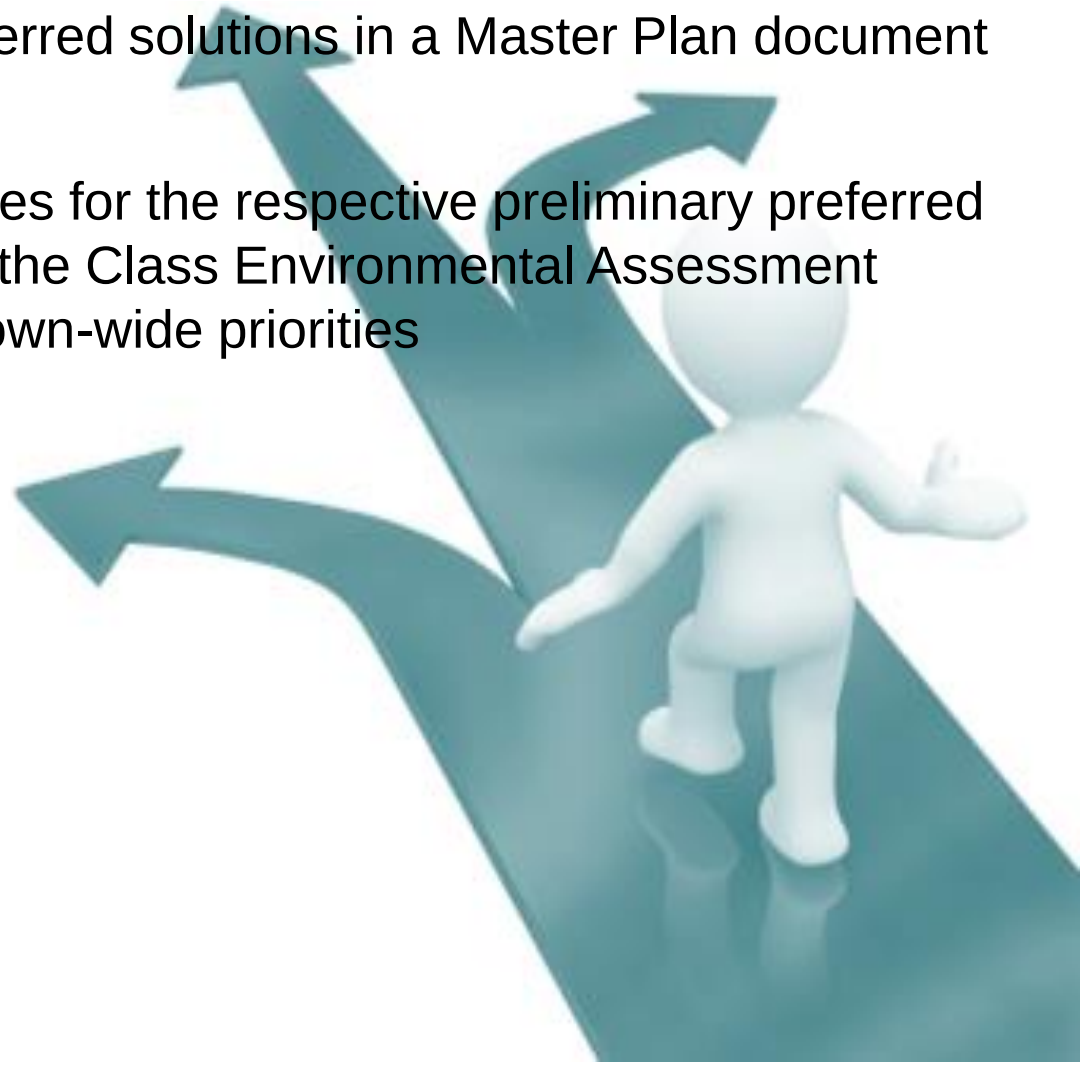
Implementation Considerations/Challenges:

The Preliminary Preferred Solutions outlined in this Master Plan consist of a set of projects of varying complexity with respect to implementation

- Several factors need to be considered by the Municipality through the next phases of planning and design including:
  - *Cost/benefits*
  - *Land ownership*
  - *Agency approvals*
  - *Private property impacts*
  - *Environmental impacts*
- The Town of Oakville will also need to assess these projects in the context of Town-wide priorities to address flood risk across the community

Next Steps

- Receive public comments by December 16, 2014;
- Review and consider public comments and confirm or refine preferred solutions
- Prepare, document and file description of preferred solutions in a Master Plan document for a 30 day public review period
- The Town to schedule future site specific studies for the respective preliminary preferred solutions in accordance with the provisions of the Class Environmental Assessment procedures, subject to budget approval and Town-wide priorities



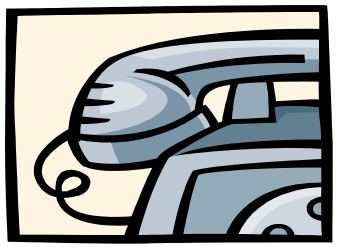
How to Provide Your Comments

Complete a comment sheet

- By Mail
- By Phone
- By Fax
- By e-mail

Kristina Parker M.A.Sc., P.Eng.
Water Resources Engineer,
Engineering and Construction
Town of Oakville
1225 Trafalgar Road
Oakville, ON L6H 0H3
Telephone: 905-845-6601 Ext: 3889
Fax: 905-338-4159
Email: kristina.parker@oakville.ca

Mr. Ron Scheckenberger, P.Eng.
Project Manager
AMEC Environment & Infrastructure
3215 North Service Road,
Burlington, ON L7N 3G2
Telephone: 905-335-2353
Toll Free: 1.886.751.2353
Fax: 905-335-1414
Email: ron.scheckenberger@amecfw.com



Please submit comments no later than

December 16, 2014

Thank you for your participation!