

Town of Oakville

Flood Mitigation Opportunities Study

Fourteen Mile Creek & McCraney Creek Systems

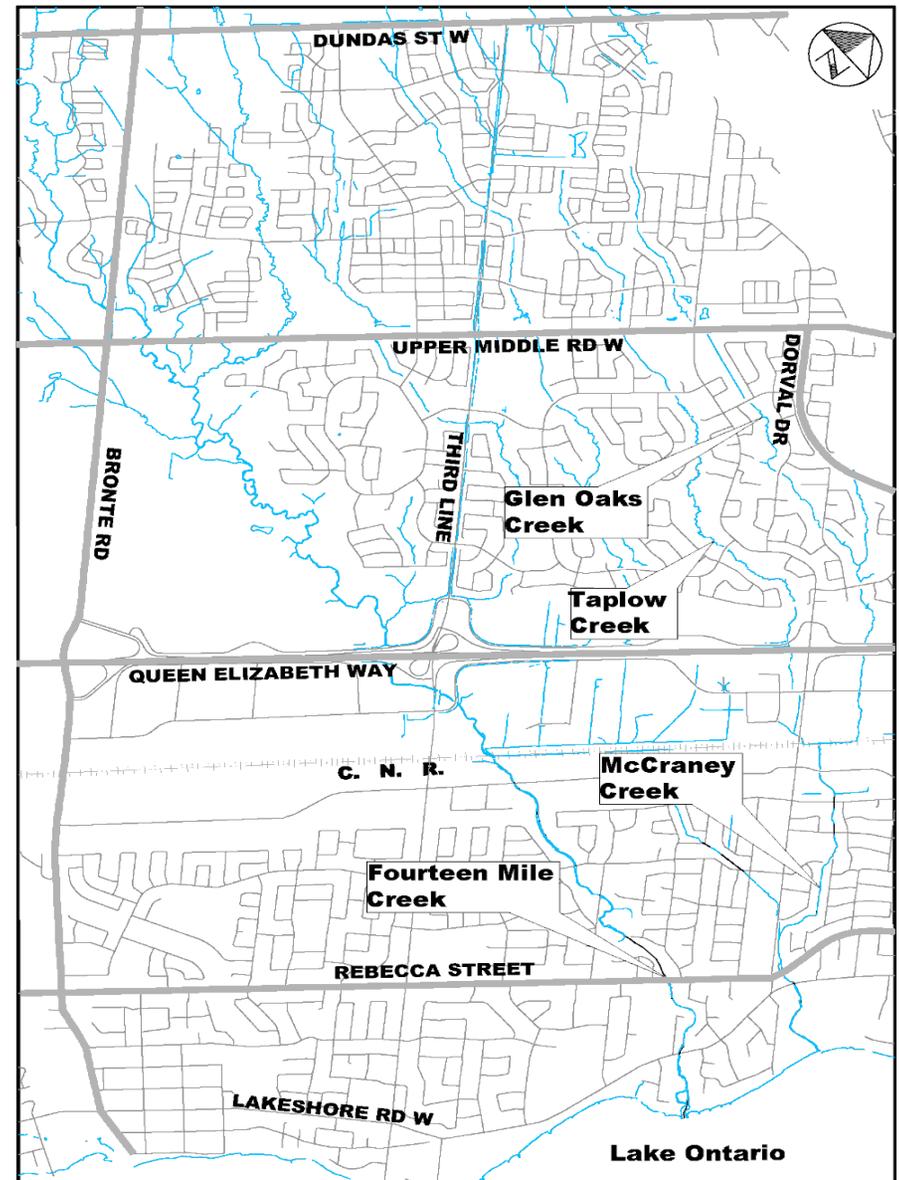
November 14, 2013



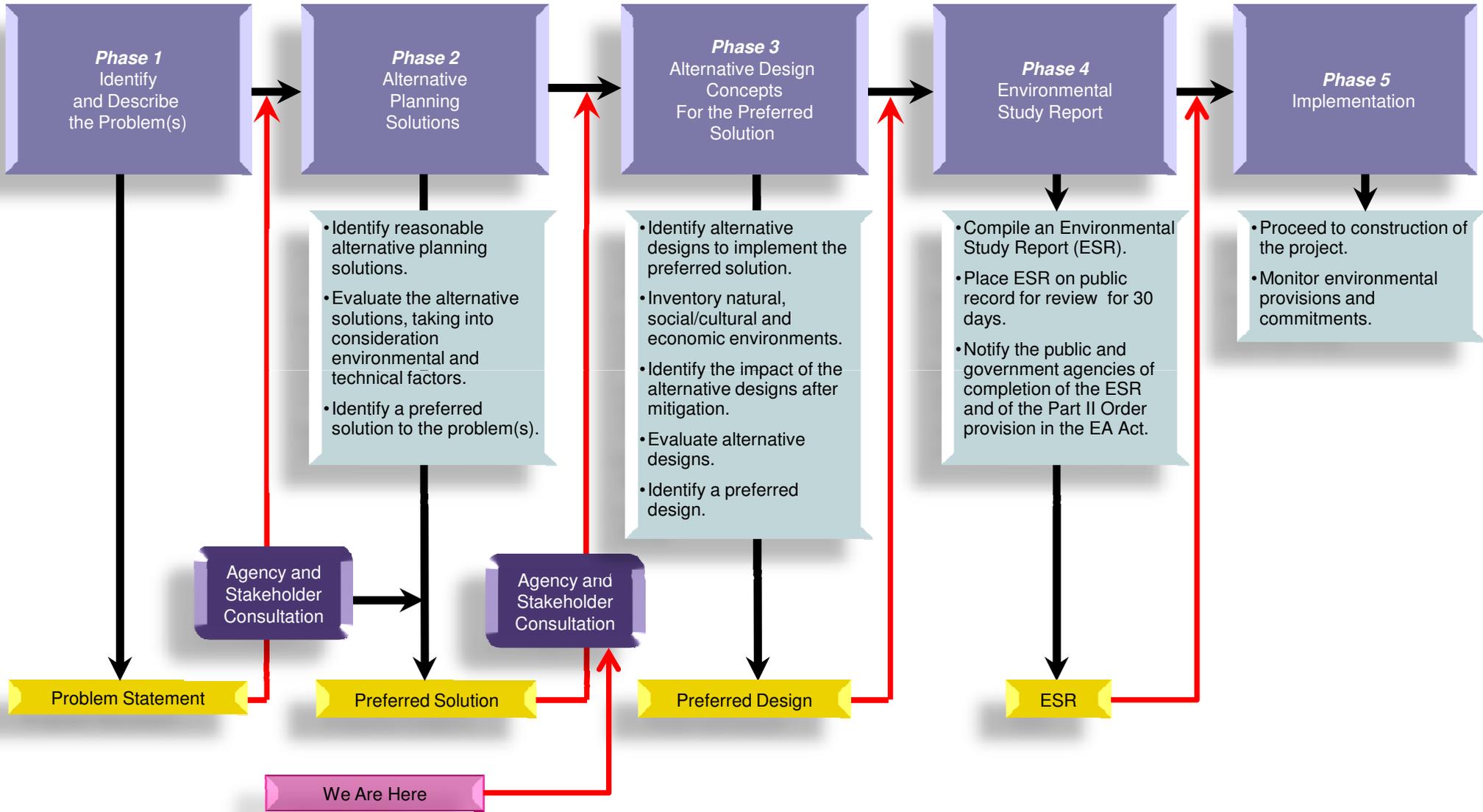


Study Area

- 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.



- Many projects related to municipal water supply, drainage and transportation systems that are similar in nature, are carried out routinely, and have predictable and mitigable environmental effects, are investigated according to the Municipal Engineers Association "Municipal Class Environmental Assessment," (2011).
- The Municipal Class Environmental Assessment (Class EA) process categorizes proposed municipal projects according to their anticipated environmental impact, and requires increasingly stringent review requirements as the magnitude of the anticipated environmental impact increases.
- This project is being conducted in compliance with the Municipal Engineers Association as a form of Master Plan to address flood issues along the Fourteen Mile Creek and McCraney Creek.

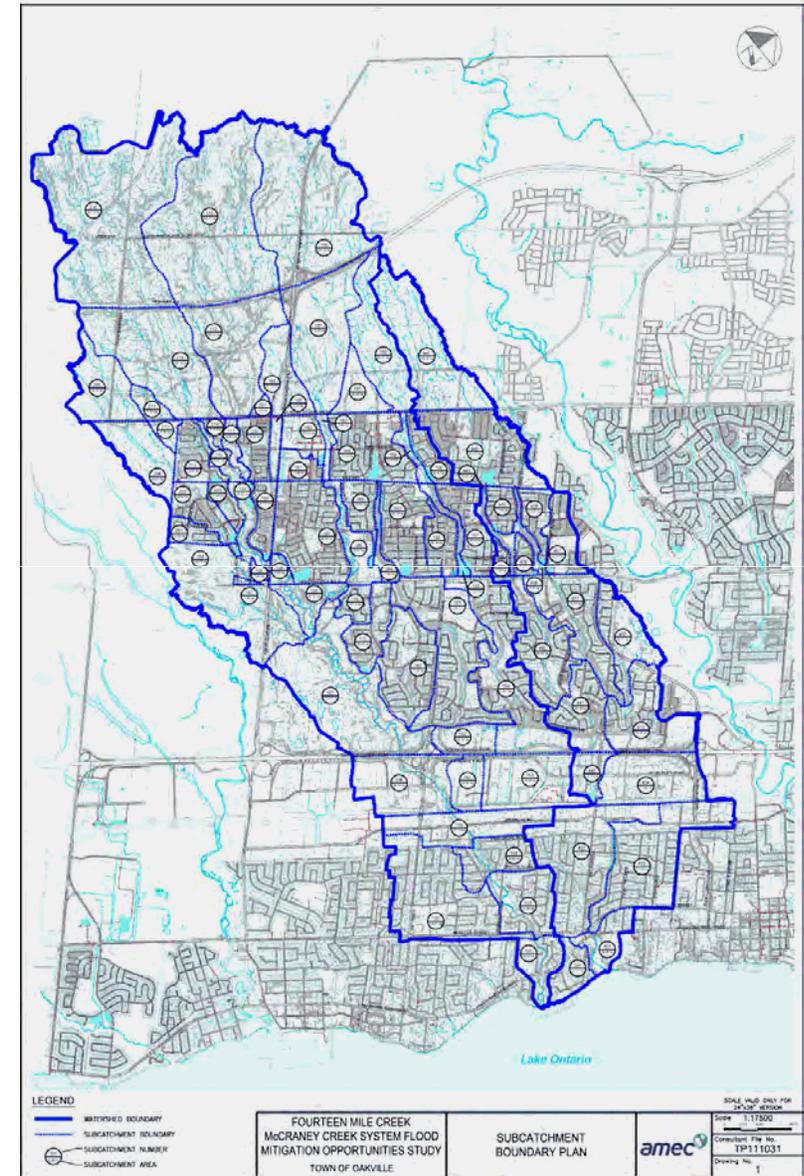


- The Town of Oakville Town-wide Flood Study, 2008, established (on a priority basis), creek reaches that should be investigated in detail to determine opportunities for flooding mitigation, with Fourteen Mile Creek and McCraney Creek being the highest priorities
- Flooding has become more of a concern due to more severe storm events and increased risk of flood susceptibility. (i.e.: Toronto storm July 8, 2013)
- The intent of this study is to investigate the extent of the flooding risk along Fourteen Mile Creek and McCraney Creek and to develop various alternative solutions to protect public safety, municipal infrastructure, and private property.



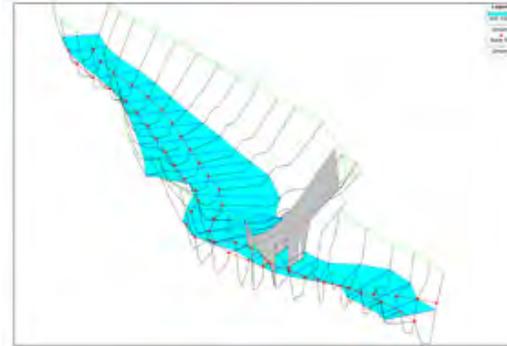
Hydrology

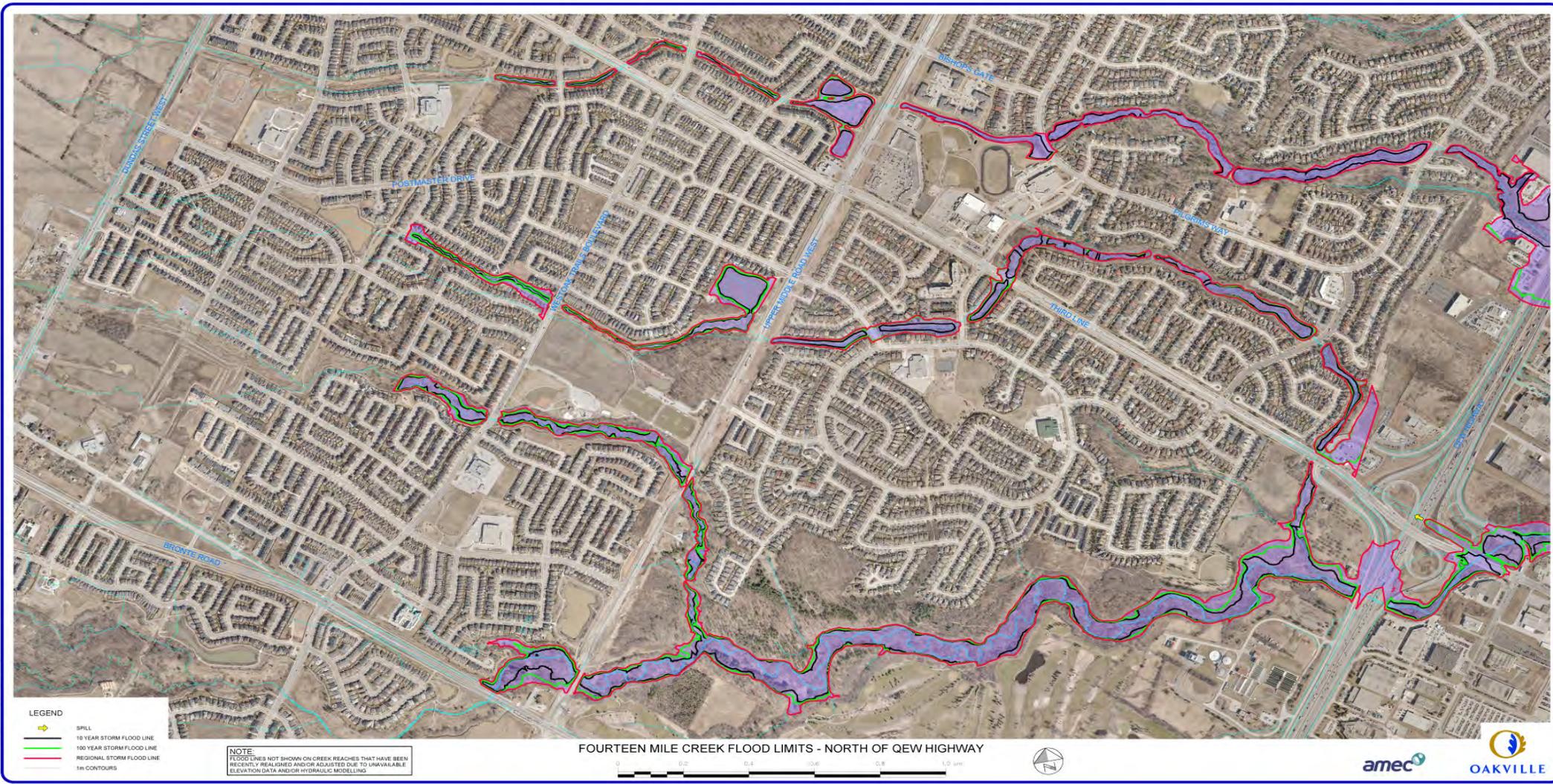
- The science of the movement of water from rain and snow to runoff in ditches and creeks based on processes within a watershed. Hydrologic models are numerical tools (computer-based) which are used to determine runoff rates from various land uses in response to a rainfall or snowmelt event.
- For this study hydrology was updated based on a new modelling platform (PCSWMM)
- Model validated using observed flows based on local rainfall and stream flow gauging.

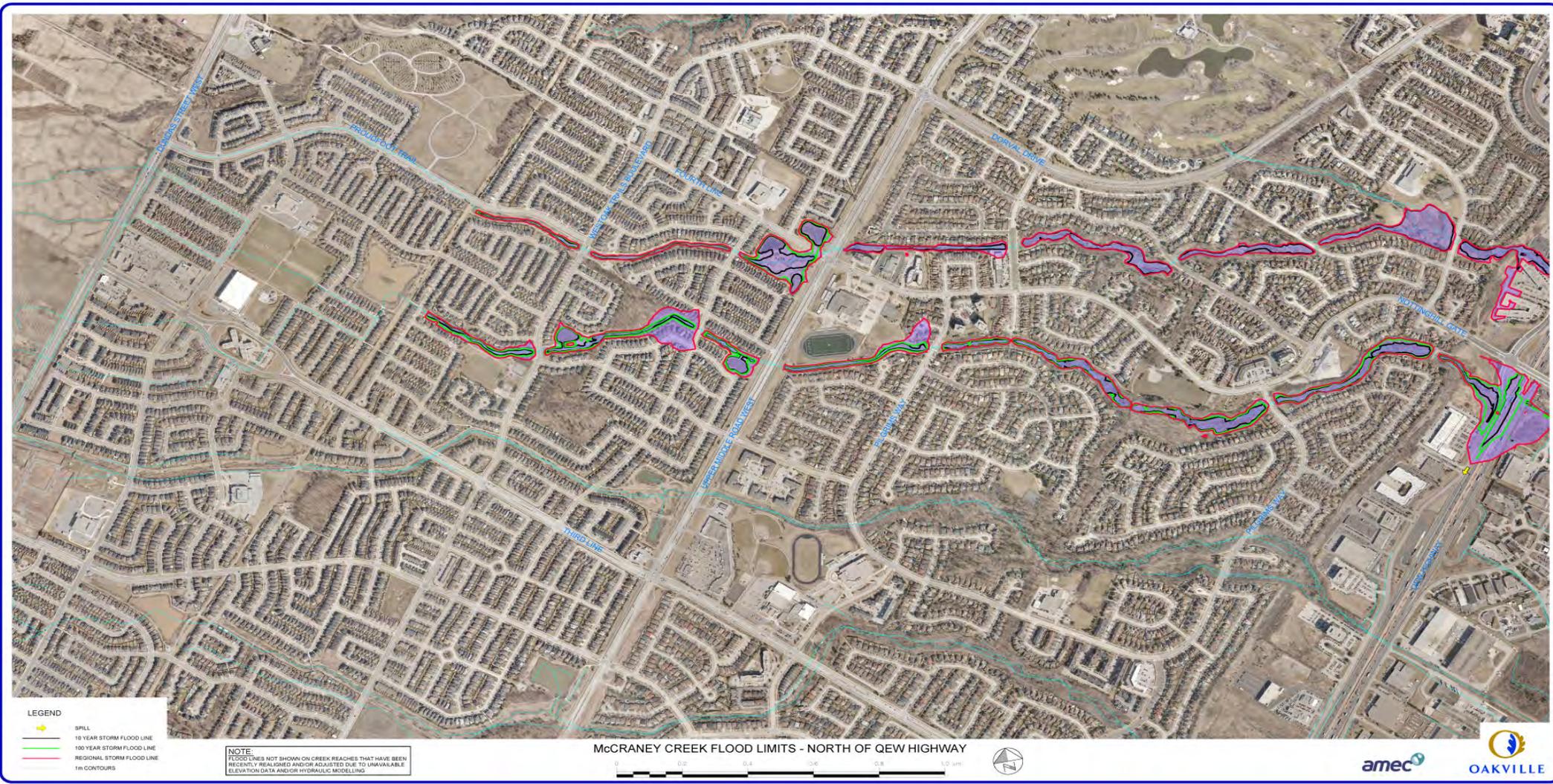


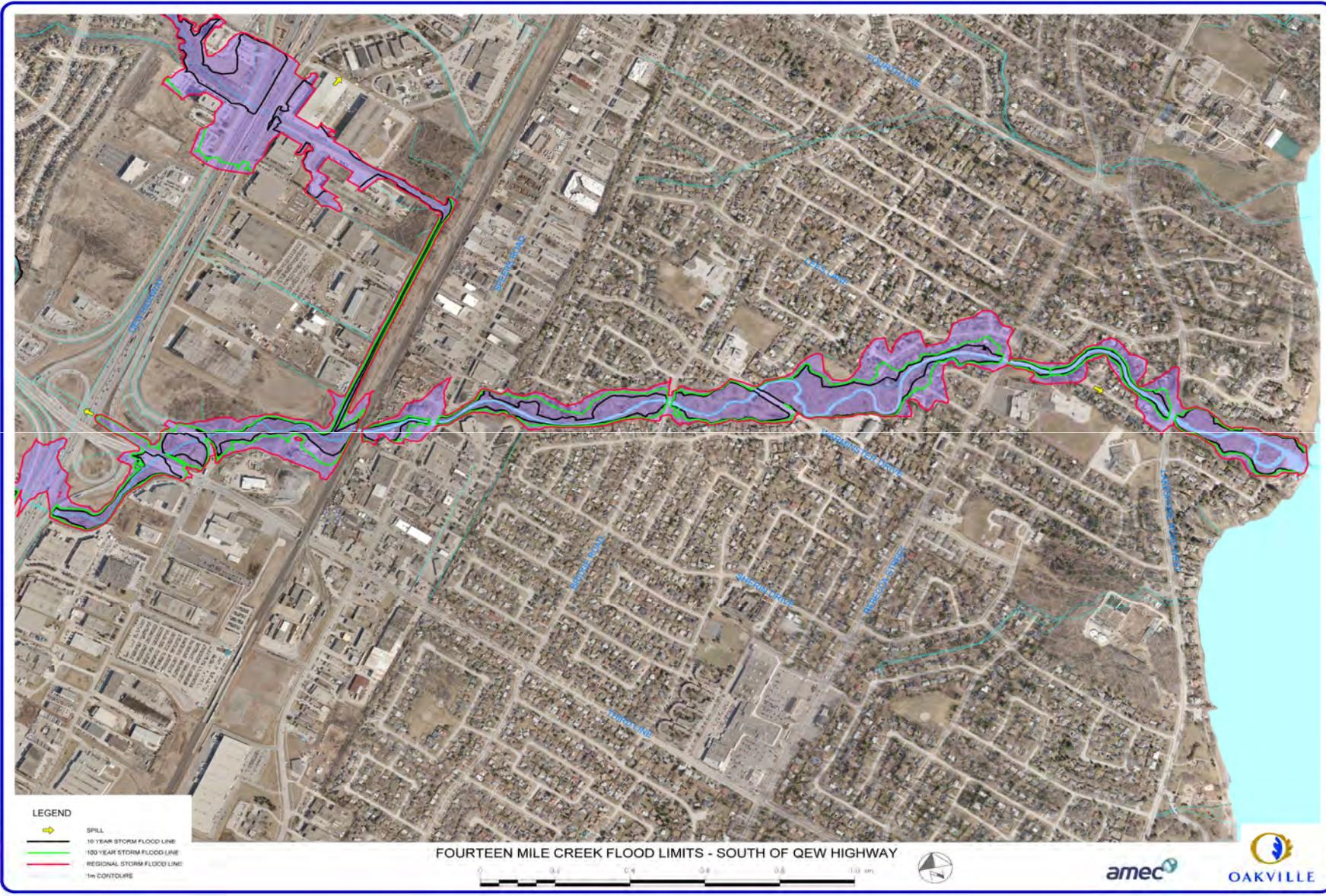
Hydraulics

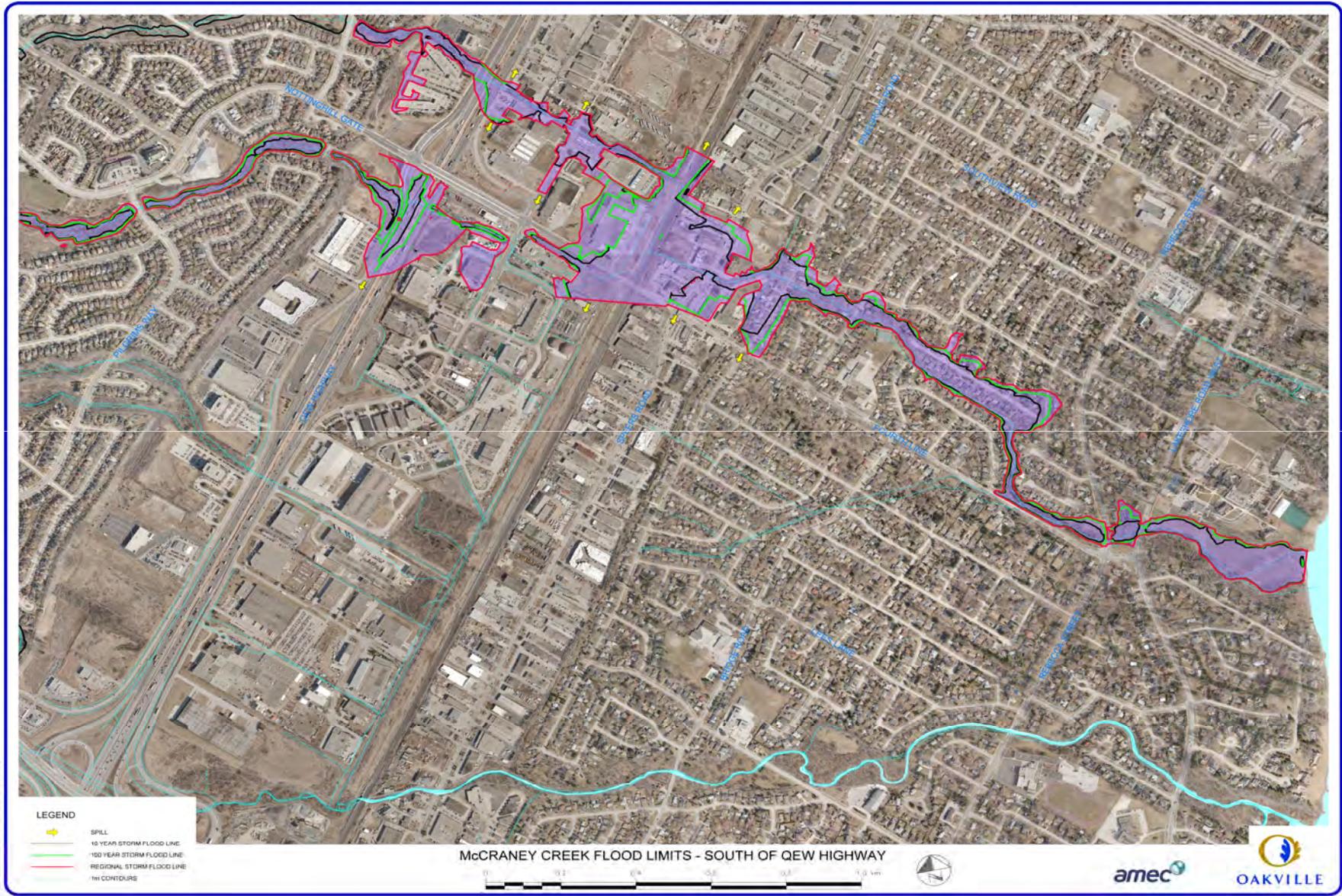
- The study of the capacity or hydraulic performance associated with sewers, creeks, culverts, bridges, etc. It provides an indication of the velocity and depth associated with various flow rates. For this study the hydraulic analyses focussed on an assessment of the existing flow capacity of the creek systems for the purpose of developing a better understanding of extent and frequency of flooding and the effectiveness of various flood reduction alternatives.
- Hydraulic modelling was updated using “current modelling” platform (HEC-RAS), using peak flows determined from the updated hydrologic assessment.
- Hydraulic modelling was used to determine Regulatory Flood (Regional Storm - Hurricane Hazel) flood limits used by Conservation Halton to regulate flood plains (hazard lands).
- Approximately 80 (Fourteen Mile Creek) and 110 (McCraney Creek) buildings within Regional Storm flooding limits south of QEW.
- North of QEW there are approximately 20 homes in the Regional Storm flooding limits.







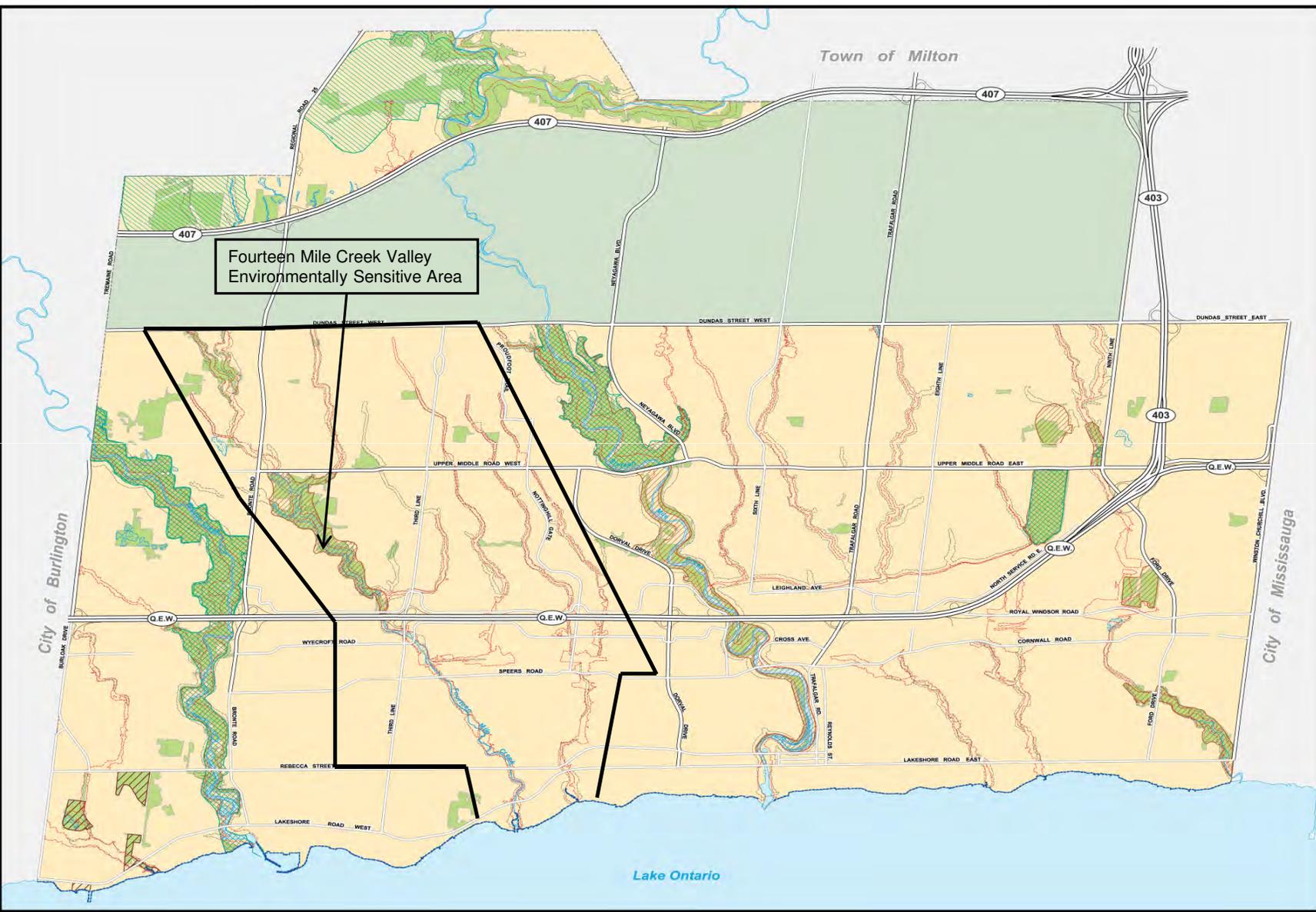




Natural Heritage

- A desktop review of available information on soils, terrestrial (flora/ fauna) and fisheries habitat has been conducted to document general natural environment conditions.
- Soils for the study area are moderately to poor draining (clay tills predominantly).
- Both Creek systems south of Dundas Street are located within significantly urbanized areas with limited vegetation resources due to historical encroachment by development.
- 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 has a mixture of both warmwater and coldwater fisheries habitat, and has been designated as a coldwater fishery by the Ministry of Natural Resources.
- McCraney Creek is considered to be warmwater fisheries habitat.
- Fourteen Mile Creek is Redside Dace habitat, listed as an endangered fish species in 2009 under Ontario's Endangered Species Act, 2007.





**SCHEDULE B
NATURAL FEATURES
&
HAZARD LANDS**

-  FLOODPLAIN
-  SHORELINE FLOOD LIMIT
-  VALLEYLANDS
-  SIGNIFICANT WILDLIFE HABITAT
-  AREA OF NATURAL AND SCIENTIFIC INTEREST
-  ENVIRONMENTALLY SENSITIVE AREAS
-  WETLANDS
-  WOODLANDS
-  LANDS NOT SUBJECT TO THE POLICIES OF THIS PLAN

NOTE: Natural features and hazard lands are shown conceptually and for reference purposes only.



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May 10, 2011

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Based on the baseline inventory and technical assessment of existing/ future conditions and consultation with agency stakeholders, the following problems/ opportunities have been identified:

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



Long List of Flooding Alternatives

“Do Nothing”

- *Maintain creek(s) in present condition*
- *Serves as a base line condition to compare the technical performance of all other alternatives.*
- *Continue regular maintenance of the creek(s).*
- *This alternative does not reduce existing flooding conditions and risk.*



Long List of Flooding Alternatives

Structural/Capital Alternatives

Alternative 1: Culvert/ Bridge Upgrades:

Replacing or supplementing the capacity of the existing culvert/bridge crossing to reduce upstream flooding conditions.



Alternative 2: Floodplain/ Channel Improvements

Improve channel and floodplain flow conveyance capacity by widening the channel, local grading improvements, removal of flow obstructions and channel profile improvements.



Long List of Flooding Alternatives

Structural/Capital Alternatives

Alternative 3: Roadway Profile Modifications:

Roadway profiles can be modified to reduce the amount and extent of upstream flooding by lowering and allowing more water to flow over the road and less back-up.



Alternative 4: Flood Proofing Buildings:

Buildings can be flood proofed by sealing low openings or alternatively local berming and/or flood walls.



Long List of Flooding Alternatives Structural/Capital Alternatives

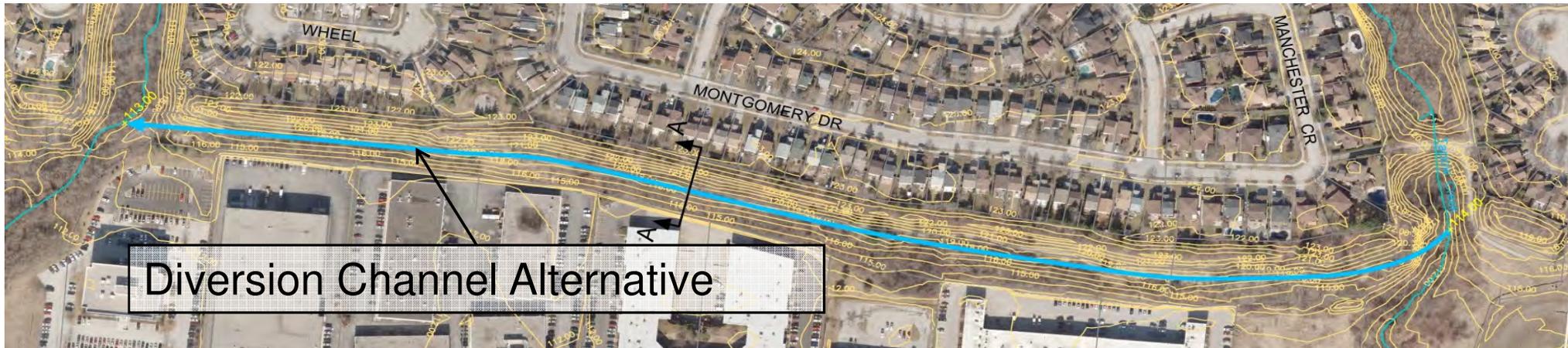


Alternative 5: Eliminate/Reduce Potential Culvert Blockages:

Eliminating or reducing potential culvert and/ or creek blockages can reduce the potential for future flooding.

Alternative 6: Diversions:

Locally diverting runoff from one location to another to reduce flooding conditions.



Long List of Flooding Alternatives

Structural/Capital Alternatives

Alternative 7: Stormwater Flood Storage (Off-line or On-line Flood Storage or LID):

To reduce peak flows, flood storage using existing modified structures or new control structures within well defined valley systems. Flood storage, can also be provided by Low Impact Development (LID) best management measures, which could reduce peak flows particularly for frequent storm events.

Alternative 8: Combinations of Alternatives:

when a stand-alone alternative does not provide fully adequate flood remediation.



Long List of Flooding Alternatives

Non-Structural Alternatives

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 jurisdiction.

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

Alternative 4: Creek Maintenance Plan: Regular inspection of all creek reaches to determine flooding issues such as erosion, debris accumulation and culvert blockages and the subsequent removal of each blockage.

Alternative 5: Property Acquisition: At risk properties located within the flood plain, could be acquired 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 categories and sub sets of 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 designed culvert's flow capacities.

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

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

- *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 related to the removal of the drop structure, lowering of the channel and potential widening.

Alternative 3: Roadway Profile Modifications:

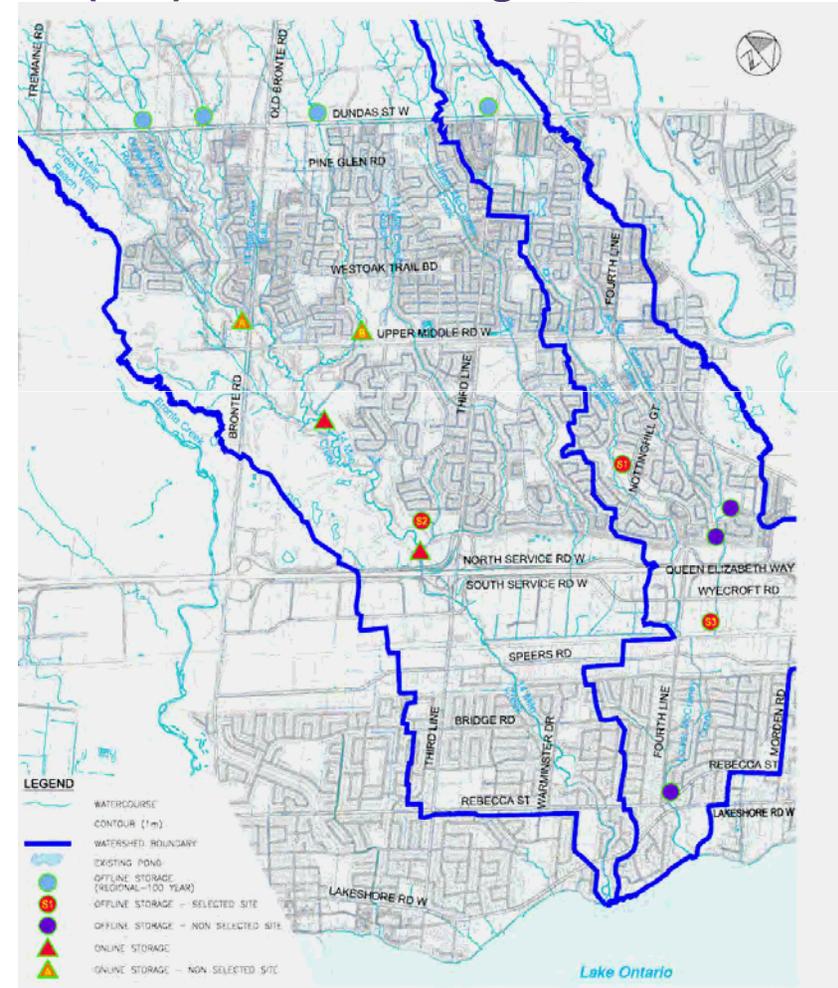
The South Service Road on Taplow Creek could be lowered to reduce upstream flooding.



Short Listed Alternatives

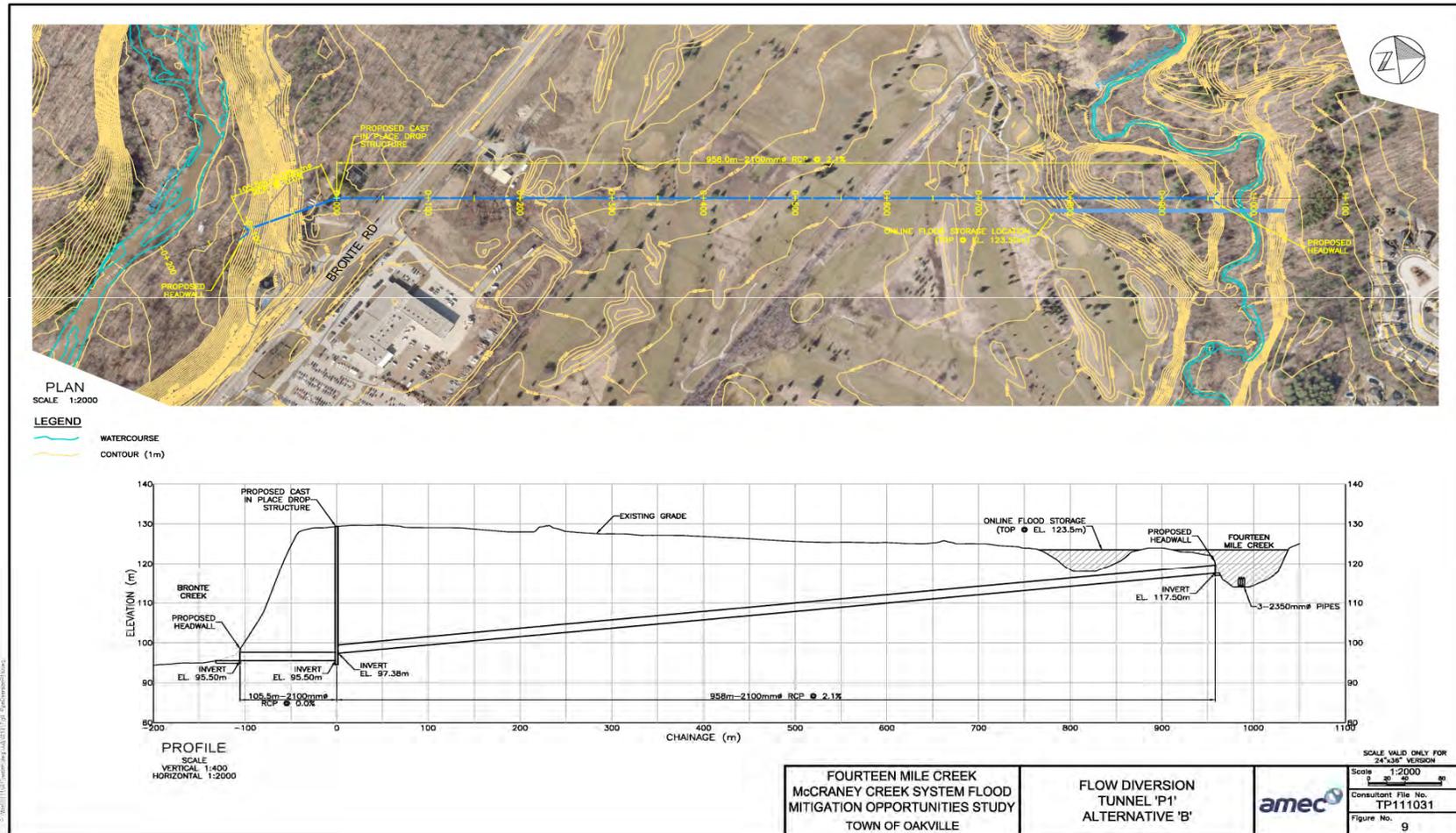
Alternative 7: Flood Control via Stormwater Storage Measures (Off-line and On-line Flood Storage, Low Impact Development (LID) Best Management Practices (BMPs):

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.

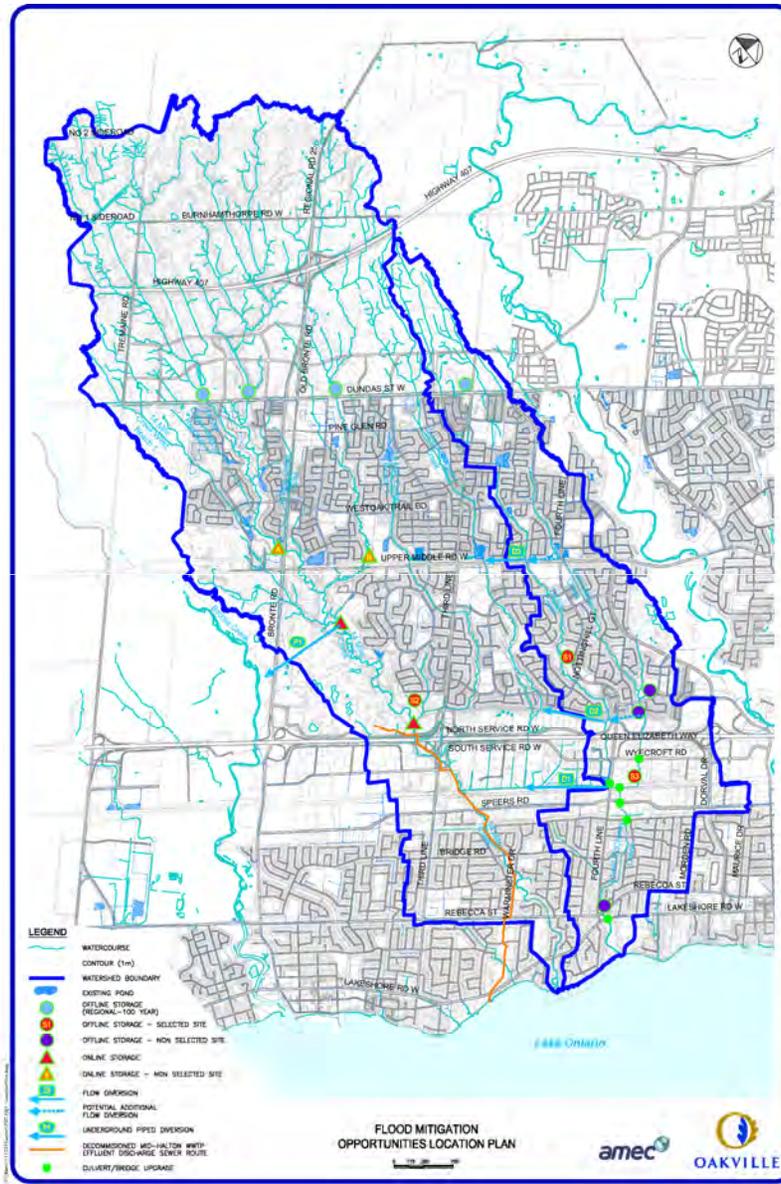


Short Listed Alternatives

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.



Short Listed Alternatives



- Receive public comments by November 29, 2013;
- Review Short-Listed Alternatives, design concepts and assessment based on comments received from the public and agencies, and confirm or refine alternatives and design concepts;
- Develop Preferred Alternatives
- Assess mitigation requirements of potential negative effects;
- Consultation with agencies and stakeholders;
- PIC No. 2 – Spring 2014,
- Prepare and File Environmental Study Report.

Complete a comment sheet

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

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**Please submit comments no later than
November 29, 2013**

Thank you for your participation!