



Public Information Centre No. 1

North West Brampton, Heritage Heights

Landscape Scale Analysis Update and Subwatershed Study for
West Huttonville Creek and Credit River Tributaries

Phase 1: Subwatershed Characterization and Integration

City of Brampton

October 22, 2012



Welcome to Public Information Centre No.1

- Please sign in and take a comment sheet.
- If you have questions, our representatives are available to discuss the study with you.
- Place your completed comment sheets in the Comment Box or send them to one of the following Project Managers by November 23, 2012

Ms. Jill Hogan, MCIP, RPP
Planning Project Manager
City of Brampton
Box 220, 2 Wellington Street West
Brampton, ON L6Y 4R2
Phone: (905) 874-3450
E-Mail: jill.hogan@brampton.ca

Mr. Ron Scheckenberger, P. Eng.
Study Team Project Manager
AMEC Environment & Infrastructure
3215 North Service Road,
Burlington, ON L7R 3Y2
Phone: (905) 335-2353
E-mail: ron.scheckenberger@amec.com



Secondary Planning

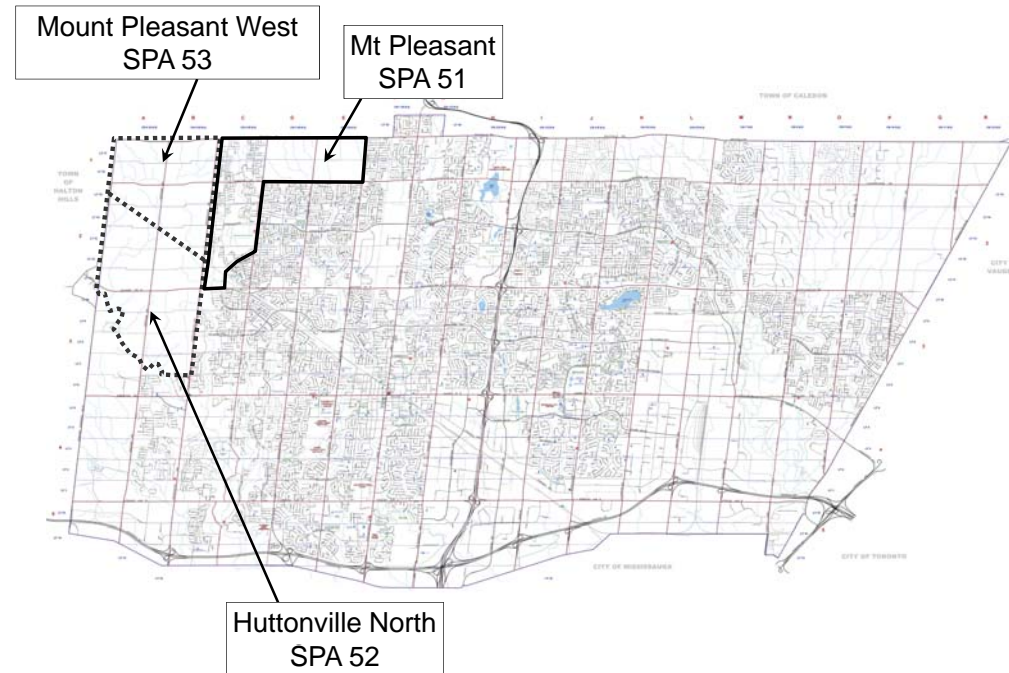
- The City of Brampton has initiated a Secondary Plan work program for Area 52 (Huttonville North) and Area 53 (Mount Pleasant West), collectively referred to as “Heritage Heights”, in accordance with the timeline and polices of ROPA 15, OPA 93-245 and Council direction in December 2009.

The work program includes the following studies:

- Transportation Master Plan
- Servicing and Infrastructure
- Employment Implementation
- Shale Resources Review Update
- Community Visioning
- **Subwatershed Study & Updated Landscape Scale Analysis** (which is the subject of tonight’s open house.)

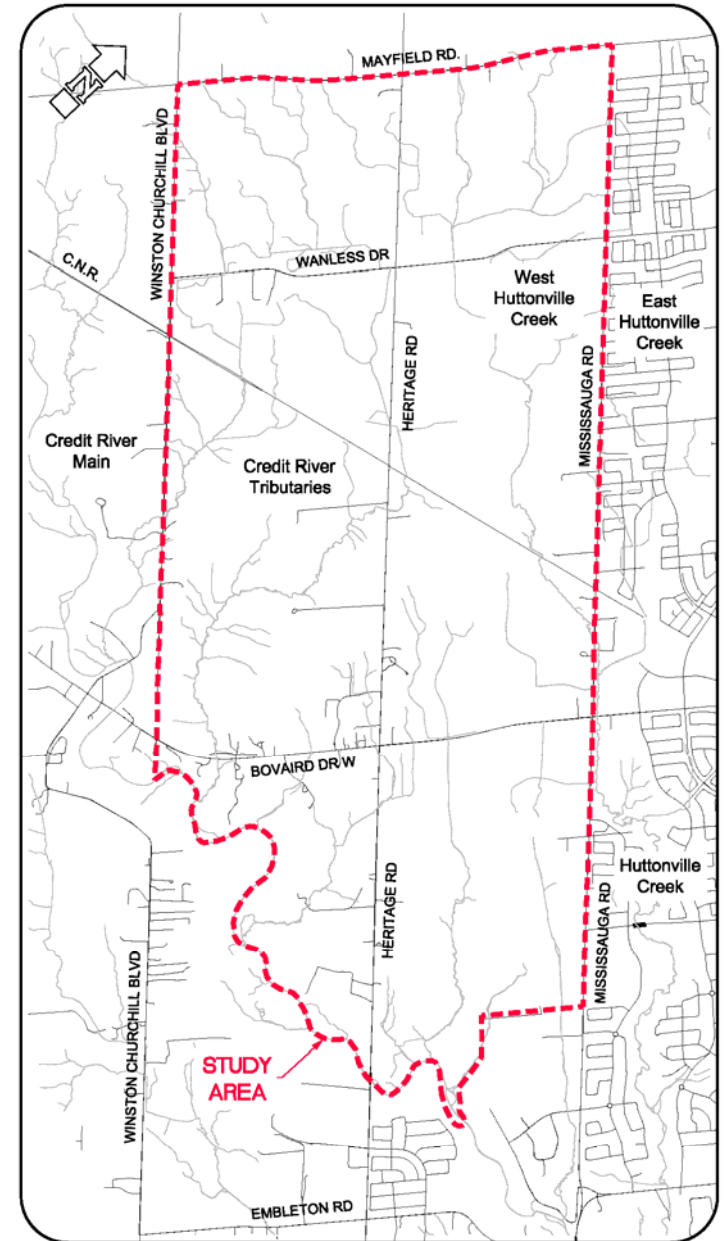
For further information and status updates regarding the Secondary Plan Program for Heritage Heights, please visit:

<http://www.brampton.ca/en/Business/planning-development/projects-studies/Pages/HeritageHeightsCommunity.aspx>



Study Area

The Study Area for this project includes the area to be developed for the Heritage Heights community which is generally located west of Mississauga Road, north of the Credit River Valley, south of Mayfield Road and east of Winston Churchill Boulevard.



Governing Provincial Legislation

Municipal Class Environmental Assessment (October 2000, as amended in 2007 & 2011)

- The Municipal Class Environmental Assessment (Class EA) process categorizes proposed municipal projects according to their anticipated environmental impact, and calls for increasingly stringent review requirements as the magnitude of the anticipated environmental impact increases.
- The Class EA defines a Master Plan as:
“A Long Range Plan, integrating infrastructure requirements for present and future land use with environmental planning principles. The Plan examines the whole infrastructure system in order to outline a framework for planning subsequent projects and/or developments (Class EA, October 2000, as amended in 2007 & 2011).”

Planning Act (1990)

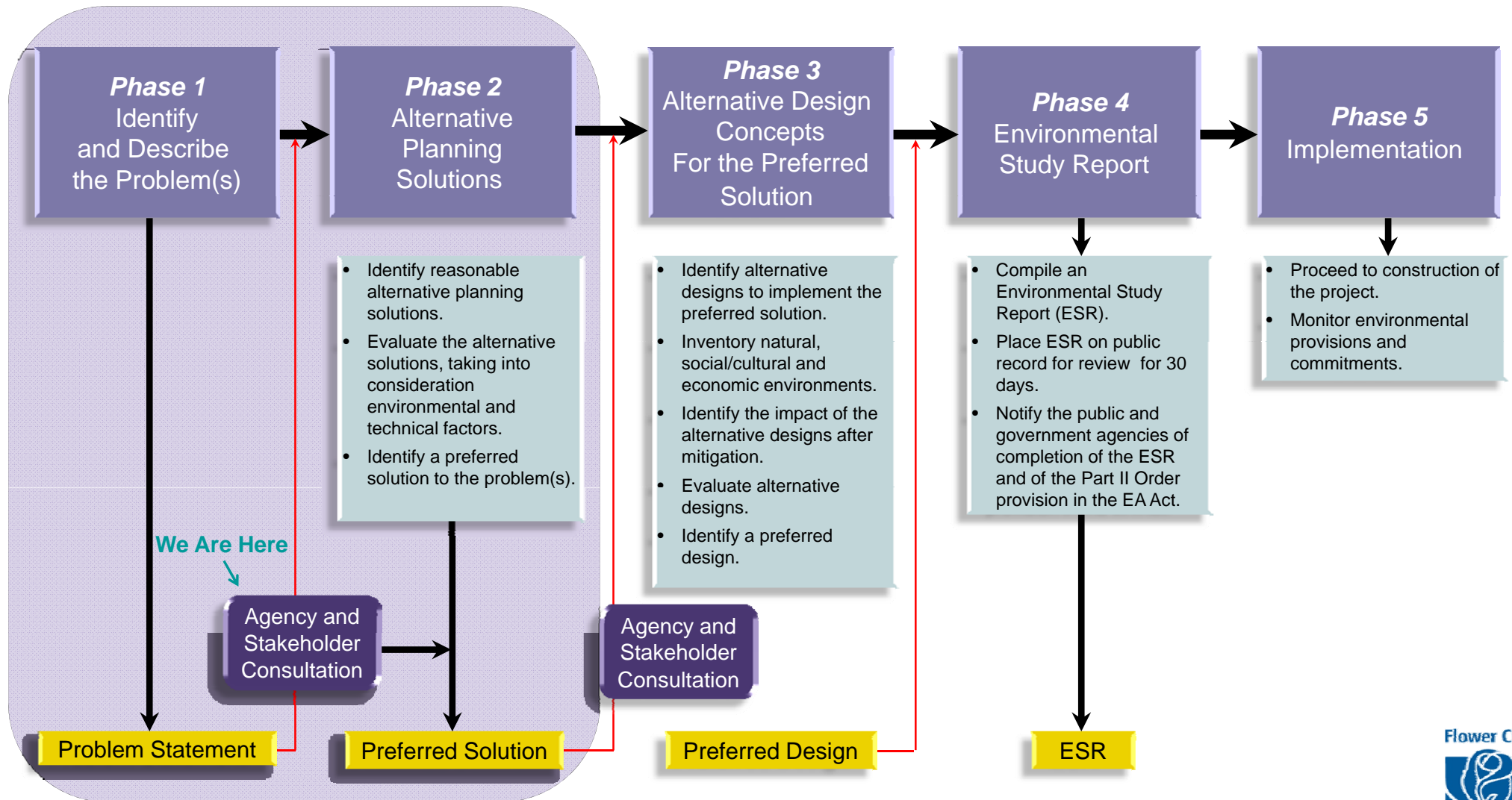
- The Planning Act sets out the ground rules for land use planning in Ontario and describes how land uses may be controlled, and who may control them.

Provincial Policy Statement (2005)

- The Provincial Policy Statement contains clear, overall policy directions on matters of provincial interest related to land use planning and development.
- It promotes a policy-led planning system that recognizes there are complex inter-relationships among and between environmental, economic and social factors in land use planning.

The Subwatershed Plan being prepared for the Heritage Heights Community constitutes stormwater and environmental management Master Plans to support future urbanization.

Municipal Class EA Process



Note: The Subwatershed process will complete Phases 1 and 2 of the Municipal Class EA Process as a Master Plan. At a later date, Phases 3, 4 and 5 will be completed as required.

Subwatershed Study

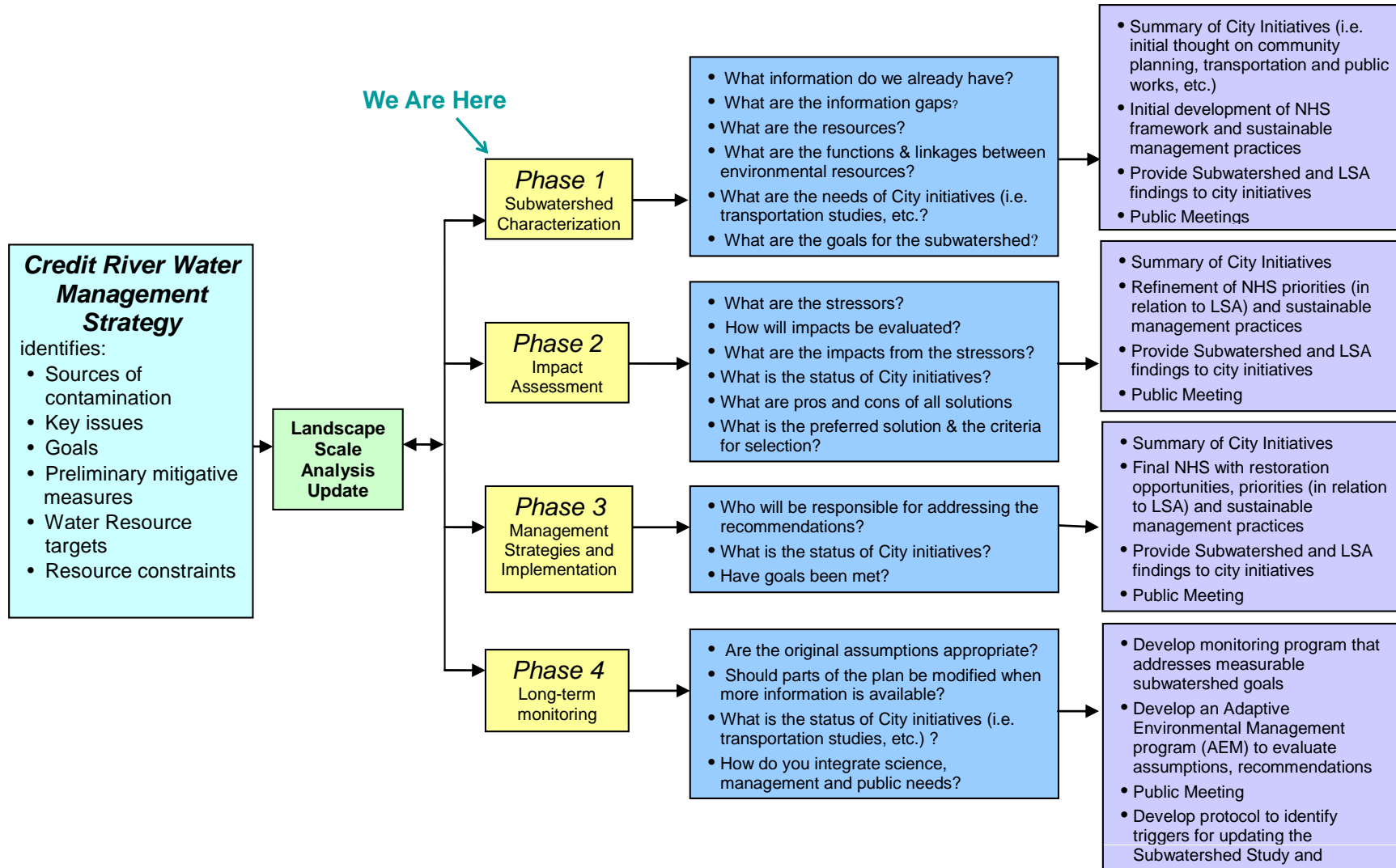
What is a Subwatershed Study?

- A document developed cooperatively between government agencies and the community, to foster ecosystem-base land use planning that integrates environmental protection and conservation with regard to present and future subwatershed interactions, including those between: water, land/water interactions, aquatic life and aquatic resources as urban development occurs.

What will it tell us?

- Defines the area's land and water-based resources, where they are and how they work, which are sensitive, significant and important.
- Outlines how the subwatershed and its resources have been (and will be) impacted by past, present and future land use changes (e.g. deforestation, wetland draining, agriculture, urbanization, infrastructure, etc.).
- Establishes a natural heritage system for the plan areas, that is connected to other local and/or regional natural heritage systems.
- Establishes a set of actions and opportunities to protect, restore and enhance the respective resources and the natural heritage system.
- Offers strategies that will provide direction on how best to manage urban land uses to address potential impacts on water resources and natural heritage systems, in the context of land use planning approvals.

Subwatershed Planning Process



Objectives, Indicators, Targets

- The Credit River Water Management Strategy (2006) provides preliminary Objectives, Indicators and Targets to conserve natural features and functions for the following disciplines:
 - Surface Water;
 - Groundwater;
 - Fisheries;
 - Geomorphology, and
 - Terrestrial Ecology.

The targets are refined through the consultative subwatershed study process with agencies and stakeholders based on detailed information and data, including the neighbouring Mount Pleasant Community Subwatershed Study (i.e. east of Mississauga Road), and the Heritage Heights Subwatershed Study.

Landscape Scale Analysis (LSA) Update



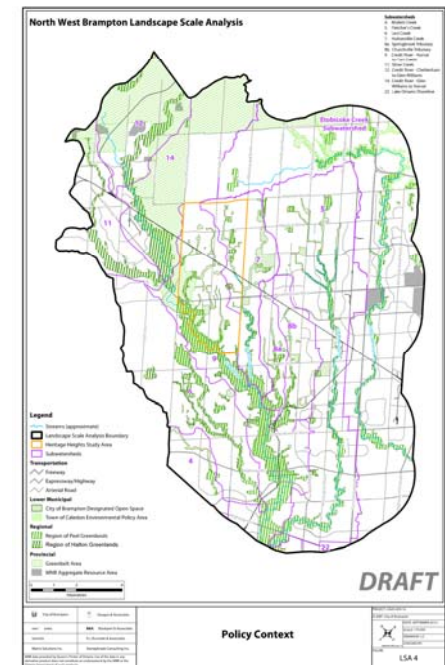
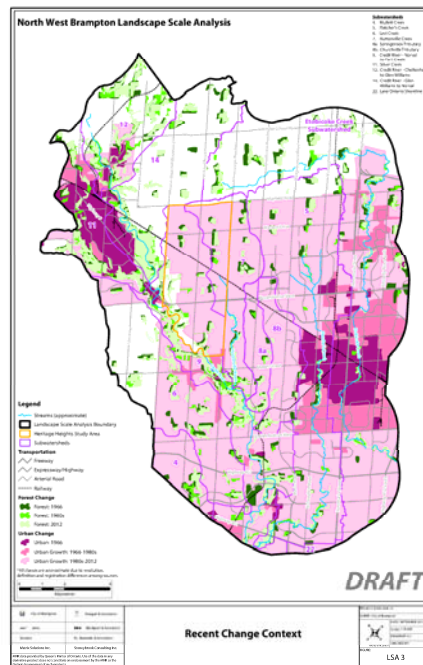
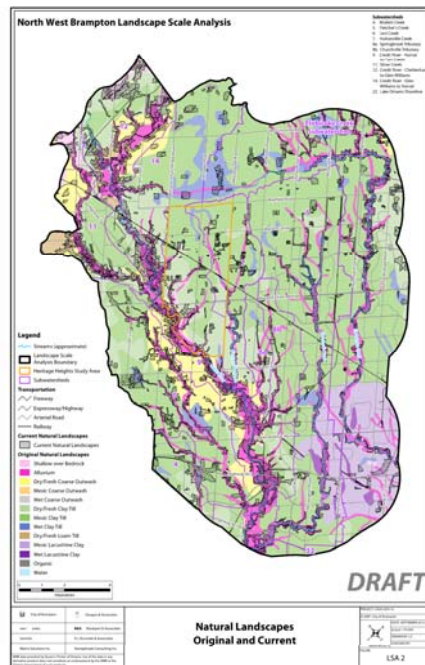
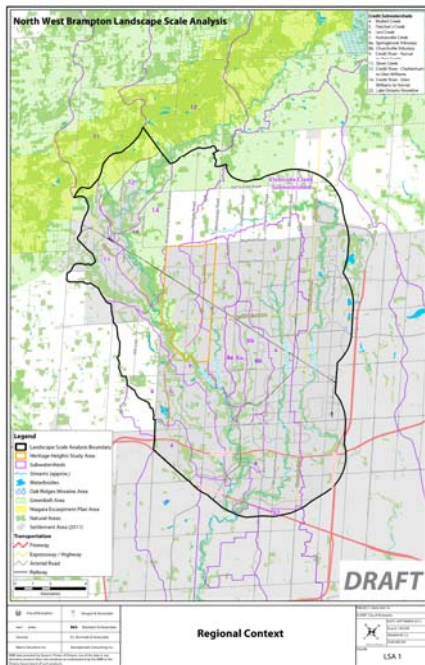
- Provides ecological context to guide subwatershed plans by considering “*the natural heritage system....in a broad environmental (regional) system context*”
- Helps address Provincial Policy Statement requirements that “*the diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems should be maintained, restored or where possible improved.*”

Process involves:

1. Identifying natural features and habitat blocks
2. Identifying riparian and terrestrial linkages between natural features and habitat blocks
3. Identifying barriers (bridges, roads, railways) to assess the viability of corridors
4. Interpretation and understanding of the hydrologic function and infrastructure necessary to support sustainable development
5. Identifying restoration opportunities and rationale



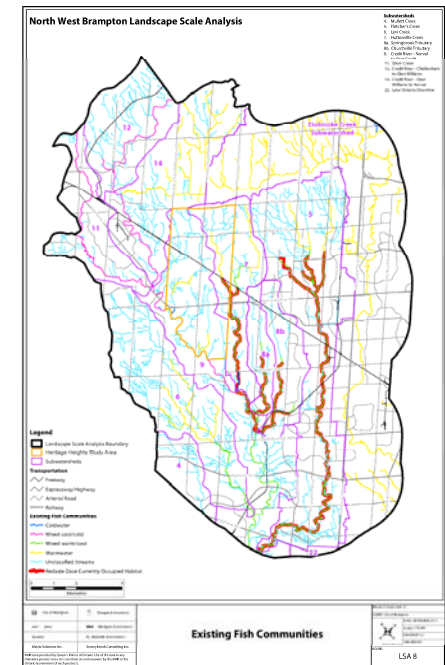
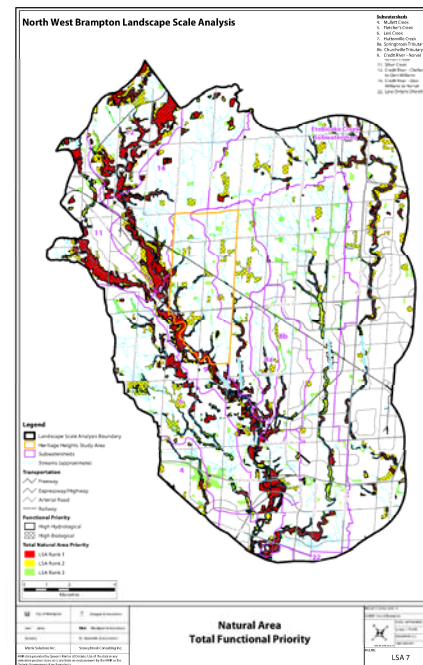
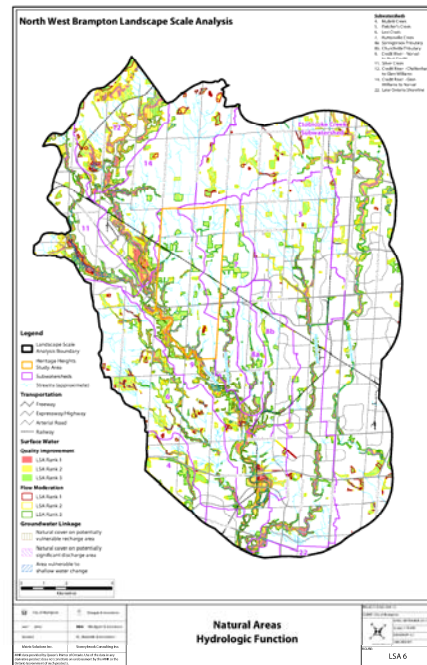
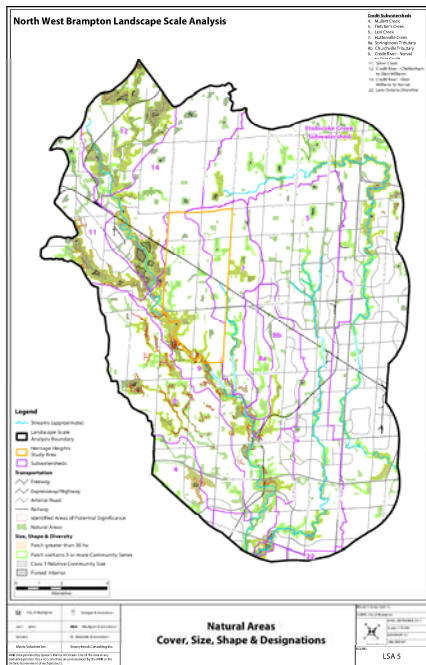
LSA Update: Regional & Historic Context



- Regional study area situated on the western edge of the heavily urbanized GTA.
- Connected to provincially and regionally important areas (Niagara Escarpment, Oak Ridges Moraine, and the Greenbelt).
- Natural areas would have covered almost all of the LSA area prior to European settlement; currently, natural areas occur predominantly on lands difficult to develop and farm (e.g. on alluvial soils, and poorly drained soils).

- Urban expansion across the LSA has increased approximately 10 fold over the past 5 decades; extent of natural areas has remained relatively constant.
- Lands under various forms of policy protection cover approximately a quarter of the LSA and Heritage Heights study area.

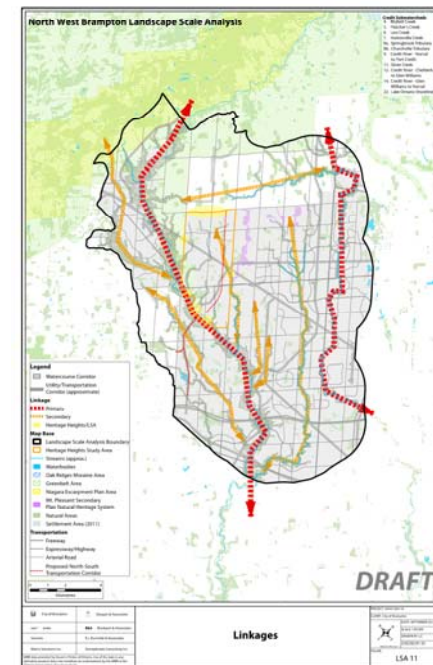
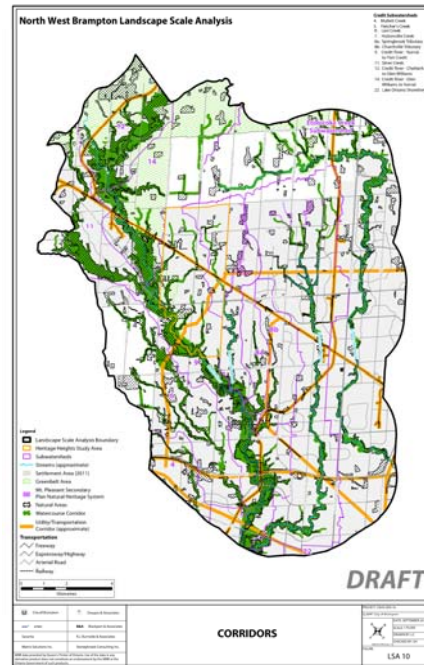
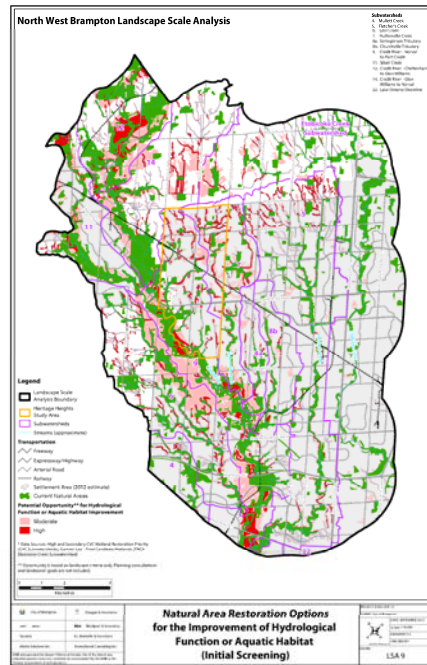
LSA Update: Bio-function & Hydro-function



- Natural areas cover 17% +/- of the LSA area, and 12% +/- of the Heritage Heights study area.
- Natural area patches and vegetation communities prioritized based on size, diversity, and rarity, cover 8-12% of the LSA study area, and less than 1% of the Heritage Heights study area.
- Interior forest (important for area sensitive species) is rare across the LSA area and within the Heritage Heights study area.
- Natural areas contributing to high and intermediate water quality improvement are limited (~12% of LSA area, ~ 9% in Heritage Heights study area).
- Natural areas contributing to high and intermediate flow moderation are low across both the study areas (7% of LSA area, and 1% of Heritage Heights study area).

- Natural lands on areas with potentially significant ground water linkage (recharge, discharge, and areas sensitive to changes in shallow ground water) are restricted across both study areas (0.5-6% in the LSA area, and 0.-2% in Heritage Heights study area).
- Fish habitat is predominantly warm water or mixed cool/warm across both study areas; cold water habitat is restricted across both study areas.
- Redside Dace habitat is primarily associated with reaches of Huttonville Creek and Fletchers Creek; Heritage Heights study area supports very little.

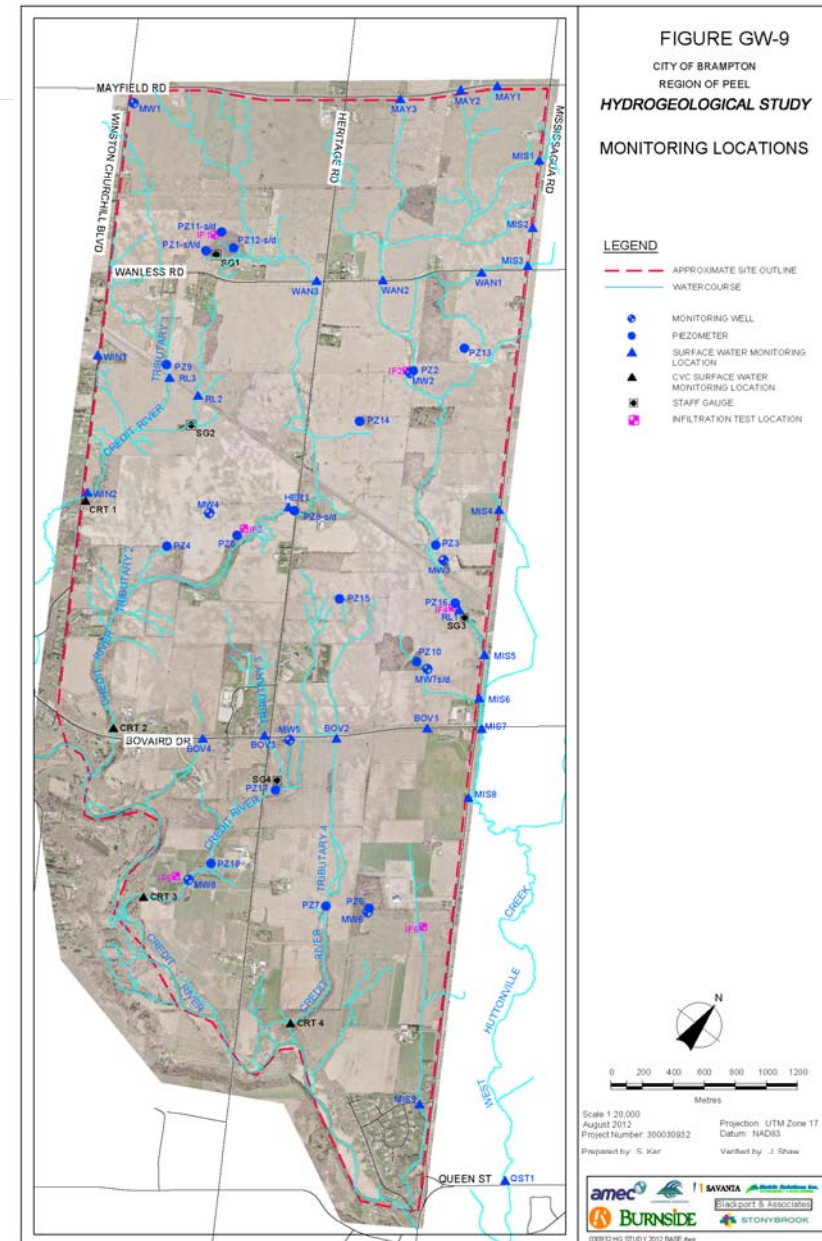
LSA Update: Restoration Options & Linkages



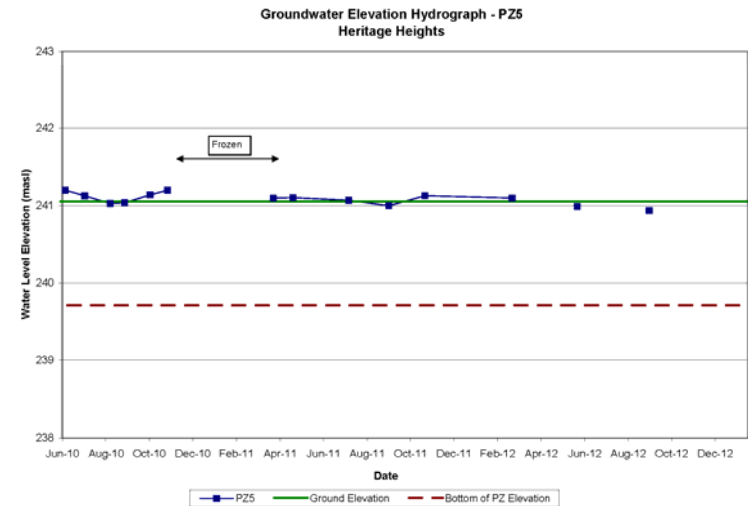
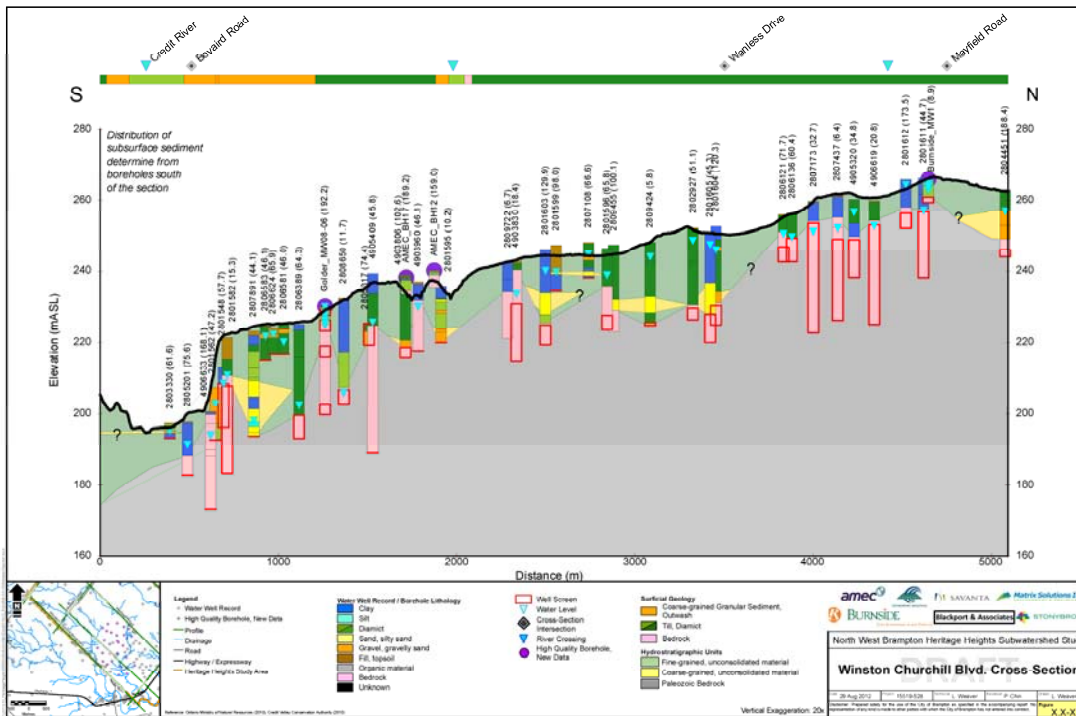
- Areas where restored natural cover could potentially improve hydrologic function cover 18% of the LSA area, and 25% +/- of the Heritage Heights study area.
- Watercourses form the primary network of natural corridors across the LSA area; within Heritage Heights study area, corridors include the Credit River Tributaries, and West Huttonville Creek.
- Anthropogenic corridors (rail and utilities) provide some restricted opportunity for linkage across the LSA and Heritage Heights study area.
- Primary linkages across the LSA and Heritage Heights study area includes the Credit River Valley and Etobicoke Creek (linking Lake Ontario to the Niagara Escarpment and Oak Ridges Moraine).
- Secondary linkages across the LSA area are formed by other major watercourse systems (e.g. Huttonville Creek, Fletchers Creek, Black Creek, and Silver Creek).
- Strategies for local linkages that connect natural features to major linkages are discussed in the characterization phase report, and will ultimately be identified at the site-level.
- Six major connections to the LSA area are identified on the boundary of the Heritage Heights study area, and are associated with connections to primary and secondary linkages.

Hydrogeology

- The groundwater characterization component of this study is being carried out to refine the current understanding of the hydrogeologic setting and its interconnection with the aquatic and terrestrial systems.
- This refined characterization involves the collection of additional field data and the use of various groundwater models.
- The field portion of the characterization included:
 - Installation of 9 monitoring wells and borehole logging at 8 sites.
 - Installation of 18 drivepoint piezometers.
 - Hydraulic conductivity testing through single well response tests and grain-size analysis.
 - Infiltration tests at 6 sites.
 - Groundwater level monitoring.
 - Surface water flow measurements at 26 locations.
 - Water quality testing.



Hydrogeology



- The surface soils are a fine-grained clay/silt glacial till which has a relatively low permeability.
- The deeper overburden includes lenses of more permeable coarse-grained sand and gravel.
- Overburden thickness ranges from 0-25 metres and is underlain by shale bedrock.

- In areas where groundwater levels rise above ground surface there is a potential for groundwater discharge.
- This potential increases in areas where bedrock or sand and gravel lenses intercept ground surface.
- Groundwater discharge is known to occur in the lower reaches of tributaries CRT2 and CRT4 and may contribute, to a limited extent, to a number wetlands.

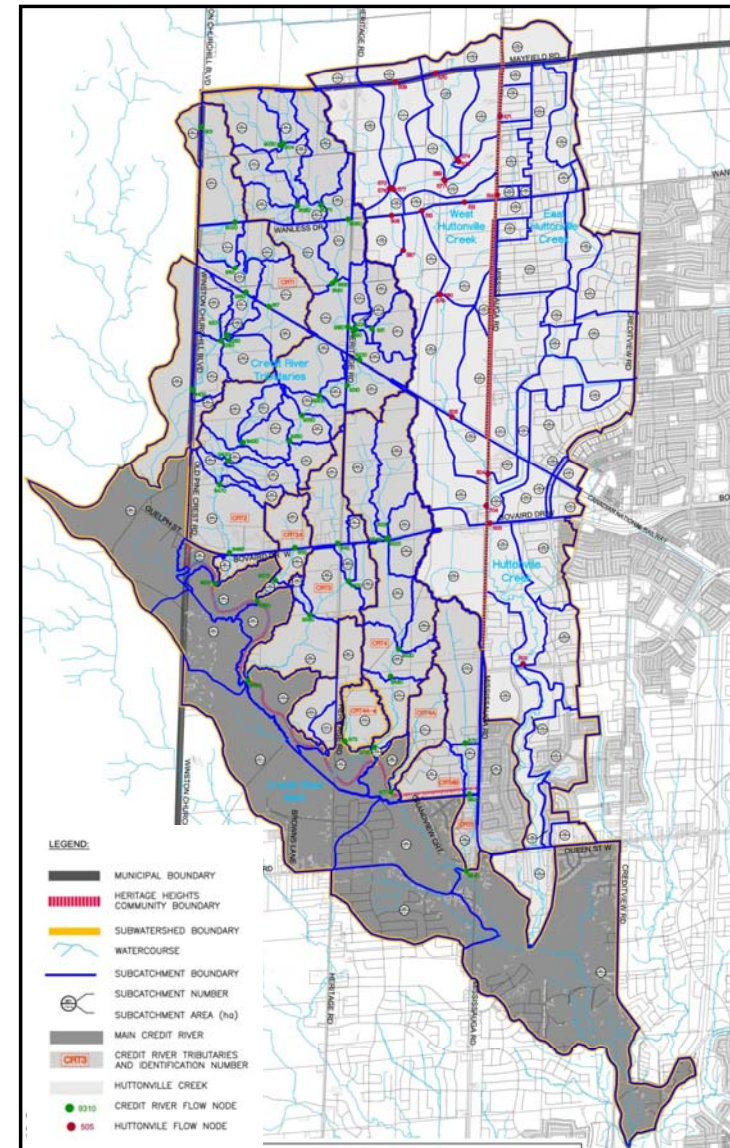
Surface Water Characterization

- Surface water evaluation characterizes runoff potential from the lands to inform management of creeks and floodplains, and define influence on water dependent features, i.e. wetlands and the groundwater systems.
- Background data/information from the Mount Pleasant Community study complemented by specific Heritage Heights field investigations.
- Hydraulic models prepared - West Huttonville Creek and Credit River Tributaries – to define flow conditions for each creek system for various storm frequencies, including Regional Storm Hurricane Hazel.
- Hydraulic models prepared - West Huttonville Creek and Credit River Tributaries – based on existing topography and hydraulic crossings (culverts/bridges) to determine flow limits (depth, velocity extent) for each creek system.



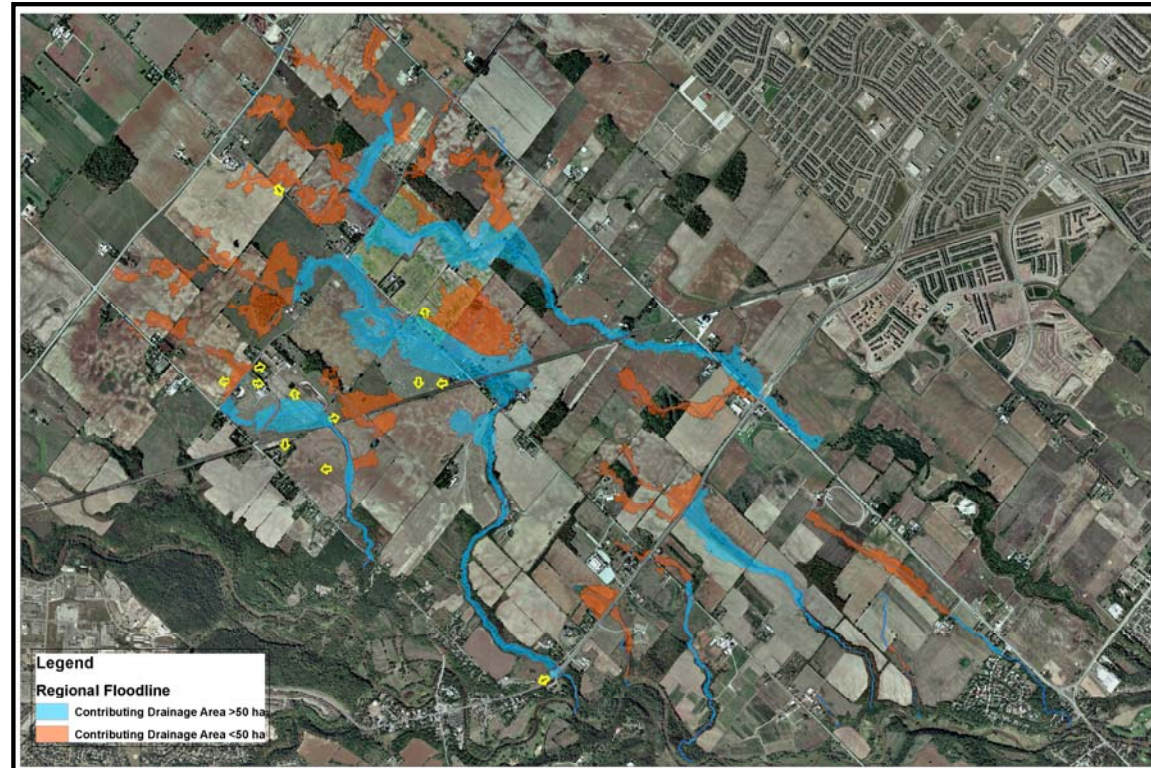
Surface Water Characterization

- Drainage Area Plan for the Huttonville Creek and the Credit River Tributaries based on existing land use and approved Block Plans for developing lands east of Mississauga Road in Mount Pleasant Community and Credit Valley Community.



Surface Water Characterization

- Regional Storm (Regulatory) floodplain for the West Huttonville Creek and the Credit River Tributaries based on minimum 50 ha drainage area.
- Flat topography coupled with headwater creek channels that lack definition results in wide floodplains.
- Existing road and CNR crossings lack capacity to convey Regulatory flows causing significant ponding/backwater and/or overtopping of crossings.
- The Regional Storm floodplain is contained within the lower Credit River Tributaries valley systems.



Stream Morphology

- Study of physical characteristics of stream systems (i.e. slope, top of bank widths etc.) to provide direction on future management practices, specific to key parameters including: meander amplitude, low flow geometry, longitudinal slope and others.

This study has involved:

Desktop Assessment

- Background review
- Reach delineation
- Historic assessment of land use/watercourse change

Field Program

- Rapid assessments
- Headwater drainage feature assessment
- Detailed data collection (5 sites)

Determination of Erosion Thresholds

- Establishes need for erosion control and stormwater management requirements



Stream Morphology

- Majority of reaches lacked a defined channel – stream types included:
 - Gullies (e.g., CRT4A-1)
 - Defined reaches (confined valley) (e.g., CRT2-1)
 - Defined reaches (unconfined valley) – few (e.g., HV3)
 - Poorly defined headwater drainage features – numerous (e.g., HV10)
- Detailed data collection at 5 field sites
- Site selections based on:
 - Permission to access
 - Spatial representation
 - Future servicing requirements
 - Existing available data
 - CRT2-4, CRT3-5, CRT4-5, HV4, HV9
- Erosion thresholds prepared





CRT2-1
(Confined valley setting with defined active channel)



HV10
(Unconfined valley setting with poorly defined and heavily modified active channel)

Stream



CRT4A-1
(Gully - confined valley setting with poorly active channel)

Morphology



CRT5-5
(Unconfined valley setting with intermittently defined active channel)



HV3
(Unconfined valley setting with defined active channel)

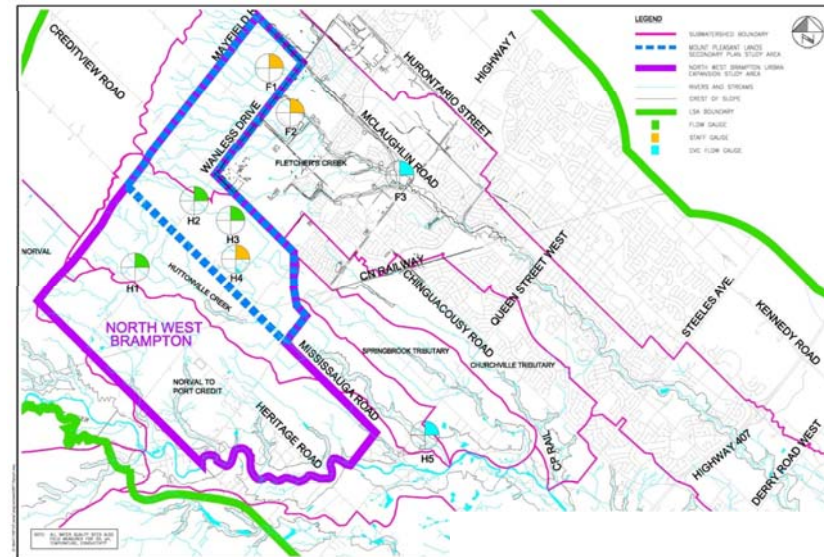
Examples of various stream forms across study area.

Water Quality

- The protection and enhancement of in-stream water quality is important to the health and biodiversity of the aquatic ecosystem.
- Data on area stream water quality collected to determine existing baseline conditions to establish future management issues as land use changes.
- Mount Pleasant Community Subwatershed Study implemented water quality field monitoring program including 4 sites in Huttonville Creek subwatershed. Multiple water quality parameters collected including temperature to assist in characterizing local streams.
- Water quality modeling based Credit River Water Quality Model Methodology, which was calibrated as part of Mount Pleasant Community study.
- Contaminant loading based on empirical relationships and monthly runoff volumes. Water quality model integrated with surface water and groundwater models.
- Current water quality impaired by the existing agricultural land uses and practices, including several exceedences of Provincial Water Quality Objectives during wet weather events.

Water Quality

- Water Quality Modelling of contaminants of concern has been established at key locations:
 - Credit River Tributaries Outlets
 - West Huttonville Creek – H1 at Wanless Drive (MPC Water Quality gauge site)
 - Huttonville Creek Main Branch south of Queen Street – H5 (MPC Water Quality gauge site)



Aquatic Resources

- The purpose is to determine the extent and quality of aquatic habitat within the Heritage Heights Study Area
- Seasonal field work in 2011/2012 using CVC protocols to classify headwater drainage features
- Field sampling to determine fish presence of fish associated with West Huttonville Creek and Credit River Tributaries, as well as using current fish and benthic monitoring data from CVC/MNR

Simple Contributing



Complex Contributing

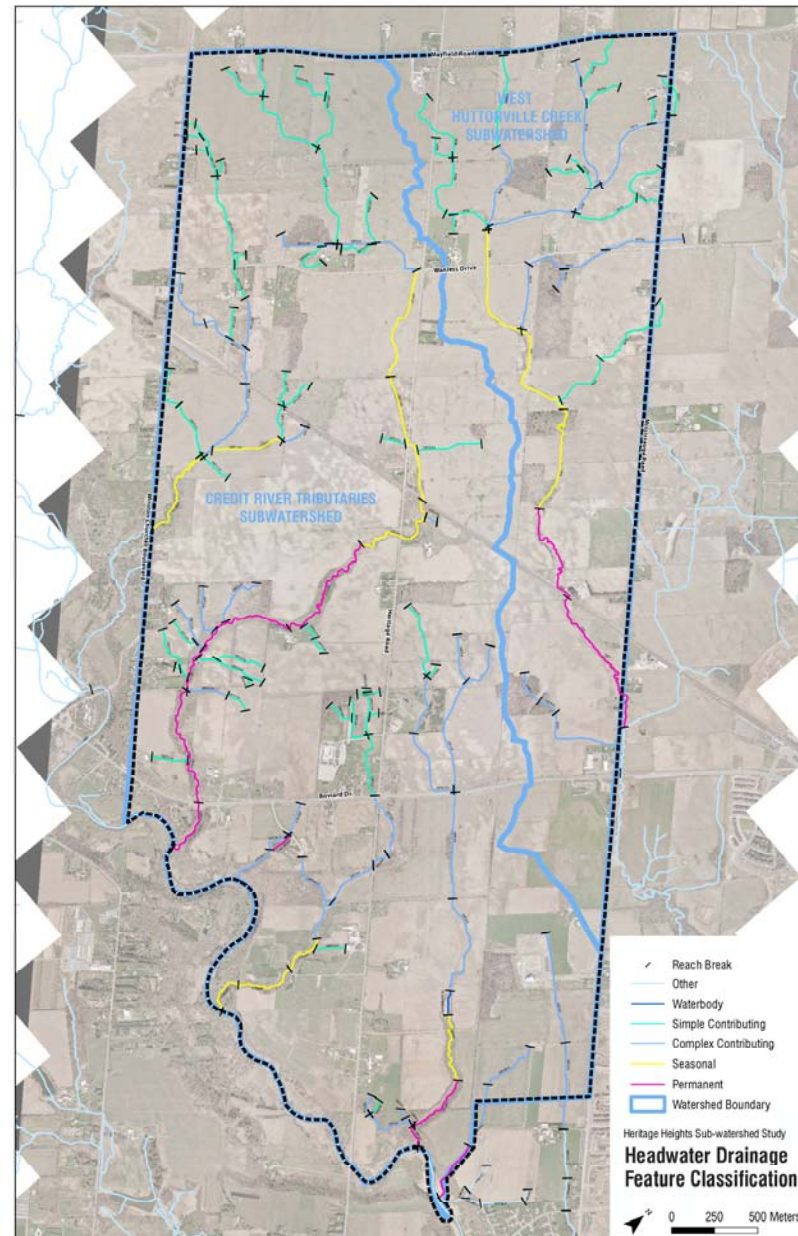


West Huttonville Creek near CNR



Aquatic Resources

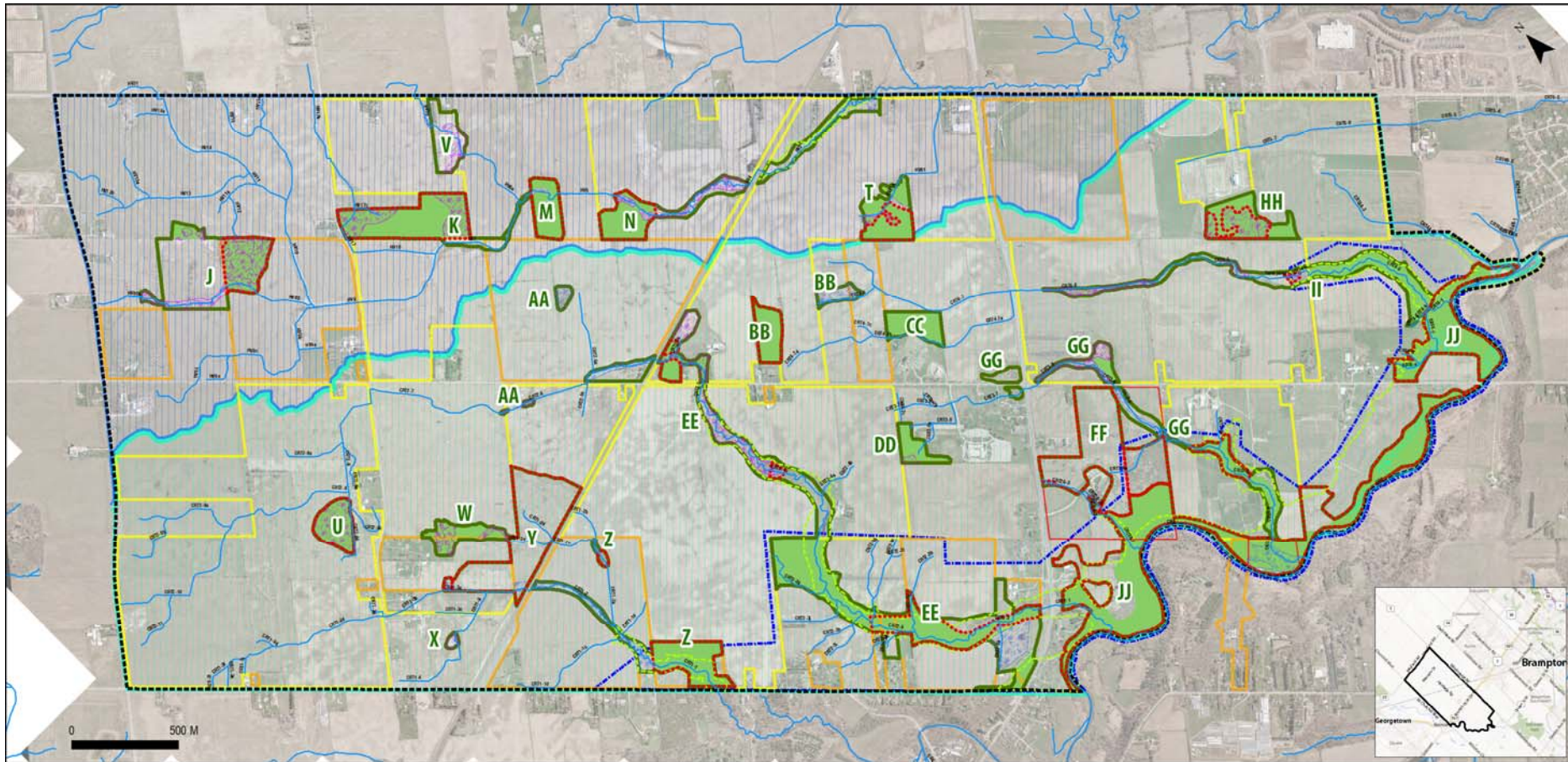
- Headwater swales were classified as per the Headwater Drainage Feature Classification Mapping.
- Particular emphasis was placed on the classification of “Simple” and “Complex” contributing habitat given the need to consider this form explicitly in future management strategies.



Aquatic Resources

- Based on field observations, the following reaches display evidence of permanent flow:
 - HV4 and HV3 on West Huttonville Creek;
 - CRT2-3 and CRT2-4 downstream of Heritage Road, and
 - CRT4-3 downstream to the Credit River.
- Mid- and Upper reaches of West Huttonville Creek provide warmwater tolerant fish community.
- Lower reaches of West Huttonville Creek (HV3 and HV4) are classified as “Direct/Occupied” Redside Dace habitat.
- Lower reaches of CRT4 are “coldwater refuge” habitat as coho salmon and brown trout have been found there since 2008.
- Lower reaches of CRT2 also exhibit coldwater habitat, although the barrier under Bovaird Road prevents upstream fish movement.
- Benthic invertebrate production is poor within mid- and upper reaches of all watercourses because of lack of flow.

Natural Heritage Features

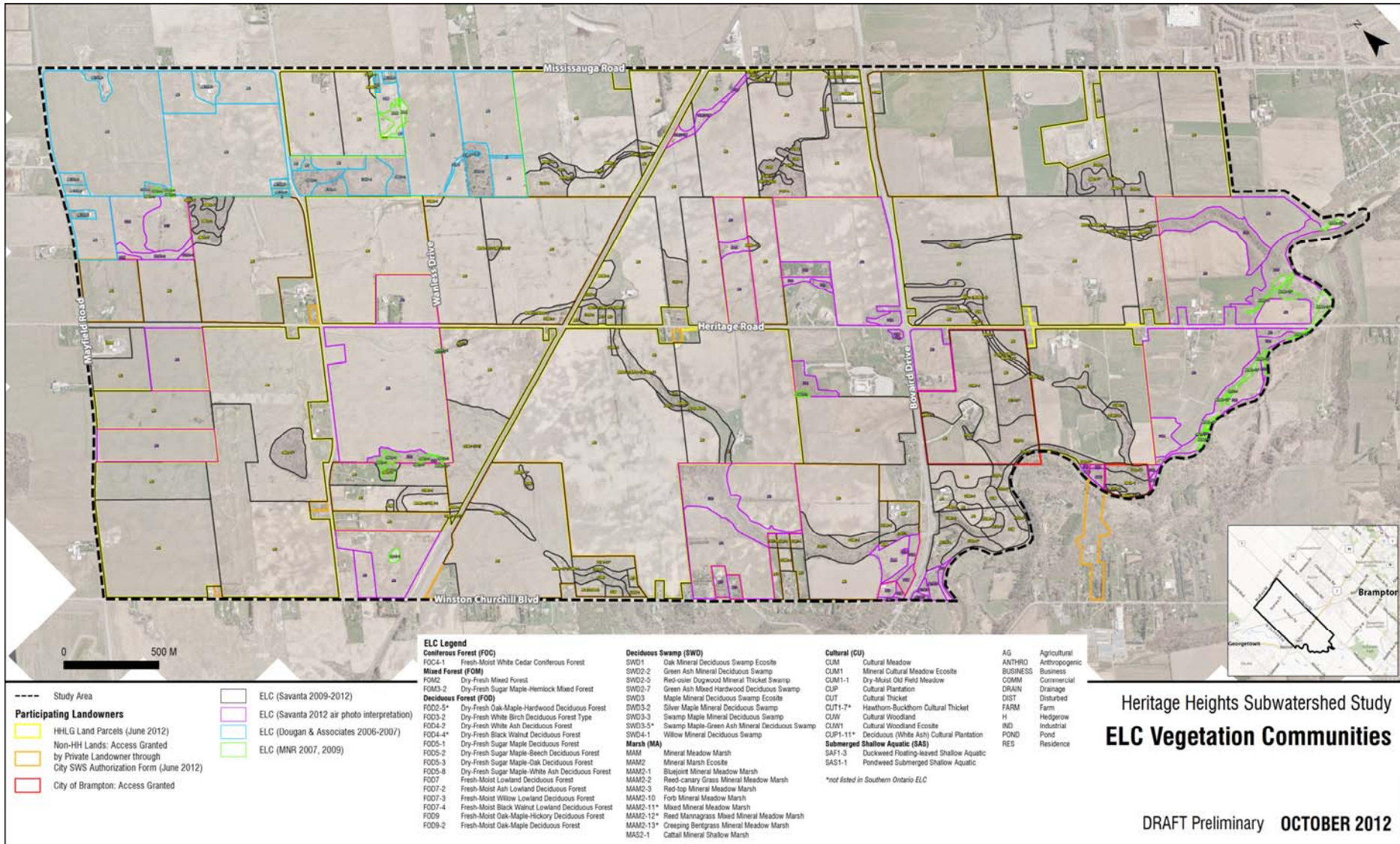


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| <ul style="list-style-type: none"> --- Study Area Boundary Participating Landowners <ul style="list-style-type: none"> ■ HHLG Land Parcels (June 2012) ■ Non-HH Lands: Access Granted by Private Landowner through City SWS Authorization Form (June 2012) ■ City of Brampton: Access Granted | <ul style="list-style-type: none"> ■ AA Natural System Integration Units ■ Local Wetlands (Savanta 2008-2012) ■ Draft Churchville-Norval Wetland Complex (MNR, Feb. 2009) ■ Draft Huttonville and Area Wetlands (MNR Dec. 2007) ■ West Huttonville Creek Subwatershed ■ Credit River Tributary | <ul style="list-style-type: none"> — Stream Reaches ■ Significant Woodlands ■ Valleyland ■ Greenbelt ■ Significant Wildlife Habitat (OMNR, 2000) |
|---|--|---|

Heritage Heights Subwatershed Study
Natural Heritage Features

DRAFT Preliminary **OCTOBER 2012**

ELC Vegetation Communities



Natural Systems Integration

- Natural Heritage System planning requires an integration of study disciplines and associated assessments in order to understand the fundamental elements of subwatersheds, i.e. environmental features, attributes and associated functions.
- Environmental features have varying attributes and functions, and not all environmental units are considered by each study discipline.
- Hydrologic water cycle (i.e. movement of water) links the water, aquatic and terrestrial systems.
- Subwatershed Team and Agency consultation required to:
 - Identify the environmental units,
 - Develop enhanced understanding of natural feature significance and sensitivity,
 - Qualify applicable environmental policy and regulations; and
 - Establish management approach in context of urbanized land form.

Natural Systems Integration

- Each of the primary environmental elements to varying degrees requires an integrated assessment in order to establish the significance and associated sensitivity of the unit, particularly in the context of the future urbanizing setting; the following provides some associated guidance in this regard:

1. Watercourses:

- Presence/absence of form/stability
- Baseflow – perennial?
- Groundwater discharge
- Presence/absence of riparian corridor vegetation
- Bankfull/riparian/flood flows
- Flood plain
- Sediment transport
- Fisheries production
- Benthics
- Temperature/water quality

2. Wetland/Woodland Units:

- Number and diversity of species
- Potential for corridor/linkage
- Presence/absence of fluvial unit
- Local catchment area
- Groundwater influence to sustainability
- Wildlife usage
- Overall size/ connectivity

3. Recharge/Discharge function:

- Rate of infiltration/recharge
- Discharge area (location/size)
- Potential groundwater flux
- Scale of contributing groundwater flow system

Next Steps

- Stakeholder meeting to discuss Phase 1: Subwatershed Characterization and Integration
- Phase 1: Subwatershed Characterization and Integration Report Review
- Visioning Study and Land Use Plan Development
- Phase 2 Impact Analysis
- Public Information Centre No.2 – Presentation of Environmental Analysis of Land Use Concepts



What Happens Next?

How can you provide comment on the project?

Please fill out the comment sheet today, or send comments by email/fax/letter to either of the following project team members by **November 23, 2012**



Ms. Jill Hogan, MCIP, RPP
Planning Project Manager
City of Brampton
Box 220, 2 Wellington Street West
Brampton, ON L6Y 4R2
Phone: (905) 874-3450
E-Mail: jill.hogan@brampton.ca



Mr. Ron Scheckenberger, P. Eng.
Study Team Project Manager
AMEC Environment & Infrastructure
3215 North Service Road,
Burlington, ON L7R 3Y2
Phone: (905) 335-2353
E-mail: ron.scheckenberger@amec.com



Thank you for your participation