

# TRIECA CONFERENCE



3<sup>rd</sup> Annual TRIECA Conference – March 25 & 26, 2014  
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# *An Opportunity for Leadership, Innovation, and Partnership*

*John Nemeth, C.E.T.*

*Infrastructure Planning and Studies*

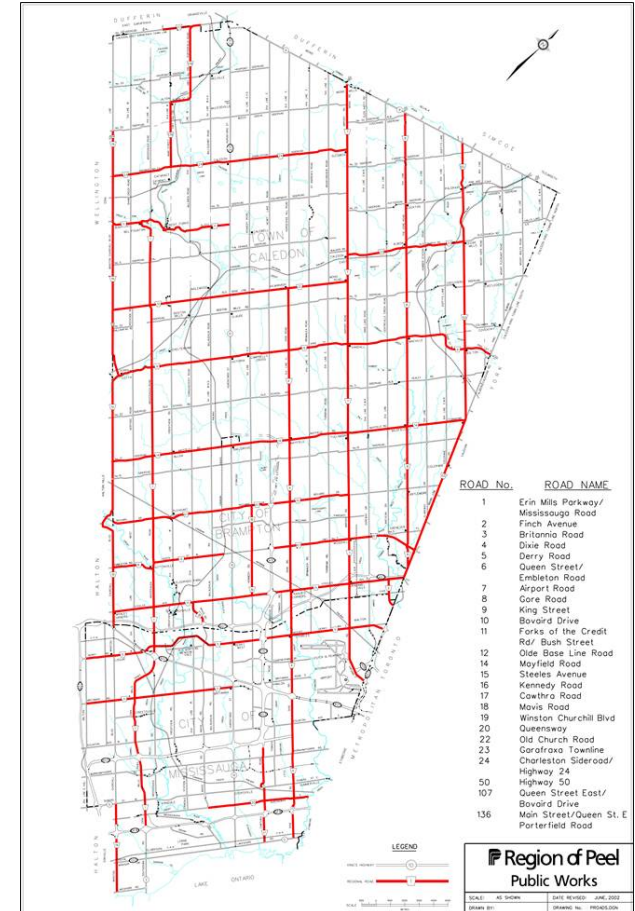
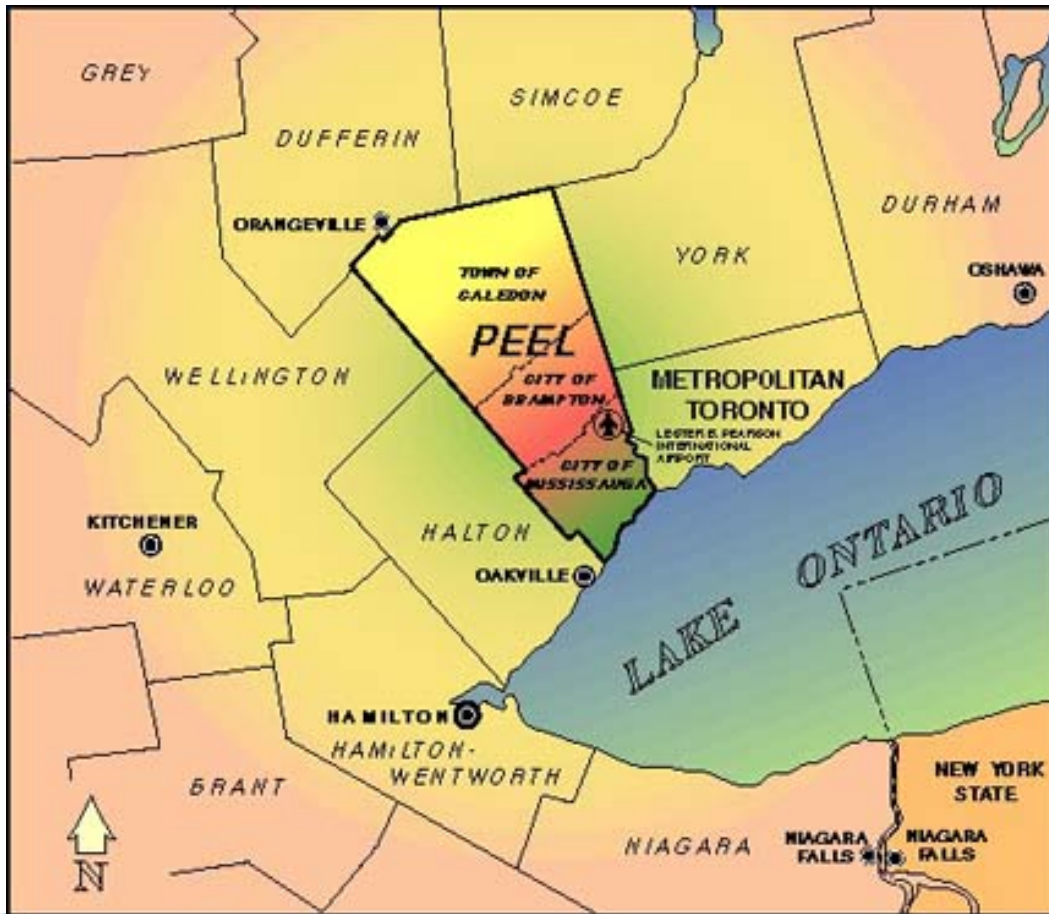
*Transportation Division – Public Works Department*

Day One - Track One  
11:00 a.m. – 11:45 a.m.  
Tuesday, March 25th, 2014

Pearson Convention Centre  
2638 Steeles Avenue East  
Brampton, ON, L6T 4L7

**TRIECA** | CONFERENCE

# Peel Region



"The ultimate goal of stormwater management is to maintain the health of streams, lakes and aquatic life as well as provide opportunities for human uses of water by mitigating the effects of urban development. To achieve this goal stormwater management strives to maintain the natural hydrologic cycle, prevent an increased risk of flooding, prevent undesirable stream erosion, and protect water quality"

[illegible]

## ***Term of Council Priority No. 4 - What is it?***

- The Region's Strategic Plan and Term of Council Priorities has elevated the importance of stormwater management at a Regional level geared to reduce citizens' risks for flooding and to plan for stormwater management in an effort to address broader environmental impacts.
- Staff will develop a stormwater management framework with Area Municipalities and Conservation Authorities.



# ***Term of Council Priority No.4***

| <b>Priority</b>               | <b>Outcome</b>  | <b>Actions (2011)</b>  | <b>Actions (2012–2014)</b>   | <b>Strategic Plan Themes</b>                       |
|-------------------------------|---|--|--|--|
| Improve stormwater management | Reduce the citizen risks associated with flooding and address broader environmental impacts | Reduce the citizen risks associated with flooding and address broader environmental impacts<br><br>Establish targets | Support implementation of framework recommendations adopted by Council | Environment<br>Public Safety<br>Service Excellence |



# Stormwater Authority

| Agency                   | Level of Responsibility  |
|--------------------------|--|
| Federal                  | Guidance, Federal Law and regulation   |
| Province                 | Guidance, Provincial law and regulation<br>Regulatory approvals, environmental protection  |
| Region of Peel           | Stormwater management, infrastructure design, construction, operations and maintenance from regional roads. Support in watershed based research, policies and watershed based planning   |
| Area Municipalities      | Through the land use approval process set the framework for stormwater development planning, including stormwater management, infrastructure design, construction, operations and maintenance and construction of area municipal roads. This includes storm water runoff coming from residential properties and businesses being conveyed through municipal storm water systems. |
| Conservation Authorities | Riverine flood management, stormwater development approvals in collaboration with area municipalities and delivering watershed-based ecosystem resources and services.   |

# ***Regulatory Obligations***

- The Ontario Ministry of the Environment issues ***“Certificates of Approval”***, more recently ***“Environmental Compliance Approvals”***, under the Water Resources Act to municipalities to operate stormwater infrastructure.
- As the owners and operators of stormwater infrastructure, the Region of Peel, our area municipalities and to a lesser extent the Conservation Authorities individually have defined obligations to provide a level of service for the operation and maintenance of their stormwater assets.

# ***Municipal Interest***

Stormwater is considered in three distinct areas of municipal interest;




1. through the planning and land development processes;
2. through capital programs delivering engineering projects of the municipality e.g. roads, erosion, facility design, etc;
3. operations and maintenance programs and practices.



# ***Stormwater Infrastructure***

- Stormwater management infrastructure is generally identified by the local area municipalities through the preparation of Master Environmental Servicing Plans, prepared in support of secondary plans, and constructed through the land development process.
- The Region of Peel identifies new Regional road storm water requirements through the preparation of Environmental Assessment process (EA's) as each road project is being designed.

# *Area Municipal Programs*

|  |   |
|--|---|
|  The logo for the City of Mississauga, featuring a stylized white 'M' on a blue square background with the word 'MISSISSAUGA' in white capital letters below it.                  | <ul style="list-style-type: none"><li>•Have a SWM Inventory</li><li>•Reported to Council on July 8, 2014 storm</li><li>•Designing new SWM facilities (2014)</li><li>•Creating a Flood Impact Advisory Panel</li><li>•Cooksville Creek Flooding Task Force</li><li>•Implementation of Council Recommendations Re; July 8, 2014</li></ul> |
|  The logo for the City of Brampton, featuring a stylized yellow flower icon on a blue square background with the text 'brampton.ca' and 'BRAMPTON Flower City' below it.          | <ul style="list-style-type: none"><li>•Updating SWM Inventory and Rehabilitation Study</li><li>•SWM Facility Sediment Removal program</li></ul>   |
|  The logo for the Town of Caledon, featuring a stylized black silhouette of a landscape with trees and a sun/moon on a white background with the text 'TOWN OF CALEDON' below it. | <ul style="list-style-type: none"><li>•Initiated a SWM Inventory study</li></ul>  |

# ***Conservation Authorities***

“A principal mandate of the TRCA is to reduce the risk to life and damage to property caused by flooding. We do this by providing local agencies and the public with notice, information and advice so that they can respond during severe rainfall events with the potential for flooding, and during flood related emergencies. The TRCA's Flood Management Service (FMS) has been developed in order to prepare and respond to our changing environment, the increasing needs of our municipal partners and the health and well being of our living city.”



Credit Valley  
Conservation

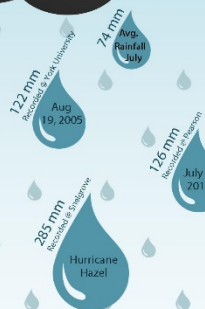
Source : TRCA website

# TORONTO FLOOD

July 8, 2013

THE GREATER TORONTO AREA (GTA) IS AT RISK OF FLOODING FROM **THUNDERSTORMS, HURRICANES, SNOWMELT AND RAIN ON SNOW EVENTS**. ON **JULY 8, 2013** THE GTA WAS HIT BY SEVERE THUNDERSTORMS WHICH PRODUCED INTENSE RAINFALL RESULTING IN **RIVERINE AND URBAN FLOODING**.

THE MAXIMUM TOTAL RAINFALL RECORDED JULY 8TH WAS **126 MM** AT PEARSON INTERNATIONAL AIRPORT. THIS WAS MORE THAN THE AVERAGE FOR THE ENTIRE MONTH OF JULY BUT LESS THAN THE **285 MM** OF TOTAL RAINFALL RECORDED AT SNELGROVE DURING HURRICANE HAZEL.



## rainfall

how much

how long

where does it go?

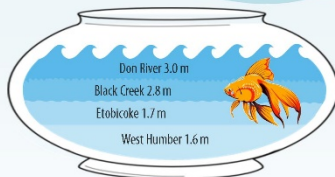
Hurricane Hazel's rainfall lasted significantly longer than Toronto's recent flooding events July 8, 2013 and August 19, 2005



74 mm/hr

At Pearson International Airport, rainfall intensity peaked at **74 mm/hr** between 5-6 pm. Elsewhere, rainfall intensity ranged from **0.8 mm/hr** to **63.0 mm/hr**.

MAXIMUM  
RECORDED  
RISE IN  
WATER LEVEL



Total precipitation was greatest in the west end of Toronto

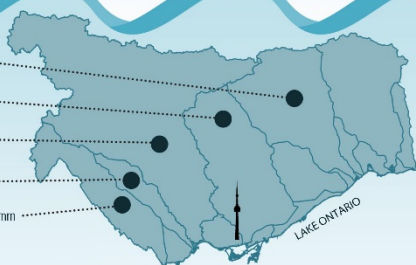
Rouge River Watershed 19.8 mm

Don River Watershed 69.4 mm

Humber River Watershed 72.6 mm

Mimico Creek Watershed 97.4 mm  
(Estimated from nearby gauges)

Etobicoke Creek Watershed 126.0 mm  
(Pearson International Airport)



**Riverine flooding** is the responsibility of conservation authorities and occurs when water levels of rivers rise, and the rivers overflow their banks

**Urban flooding** is the responsibility of municipalities and consists of flooding to streets, basements and other low lying areas due to lack of overland flow routes or the limited capacity of existing drainage systems

# Regional Stormwater Interest

Regional Government in southern Ontario has not traditionally practiced stormwater management, although they contribute significant flows from highly impervious surfaces such as linear networks of major arterial roads and the clearing of snow during inclement weather.

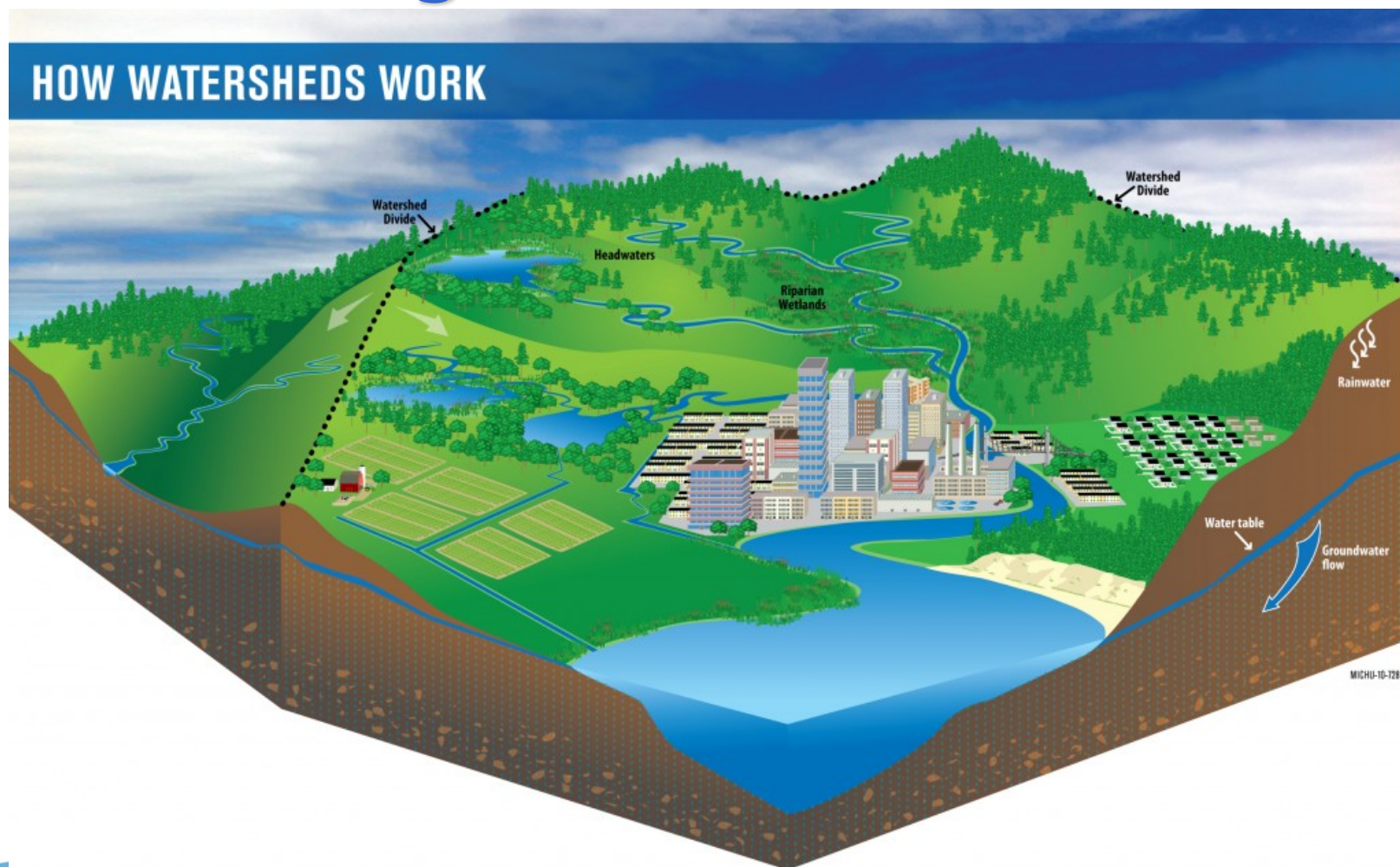
# Areas of SWM Delivery

| Area of Interest           | Process  | Examples   |
|----------------------------|--|--|
| Policy                     | Principles and Guidance                                  | Official Plans<br>Secondary plans  |
| Development                | Planning and Land Development                            | Master Environmental Serving Plans, Plans of Subdivision, Site Plans, Subdivision Agreements, etc. |
| Capital Programming        | Environmental Assessments<br>Infrastructure construction | Engineering projects of the municipality i.e. roads, erosion, facility design, etc,                |
| Operations and Maintenance | Owner/ Operator  | Operating programs delivering operations, maintenance and monitoring programs and practices        |

# SWM Standards and Specifications

|   |   |  |
|---|---|--|
| <b>Development</b>                          | Design Criteria<br>Design Standards<br>Design Specifications<br>Monitoring<br>Infrastructure Assumption Protocols<br>Infrastructure End of Maintenance Procedures | <ul style="list-style-type: none"><li>• Master Environmental Servicing Plans</li><li>• Plans of Subdivision</li><li>• Site Plans</li></ul> |
| <b>Engineering<br/>Capital Construction</b> | Design Standards<br>Design Specifications<br>Monitoring<br>Infrastructure Assumption Protocols  | <ul style="list-style-type: none"><li>• Design</li><li>• Construction</li></ul>  |
| <b>Operations and<br/>Maintenance</b>       | Design Standards<br>Design Specifications<br>Monitoring<br>Operations and Maintenance Standard Operating Procedures   | <ul style="list-style-type: none"><li>• Operations</li><li>• Maintenance</li><li>• Repair</li><li>• Replacement</li></ul>                  |

# The missing Piece of the SWM Puzzle



# *Stormwater at Peel Today*

## **Internal Partners**

|  |  |
|--|--|
| Integrated Planning - Risk Management    | Policy, Natural Heritage, Climate Change   |
| PW – Operations Support - Communications | Education Materials  |
| PW – Water/Wastewater                    | <ul style="list-style-type: none"><li>• Source Water Protection</li><li>• Sanitary System</li><li>• Inflow/Infiltration – i.e. protection of the sanitary system from external flows</li><li>• Lot based plumbing<ul style="list-style-type: none"><li>– downspout connection</li><li>– foundation drains</li><li>– individual lot grading</li><li>– cross connections</li></ul></li><li>• Sanitary sewers at risk in open space lands</li></ul> |
| PW – Development Engineering             | Standards & Criteria for new development   |
| Finance                                  | Development Charges  |
| Public Health                            | Healthy Communities  |

# Common Thoughts at Councils

## Studies

- Determine the source causes for flooding
- Examine environmental impacts
- Storm overland flow studies required
- Urban flooding models would be very useful
- Noted: Brampton rain impacts on Mississauga look on a watershed scale for solutions
- SWM financing to be established (Mississauga soon, Region and others should investigate)
- Update flood plain mapping
- Flood plain issues – more impervious area means more storm water runoff (changes flood limits)
- Mitigate overland flow issues - modeling should be done
- Real-time information would help Operations and Emergency Services
- Individual study for Malton needed (Bonnie Crombie)
- Explore LID/permeable, asphalt, etc.

## Coordination

- Service coordination is imperative between City and Region of Peel
- More LID (Low Impact Development project implementation)
- There are several special cases for flooding i.e. Lisgar area / Malton.
- Innovation from others, what can we learn?
- TRCA – looks after riverine flooding only
- Climate Change – **Accept it** - mitigation and adaptation are key to solutions
- Operations Support mandate for education function
- Develop educational materials for public - brochure to explain SWM, LID, downspout disconnection, collective access to data

# Provincial Policy Statement 2014

- Require the consideration of potential impacts of climate change (e.g., flooding due to severe weather) to support the reduction of greenhouse gas emissions and adaptation to climate change | Policy 1.8
- Encourage green infrastructure (e.g., permeable surfaces) and strengthen stormwater management requirements | Policies 1.6.2, 1.6.6.7
  - *Green infrastructure: means natural and human-made elements that provide ecological and hydrological functions and processes. Green infrastructure can include components such as natural heritage features and systems, parklands, **stormwater management systems**, street trees, urban forests, natural channels, permeable surfaces, and green roofs.*
- Support the adaptive re-use of infrastructure and require consideration of life-cycle cost of infrastructure (e.g., through asset management planning) | Policies 1.6.1, 1.6.3

## PPS 2014 Policy 1.6.6.7

Planning for stormwater management shall:

- a) minimize, or, where possible, prevent increases in contaminant loads;
- b) minimize changes in water balance and erosion;
- c) not increase risks to human health and safety and property damage;
- d) maximize the extent and function of vegetative and pervious surfaces; and
- e) promote stormwater management best practices, including stormwater attenuation and re-use, and low impact development.

# PPS 2014 – Policy 2.2.1

## Watershed Approach

Planning authorities shall protect, improve or restore the *quality and quantity of water* by:

- a) using the *watershed* as the ecologically meaningful scale for integrated and long-term planning, which can be a foundation for considering cumulative impacts of development;
- b) minimizing potential *negative impacts*, including cross-jurisdictional and cross-*watershed* impacts;
- c) identifying water resource systems consisting of *ground water features, hydrologic functions, natural heritage features and areas, and surface water features* including shoreline areas, which are necessary for the ecological and hydrological integrity of the *watershed*;
- h) ensuring stormwater management practices minimize stormwater volumes and contaminant loads, and maintain or increase the extent of vegetative and pervious surfaces.

# Setting the Stage

*The July 8, 2013 storm event has presented an opportunity for Peel to lead by example and tackle stormwater from a “watershed management” approach through:*

- partnering with Caledon, Brampton, Mississauga and Conservation Authorities to develop common policies, standards, guidelines, etc. **at the watershed level.**
- to model precipitation and climate change to understand areas where “overland flow” is of concern putting Regional infrastructure at risk.
- enhance storm sewer asset management information through development of a storm sewer inventory and condition assessment program leading to an operations and maintenance program
- To make continuous improvements to the stormwater environment through knowledge transfer through National Benchmarking and Southern Ontario SWM Group.

# *Stormwater at Peel Today*

## **Transportation**

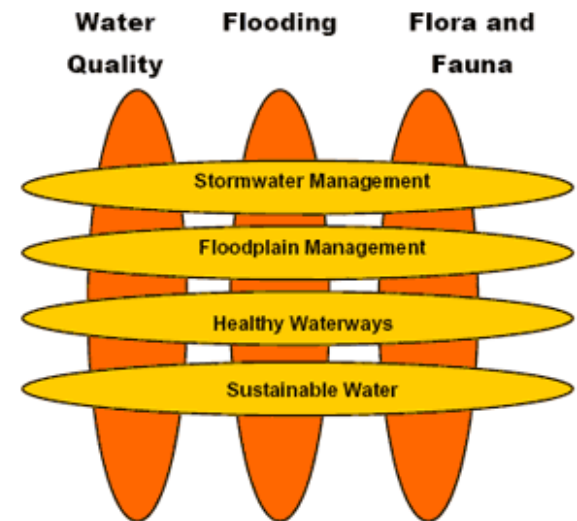
- SWM Infrastructure Asset Management
- Strategic Planning of Storm System (Water Quantity and Quality)
- Regulatory Obligations and Liability
- Design Standards and Criteria
- Establishing Levels of Service
- Standard Operating Procedure
- Operations and Maintenance
- Monitoring
- Watershed Protection
- Flood Protection
- Partnerships
- Projects
- Sustainable funding
- Technical Support to other Departments and Divisions



# *Key Theme Areas of Work*

The following key theme areas of work have been identified:

1. Development of Watershed Management Principles/Policies
2. Flooding Preparedness and Response
3. SWM Quantity and Quality management for Regional Infrastructure
4. Development of Common Standards, Criteria, Guidelines, Levels of Service and Standard Operating Procedures
5. Sustainable Funding Program
6. Communications, Outreach and Education
7. Monitoring- Data Collection and Enhancement
8. Studies, Communications and Emergency Services
9. Governance



## Milestones for the ToCP #4

| ToCP & Milestones   | 2013 | 2014 |    |    |    |
|---|------|------|----|----|----|
|   | Q4   | Q1   | Q2 | Q3 | Q4 |
| <b>ToCP#4: Improve Storm Water Management (SWM)</b>   |      |      |    |    |    |
| <b>Milestone 1: Establish an internal Peel SWM Working Group to undertake the following activities:</b>   |      |      |    |    |    |
| a) Develop best practice documents to guide the review and comment on development applications, capital construction, and operations and maintenance as they relate to SWM. |      |      | ▲  |    |    |
| b) Draft SWM policies for the Regional Official Plan Update and to support the Climate Change Strategy.   |      |      |    | ▲  |    |
| c) Pilot low impact development opportunities on Regional Roads (already underway in a pilot on Mississauga Road, north of Queen Street).                                   | ▲    |      |    |    |    |
| d) Complete a Storm Sewer Data Collection / Asset Inventory.  |      |      |    |    | ▲  |



Milestone Completed – Did Involve Council



Council's involvement required – for decision and/or information



Milestone Completed – Did not Involve Council





Do not require Council's involvement


→ Shift in Timeframe for Milestone


## Milestones for the ToCP #4

| ToCP & Milestones   | 2013 | 2014 |    |    |    |
|---|------|------|----|----|----|
|   | Q4   | Q1   | Q2 | Q3 | Q4 |
| <b>ToCP #4: Improve Storm Water Management (SWM)</b>  |      |      |    |    |    |
| <b>Milestone 2: Initiate a monitoring program for SWM Ponds that serve Regional Road drainage.</b>            |      |      | ▲  |    |    |
| <b>Milestone 3: Report to Council on ToCP #4 and next steps.</b>  |      |      | ▲  |    |    |
| <b>Milestone 4: Prepare and deliver a SWM Workshop</b>  |      |      |    | ▲  |    |
| <b>Milestone 5: Partner with Conservation Authorities to develop a outreach and education Program for SWM</b> |      |      |    |    | ▲  |
| <b>Milestone 6: Report to Council and update on activities completed and next steps</b>                       |      |      |    |    | ▲  |

 Milestone Completed – Did Involve Council

 Council's involvement required – for decision and/or information

 Milestone Completed – Did not Involve Council

 Do not require Council's involvement

→ Shift in Timeframe for Milestone

# *What is needed?*

- Leadership by Example -  
the time is now to lead in a manner that  
allows area municipalities to maintain  
existing stormwater responsibilities,  
BUT at the same time enhance the  
relationship between  
Regional government and Conservation  
Authorities to take a watershed  
approach to advance ToCP No. 4



# Regional Stormwater Program Examples

1. Developing an Operations and Maintenance system(s) for regional stormwater infrastructure;
2. Adapting Low Impact Development to linear transportation networks; and
3. Protecting the environment with modern snow storage practices.



# Active Stormwater Projects

| Activity   | Description  | Status  |
|--|--|---|
| Regional Storm Sewer Inventory   | Identification of regional storm sewer assets, GIS Mapping and condition assessment  | Caledon - Complete<br>Brampton - In progress<br>Mississauga - In progress |
| Development of Regional SWM Policy for Regional SWM infrastructure   | A Water Resources background paper, which includes SWM, is scheduled as part of Phase 2 of the current Official Plan Update. This will establish regional policies to support stormwater management through the land use planning process and guide regional capital projects. | Ongoing   |
| Pilot Demonstration of Low Impact Development (LID) on a Regional road, including low cost watering measures for median planters | LID Pilot Median Project in partnership w/ Credit Valley Conservation –<br>Mississauga Road between Queen Street and Williams Pkwy<br>- City of Brampton   | Design - Underway<br>Construction – 2014/2015                             |

# *Immediate Action Plan*

## **Establish an internal SWM group**

charged with developing Peel's SWM for road infrastructure and its linkage to watershed management, climate change and overall water quantity and quality

## **Partner with Conservation Authorities**

key policy initiatives, guideline development, and showcasing of projects such as a the snow storage facility that integrates with a SWM facility



## **Invest time, resources and finances**

to address GIS and mapping capabilities for “tactical and operational” requests such as The Queensway and the International Centre overland flow/flooding

# Peel Internal Cooperation



# CONCLUSION

- The Region of Peel will focus on stormwater management activities addressing the Regional road network infrastructure.
- Peel will work in collaboration with our internal partners and Conservation Authorities to improve our overall program, data sharing, best practices and technology enhancements.
- As the work program moves forward staff will seek partnerships with local area municipalities.
- Staff will report back to Regional Council on the progress of initiatives in late 2014.

# Thank you !

