Low Impact Development (LID) Opportunities for Eastern Ontario

Presentation for 2016 Ontario East Municipal Conference

September 14, 2016 – Kingston, ON

Presentation Agenda

1. What is LID and why is it important?
2. Policy Context
3. Guidelines & Direction
4. Barriers and Opportunities
5. LID in the Eastern Ontario Context
6. LID in the Rural Context
7. Case Studies
8. Roles for municipal staff

What is LID?

Low impact development (LID) is:

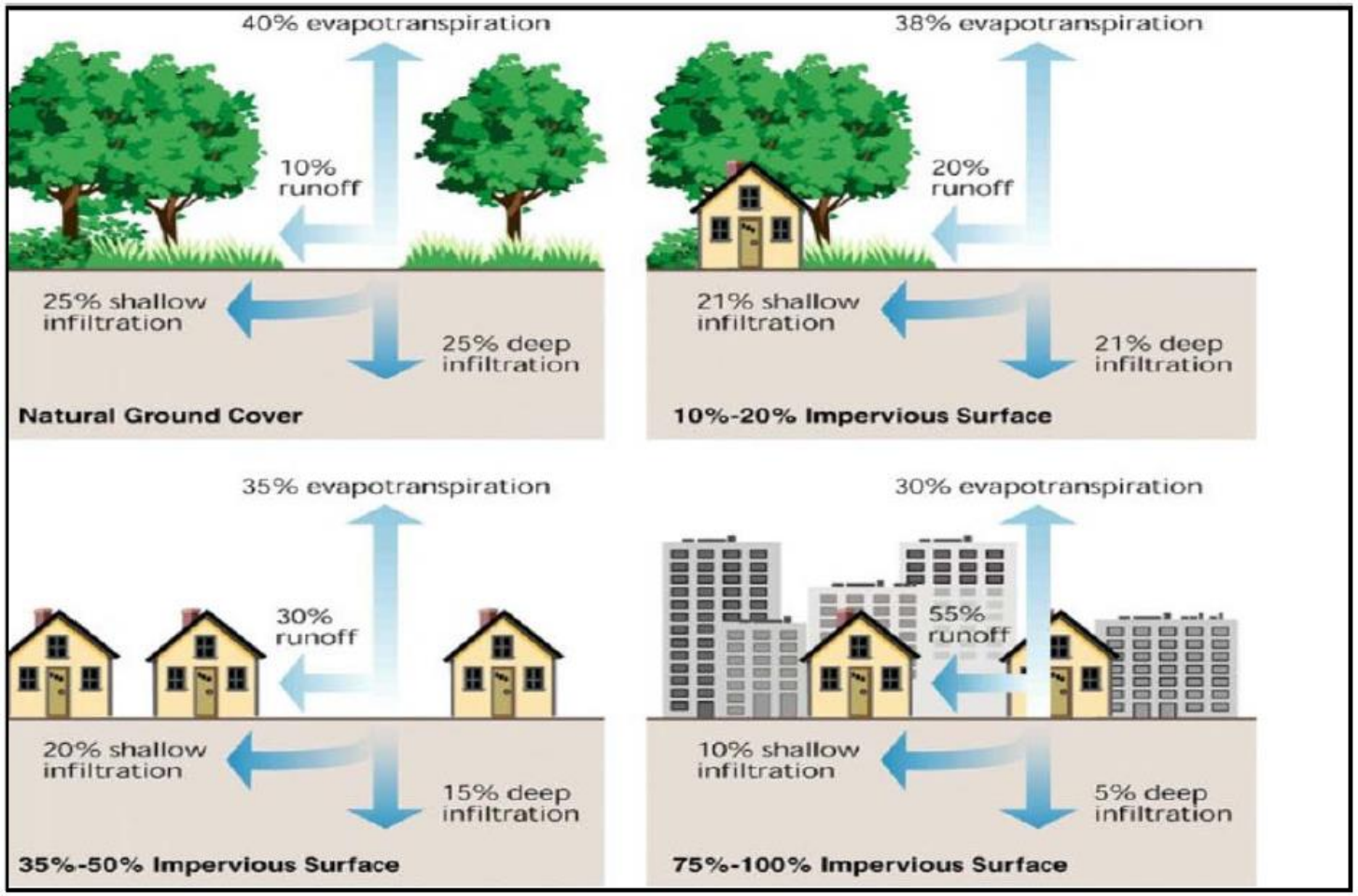
A stormwater management strategy that seeks to mitigate the impacts of increased runoff and stormwater pollution by managing runoff as close to its source as possible. LID comprises a set of site design strategies that minimize runoff and practices that mimic natural or predevelopment conditions through the processes of infiltration, evapotranspiration, harvesting, filtration and detention of stormwater.

These practices can effectively remove contaminants and reduce the volume and intensity of stormwater flows.

(Adapted from U.S. EPA definition, 2007)

What is LID?: the Issue

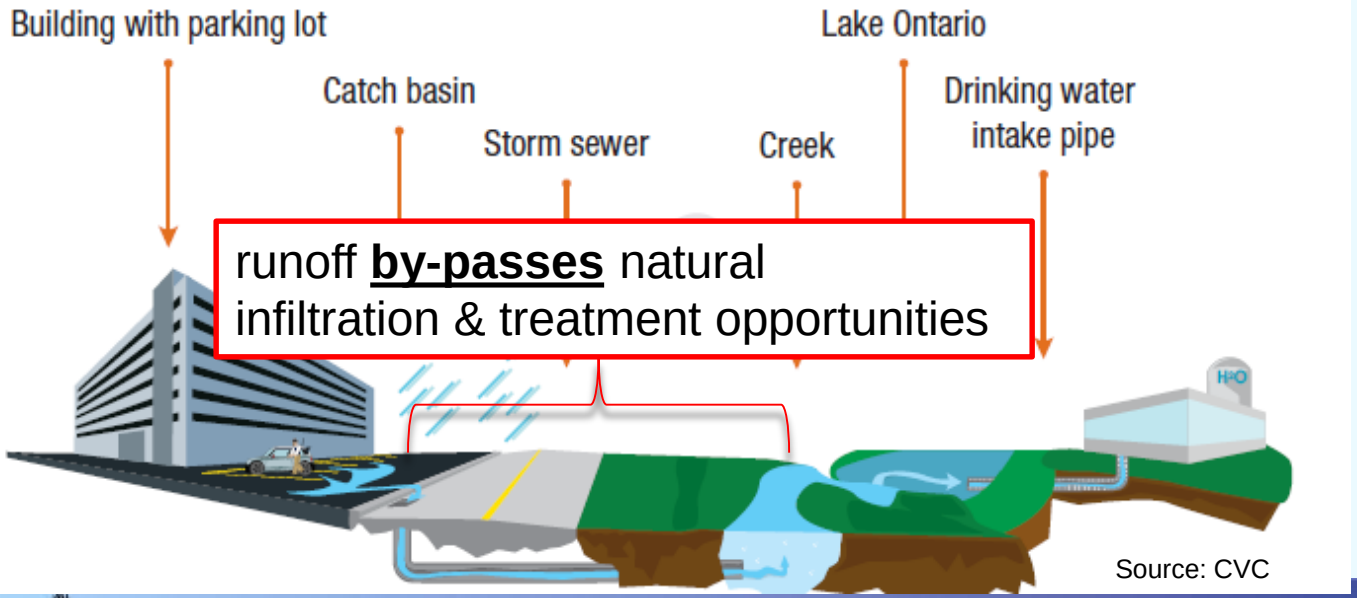
Impact of traditional development on the Hydrologic Cycle



Source: U.S. EPA, 2007

What is LID?: Conventional SWM

Conventional SWM Practices



Source: CVC

"end of pipe" solutions

What is LID?: Principles

LID Principles

- Preservation of natural infiltration
- Small-scale integrated controls *at the site ("treatment train" approach)*
- Minimizing and disconnecting impervious areas
- Prolonging runoff flow paths and infiltration times
- Create multi-functional landscapes

What is LID? - Design

Example LID Design Types

Green Roofs

Rain Harvesting

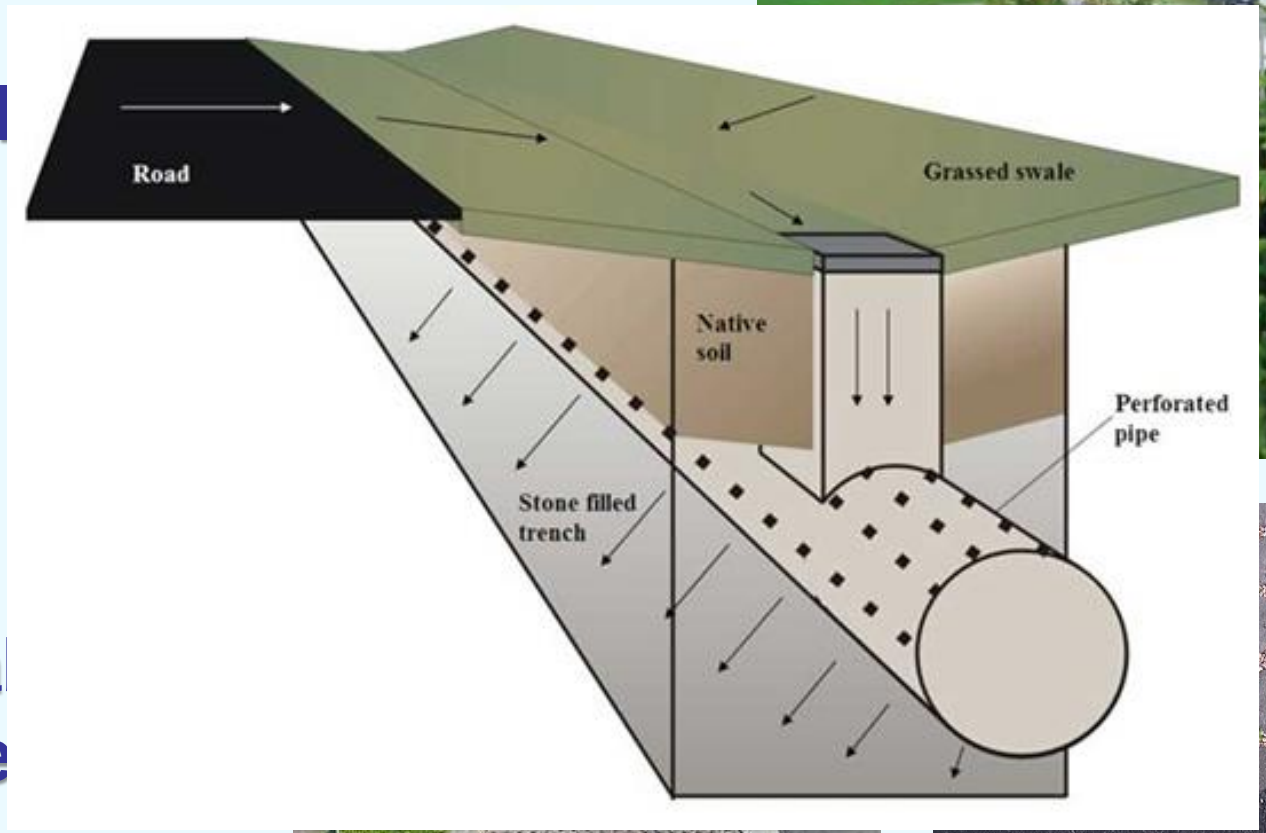
Rain Gardens / Bio-retention

Source: CVC

What is LID? - Design

Example LID Design Types (cont…)

Bioswal



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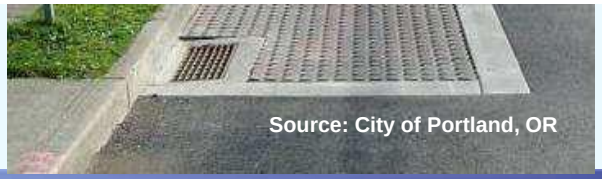

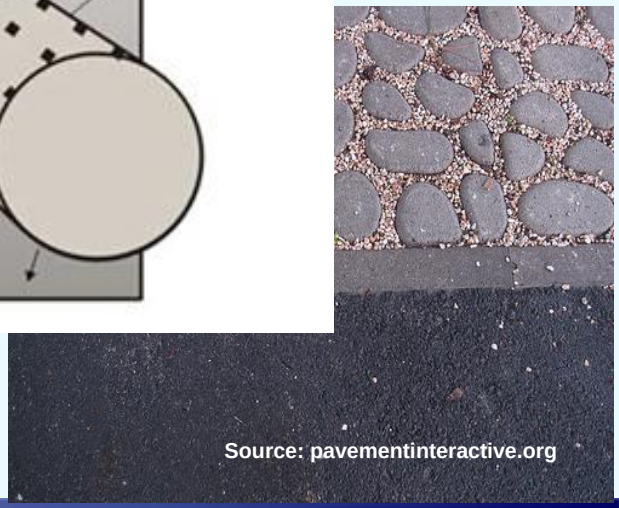

LID: Why is it important?

- **Local level environmental impacts**
  - protection of downstream resources;
  - abatement of pollution;
  - recharge of groundwater;
  - improvement of water quality;
  - improvement of habitat;
  - reduced downstream flooding and erosion;
  - conservation of water and energy; and
  - improved aesthetics in streams and rivers.

Source: TRCA

LID: Why is it important?

- **LID as a response to <u>Climate Change</u>**
  - CC = increased rainfall intensities & frequency of extreme events
  - Massive cost associated with extreme weather events
    (e.g. Alberta & GTA 2013 floods)
    - Cost to municipalities
    - Cost to landowners
  - Flooding claims now outnumber all other insurance claims in Canada (ICLR)
  - Need for **<u>resilient infrastructure</u>**

LID: Why is it Important?

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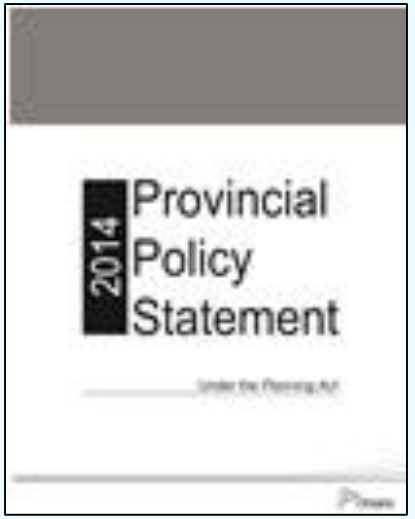
LID: Policy Context



Provincial Policy Statement (2014)

- Section 2.2.1 (Water)

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

  h) ensuring stormwater management practices minimize stormwater volumes and contaminant loads, and maintain or increase the extent of vegetative and pervious surfaces

- Section 1.6.6.7 (Sewage, Water & Stormwater)

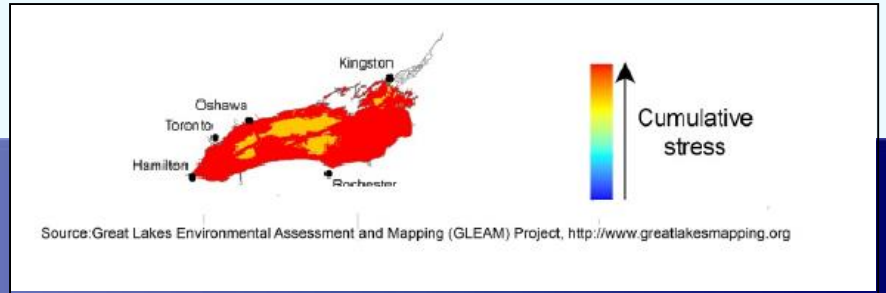
  Planning for Stormwater management shall:

  a) Promote stormwater management best practices, including stormwater attenuation and re-use, and ***low impact development***

LID: Policy Context

Applicable Policy and legislation:

- *Planning Act*
- *Ontario Water Resources Act* (1990)
- *Ontario Water Opportunities & Water Conservation Act* (2010)
- *Great Lakes Protection Act (2015)*
- Source Protection Plans
- Watershed Plans
- Remedial Plans
- Official Plan Policies
- Master Drainage Plans
- etc.



LID: Resources & Direction

- **Stormwater Management Planning & Design Guideline (MOECC, 2003)**
  - Focus on conventional SWM practices
  - Enables alternatives, but no requirement, incentives or credits
  - Update anticipated soon (to include LID)
- **Conservation Authority Leadership**
- **Municipal Pilot Projects**
- **Other organizations (NGOs, Private Consultants)**
- **Direction of LID**
  - Continued implementation in other jurisdictions
  - Policy formation
  - Incentives / Requirements (e.g. **SWM Utility**)
- **Eastern Ontario experience**

LID: Barriers

- **Real barriers**
  - reluctance, culture,

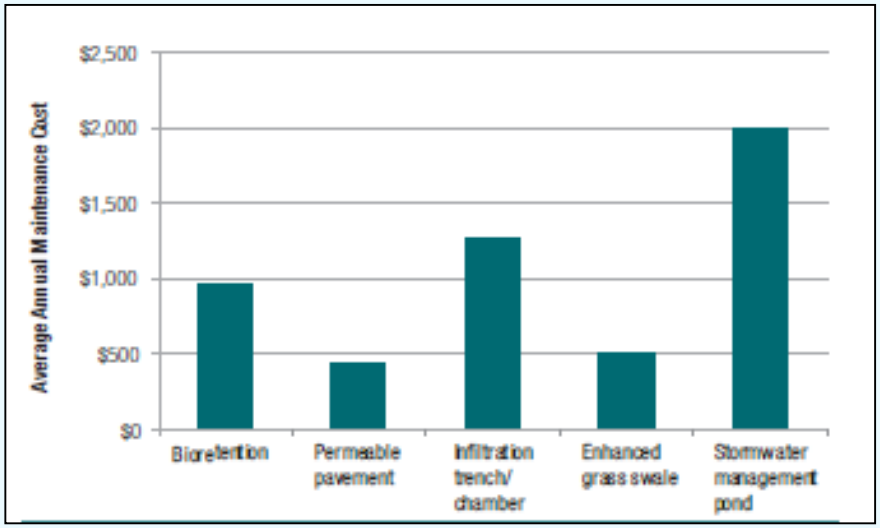
    lack of information & resources,

    geology/soils

- **Perceived barriers**
  - cost, complexity,

    "all or nothing" perception,

    effectiveness



Maintenance Costs of LID Practices & Conventional SWM Pond (Source: CVC)

LID: Opportunities

- Environmental protection and enhancement
  - Improved water quality, reduced erosion, groundwater recharge, species protection, reduced flooding
- Financial sustainability & feasibility
  - **Municipality**: lower SWM maintenance costs, less demand for infrastructure upgrades (bigger pipes)
  - **Landowner**: financially feasible opportunities, less water usage
  - **Developer**: lower implementation costs for new projects (15-80% cost savings in 92% of projects studied – U.S. EPA Study, 2007)
- Secondary benefits
  - Lot yield, aesthetic value, amenity value
  - Compliance/credits for developers, empowerment for landowners (can take control themselves)

From a development-wide, life cycle perspective, LID can reduce development costs because it may reduce the need for conventional infrastructure (such as curbing, piping, ponds, catch-basins) and can increase the number of developable lots. **(CVC, 2012)**

LID: Eastern Ontario Context

- What works in eastern Ontario?
  - Combined treatment train approach
  - Small-scale integrated features
  - Bioswales & Bio-retention (rain gardens, basins)
  - Innovative technologies (ex: Silva Cells)


Source: CVC

Source: City of Boise


Source: GreenSource


Source: CRCA

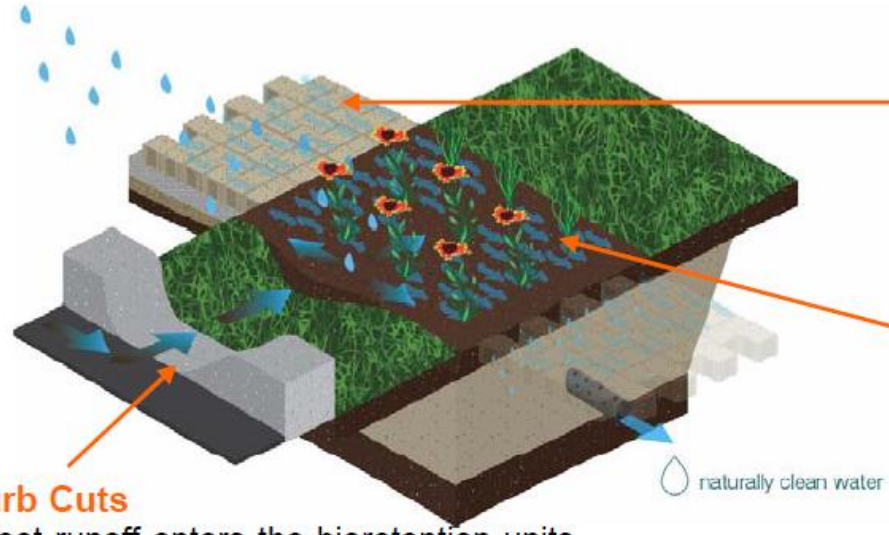
LID: Eastern Ontario Context

- Impetus for LID in rural areas?
  - Groundwater levels (recharge)
  - Flooding & erosion
  - Water Quality (agr. runoff, septic)

- What works in rural areas?
  - For settlement areas & large commercial & institutional sites: **bioswales, rain gardens, permeable pavement**
  - Residential lots: **rain harvesting programs**
  - Multi-purpose projects

LID: Case Studies

Urban ROW - Lakeview Neighbourhood, Mississauga



Permeable Pavers
An alternative to traditional asphalt this LID allows rainfall and road runoff to be filtered as it flows through the pavers and returns to the ground.

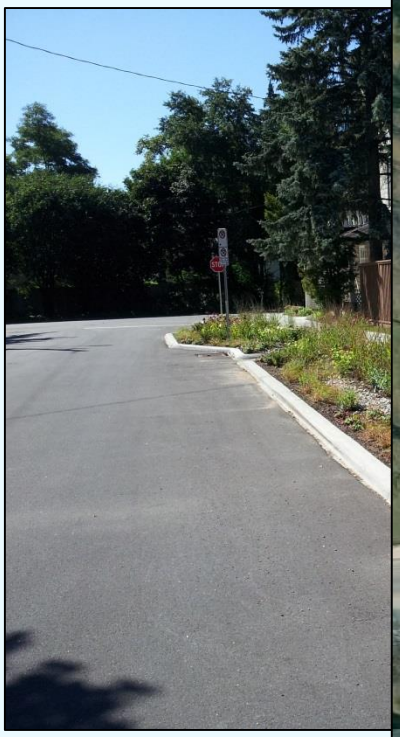
Boulevard Bioretention Units
The bioretention units located in the boulevard absorb and filter rainfall and road runoff as the water flows through the plants and soils and back into the ground.

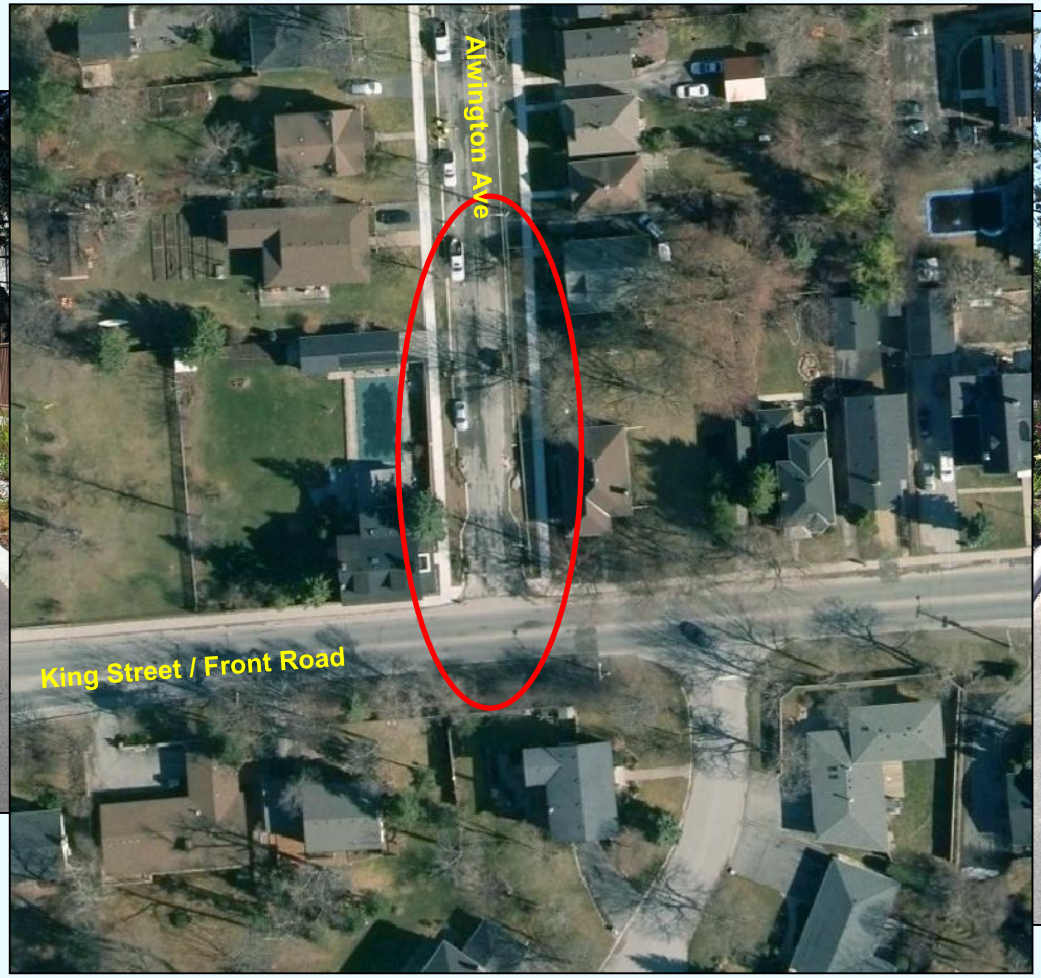
Curb Cuts
Street runoff enters the bioretention units through the curb cuts.

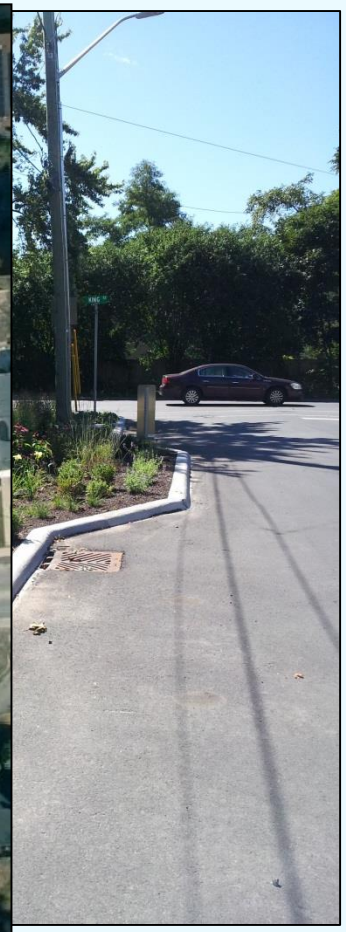
Source (all images): CVC

LID: Case Studies

Urban ROW (cont…) – Alwington Ave, Kingston







LID: Case Studies

Community Rain Garden – Washington County Fairgrounds, Minnesota

Source (all images): Bluethumb.org

LID: Case Studies

Shoreline Stabilization - Lily Lake Boat Launch Native Shoreline, Minnesota

Multi-purpose project: erosion protection, water quality improvement, beautification

LID: Case Studies

Kingscourt Groundbreakers Program

Kingscourt Neighbourhood, Kingston

Red Squirrel Conservation Services,
partnership with:

- Green Communities Canada (RAIN program)
- Kingscourt Community Assoc.
- City of Kingston


Source: Red Squirrel

- Problem: **basement flooding** on urban lots
- Solution: Construction of **rain gardens** & use of **rain harvesting**
- Added benefits: **community building, beautification**

RED SQUIRREL CONSERVATION SERVICES

RAIN COMMUNITY SOLUTIONS

LID: Moving Forward

- **What are we trying to achieve?**
  - Shift in thinking regarding SWM (ex. recycling analogy)
  - Low cost, simple, easily implementable alternative for landowners, developers, municipalities
  - Better, more effective treatment
  - Often with ancillary benefits

Source: Green Communities Canada

LID: Role for Municipalities

What can municipal staff and government do?

- ***Identify target areas*** **-** what areas would benefit most?
- ***Assess existing policy framework*** - are changes needed?
- ***Start the conversation*** **-** include building, engineering & public works departments, politicians, other stakeholders
- ***Consider pilot projects*** – how can a project tie into other policy goals/objectives? (e.g. greenspace, recreation, etc.)
- ***Take advantage of available resources*** - e.g. information, ongoing projects, incentive programs
- ***Develop partnerships*** - work with other organizations/agencies
- ***Incorporate LID into ongoing projects, development review***

LID: Resources

CVC
CREDIT VALLEY CONSERVATION

bealeader.ca

Guidance, case studies and tools to be a leader in low impact development (LID)

AUSABLE BAYFIELD CONSERVATION
CREATING AWARENESS | TAKING ACTION

ruralstormwater.com

Green Communities CANADA

RAIN COMMUNITY SOLUTIONS

slowwater.ca

www.bluethumb.org www.lowimpactdevelopment.org www.aquaforbeech.com

Resources cont..

Latornell Conference

2016 Theme: **Green Infrastructure**

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Thank You / Questions?

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