Implementing Low Impact Development (LID) in the Lake Simcoe Watershed: Progress, lessons learned and applicability to Muskoka watershed

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31% of Lake Simcoe Phosphorus loads from Stormwater

- Watershed Streams (41 t/yr) 56%
  - Urban: ~31%
  - Rural/agric. ~25%

Septics (4 t/yr) 6%
Holland marsh and smaller polders (3 t/yr) 4%
STPs (5 t/yr) 7%
Atmospheric (19 t/yr) 27%
The trouble with SWM ponds

- Costly to maintain, therefore not being maintained
  - Estimated cost to bring 56 ponds back to design level: **$18.5 million**

- Diverting stormwater to ponds is reducing critical cold water habitat
  - Change from ground to surface flow

- Stormwater ponds can become a source of phosphorus:
  - Low dissolved oxygen causing dissolved P to be released from sediment
Our urban creeks have flashy high flows and periodic flooding
Only going to get worse unless we change the way we do business…Meeting Growth Plan targets

Growth Plan
for the Greater Golden Horseshoe, 2006
OFFICE CONSOLIDATION, JUNE 2013

2010 urban = 22,793 ha
Future at 2031 = 35,028 ha
Increase From 2014 = 9,990 ha
Only going to get worse unless we change the way we do business...Climate Change
A market transformation program to promote Low Impact Development (LID) and more sustainable building practices.
Low Impact Development (LID) Definition

An integrated ecological, planning, and aesthetic strategy for stormwater management to maintain natural hydrology by managing runoff as close to the source as possible.

Source of Photos: L - City of Maplewood, MN via CVC/TRCA; C - City of Seattle; R - Unilock
**Lake Simcoe Region Conservation Authority • A Watershed for Life**

**Protection**

New Development

Developers, Builders and Municipalities

**Restoration**

Retrofit Existing Urban Areas

Public Lands (Municipalities)  Private Lands (Residential, Institutional, Commercial, Industrial)
Strategies to effective change

- Short and long-term funding
- Model By-law and new LID SWM Guidelines
- Demonstration / pilot projects
- Industry uptake: Charrettes, Design Tools
- Technical Support (Municipal & Industry)
- Training, Education, Outreach, Collaboration

RainScaping

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Building municipal support: *Council and senior staff*

**What was needed**

- Council and senior staff understanding and supporting a change towards LID

**What have we done**

- Workshops & council delegation: Showcase successes in other jurisdictions (Minnesota)
- Tour: showcasing LID Pilot projects
- Media events: ground breaking and ribbon cutting
Collaboration: Stormwater Management Working Group

Aim

Provide a forum to drive collaboration, consistency and knowledge sharing between all stakeholders

What has been done

• Regularly bringing together municipal, Provincial, development, consultant & Conservation Authority

• Progressed a number of key initiatives. e.g.
  – development of model by-law & guidelines
  – SWM Utility Fees / Credit Program; Grant programs,
New Development: Regulatory approach

**Aim:** Capture and control 90th percentile (25mm) rainfall event in all new development using principles of better site design & LID

**How:** In collaboration with stakeholders;
- Prepared template by-laws for municipalities to adopt
- Updated LSRCA Stormwater Management Guidelines
- Province updating their SWM guidelines, likely similar requirements
Getting developers on board: *Design Charrettes*

**Aim**

Promote the early integration of LID into site plan design

**What’s being done**

- Offering design charrettes for new development
  - Defined opportunities & constraints for LID implementation
  - Reducing the number of submissions to reach Final Draft Plan Approval
- Modelling tool to support early design
Providing technical & implementation support

Aim

• Provide technical support for LID design and implementation, as requested for Municipal and Private projects

What have we done

• Ensure municipalities are aware LSRCA staff available to assist / answer technical questions and issues
• Updating LID Guidelines
• Improving ESC inspection process
Building knowledge: *Training, Education, Outreach*

**Aim**

- Provide LID and related training courses for Municipalities and industry.

**What have we done**

- Regularly providing subsidized training opportunities related to design, construction and maintenance
- Updating STEP website: Ontario water resource hub
Taking action: *Funding the fixes*

**Aim**

- Immediate and long term funding.

**What have we done**

- **Immediate funds:**
  - Grant applications and partnership (e.g. LSGBCUF)
  - Reallocating LSRCA funds towards urban restoration

- **Long term:**
  - Supporting municipalities in establishing SWM Utility Fees and Credit Programs.
  - Phosphorus off-setting program
New revenue sources – Phosphorus Offset

- Provincial enabling legislation passed. Pending LSRCA BOD approval
- New & re-development required to ensure zero P exported from site
- If cannot achieve requirement, payment at set price to support offsite P reduction
- Revenue used for urban retrofit (e.g. LID)
- Open and transparent reporting
Taking action: RainScaping Restoration

What is needed

• Revitalized urban restoration program.

What have we done

• New department within LSRCA

• Stewardship Prioritization Opportunities Tool (SPOT).

• Municipal: Pilot projects and incentives

• Residential: Implementing a residential Raingarden Grant Program, downspout redirection program

• ICI: establishing incentive program
Taking action: Municipal LID Demonstration Projects

What was needed

- Demonstration projects to showcase LID, learn a few lessons, make a difference!

What have we done

- Over 10 projects completed and more underway
- Secured up to 2/3 federal funding to complete each project
- Seeking funds and/or assisting municipalities to implement additional LID projects.
## Municipal Pilot Projects

<table>
<thead>
<tr>
<th>Municipality</th>
<th>Feature treated</th>
<th>LID installed</th>
<th>Area treated (ha)</th>
<th>P reduction (kg/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bradford</td>
<td>Town parking Lot</td>
<td>Permeable Pavement/Bioswale</td>
<td>0.29</td>
<td>0.43</td>
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<tr>
<td>Newmarket</td>
<td>Residential Road (Woodland Crt)</td>
<td>Enhanced swale</td>
<td>0.02</td>
<td>0.015</td>
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<tr>
<td>Innisfil</td>
<td>Fire Station parking lot and roof</td>
<td>Infiltration Gallery &amp; cistern</td>
<td>1.05</td>
<td>0.09</td>
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<tr>
<td>Newmarket</td>
<td>Residential Road (Forest Glenn)</td>
<td>Bioswale / biofilters / Raingardens</td>
<td>1.16</td>
<td></td>
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<tr>
<td>Whitchurch Stouffville</td>
<td>Community Park &amp; parking lot</td>
<td>Permeable asphalt/infiltration galleries/raingardens</td>
<td>0.11</td>
<td>0.012</td>
</tr>
<tr>
<td>East Gwillimbury</td>
<td>Municipal office sidewalk/entrance area</td>
<td>Permeable Pavement/Bioswale</td>
<td>1.11</td>
<td>1.21</td>
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<tr>
<td>Newmarket</td>
<td>Recreation Complex – roof &amp; parking</td>
<td>Dry Swales / Permeable Pavement/Bioretetion</td>
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<td></td>
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<tr>
<td>Aurora</td>
<td>Recreation Complex – roof &amp; parking</td>
<td>Permeable pavement, rain gardens</td>
<td>1.98</td>
<td>3.5</td>
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<tr>
<td>Uxbridge</td>
<td>Recreation Complex – parking</td>
<td>Bioswale</td>
<td>1.67</td>
<td>1.7</td>
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<tr>
<td>Barrie</td>
<td>Recreation Complex – parking</td>
<td>Bioswale - Design phase only</td>
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<td>N/A</td>
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<tr>
<td>Barrie</td>
<td>School play area and parking</td>
<td>Permeable Pavement/Bioswale</td>
<td>TBC</td>
<td>TBC</td>
</tr>
</tbody>
</table>
Demonstrating progress: Focused catchments

New monitoring station
Demonstrating progress: Focused catchments

- LID retrofit at recreation Centre (roof and parking lot)
- Street LID retrofit
- Pond maintenance
- School De-Pave
- Residential Raingardens
- SWM guidelines driving LID in re-development
Recreation Centre: Newmarket

- Opportunity and constraints assessment
- Partnership with Town
  - LSRCA: Funding through EC & technical support
  - Town: Funding and project management
- Treat: Roof (flat section), entrance drive and parking lot
- Permeable pavement and bioswale
Recreation Centre: Newmarket

Before

After
Street retrofit: Newmarket

- Major works (water, sewage, Stormwater) planned for street
- Western Creek prone to flooding (flooding challenges well known to elected officials)
- Partnership with Town
  - LSRCA: Funding & technical support
  - Town: Funding and project management
- Strong community focus
- Bioswales and rain gardens
Street retrofit - Town of Newmarket

Before

After
Forest Glen Video
Town parking lot (Bradford)

- Town planning upgrade to Town Parking lot
- With LSRCA support able to include LID
- Permeable pavement and bioswale
Aurora Community Centre
Aurora Community Centre

Before

After
Pilot project: Lesson’s learned

- Financial support needs to align with municipal budget cycles
- No set formula for funds needed to incentivize a project
- Important to be able to demonstrate multiple benefits of LID - especially financial return
- Keep projects relatively simple at first
- Contactor training essential
- Continuous construction monitoring essential
Moving forward

- We’ve made some great progress
- Learned some valuable lessons
- Recognize that need to keep adapting and learning if we’re going to be successful in restoring urban environment!
- Success = move beyond ‘pilot project’ - widespread and rapid restoration of urban watershed
  - What will that take?
Moving beyond pilot projects...

- Significant sustained funding
- Economic justification for investment
- Catchment/watershed based decision support tools to guide: where, when, what types of GI/LID
- Demonstrate that we are making a difference
Thank you