Using the Drainage Act to Promote Low Impact Development

New Horizons in Urban Stormwater Management

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Why Would a GTA CA Want to Explore the Drainage Act?

EXISTING CONDITIONS (15% URBANIZATION)

BUSINESS AS USUAL MANAGEMENT ALTERNATIVE (25% URBANIZATION)

Mississauga resident living in tent since flood
Ken Hills, 60, is one of hundreds living near Cooksville Creek displaced since last week’s storm.
Integrated Stormwater Management

- Treat it where it falls
- Treat it along the path
- Treat it before it goes to your Lake
LID = Low Impact Development
LID = Low Impact Drainage

Landscaped / Surface Features
<table>
<thead>
<tr>
<th>Metric</th>
<th>Criteria</th>
<th>Performance at Elm*</th>
<th>Criteria Met?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peak Flow Reduction</td>
<td>100-Year Post equal to Pre</td>
<td>60% Reduction</td>
<td>N/A</td>
</tr>
<tr>
<td>Runoff Volume Reduction</td>
<td>15 mm</td>
<td>21 mm</td>
<td>✓</td>
</tr>
<tr>
<td>TSS Removal</td>
<td>80%</td>
<td>93%</td>
<td>✓</td>
</tr>
<tr>
<td>Phosphorous Removal</td>
<td>80%</td>
<td>96%</td>
<td>✓</td>
</tr>
<tr>
<td>Effluent Cd Concentration</td>
<td>0.2 μg/L</td>
<td>0.10</td>
<td>✓</td>
</tr>
<tr>
<td>Effluent Ni Concentration</td>
<td>25 μg/L</td>
<td>0.70</td>
<td>✓</td>
</tr>
</tbody>
</table>

WE KNOW IT WORKS, AND YET
WIDESCALE ADOPTION HAS NOT OCCURRED
ITS ALL ABOUT RETURN ON INVESTMENT
How can we Address Pre-Existing Urban Development?

- Mostly privately-owned (up to 85%)
- High level of imperviousness
- Dense storm sewer network

Why would these property owners want to see improved stormwater management?
Taking the Lead

• Properly enticed, private property owners would still need to overcome a number of barriers in order to aggregate their properties

• To stretch offset dollars as far as possible, we should encourage property owners to pool their stormwater resources

• Pooling allows for economies of scale to be realized at the neighbourhood level
Enter the Drainage Act

• Statue law in the Province of Ontario
  – Earliest drainage laws date back to 1835

• The Drainage Act is intended to ‘play nicely’ with other pieces of legislation
Initiating Projects Through Petition

- Almost anyone can petition for drainage. This includes individuals, municipalities and for-profit corporations (signing authority must reside with the petitioner)
- Rural and urban property owners can sign a petition for drainage
- Since the Act specifies an “Area Requiring Drainage” (ARD), and not a “drainage area” or “watershed”, it lends itself well to the Grid Block concept
Defining the Project: Onsite Meetings

• Under the Act, the engineer must hold an onsite meeting to determine the ARD
• Onsite meeting is a good opportunity for land owners to provide project input
• As noted, some clarification as to how engineers may interpret ‘ARD’ is required.
  – Can drainage engineers working in urban contexts interpret the above as areas requiring improved drainage, or low impact drainage?
Engineer’s Report

- Engineers are required by this Act (and others!) to be fair and impartial. They must perform their duties without prejudice, and must make a true report and a promulgate a design which holds above all else the their duty to the public (Section 11).

- O.Reg. 941 77(1): “Practitioner shall act at all times act with (ii) fidelity to public needs”

- O.Reg. 941 77(2): “Practitioners shall (i) regard the practitioner’s duty to public welfare as paramount”

- Under the Act, covered drainage works can be employed (Section 14(2)).
Preliminary Reports

- Section 10(1): When municipalities consider it expedient to do so, they can instruct the engineer to produce a preliminary report, which includes:
  - A sketch of the plan
  - A simple cost estimate
  - If an environmental appraisal is required, it must also be included

- In an urban context this may be akin to a feasibility study

- Section 10(2): Upon filing a preliminary report, council must cause the clerk to send a meeting notice to every landowner within the ARD
Project Costs

• Allowances (for land dedicated to the works, the disposal of spoil, loss of property access, etc.)

• Construction costs (labour, equipment and materials)

• Engineering costs (topographic surveys, public meetings, professional design services, assessments schedules, prepare report, attend report meetings)

• Administrative costs (non-clerical costs incurred by the municipality)
Assessments

• Project costs are initially borne by the municipality before being assessed out to land owners

• Municipalities are eligible for an HST rebate, and pay only 1.76% tax

• The assessment schedules developed by the engineer provide a transparent means to assess all project costs to the parcels of land which benefit from the work’s existence

A note on property taxes:

• General taxes pay the municipality’s portion of the drain costs. However, drainage works are a “user pay system”, so lands within the ARD are informed what their share of construction, O&M and monitoring costs are and are assessed accordingly
Provisions for Future Maintenance

- Future maintenance schedules are developed by the engineer.
- All costs must be assessed for lands within the ARD and accounted for in the assessment schedule.
Future Improvements

- Section 78(1) states that municipalities may endeavour to undertake one or more projects which improve the drainage works, without the need for a petition.
  - “Improvement” is defined under Section 1 as “any modification of or addition to a drainage works intended to increase the effectiveness of the system”
  - If the intended purpose of the works if to alleviate drainage issues – including issues noted under 23(3): “…volume and rate of flow of the water artificially caused to flow”, then improvements by extension would include enhancements to LID features
Appeals

- Ideally, Grid Blocks would be tailored in such a way that only signatories to a petition would be included therein.
  - As part of a neighbourhood-scale design optimization process, engineers may need to include additional properties that were not initial signatories.
  - The financial incentives should be such that push back is limited in the regard. However, having appropriate appeal mechanisms in place is essential.
- Robust appeals system exists within the Drainage Act process.
A Possible Scenario

- A City with a pre-existing utility and credit program “ups the ante” and increases utility rates while also offering up to an 80% credit for areas which meet predetermined water quantity and quality goals.

- Upper levels of government kick in one-time incentives of $100,000 per hectare served by low impact drainage systems that meet stormwater management guidelines.

- The above criteria cause some adjacent landowners to aggregate their properties and submit a petition in accordance with Section 4 of the Drainage Act.
What Could it Look like?

• Business owners get together and petition the municipality on the need for improved drainage
• The municipality must act, and moves to appoint an engineer
• Engineer holds an onsite meeting to define the area requiring improved drainage, determine if petition is valid and to hear landowner concerns. This is where it gets interesting.
Optimizing Grid Block Aggregation

- Property owners want to maximize their credit and also qualify for the grant, but need more property to meet the 1 hectare threshold
- The engineer determines that the petition is valid, but recognizes the value of aggregating more land
- Engineer delivers this information to the municipality, and engineer is asked to develop a preliminary report for the works
- Preliminary report depicts a scheme where private property owners manage creditable amount of stormwater on their properties, as well as drainage from the streets abutting their parcels
The Outcome

- Engineer’s final design allows landowners to receive full credit
- Due to receipt of road drainage, design meets areal requirements and can access one-time grant funding
- Due to receipt of road drainage, property owners receive credit for road lands served as well
A Note on (Good) Designs

- Iterative
- Challenging
- Multi-Objective Optimization
Questions?

www.creditvalleyca.ca/LID
www.sustainabletechnologies.ca