



Thunder Bay Low Impact Development (LID) Training

April 23 – 24, 2019

Building Forward: Critical Processes in LID Construction

Date: April 23, 2019

Instructors: Kyle Vander Linden – Credit Valley Conservation,
Jenny Hill – Toronto and Region Conservation Authority

Course Description:

Construction of LID practices involves techniques and specifications that differ from traditional stormwater management construction practices. Failing to follow proper LID construction processes can result in barren bioretention landscapes, clogged infiltration practices, uneven permeable pavements, and ultimately costly post-construction repairs. Instructors will take participants through the principles of LID construction, highlighting potential errors, lessons learned from various Ontario projects and explain proper techniques.

Learning Objectives:

1. Understand the role and importance of proper construction, inspection and maintenance in an LID practice
2. Identify critical LID construction processes, inspection points and key principles
3. Learn common methods for constructing LID practices and associated materials required for LID construction.

AGENDA	
Time	Task
8:00 am - 8:30 am	Registration
8:30 am – 8:45 am	Welcome & Introduction <ul style="list-style-type: none"> • Housekeeping • Course Materials • Overview for the Day
8:45 am – 9:10 am	What's different about low impact development <ul style="list-style-type: none"> • Types • Functionality • Application
9:10 am– 9:45 am	Critical Processes for LID Construction <ul style="list-style-type: none"> • Siting / Verifying Design • Tender and Contract • Activity 1 – Design Verification
9:45 am – 10:30 am	Preparing for the Pre –Construction Meeting <ul style="list-style-type: none"> • Is critical information missing • Establishing Key Inspection Points • Activity 2 – Inspection Points
10:30 am – 10:45 am	Break

The Sustainable Technologies Evaluation Program (STEP) is a conservation authority initiative. Current partners are:

10:45 am – 11:00 am	Mobilizing, Access and Staging
11:00 am – 12:00	Erosion and Sediment Control <ul style="list-style-type: none"> • Non Structural Elements • Activity 3 –Perimeter Controls and Project Phasing • Structural Elements • Activity 3b – ESC Structural Elements
12:00 – 12:45 pm	Lunch
12:45 pm - 1:45 pm	Plan of Excavation <ul style="list-style-type: none"> • Grading • Granular Backfill • Underground Infrastructure • Activity 4 – Backfill and Subsurface Infrastructure
1:45 pm – 3:00 pm	Coming to Finish Grade <ul style="list-style-type: none"> • Material Testing • Biomedia Installation • Planting • Activity 5 – Bioretention Construction Order
3:00 pm – 3:15pm	Break
3:15 pm – 4:30 pm	Activity 7 – Group Learning or Outdoor LID Tour <ul style="list-style-type: none"> • Permeable Pavers • Porous Concrete • Perforated Pipe • Soakaway Pits

Practical Guidance on Inspecting and Maintaining LID

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Date: April 24, 2019

Instructors: Jenny Hill – Toronto and Region Conservation Authority
Dean Young, Toronto and Region Conservation Authority

Course Description:

Municipalities already face significant challenges in tracking, inspecting and maintaining their own conventional stormwater infrastructure while ensuring practices on private property are also adequately maintained. Integrating green stormwater infrastructure like low impact development (LID) best management practices (BMPs), into municipal asset management programs presents additional challenges, but ways to overcome them do exist. Participants will learn about essential steps in program design, inspection and testing protocols, and the specific maintenance needs for common types of LID BMPs. The experienced instructors will also impart valuable lessons learned from Ontario case studies and life cycle cost comparisons for each type of LID BMP.

Learning Objectives:

1. Identify components of stormwater infrastructure asset management programs that are critical for developing the capacity to manage LID BMPs
2. Recognize key components of LID BMPs that require inspection and maintenance and equipment needs
3. Estimate the inspection and maintenance costs of LID BMPs over their operating lifespan using available guidance and life cycle costing tool

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Time	Task
8:30 am – 8:45 am	Registration
8:45 am – 9:00 am	Welcome & Introduction <ul style="list-style-type: none"> • Housekeeping • Course Materials • Overview for the Day
9:00 am – 9:30 am	Integrating LID BMPs into Stormwater Asset Management Programs <ul style="list-style-type: none"> • New challenges with integrating LID BMPs into existing programs • 10 essential steps to program design and implementation
9:30 am – 10:30 am	Inspection Types <ul style="list-style-type: none"> • Construction, • Assumption, • Routine Operation, • Verification • Troubleshooting
10:30 am – 10:45 am	Break
10:45 am – 11:30 am	Assumption Inspections <ul style="list-style-type: none"> • Types of testing • Liability, risk and warrantee considerations

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11:30 am – 12:00 pm	<p>Permeable Pavements</p> <ul style="list-style-type: none"> • Visual inspection indicators and triggers for follow-up action; • Routine winter maintenance • Options for renewal and ongoing cleaning. • Case studies: CVC Head Office and TRCA Kortright Centre green parking lots
12:00 pm – 12:45 pm	Lunch
1:00 pm – 2:00 pm	<p>Surface Features</p> <ul style="list-style-type: none"> • Visual inspection indicators and triggers for follow-up action; • Surface flow inlets • Vegetation • Routine maintenance; • Case studies: Lakeview bio-swales; County Court Blvd. bio-filter swales.
2:00 pm - 2:30 pm	<p>Subterranean Features</p> <ul style="list-style-type: none"> • Sumps • Perforated pipes and underdrains • Chambers • Wells • Visual inspection indicators and triggers for follow-up action; • Case studies: Etobicoke Exfiltration System; Elgin Mills and Mayfield underground infiltration systems.
2:30 pm - 2:45 pm	Break
2:45 pm – 4:15 pm	<p>Inspection and Maintenance Program Design</p> <ul style="list-style-type: none"> • Estimating ongoing costs using the LID Life Cycle Costing Tool • National benchmarking indicators to compare program cost-effectiveness
4:15 PM - 4:30 PM	Adjourn, Hand in course evaluations

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