Implementing CLI-ECA for Stormwater Infrastructure – Tackling the Forgotten Assets While Incorporating Innovative Soils Research

November 14, 2023

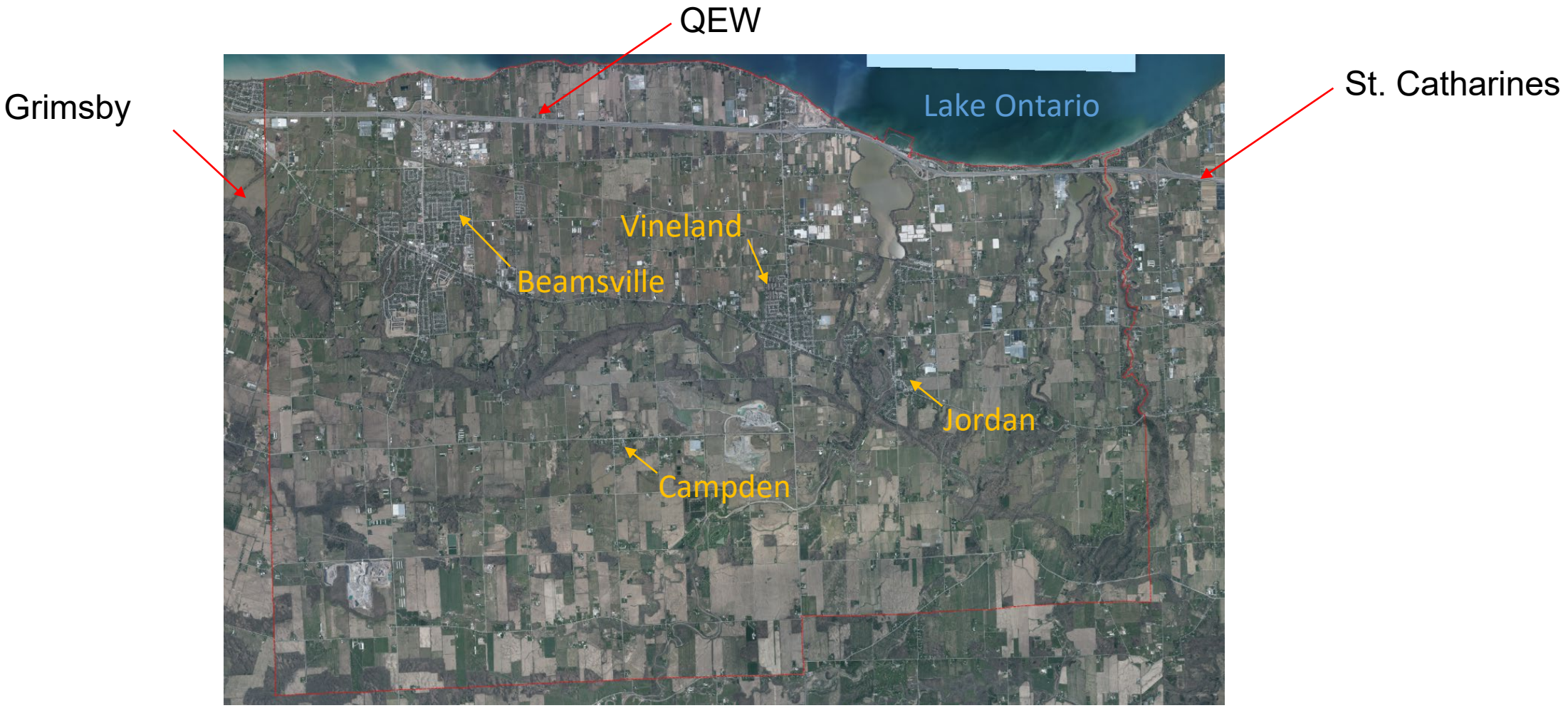
Town of Lincoln

vineland RESEARCH & INNOVATION CENTRE

Agenda

- A little bit about Lincoln
- The CLI-ECA Panic – The “Forgotten” Assets
- What do we even have?
- What are we going to do to inspect, maintain and test?
- How are we tackling new infrastructure?
- Innovation is key – Soil Amendment Research

A little bit about Lincoln



The CLI-ECA Panic – The “Forgotten” Assets

- Focus traditionally on water and wastewater assets
  - Maintenance activities mostly reactive
- Documentation severely lacking
  - As-Builts
  - Mixed Bag of ECAs
  - Staff knowledge
  - Hide and Seek
- Short staff, going through a department reorganization and largest capital and operating program we have ever had
  - What’s another deadline?

What do we even have?

- Traditional/Grey Infrastructure
  - Major/Minor System
  - Ditch/Culvert Network
  - Creeks
  - Stormwater Ponds (Wet and Dry)
  - Oil/Grit Separators
  - More focused on quantity rather than quality control
- Low Impact/Green Infrastructure
  - Soil Cells
  - Bioswale/Rain Garden Pilots

What are we going to do to inspect, maintain and test?

- Annually/Biannually inspect culvert network
- Inspections of ponds in 2023
  - Utilizing information for cleaning/improvement program
- Improved Street Sweeping Program
- Plan for full inspection of piped system in 2025
- Preparation/Formalization of O&M Manuals

What are we going to do to inspect, maintain and test?

- Testing
  - Pond levels
  - Major water courses to monitor
- Future plans for internal system model

How are we tackling new infrastructure?

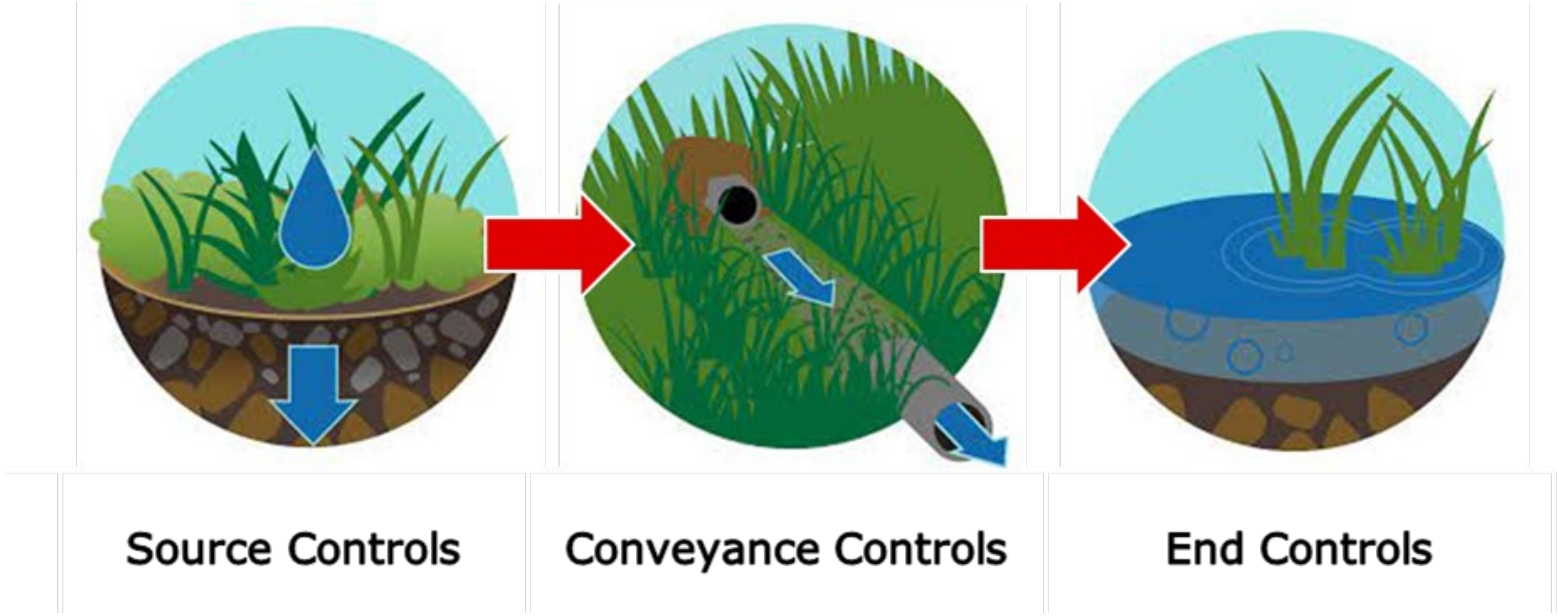
- Working closely with Building
  - Standard wording included from initial consultation and throughout
- Updating Standards
  - Looking at including request to require LID alternatives over typical ponds/tanks
- Working with VRIC for pilot program
- Early internal discussions of stormwater rates

Private System Activities

- Tree and Rain Barrel Program
  - Pilot rain barrel project in high I/I area
  - Town Wide Program
- Low Impact Development Guidelines
  - Leverage other guidelines in Ontario
  - Reference soil types within Town
- Education and Communication

Introduction

Treatment Train Approach:
Is a series of practices that meets stormwater management objectives for a given area. This approach combines lot-level, conveyance and end-of-pipe controls, to meet stormwater objectives.



Introduction

Absorbent Landscaping:

Refers to systems and practices that use or replicate natural processes to support the infiltration, evapotranspiration or use of stormwater.

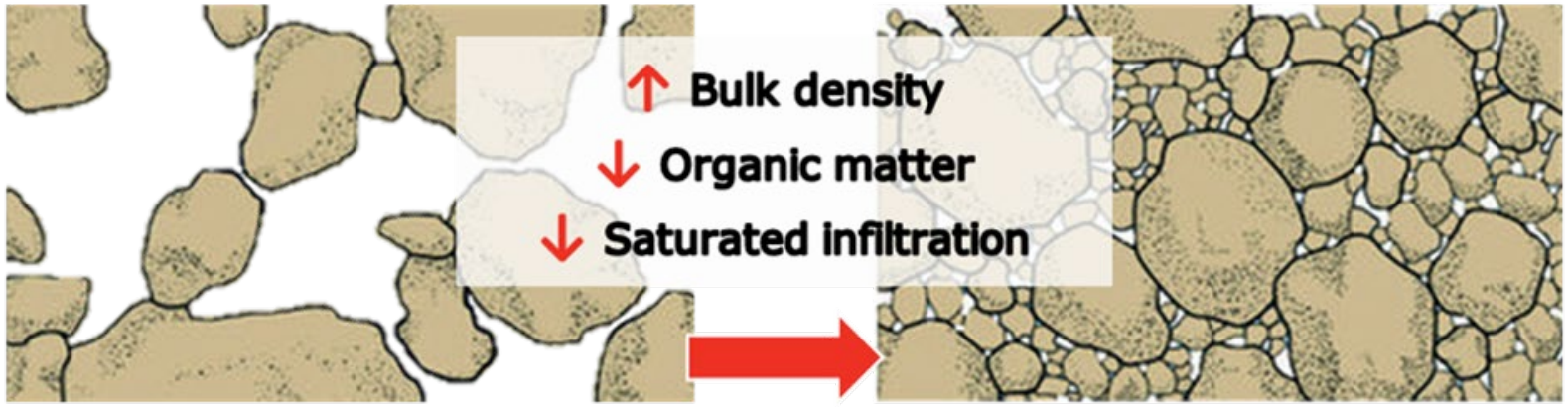
Existing approaches can be inefficient and unsustainable

Healthy soil has the potential to **infiltrate and store** large amounts of stormwater

Maintenance of newly planted trees is costly and difficult to manage

Trees have the ability to **uptake, utilize and release water** back into the atmosphere

Hydrological Function



Compacted soils are **extremely dense** and **difficult to penetrate**, with such low porosity that organic matter, water and air do not readily accumulate in or transfer through soil.

In-Lab Pre-Screening of Organic Amendments

Leaf and Yard Waste

Source Separated Organics

Wood-Based Products

		Organic Amendment	pH	Total Na	OM (%)	Organic C (%)	Nitrogen (%)	C:N	K (%)	P (%)	Ca (%)	Mg (%)	Na (%)
Raw Composts	A01	Source Separated Organics (SSO) Compost	7.8	3.36	35.84	17.92	1.76	10.17	0.687	0.407	6.140	1.603	0.243
	A02	Leaf and Yard (L&Y) Waste Compost A	7.8	2.78	39.55	19.78	1.59	12.42	0.583	0.313	7.703	2.247	0.187
	A03	L&Y Waste Compost B	8.0	3.20	72.66	36.33	1.37	26.53	0.597	0.160	4.113	0.427	0.100
	A04	Aged Bark Fines (ABF)	4.6	0.09	91.44	45.72	0.29	156.04	< 0	0.000	0.337	0.020	0.000
SSO Compost Blends	A05	80% SSO Compost , 20% ABF	7.7	3.29	39.20	19.60	1.56	12.53	0.627	0.367	6.197	1.683	0.223
	A06	60% SSO Compost , 40% ABF	7.6	2.55	45.00	22.50	1.50	15.04	0.553	0.327	5.337	1.340	0.187
	A07	40% SSO Compost , 60% ABF	7.4	2.26	51.53	25.77	1.26	20.52	0.463	0.290	4.680	1.210	0.153
	A08	20% SSO Compost , 80% ABF	7.1	1.34	66.44	33.22	0.97	34.37	0.353	0.273	2.860	0.583	0.113
L&Y Waste Compost A Blends	A09	80% L&Y Waste Compost A , 20% ABF	7.8	3.54	38.07	19.04	1.42	13.42	0.627	0.377	7.530	2.103	0.187
	A10	60% L&Y Waste Compost A , 40% ABF	7.6	3.88	44.17	22.09	1.34	16.49	0.567	0.327	6.363	1.753	0.167
	A11	40% L&Y Waste Compost A , 60% ABF	7.5	2.29	51.36	25.68	1.33	19.38	0.487	0.300	5.480	1.483	0.147
	A12	[illegible] 80% ABF	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
L&Y Waste Compost B Blends	A13	80% L&Y Waste Compost B , 20[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.297	0.060
	A14	60% L&Y Waste Compost B , 40% ABF	6.9	1.38	80.58	40.29	0.94	42.73	0.270	0.080	2.080	0.177	0.033
	A15	40% L&Y Waste Compost B , 60% ABF	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.063	2.087	0.143	0.027
	A16	20% L&Y Waste Compost B , 80% ABF	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Sub Optimal Condition (yellow) | Optimal Condition (green)

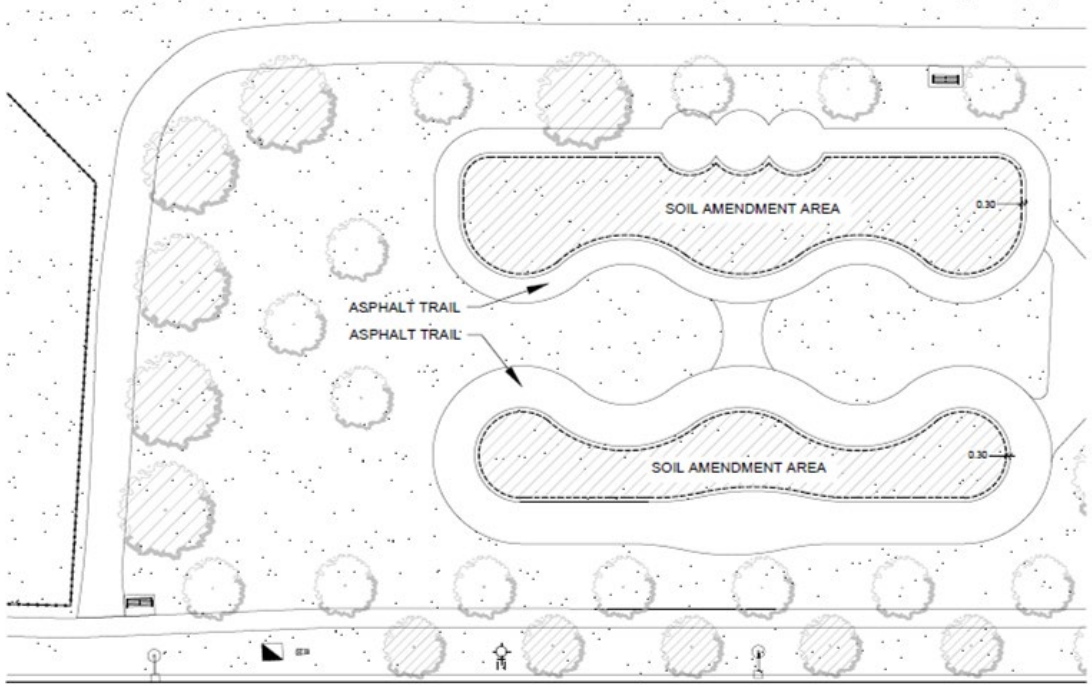
Four raw composts and two SSO compost blends were selected for additional analysis

(6 amendments in total)

Organic amendments to build soil health and develop absorbent landscapes

Town of Lincoln - Ashby Park

Purpose: To develop a stormwater management plan for the proposed development at Ashby Park that would increase the impermeable surface on



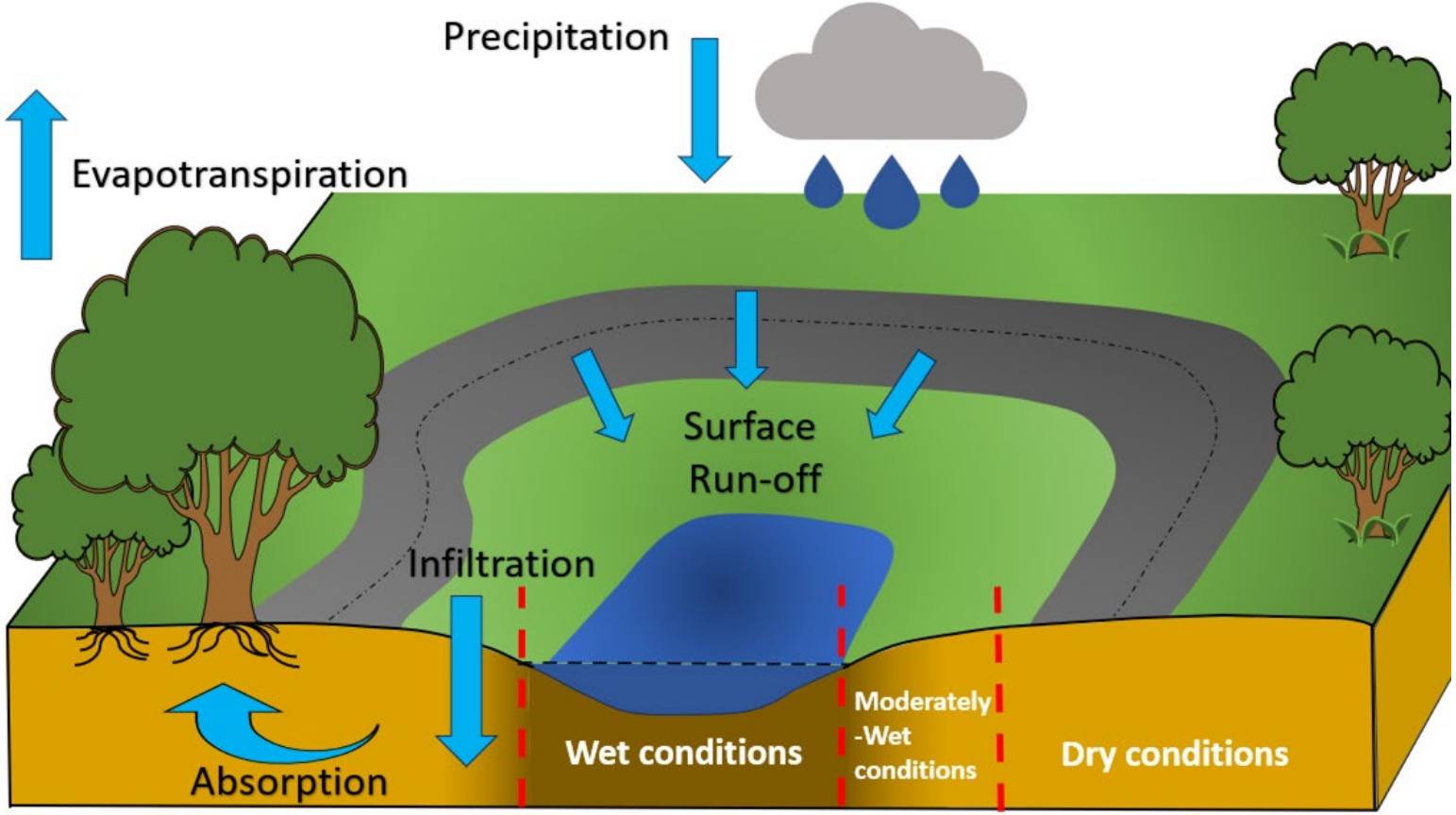
Objectives:

- Provide a cost-effective option for stormwater management.
- Retain and reuse as much water on site as possible.
- Create healthier and supportive soils for trees, shrubs, and turf.

Town of Lincoln - Ashby Park

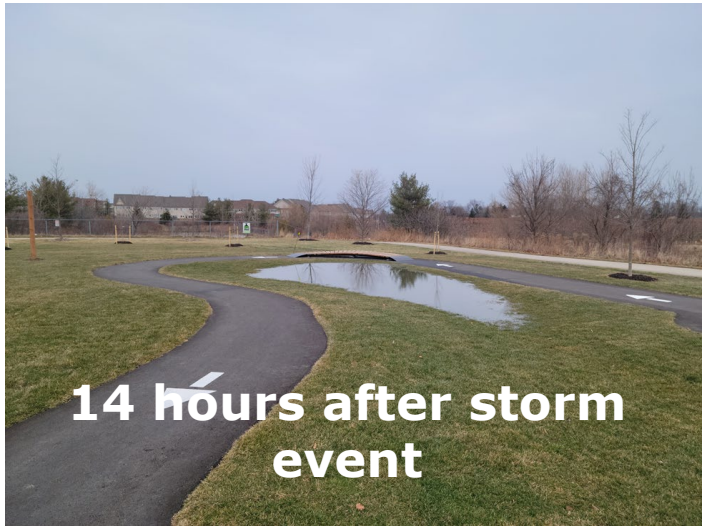
- Created an experimental design for evaluating soil specifications for an soil based LID’s
- Executed and monitored the experiment through to its completion.

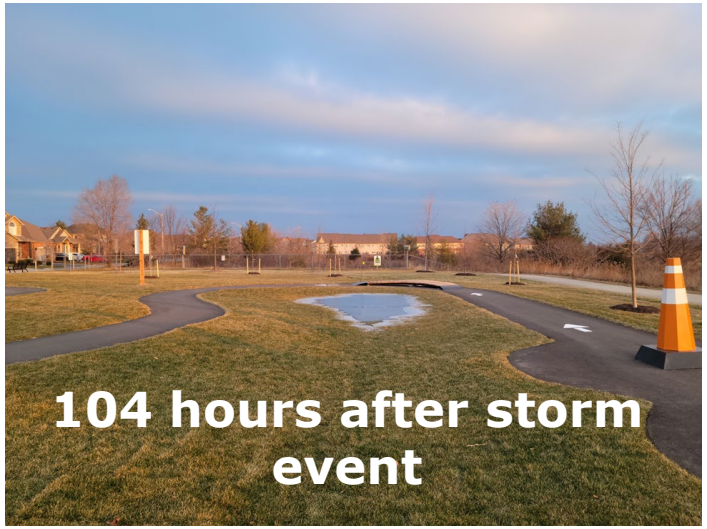
Town of Lincoln - Ashby Park



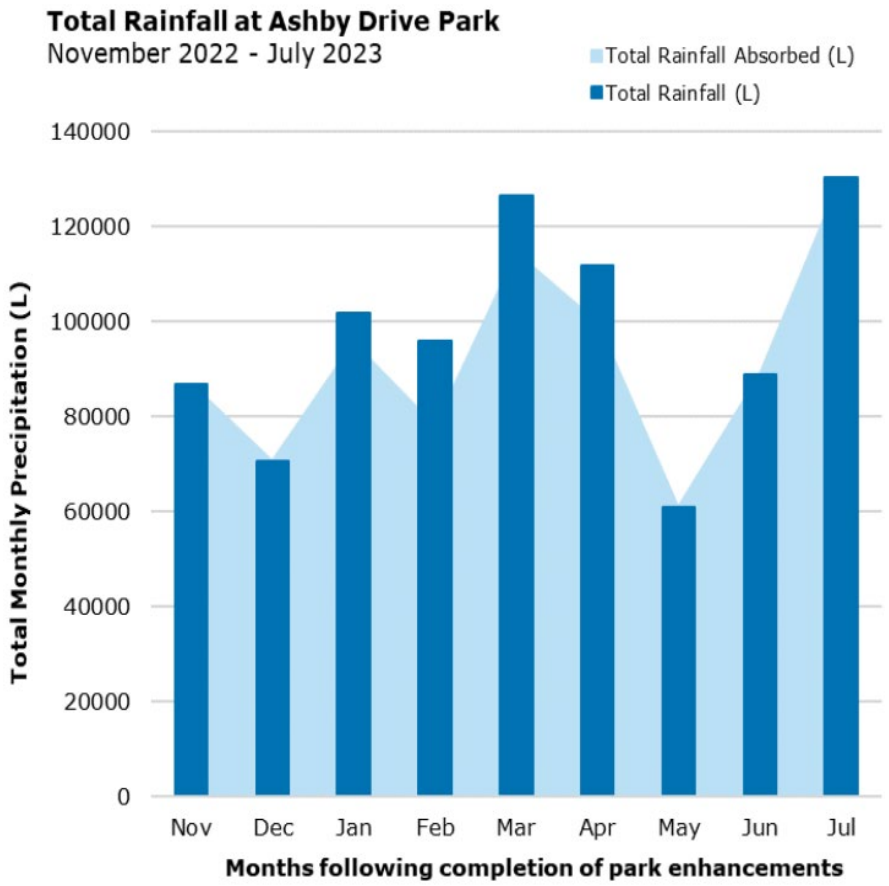
Town of Lincoln - Ashby Park

Monitoring Ashby Park after January 4th, 2023 Storm





Town of Lincoln - Ashby Park



- Ashby Park absorbs ~95% of the total rainfall on site with minimal surface flooding.
- Flooding expected to be reduced following proper tree and vegetation installation.
- **On average Ashby Park has absorbed 91 700 L of rain water per month. That is up to 300 bathtubs of water every month that can be used by trees on site!**

300 x

Contact Us!

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Questions?
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