

# Memo

**To:** Katie Haines, Project Leader – Capital Projects, Transportation and Engineering Services, Town of Oakville.

**Cc:** Lesley Matich, Manager, Science and Monitoring, Conservation Halton

**From:** Bernadeta Surowiec, Specialist, Integrated Water Management, Alexandra Veglio, Specialist, Integrated Water Management, Kyle Vander Linden, Sr. Advisor, Integrated Water Management, Phil James, Sr. Manager, Integrated Water Management, Lana Durham, Program Manager, Stormwater Science and Guidance and Jennifer Dougherty, Sr. Manager, Stormwater Science and Guidance.

**Date:** November 1, 2024

**Re:** Review of Westminster Drive Road Stormwater Design Adherence to STEP Low Impact Development Planning and Design Guidance

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## Introduction

Conservation Halton (CH), Credit Valley Conservation (CVC) and the larger STEP ([Sustainable Technology Evaluation Program](#)) Water partnership want to congratulate the Town of Oakville and its residents on the Westminster engineered green infrastructure road design. Engineered green infrastructure, also known as [low impact development](#) (LID) helps absorb, filter, clean, and cool stormwater runoff protecting Oakville's Lake Ontario shoreline and its community resiliency. LID works in concert with grey infrastructure (pipes, catch basins and manholes) forming a treatment train.

## Purpose

This memo summarizes Credit Valley Conservation's design review comments for Westminster Drive's stormwater design. STEP comments are based upon alignment of the proposed design with [STEP LID design guidance](#). Please note that STEP LID guidance is not a design standard. Rather it provides design guidance for engineers that they can use and adapt to meet technical site constraints.

## Review and Comment Limitations

CVC has provided comments based on the details available in the drawings, background reports, site visits, and consultations with the Town of Oakville and WSP staff.

## Process

To provide accurate comments on the proposed Westminster Drive LID design, CVC thoroughly reviewed background information that included:

- *Westminster Drive Storm Sewer and Green Infrastructure Design Brief*
- *Westminster Drive Hydrogeological Investigation Report*
- *Westminster Drive Water Taking Report and Discharge Report*
- *Coronation Park Environmental Assessment*
- *Soil Characterization Report – Westminster Drive*
- *Geotechnical Investigation Storm Sewer Installation Westminster Drive*
- *LID storage calculations*

CVC, CH, Town of Oakville and the WSP design consultant conducted a Westminster Drive site walk on September 6, 2024. The site walk provided an opportunity to see the site firsthand, ask questions, and better understand site context and limitations. Following the site walk, CVC continued its review of the Westminster Drive LID design and began commenting. Further consultations with the Town of Oakville and WSP occurred between September 16 and September 20, 2024. During the consultations, CVC, Oakville staff and WSP discussed site constraints and their impacts on the proposed LID facilities function, along with potential LID design alternatives.

## Main Comments: Westminster Drive Site Constraints

As part of CVC's typical design review process, it conducts a detailed review of site soil characterization and groundwater conditions. [Tight soils](#) and [high groundwater](#) limit the type and function of LID practices to infiltrate water. Although it is possible to replace tight soils with [engineered soil media \(sand-based soils\)](#) and improve infiltration with [underdrains](#), there are limited design strategies available to minimize the effects of high groundwater on infiltration. High groundwater saturates soils, which removes their ability to store water, creating dead storage. Dead storage occurs when stormwater storage volume is at capacity and cannot be actively drained or released. Thus, this volume storage is not available for the next rain

event. This restricts LID runoff infiltration and results in water ponding at the surface, limiting LID stormwater function.

Because of proximity to the Lake Ontario shoreline, high groundwater limits the Westminster Drive LID stormwater design. [STEP's LID guidance recommends a 1 m separation](#) between the bottom of the LID practice and the high groundwater mark. CVC's review of the *2021 Westminster Drive Water Taking Report and Discharge Report*, along with September 6, 2024, site walk, confirmed high groundwater. The high groundwater mark based upon the report was 0.55 m (1' 10") below the ground surface, with an estimated seasonal fluctuation of 0.45 m. Thus, the seasonal high groundwater mark could be as high as 0.10 m (4") below the ground surface.

Given the high seasonal groundwater mark, sump pumps and resulting saturated soil conditions, surface ponding may be continuous throughout the year. The September 6<sup>th</sup> site visit along with Google Street view photos stretching back to 2018 show water present in several portions of the Westminster Drive drainage swale. In fact, CVC observed wetland species such as duckweed and cattail within the drainage swale in the proposed project areas (from the south leg of Viewbank Crescent north to Hixon St) which indicates long stretches of saturated conditions.

The proposed LID feature is categorized as an infiltration chamber system that recommends 1 m separation between its bottom and the high groundwater mark to ensure infiltration of received drainage. For installation and operation, the LID tank requires a minimum depth ranging from 1.319 m to 1.624 m or 4' 4" to 5' 4" based on design drawings provided by the manufacturer. When adding the 1 m separation between the bottom of the proposed LID practice and the seasonal high groundwater mark, that depth range increases from 2.319 m to 2.624 m or 7' 8" to 8' 8". Thus, depth to groundwater of 0.55 m to 0.10 m below surface level is inadequate for the installation and operation of the proposed LID tank based on its depth requirements. The LID tank installation beneath the high groundwater mark would not contribute any additional storage or benefit to the Westminster Drive drainage swales.

Based on CVC's experience with inspecting and monitoring other LID projects affected by high groundwater, they face multiple challenges with operation, maintenance and performance. Costly repairs are typically required, which still may not benefit long-term performance. By considering other LID types and designs that account for high groundwater, these challenges can be avoided. The Town of Oakville could consider LID types that primarily filter rather than infiltrate.

## Conclusion

Credit Vally Conservation's conclusions on the planned engineered green infrastructure for Westminster Drive are as follows:

- **Stormwater Infiltration:** Due to the high groundwater table, Credit Valley Conservation recommends that the Town of Oakville consider alternative Low

Impact Development (LID) designs that filter rather than infiltrate. This may include [enhanced ditches with underdrains](#) connected to catch basins, where feasible. This type of practice filters, cools, and cleans stormwater as it flows downstream.

- **Manufactured treatment devices:** CVC commends the implementation of pollution control measures for pre and post treatment. CVC recommends manufactured treatment devices that enhance the collection of sediment, debris and leaf litter within the catch-basins. Concentrating collection of sediment and debris within the catch-basin will ease maintenance and operations and preserve the long term function of the LID feature. Further, a hydro-dynamic separator like an oil and grit separator (OGS) could be a final post treatment before drainage outflows to Coronation Park and Lake Ontario.
- **Soil Amendments:** The placement of permeable soils in suitable locations where feasible could help address the saturated ditches along Westminster. STEP wiki guidance has two filter media blends to consider: [drainage rate priority or a water quality treatment priority](#). CVC also recommends using sod species that thrive in sandy and loamy soils to support filtration.
- **Underdrain:** The use of an underdrain within the enhanced ditches helps convey filtered water and drain surface ponded water. By draining water quickly, capacity for future rain events is made available.
- **Tree Preservation:** CVC supports the Town's mission to preserve trees whenever possible. Trees play a significant role in stormwater management through tree canopy capture, uptake up of water, and loss of water through evapotranspiration

Moving forward as the detailed design drawings are finalized, Credit Valley Conservation is available to provide supplemental information and/or engineered green infrastructure specifications to support the Town and the construction of Westminster Drive.

## Contact

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