

May 29, 2018



City of Burlington Conservation Board
149 Church Street
Burlington, VT 05401

RE: *Champlain School Improvements: Preliminary Stormwater Design*

ATTACHMENTS: A-1 Existing Drainage Map
A-2 Proposed Drainage Map
A-3 Soil Characterization Report
A-4 HydroCAD Report (1 and 10 year-24 hr. storm)

Dear Conservation Board Members:

This memorandum provides a summary of the proposed post construction stormwater management system for the Champlain Elementary School campus located at 287 Shelburne Road in Burlington, VT. Information on existing site conditions and proposed stormwater approach are provided below. Supporting drainage maps, soil testing, and preliminary runoff calculations are provided as attachments to this memorandum.

A. Regulatory Context:

1. The project will require an Operational Stormwater Permit through the Vermont DEC as the project is a common plan of development with the greater Champlain School campus. The project also requires review by the Conservation Board and under Chapter 26 through the City of Burlington regulations.
2. The project site is within the Englesby Brook watershed. As part of the City's Municipal Separate Storm Sewer Permit (MS4), the City is obligated to restore the flow conditions within Englesby Brook as it presently does not meet water quality standards. Restoring flow conditions is accomplished by managing large areas of existing impervious surface that presently do not have flow control. This project will accomplish the goal of reducing flows in Englesby Brook and helping the City meet its flow restoration obligations, by managing the Facilities building and parking lot in a gravel wetland treatment system.
3. Under the State Water Quality Bill, the Vermont DEC will be regulating existing sites with 3 acres or more of existing impervious surface and requiring stormwater retrofit. The Champlain School campus would likely meet this threshold. Proactively applying stormwater treatment to existing impervious surfaces as proposed will help the City meet this future requirement.
4. The Municipal Roads General Permit issued by the Vermont DEC requires the City to address hydrologically connected outfalls that are exhibiting erosion. The existing Facilities building and

parking area presently drain to a hydrologically connected outfall along Englesby Brook that is highly eroded. The proposed project will stabilize this eroded outfall thereby helping the City meet its obligations under this permit requirement.

5. The Lake Champlain Phosphorus TMDL will require the City to develop a Phosphorus Control Plan (PCP) as part of MS4 requirements. Controlling phosphorus from developed lands includes retrofitting existing impervious surfaces that are not presently being managed, such as the Facilities building and parking. The proposed stormwater treatment system that will manage this runoff is a gravel wetland, which are very effective treatment systems for phosphorus control. The 2017 Vermont Stormwater Management Manual (VSMM) states that gravel wetlands can provide up to 80% removal of phosphorus from stormwater. The management of the existing impervious surfaces through filtration in the gravel wetland, and stabilization of the existing eroded outfall, will reduce the overall phosphorus discharge from the site thereby helping the City meet future PCP goals.

B. Existing Conditions:

1. Site Description: The facility is located at 287 Shelburne Road and consists of an existing building and dirt/gravel parking area. The area proposed for the new school building and parking is wooded and open undeveloped land.
2. Drainage Pattern: The majority of drainage from the site flows to a catchbasin and pipe system that discharges to Englesby Brook at an eroded outfall point.
3. Existing Impervious Cover: Presently approximately 2.11 acres of impervious area covers the study site area.
4. Existing Peak Discharge: The predicted peak discharge for the 10-year, 24-hour storm is 2.80 cfs. The 10-year 24-hour storm is required to be controlled to pre development levels under the 2017 VSMM.
5. Soil Conditions: On April 24th, 2018 a series of tests pits were completed by Watershed to characterize soils. The soil characterization of the test pits showed that high groundwater conditions covered the site, with observed seasonal groundwater table evident as shallow as 9 inches from the surface.

C. Proposed Conditions:

1. Drainage Patterns:
 - DA1: Existing access from Shelburne Road. The access road will drain into a proposed dry swale and then into the existing stormwater wetland treatment system adjacent to the site.
 - DA2: Proposed parking area. Runoff from this area will drain to a proposed dry swale and then into a proposed gravel wetland treatment system.
 - DA3. Undeveloped land. This area of undeveloped land will drain overland to Englesby Brook as it does presently.

- DA4. Proposed building rooftop. The proposed school building rooftop will drain to the proposed gravel wetland treatment system.
 - DA5. Existing building rooftop and parking. The existing facilities building and parking area and relocated salt shed will drain to the proposed gravel wetland treatment system.
2. Proposed Impervious Cover: A net increase of 0.70 acre of new impervious area is proposed, which includes the new school building rooftop and parking area, and the relocated salt shed. A total of 2.81 acres of impervious area is proposed to be managed in the new stormwater system, which includes the 2.11 acres of existing impervious surface.
 3. Proposed Peak Discharge: The proposed peak discharge for the 10-year, 24-hour storm event without any control is 5.09 cfs. With the addition of flow control provided by the gravel wetland, the peak discharge is reduced to 1.52 cfs, which is below the existing peak discharge of 2.80 cfs.
 4. Proposed Infiltration/Water Quality System: The proposed dry swales in the new parking area and along the existing access road will be constructed with a subsurface sand layer for filtration. Though underdrains will most likely need to be provided given high groundwater conditions, a stone sump below the underdrains will allow for infiltration during times of low groundwater table conditions.
 5. Proposed Detention/Water Quality System: The proposed gravel wetland will provide treatment by routing stormwater flows through a subsurface gravel layer. The system will provide flow control by allowing pond and a slow release of stormwater through a controlled orifice.

D. Summary:

The proposed stormwater management plan goal is to address the presently deficient stormwater conditions at the site by managing existing impervious surfaces, and managing the proposed impervious surfaces associated with the new school and parking lot. Comprehensive management of the site will benefit the watershed and the City permitting goals by providing a net water quality improvement to Englesby Brook and to Lake Champlain.

Sincerely,



Andres Torizzo, WCA Principal