## Scott Gustin

**From:** Peter Smiar <psmiar@cea-vt.com>
**Sent:** Wednesday, February 18, 2015 10:14 AM
**To:** Scott Gustin; Megan Moir
**Cc:** Greg Johnson; Bruce Baker; Arthur Chukhman; 'Greg Doremus'
**Subject:** 289 College Street - Stormwater Technical Submittal Package
**Attachments:** C1.3 289 College Drainage 2-17-15.pdf; C2.0 289 College Details.pdf; C2.1 289 College Details.pdf; SW1 289 College Prop Storm.pdf; SW2 289 College Ex Storm.pdf; SW3 289 College Storm Maint Plan.pdf; 289 College St Modeling.pdf

**Follow Up Flag:** Follow up
**Flag Status:** Flagged

Hi Scott and Megan,

Please find accompanying plans and supporting information submitted for review by DPW, and by the Conservation Board in preparation for the board's March 2nd meeting. The following narrative describes the site and the proposed treatment design. The proposed project generally consists of a new building addition at the west side of the existing building.

**Existing Conditions**
Runoff from the rear of the existing building and gravel parking lot flows west across lawn areas where it crosses the property line and flows behind (south of) the existing building to the west (study point #1). From there it drains across an existing paved parking lot which drains via sheet flow and pipe flow to the combined system at the intersection of College Street and North Union Streets. Runoff from the front of the existing building and a portion of the existing paved driveway drains toward College Street and flows along the curb line (study point #2) and into a catch basin at the same intersection with N. Union St. This is the common downstream point within the City collection system. Because runoff from the site converges at this common point and the travel time to the system is relatively short, the combined contributing peak flow to the system at both study points is used as the peak flow target for the project.

**Soils**
CEA performed test pits in November 2014 which revealed about a 3' deep layer of fine sandy loam atop a saturated clay layer. Seeps were present and mottling in the soil profile indicated a seasonal high water table at 20" depth.

**Stormwater Treatment and Drainage Considerations**
The relative elevations of the clay layer and water table unfortunately presents a challenging soil profile in which to infiltrate a significant amount of runoff. The proposed system will need to provide detention of flows during large storms to meet its flow targets.

We did not want to significantly alter the flow pattern behind the neighboring building at study point #1. Given our past experience with issues with runoff on the hill in Burlington, it was decided that the preferred option would be to treat and detain the runoff onsite before directing any overflows to the City collection system, and to eliminate the existing flow pattern from the rear of the site and provide a more stable connection point in order to protect downstream properties.

**Proposed System Description**
The proposed system consist of two treatment areas. Runoff from new and existing rooftop areas at the front of the building will drain via new stone drip edge into a new raingarden courtyard area which has been designed to provide volume uptake via soils and plantings, as well as temporary detention during larger events. A typical cross section of this

system is shown on detail sheet C2.1. Runoff from the remaining new rooftop and the redeveloped parking area will be directed to a large diameter underground pipe which will detain runoff and provide flow control prior to discharge to the city system. Both of these systems will drain via new 15" connection pipe to the City's combined sewer line under College Street.

**Treatment Targets**

*1-Year Event*

The system has been designed to provide a match of the peak flow rate from the site during the 1-year storm when modeled as if 50% of the existing impervious surface were meadow. This results in a flow target of 0.58 cfs. The attached modeling results show that the proposed system meets this flow target at the new connection manhole in College Street. It should be noted that the attached modeling calculations do not take into account any volume reduction accomplished by soils and plants within the raingarden. References (NY State Storm Manual and others) allow for a reduction of 40% of the first flush volume (0.9"), which equates to 0.36" of rain or 17% of the 1-year storm volume draining to the raingarden.

The pipe detention system at the rear of the site uses a control structure with an small diameter orifice to detain flows to meet this standard.

Summary: Q-1 peak rate w/ 50% meadow **= 0.58 cfs**, Proposed Q-1 peak rate =**0.58 cfs minus volume reduction**. This results in a 41% decrease over existing conditions.

*10-Year Event*

This flow target is achieved by matching the existing peak discharge rate from the site to the City collection system. The system accomplishes this by detention in the raingarden and in the pipe detention system.

Summary: Q-10 existing peak rate = **1.78 cfs**, Proposed = **1.72 cfs**

This concludes our summary of the proposed treatment system for the project. Please feel free to contact our office with any questions or if any additional information is required.

Thanks,

Peter

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