

Site A-5: Warehouse and Motor Pool

Perimeter Sand Filter/ Green Roof at Stormwater Hotspots

Project Summary



Parameter	A-5a	A-5b
Impervious Cover Treated (acres)	1.33	0.93
Runoff Reduction Volume (cu ft per 1" rain event)	0	1,444
TN Removal (lb/yr)	4.63	8.0
TP Removal (lb/yr)	1.25	1.1
TSS Removal (lb/yr)	212.96	284
Estimated Cost	\$56,000	\$545,400

Site Description

The proposed retrofit concept is located on the UConn Campus at the motor pool and warehouse east of the facilities building (Figure 1). The motor pool's parking area is entirely impervious, with some indications of oil spillage near the fueling area. The warehouse has a large, flat roof.

Existing Conditions

Runoff from this site is captured in an enclosed storm drain system. Although there appears to be a trap to capture drainage from inside the building, presumably leading to the sanitary sewer system, there is currently no stormwater treatment on the site. Consequently, the potential for automotive contaminants (i.e., oil, antifreeze, brake fluid) to come into contact with stormwater is high (Figure 2).

Proposed Concept

Install a perimeter sand filter to capture motorpool parking lot runoff (Site A5a), and a green roof on the rooftop (Site A5b). Convey overflow from these practices to the existing storm drain system.

Figure 1. Drainage areas to two proposed practices, a sand



filter (A5-a) and green roof (A-5b).

Figure 2. Motorpool parking lot (top) and existing external



rooftop drains from warehouse to storm drain (lower).

Preliminary Concept Designs

A 25% concept design for the proposed retrofit can be found in attachment B, which includes preliminary plan views, cross sections and project details. These initial plans will require field survey

and more information on drainage pipes and utilities before going to construction plans.

Preliminary Hydrologic Calculations

Preliminary sizing was completed based on guidance provided in the 2004 Connecticut Stormwater Quality Manual. These computations are summarized in the following table.

Sizing Calculations for Sites A-5a/b		
Parameter	Value	
	A-5a	A5-b
Drainage Area, A (acres)	0.92	0.93
Imperviousness, I (%)	97	100
Volumetric Runoff Coefficient, Rv	0.92	0.95
Rainfall Depth, P (in)	1	1
Water Quality Volume, WQv (cf)	4,600	3,208
Porosity	--	0.4
Depth of the Filter Bed, d (ft)	1.5	--
Hydraulic Conductivity, k (ft/day)	3.5	
Max. Ponding Depth, hmax (in)	12	
Average Ponding Depth, h (ft)	0.5	
Drawdown Time, t (days)	1	
Surface Area Required, Af (sq. ft)	986	
Media Depth Required (in)	--	2.5
Surface Area Provided (sq ft)	600	40,520
Treatment Provided (% of 1")	61	100

Design Considerations

For site A-5a, the depths and locations of storm drainage needs to be confirmed. Available storm drain infrastructure maps suggest that no storm drains exist within the parking lot, or in the adjacent road, but field investigations indicate at least one storm drain structure in the parking lot, and an additional structure near the entrance of the lot treated by practice A-5a. Mapping needs to be validated.

In addition, the filter at site A-5a is relatively close to mapped water and electric lines. The specific location of these utilities needs to be verified in the field.

For site A-5b, the roof’s structural integrity needs to be verified to confirm that a green roof is a feasible option. Lessons learned from other green roof installations on campus should be incorporated into planning, construction, and long-term maintenance.

Maintenance

The routine maintenance activities typically associated with sand filters (A-5a) and green roofs (A-5b) are summarized in the tables below.

Maintenance Activities for Sandfilters	
Activity Schedule	Frequency
<ul style="list-style-type: none"> Remove blockages and obstructions from inflows. Relieve clogging. Stabilize contributing drainage area and side-slopes to prevent erosion. 	As Needed (following construction)
<ul style="list-style-type: none"> Inspection and cleanup. 	Annually
<ul style="list-style-type: none"> Cleanout wet sedimentation chambers. 	Every 2 to 3 Years
<ul style="list-style-type: none"> Replace top sand layer. 	Every five years

Maintenance Activities for Green Roofs	
Activity Schedule	Frequency
<ul style="list-style-type: none"> Water to promote plant growth and survival. Inspect the green roof and replace any dead or dying vegetation. 	As Needed (Following Construction)
<ul style="list-style-type: none"> Inspect the waterproof membrane for leaking or cracks. Repair as needed. Inspect outflow and overflow areas for sediment accumulation. Remove any accumulated sediment or debris. Inspect the green roof for dead, dying, or invasive vegetation. Plant replacement vegetation as needed. 	Semi-Annually (Quarterly During First Year)