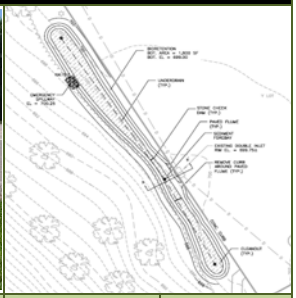
# Site B5: Parking Lot Y

Managing Parking Lots with Bioswales

**Project Summary**



| Parameter | *B5a* | *B5b* |
|---|---|---|
| Impervious Cover Treated (acres) | 1.32 | 0.5 |
| Runoff Reduction Volume (cu ft per 1" rain event) | 2,485 | 1,044 |
| TN Removal (lb/yr) | 14.6 | 6.13 |
| TP Removal (lb/yr) | 1.69 | 0.71 |
| TSS Removal (lb/yr) | 367.18 | 154.29 |
| Estimated Cost | $43,500 | $18,300 |

## *Site Description*

The proposed retrofit sites are located in the grassed area along the western edge of Parking Lot Y on the UConn campus. The Y Lot is a large parking lot (upper lot) currently draining to existing inlets that discharge toward Lot 8 then, ultimately, towards Site B3 (proposed gravel based wetland).

## *Existing Conditions*

The entire lot (2.2 acres) drains towards the western edge of the parking area to one of two inlets along the curb (~1.8 impervious acres). These inlets convey stormwater northward to an underground detention pipe system with an offline Vortechnic device (WQ Unit) in Lot 8.* Snow storage for Lot Y is over the hill and results in large sand deposits beyond the parking lot edge.

**Lot 8 surface drainage appears to bypass inlets at low end of parking lot, likely contributing to slope damage of reinforced slope.*

## *Proposed Concept*

Remove existing curb at each side of double inlets and install paved flumes to allow surface drainage from parking lot to enter forebays of two bioretention cells excavated in existing grassed areas (Sites A and B, Figure 1). Install curb cuts/paved flumes at other strategic locations to better distribute runoff into practices (Figure 2). Bioretention designed with sediment forebays, underdrains, and an overflow mechanism back into existing inlets (Figure 3).


**Figure 1.** Drainage areas to two proposed bioretention cells.

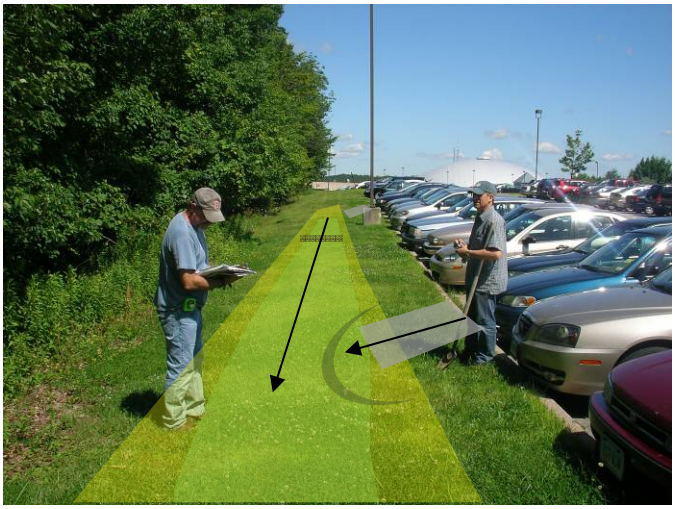


**Figure 2.** Proposed location of bioretention/swale system in grassed edge of Parking Lot Y. Curb cuts allow inflow to forebays at strategic locations along system.

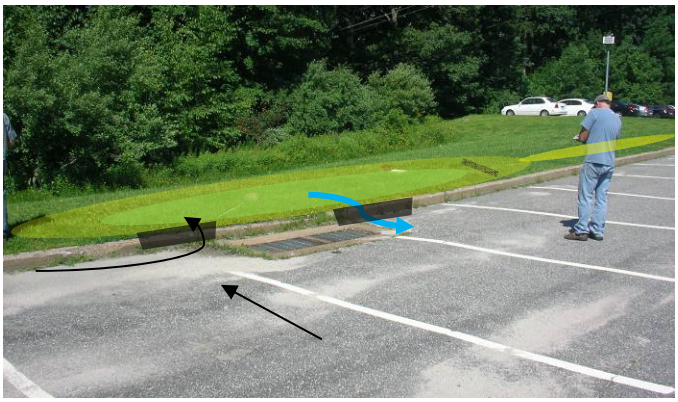


**Figure 3.** Remove curb along sides of double inlets to allow surface runoff into bioretention area through paved flume with riprap channel. Primary overflow where ponded water "backs up" into existing inlet (blue arrow).

Emergency spillways provided (into wooded area). Use shallow swales along full length of parking lot to convey flow to bioretention. Use riprap channels to convey runoff from curb cuts/paved flume to small pretreatment forebays and to dissipate the energy and velocity of runoff. Existing inlet acts as primary overflow and emergency spillway provided for overflow into wooded slope. The bioretention areas should have a filter depth of 24 inches and provide 6-9 inches of ponding depth. Due to the compacted nature of the soils, include an underdrain that ties back into the existing drains.

### *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, utilities, and soils (among other things) before going to construction plans.

### *Preliminary Hydrologic Calculations*

Preliminary sizing of the bioretention area was completed based on guidance provided in the *2004 Connecticut Stormwater Quality Manual*. These computations are summarized in the table below.

| Sizing calculations for Site B5 | | |
|---|---|---|
| **Parameter** | **Value** | |
| | B5a | B5b |
| Drainage Area, A (acres) | 1.5 | 0.6 |
| Imperviousness, I (%) | 85 | 77 |
| Volumetric Runoff Coefficient, Rv | 0.82 | 0.74 |
| Rainfall Depth, P (in) | 1 | 1 |
| Water Quality Volume, WQv (cf) | 4591 | 1740 |
| Depth of the Filter Bed, d (ft) | 2.50 | 2.50 |
| Hydraulic Conductivity, k (ft/day) | 1 | 1 |
| Max. Ponding Depth, hmax (in) | 9 | 9 |
| Average Ponding Depth, h (ft) | 0.375 | 0.375 |
| Drawdown Time, t (days) | 2 | 2 |
| Surface Area Required, Af (sq. ft) | 1996 | *757* |
| Surface Area Provided (sq ft) | 1800 | 1500 |
| Treatment Provided (% of 1") | 90 | 100 |

### *Design Considerations*

- A retrofit of the Y Lot would help reduce the volume ultimately discharging to Site B-3.
- Possible conflict with electric cables and existing light pole(s).
- Compare feasibility of various design alternatives for raising exiting inlet structures.
- Incorporate educational signage.

### *Maintenance*

Maintenance is important for bioretention areas, particularly in terms of ensuring that they continue to provide measurable stormwater management benefits over time. The routine maintenance activities typically associated with bioretention areas are summarized in the table below.

| Maintenance Activities | |
|---|---|
| **Activity Schedule** | **Frequency** |
| • Water once a week during the first two months, and then as needed and depending on rainfall to promote plant growth and survival.<br>• For the first six months following construction, the site should be inspected at least twice after storm events that exceed a half-inch. Inspectors should look for bare or eroding areas in the contributing drainage area or around the bioretention area, and make sure they are immediately stabilized with grass cover. | As Needed (following construction) |
| • Prune and weed bioretention area to maintain appearance.<br>• Remove accumulated trash and debris. | Regularly (Monthly) |
| • Inspect inflow areas/forebays for sediment accumulation and remove any accumulated sediment or debris.<br>• Inspect bioretention area for dead or dying vegetation. Plant replacement vegetation as needed. | Annually |
| • Remove and replace existing mulch. | Every 2 to 3 Years |

### *Cost Considerations*

Added costs if new overflow inlets are required; relocation of electrical lighting a possibility.