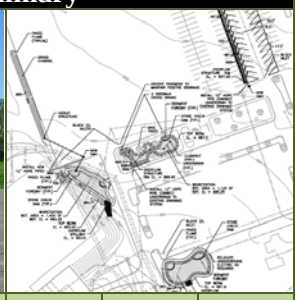
Site B11: Parking Lot W

Managing Parking Lots with Bioretention

Project Summary



Parameter	B11a	B11b	B11c	B11d
Impervious Cover Treated (acres)	0.86	1.38	1.02	0.92
Runoff Reduction Volume (cu ft per 1" rain event)	1,553	1,864	1,932	1,916
TN Removal (lb/yr)	9.12	10.95	11.35	11.25
TP Removal (lb/yr)	1.06	1.27	1.32	1.31
TSS Removal (lb/yr)	229.5	275.4	285.5	283.1
Estimated Cost	$27k	$33k	$34k	$34k

Site Description

The proposed retrofit concepts are located in Parking Lot W in the northern portion of UConn campus near the reservoir and Greek Housing area. This large parking lot is showing signs of decay and is, reportedly, underused.

Existing Conditions

The upper northwest and eastern portions of the parking lot drain out of the watershed. The remaining portions of the lot (~ 6 acres) are divided into four separate catchments that drain to surface inlets. There are currently no stormwater practices treating the runoff. Soils at this site appear suitable for infiltration.

Proposed Concept

Concepts to use bioretention facilities to capture and treat runoff from the four drainage areas:

Area A: Block inlets and use curb cuts/sidewalk cross drains to direct runoff into forebay and bioretention area. Shape cell to avoid existing trees. Overflow to manage/treat drainage area of approximately 1 acre. Underdrain and outlet overflow back into existing stormdrain.

Area B: Remove pavement to install a 5 ft wide bioretention to manage/treat parking lot and upslope pervious area of approximately 2.6 acres. Restripe parking area, bioretention located in island between travel lanes as shown on sketch; no pretreatment, stone check dams.

Area C: Grass channel and/or forebay for pre-treatment flowing into bioretention along edge of lot. Convert existing inlet to manhole at low point, provide positive drainage to grass channel/forebay flowing into bioretention. Overflow via rip rap spillway back into existing drainage feature.

Area D: Block existing inlet and divert runoff to bioretention area via curb cuts/paved flume into forebay then into bioretention. Overflow ties back into existing drainage inlet. No underdrain required. May need to relocate existing electric lines.

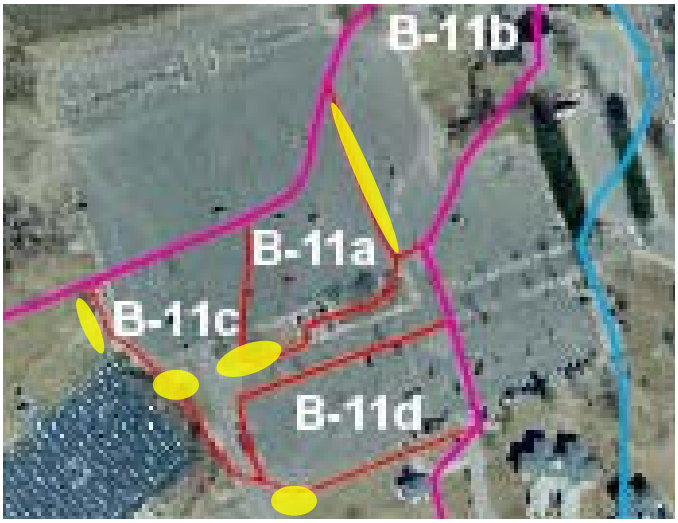


Figure 1. Location of proposed bioretention cells. Two portions of lot drain out of the Eagleville Brook watershed (outside of pink line).

Figure 2. Approximate location of proposed bioretention cells in parking lot. Restriping of lot will be required around landscape island bioretention to alter current traffic flow patterns. Loss of only four or five spaces anticipated.

Preliminary Concept Designs

25% concept designs for proposed retrofits can be found in attachment B, which includes preliminary plan views 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 B11				
Parameter	**Value**			
	A	B	C	D
Drainage Area, A (acres)	0.98	2.57	1.38	1.09
Imperviousness, I (%)	88	54	74	84
Volumetric Runoff Coefficient, Rv	0.84	0.53	0.72	0.81
Rainfall Depth , P (in)	1	1	1	1
Water Quality Volume, WQv (cf)	2972	4962	3598	3193
Depth of the Filter Bed, d (ft)	2.50	2.50	2.50	2.50
Hydraulic Conductivity, k (ft/day)	1	1	1	1
Max. Ponding Depth, hmax (in)	9	9	9	9
Average Ponding Depth, h (ft)	0.375	0.375	0.375	0.375
Drawdown Time, t (days)	2	2	2	2
Surface Area Required, Af (sq. ft)	1292	2157	1564	1388
Surface Area Provided (sq ft)	1125	1350	1400	2200
Treatment Provided (% of 1")	87	63	90	100

Design Considerations

- Existing water lines and drainage pipes at site A to be verified in order to finalize location of inlet and determine if culvert under access road is required.
- Try to protect existing trees during excavation.
- At Site B, the only location for bioretention is island constructed between travel lanes, most runoff will enter in the upper portion, so provide forebay in first cell, may require check dams to terrace facility. Raise existing inlets to act as overflow.
- Design and excavation of bioretention and inlet structures at site C to save large tree.
- Feasible and likely cost effective, though site B is undersized given contributing watershed.
- No significant loss of parking spaces, though lot will need to be restriped.

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. • 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. • Remove accumulated trash and debris.	Regularly (Monthly)
• Inspect inflow area for sediment accumulation and remove any accumulated sediment or debris. • Inspect bioretention area for dead or dying vegetation. Plant replacement vegetation as needed.	Annually
• Remove and replace existing mulch	Every 2 to 3 Years

Other Considerations

It was reported that a stormwater master plan has been proposed that will divert stormwater from this area to Swan Lake, and ultimately out of the watershed.