David Douglas Administration Site

1500 SE 130th

Project Summary	
Project Type:	Public school stormwater retrofit – demonstration project
Technologies:	Redirecting parking lot flows into two bioswales
Major Benefits:	• Removing 1,200 square feet of impervious parking lot area and replacing with vegetated swales • Redirecting 62,475 square feet, or 1.43 acres, of parking lot drainage into two infiltration swales
Cost:	$9,960
Constructed:	March 2005 through June 2007

Overview of the Stormwater System

- Approximately one acre of parking lot drainage to the south of the David Douglas Administration buildings was diverted from an onsite drywell into two infiltrating bioswales.

Figure 1 - site map (south swale sizing modified later)

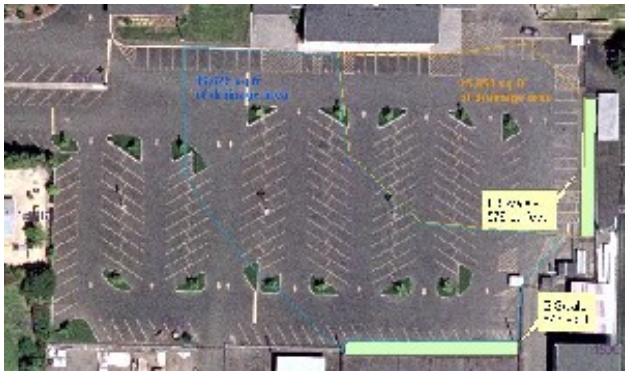

Figure 2 – south swale pre-construction

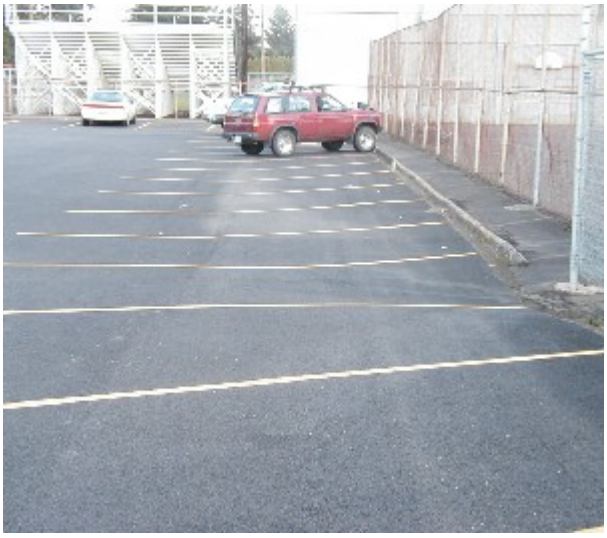

Figure 3 – east swale post construction

Figure 4 – south swale post construction

--Stormwater Capacity and System Components

Stormwater Management Goal

The stormwater facility was designed in accordance with the 2004 Stormwater Management Manual guidance for vegetated swales.

System Components

Vegetated Swales

East Swale

Catchment area: 25,850 sq. ft. *Facility footprint:* 560 sq. ft.

Overflow: At southern end into existing drainage collection system that overland flows into the main parking lot sump

West Swale

Catchment area: 25,850 sq. ft. *Facility footprint:* 640 sq. ft. (this size was modified by original plan, see Lessons Learned section)

Overflow: At west end of the facility into existing drainage sump

Landscaping

While students participated in construction of the project, David Douglas School District horticultural staff installed landscaping. Each swale was planted per the specifications of the city's Stormwater Management Manual. Each 100 foot long swale was planted with five trees, 30 shrubs and about 100 groundcovers. The following species were planted:

Groundcovers

95	Juncus effuses	Common / Soft Rush
110	Scripus Microcarpus	Small Flowering Bulrush

Shrubs

20	Symphorica Albus	Snowberry
28	Vaccinim Ovatum	Evergreen Huckleberry
12	Mahonia Aquafolium	Oregon Grape
12	Cornus Sericea Isantii	Red Twig Isantii Dogwood
8	Rosa Nutkana	Nootka Rose

Trees

1	Cericidiohyllum Japonicum	Katsura Tree
10	Acer Cirinatum	Vine Maple

No irrigation system was provided for these plantings, and hose irrigation will be used during the establishment period.

Budget

The David Douglas Administration Parking Lot project cost $9,960 with $7,050 billed out for student installation labor and materials and $2,000 for in kind work by David Douglas staff. Overall design was completed by Environmental Services staff and David Douglas School District teachers and students. Design was not included in these costs.

Item		Item Cost	DDS Staff INKS	Total Cost
Construction				**$6,142**
Excavation and backfilling of stormwater facility:	Rentals	$930	$1500	
	Student Labor	$1,372		
	New Extruded Curbing	$840		
	Drain Rock / Backfill	$1,500		
	Subtotal	***$4,642***		
Landscaping				**$2,907**
	Plant Material (trees, grasses)	$1,947		
	Mulch	$185		
	Vegetation installation	$275	$500	
	Subtotal	***$2,407***		
Permitting				**$911**
	Site Development + Commercial Building Permit	$911		
	Subtotal	***$911***		
	TOTAL	**$7,960**	**$2,000**	**$9,960**

Budget Elements

Non-construction activities
The cost of design was not included in the budget and was a joint effort of the school district and BES staff. Overall project management was estimated as in kind services.

Construction Activities
The David Douglas School District Construction Technology CAM instructor, Bill Ekroth, managed the construction of this site. Construction Technology CAM students participated in project installation, except landscape installation, which was completed by district horticultural staff.

Cost Components

Construction
Construction cost $6,142 (including David Douglas School District in kind services), or 62% of the overall project cost. The majority of the work was completed by one excavation contractor and proceeded with few issues.

Landscaping
Landscaping cost $ 2,907 (including school district in kind services), or 29% of the overall project cost. These costs were entirely for plant purchase from a native plant nursery.

Permitting
The permits for this project cost $911, or 9% of the overall project cost (excluding volunteer labor).

Cost Comparisons

This project had a relatively simple design: minimal grading of two 6-foot by 96-foot swales (with an additional 8x10 foot section removed in the southern swale) in the paved parking area south of the District Administration offices. Because of student resources and in-kind staff support from the David Douglas School District, this project cost well below the low cost range of swale construction:

$ 0.16 per square foot of impervious area treated
$ 0.12 per square foot of basin constructed

This project is likely a non-replicable example of volunteer and student installed retrofits for existing development.

Maintenance and Monitoring

David Douglas Schools is responsible for the facility and its maintenance. No monitoring will be performed at this site, but BES staff will make regular visits to photograph the site and ensure overall performance.

Public Involvement

David Douglas Administrative parking lot was a very cost effective retrofit site. There was good involvement of students and district staff, but interest waned over the long implementation period. Limited outreach to other school classes and parents has been made.

Successes and Lessons Learned

This project pilot tested a variety of implementation elements including:

- ***Student / teacher led design***. BES and DDS teaching staff met several times onsite to discuss design concepts. DDS teaching staff then finished design and submitted permits. It was good to have such ownership in the project, but it did result in a design that was only partially viable on the southern swale. The swale was initially located at a high point of the parking lot. BES helped modify the design to take out a parking space (approximately 8'x 10') toward the lower west end to provide a bay for flows to back up into the swale, which provided sufficient capacity for the drainage area. A permit modification was made to alter the submitted site plan with the Portland Bureau of Development Services. With some additional fill removal in the center of the swale, the facility seems to be working properly.
- ***Use of extruded curb for parking tire stops***. DDS staff is experimenting with extruded curb sections as tire stops. After almost six months of use, they appear to be working well. At about $40 for each stop, this was less costly than spending between $45 and $80 for rubber or concrete curbing.