

Sunnyside School

3421 SE Salmon Street, Portland, Oregon

PROJECT SUMMARY

Project Type:	Pavement removal
Technologies:	Asphalt removal; porous asphalt; gravel and landscaped areas
Major Benefits:	Approximately 1,615 square feet of impervious area was removed and replaced with materials that can infiltrate stormwater.
Cost:	\$11,890
Constructed:	August 2004 through November 2004

Overview of the Stormwater System

- Asphalt was removed in three locations: in a locked, gated courtyard; near the northwest entrance by the kindergarten; and in four radial strips holding wooden expansion joints in the concrete play area.
- The courtyard asphalt (Figure 1) was replaced with gravels and other crushed rock to allow for infiltration (Figure 2). This removed approximately 1,135 square feet of impervious area.
- The asphalt near the kindergarten area (Figure 3) was replaced with topsoil and seeded with grass, removing approximately 200 square feet of impervious area (Figure 4).
- The radial wooden expansion joints (Figure 5) were replaced with porous asphalt (Figure 6), removing approximately 280 square feet of impervious area.

Figure 1: Courtyard area



Figure 2: Courtyard with crushed gravels



Figure 3: Kindergarten area



Figure 4: Kindergarten area with grass landscaping



Figure 5: Wooden expansion joints

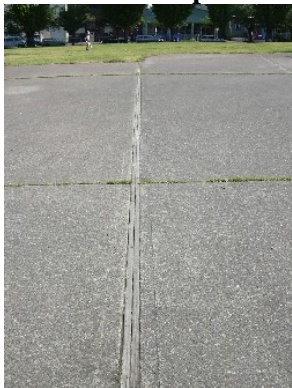


Figure 6: Porous asphalt radials



STORMWATER CAPACITY AND SYSTEM COMPONENTS

Stormwater Management Goal

The stormwater management goal was to reduce stormwater runoff by replacing asphalt with areas that could infiltrate stormwater.

System Components

(See Figure 7.)

Pavement Removal

Approximately 1,135 square feet of impervious area was removed from the gated courtyard and replaced with drain rock. Approximately 200 square feet of asphalt was removed in the kindergarten area and replaced with grass.

Porous Asphalt

Porous asphalt replaced the radial wooden expansion joints on Portland Parks and Recreation property adjacent to the school.

The porous asphalt was dyed harvest gold to tie in to future enhancement projects related to the radial pattern design. The four porous asphalt radials are approximately 6 inches wide and ranged in length, averaging about 80 feet. This area drains approximately 3,000 square feet of playground area.

Landscaping

After the asphalt was removed from the kindergarten area, topsoil was added and seeded with a sterile grass mixture for erosion control. No irrigation was installed for the grass mixture. School students and staff later planted the kindergarten area with decorative flowers, which eventually died out.

Figure 7: Site plan



BUDGET

The Sunnyside School project cost a total of \$11,890, including construction, landscaping, and permitting.

Item	Item Cost	Total Cost
Construction		\$10,886
Construction (including impervious area removal for porous installation)	\$7,606	
BES contract oversight	\$1,075	
Porous asphalt installation	\$2,205	
<i>Subtotal</i>	\$10,886	
Landscaping		\$442
Gravel, topsoil, erosion control grass seed	\$442	
<i>Subtotal</i>	\$442	
Permitting		\$562
Commercial permit	\$562	
<i>Subtotal</i>	\$562	
TOTAL	\$11,890	\$11,890

Budget Elements

Non-Construction Activities

The cost for design and overall project management was not included in the budget because these elements were considered a part of existing staff responsibilities and were not tracked separately for this project.

Construction Activities

A contractor with an existing BES on-call services contract completed multiple school site projects. The contractor billed the work for each school site by general activity (labor, machinery used) and did not break down costs by project activity (excavation, backfilling, grading, landscaping).

Cost Components

Construction

Construction elements cost \$10,886, or 92 percent of the total budget. The manufacturer of the porous asphalt required a minimum production order of 3 cubic yards, which was much more than needed for this project. One cubic yard was used at Sunnyside, and the other 2 cubic yards were used at BES's Columbia Boulevard Wastewater Treatment Plant. Even though the excess porous asphalt was used at a separate site, this increased the price of the porous asphalt actually needed at the school because a minimum order had to be produced, distributed, and installed in two locations.

Landscaping

Landscaping elements cost \$442, or 4 percent of the total budget.

Permitting

Permits costs \$562, or 5 percent of the total budget.

Cost Comparisons

The costs per square foot of mitigated area were relatively high: approximately \$7.35 per square foot.

MAINTENANCE AND MONITORING

Portland Public Schools is responsible for general maintenance of the created landscape area. Sunnyside School is responsible for any future vegetation or other modifications or enhancements to the project sites. BES later gave the school a gift certificate for the purchase of native plants.

PUBLIC INVOLVEMENT

A one-page handout (Attachment 1) was developed to educate the local community about the benefits of the project. Copies were provided for each student at Sunnyside School to take home, and extra copies were provided to school office staff to give to people who had questions (approximately 800 copies total).

SUCCESSSES AND LESSONS LEARNED

Retrofit Projects at School Sites: Projects at school sites should be initiated by the schools when possible. This project was initiated by parents and the PTA, and onsite teachers were introduced partway through the project. If there is not a constant contact person (teacher, parent, or other staff) who advocates at the school and within the school district for a stormwater retrofit project, it is difficult to coordinate with teachers and students for effective outreach and education. This project was also proposed at a time when the school was undergoing grade expansion (from middle school to K-8), and a large magnet program (Environmental School) was establishing itself in the neighborhood. In addition, stewardship-type projects that were initiated by the school took precedence. Given these other activities and priorities, an externally proposed project did not receive a lot of attention or focus. Project initiation by schools would better ensure that issues concerning the school calendar, curriculum, and other school priorities are identified and met.

After construction was complete, school staff and volunteers used project sites for purposes different from those originally proposed. The future option of disconnecting downspouts to the pervious areas was eliminated because the space

Figure 8: Pervious areas being used as storage for future raised garden beds



that would be needed for landscaped infiltration was used for storage instead (Figure 8). Sunnyside also began to vegetate the kindergarten area (Figure 9), reducing opportunities for other stormwater projects at this project site.

Soil Problems: The contractor used topsoil with high clay content to backfill the kindergarten area, which ponded water after heavy rains in fall 2004. Soil types should be carefully checked prior to initial installation. New soil specifications that will be included in the City's 2007 *Stormwater Management Manual* should help address this issue.

Porous Asphalt: It is possible that the porous asphalt is too narrow to be maintained properly or that staff training on proper maintenance practices was inadequate.

Figure 9: Non-native potted vegetation in kindergarten area



Figure 10: Porous asphalt clogged with debris



Sunnyside Elementary School

Innovative Wet Weather Project

September 2004

working for
clean rivers,
healthy
watersheds,
and a livable,
sustainable
community

You've probably noticed construction in several areas on the north side of the school grounds. Portland's Environmental Services is working with Portland Public Schools on a project to reduce stormwater runoff from the school. The project has three parts:

- Removing asphalt from the fenced courtyard area on the east side of the gym and disconnecting four downspouts to allow stormwater from surrounding roofs to soak into the soil;
- Removing asphalt near the doors to the kindergarten classrooms, planting the area with grass and disconnecting a downspout to direct stormwater from the roof to the planted area (students and teachers will add more plants over time);
- Removing thin sections of pavement in the playground and installing porous pavement that lets stormwater soak into the ground.

Environmental Benefits

Removing asphalt lets more rainwater soak into the ground like it did before it was paved over. Instead of flowing into sewer pipes, the water will now help refresh natural groundwater supplies. Stormwater in sewer pipes can cause basement flooding and it contributes to combined sewer overflows (CSOs) to the Willamette River. The plantings will also help shade and cool the building and parking lot, and will provide new wildlife habitat.

A New Look

The courtyard will become gravel, which will be good for environmental education and planting activities. The planter near the kindergarten will be planted with grass now and native plants will be added later. Three gold colored "sunrays" on the new porous pavements in the playground will complement the school's sundial.

Most of the construction will be done by late October. Students will plant native vegetation before next spring.

Environmental Education

Environmental Services has worked with the school to make the courtyard, entry planters, and play area a safe and attractive part of the school grounds, as well as an educational resource. This fall, an Environmental Services educator will teach Sunnyside students about water quality and stormwater management. The activities will show students how to be stewards of the new stormwater management areas on their own school campus.

For More Information

If you have questions or concerns about site activities, please contact: Dawn Hottenroth, City of Portland Bureau of Environmental Services 503-823-7767 dawnh@bes.ci.portland.or.us



ENVIRONMENTAL SERVICES
CITY OF PORTLAND
working for clean rivers