Stormwater Management Plan (SWMP)

Revision Date: 11/05

SWMP Purpose:
Sustainable stormwater management principles are adopted as Portland State University's (PSU) preferred approach for the management of stormwater. These principles have and will be demonstrated in the planning and retrofitting of current and future campus development with the intent of managing all stormwater on site within a 50-100 year time period.

The extent to which the various management practices are selected for implementation will depend on the scale of development, budget limitations, and in-situ environmental constraints, as well as providing for adequate system capacity to protect campus populations and facilities while remaining sensitive to the natural functions.

Campus Inventory:
The PSU campus does not contain, nor is it directly adjacent to any streams, riparian areas, buffers, wetlands, or endangered species habitats. Appendix A contains an AutoCAD rendering of the approximate locations of primary drainage routes, pipes for combined and separate stormwater systems and receiving drains.

From AutoCAD calculations, Portland State University, including the South Park Blocks (which is mainly large trees and turf), has approximately 79% impervious surfaces. If the South Park Blocks are excluded, the impervious surfaces of the PSU campus comprise approximately 89% of the surface area. Considering that PSU is located in the downtown urban core of the City of Portland, it is not anticipated that the impervious surfaces of the campus will be significantly reduced, or that doing so would ultimately benefit the regional environment dramatically. However, efforts will be made to minimize impervious surfaces whenever practical.

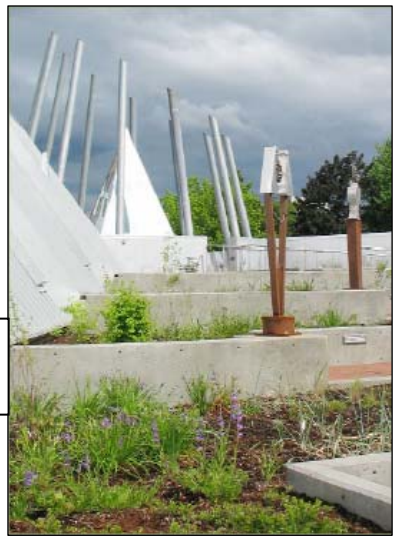
Portland State University has made a conscious effort to improve stormwater management by implementing sustainable design into new and remodeled infrastructure and landscape. Below are several, but not all, examples of such features:

Epler Hall Flow-through planters

12th Ave. Green Street Stormwater Planters

Epler Hall Stormwater Harvesting System

Community Garden



Native American Center Ecoroof

Broadway Building Ecoroof

Science 2 Native Plant Garden

SWMP Goals:

- Decrease impervious surfaces and/or increase stormwater surfaces which allow for water reuse on the Portland State University campus, especially through methods which continue to allow urban density.
- Improve water quality, decrease water runoff peak rate, increase and improve natural habitat systems.
- Decrease resource usage including pesticides, fertilizers and irrigation water.
- Implement designs which allow for stormwater to be reused on-site.
- Decrease sediment losses through sustainable erosion control.
- Implement consistent monitoring and auditing of systems.
- Implement all levels of the Stormwater Management Plan and Integrated Pest Management Plan.
- Become a leader in the research, development and successful implementation of sustainable stormwater management in the Pacific Northwest.

Stormwater Management Principles:

The application of water sensitive planning and management principles involves:

a. Incorporation of water resource issues early in the land use planning and site development/redevelopment processes, and consistent with Salmon-Safe standards. The Portland State University Office of Facilities Planning is charged with reviewing all proposed development projects to ensure that increases in impervious surface can be accommodated in the capacity of the existing and/or committed drainage system.

b. Addressing water resource management at the catchment or sub-catchment level.

c. Future development on the Portland State University campus shall occur based on a finding of adequate stormwater management system capacity to accommodate the proposed development, and consistent with Salmon-Safe standards. Any proposed increase in campus impervious surfaces shall be implemented only upon a finding that existing facility capacity is already on-line to accommodate the increased need, or that additional capacity will be funded and on-line at the time of need. In this respect, the University shall maintain a record of existing and committed impervious surface areas relative to the agency approved permit maximums.

d. Protecting buildings from flooding or damage by surface or groundwater.

e. The use of building structures to serve multiple purposes when appropriate (i.e. greenroofs, rainwater harvesting, etc.)

f. Incorporating stormwater management retention and detention features into the design of parks, walkways, common areas, and open spaces.

g. The use of vegetation (particularly indigenous vegetation) in stormwater management to promote filtering and slowing stormwater runoff to maximize the settling of particulate pollutants and materials

h. Use of slow release fertilizers and/or carefully managed fertilizer applications timed to ensure maximum root uptake and minimal surface water runoff or leaching to groundwater.

i. Avoid the widespread application of broad spectrum pesticides by involving only purposeful and minimal application of pesticides, aimed at identified targeted species.

j. Coordinating pesticide application with irrigation practices to reduce runoff and leaching to groundwater.

k. Incorporating features into the design of fertilizer and pesticide storage, mixing and loading areas that are designed to prevent/minimize spillage.

l. Continually looking for alternatives to traditional pesticide use and stormwater practices, by seeking out natural methods that are also socially and economically acceptable.

m. Educating maintenance personnel about the need to maintain motor vehicles to prevent the accumulation of oil, grease and other fluids on impervious surfaces, where they might be conveyed to surface and ground waters by runoff, and the need to regularly collect and properly dispose of yard debris.

n. Seeking out every opportunity to design all storm water management facilities to retain on-site all volume of runoff generated by the University and not adversely impacting adjacent properties.

o. Vehicles may not be washed onsite. All vehicle washing must be done at a car wash connected to the City sanitary system.

Best Management Practices Implementation Options:

- Reducing high-maintenance landscape areas – can be implemented in any landscaped/turf area.
- Native landscaping - already implemented at various sites, and can be implemented in any landscaped/turf area.
- Onsite detention - implementable where appropriate based on soil conditions and in conjunction with current structures.
- Ecoroof/Garden Roof – appropriate where structurally feasible, such as major structural retrofits or on a new building.
- Stormwater infiltration systems - possible in both new and old buildings, as well as landscaped areas, based on soil conditions.
- Buffer strips - most commonly used at perimeters of development or as parking lots strips.
- Pollutant traps/filters - implementable in existing, new, and retrofit building and land design, based on space availability and site grade (huh?).
- Bio-swale drains - primarily in new design, but planter strips and buffers can be retrofitted.
- Constructed ponds and wetlands - implementable in both new and major retrofits of landscaping, but can be time, space, and capital extensive.
- Pervious paving materials - new and retrofits in light traffic areas, has various design specifications.

Irrigation:

Irrigation is continually reduced where manually feasible, and will continue manually until there is a centrally controlled system in place, which is planned to occur no later than three years. The centralized control system will allow PSU to improve tracking of water usage and soil water content, as well as weather conditions. Such data tracking should provide many more options for reducing irrigation water usage, such as rain shutoff, irrigating based on soil moisture, less lag time between saturation point & irrigation shutoff, etc. Low water use native landscaping design has also been used at PSU to reduce the overall resources needed to maintain landscaping, and will be expanded as budgets and man hours allow.

Current irrigation practices at PSU:

Estimating a 25 week irrigation season – April through October

Approx. 172 irrigation zones on campus.

Turf zone – Rotor (32 zones)
Approx. 10 heads @ 2.5 GPM = 25 GPM per zone
30 minute run time = 750 gal.
4 days / week = 3000 gal. /zone/week

Turf zone – Spray (11 zones)
Approx. 20 heads @ 1.45 GPM = 29 GPM
15 minute run time = 435 gal.
4 days / week = 1740 gal. /zone/week

Shrub zone – Spray (74 zones)
Approx. 20 heads @ 1.45 GPM = 29 GPM
8 minute run time = 232 gal.
3 days / week = 696 gal. /zone/week

Shrub zone – Drip (9 zones)
Approx. 225 GPH
90 minute run time = 337.5 gal.
2 days / week = 675 gal. /zone/week

Tree zone – Bubblers (1 zone)
15 heads @ 1.7 GPM = 25.5 GPM
15 minute run time = 382.5 gal.
2 days/week = 765 gal.

Irrigation Usage Summary:
Rotors – Turf: 3000 gal. x 32 zones = 96,000 gal/week
Spray – Turf: 1740 gal. x 11 zones = 19,140 gal/week
Spray – Shrubs: 696 gal. x 74 zones = 51,504 gal/week
Drip – Shrubs: 675 gal. x 9 zones = 6,075 gal/week
Bubblers – Trees: 51 gal/week

Estimated Total from 2005: 172,770 gal/week x 25 weeks = 4,319,250 gal. used. per irrigation season

Monitoring and Auditing:
Monitoring and auditing of stormwater features is encouraged wherever there is potential or interest. Inspection of maintenance records for stormwater treatment systems will be performed at least annually by the EH&S or Sustainability Office to ensure proper maintenance is being performed as needed. Irrigation water usage is tracked by Landscaping during the irrigating season, and is trended and reported by the Sustainability Office. Specific monitoring may also be required for water quality and runoff rates. PSU allows stormwater management system monitoring by a third party authorized by Salmon-Safe, and fully cooperates with such monitoring in so far as possible, given staffing and funding constraints.

Updates to the SWMP:
At least annually, the Landscaping Supervisor and the Sustainability Office will review the SWMP and make any necessary updates or changes. The SWMP will also be updated whenever new best management practices are employed, or when problems arise. Completion of updates will be noted by the revision date on the SWMP.

Records:
All records will be filed by type and date.

- Stormwater Treatment Systems maintenance inspection reports
- Irrigation water trend reports
- Stormwater test reports, if applicable

Appendix A: AutoCAD Drawing of University District Drainage