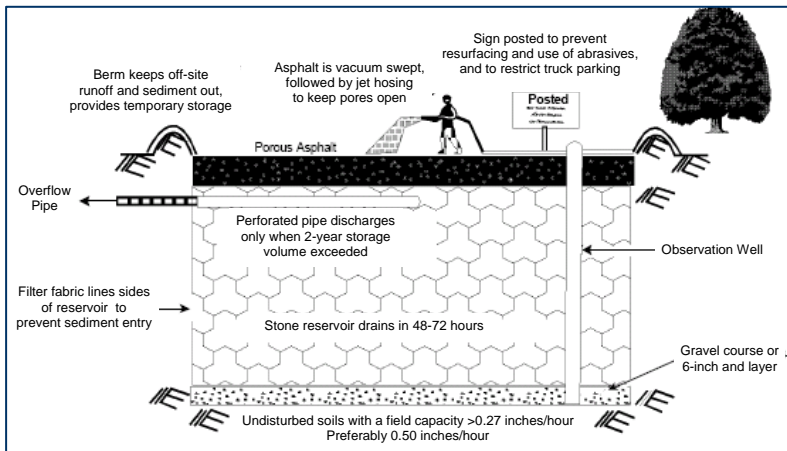


# OPERATIONS & MAINTENANCE

Quality operation and maintenance of habitat friendly facilities is key to the long-term success of a development's ability to meet its water quality and quantity goals. In creating a development plan for a site, designers should keep in mind the owner's long-term ability to operate and maintain a proposed facility. In order to assist owners, designers should prepare an Operations and Maintenance Manual as a reference document. An Operations and Maintenance Manual should include:

- as-built plans,
- operating instructions for weirs and valves,
- a vegetation list,
- vegetation maintenance schedule, and
- maintenance checklists.



## Typical Porous Pavement Installation

Courtesy Storm Water Technology Fact Sheet - Porous Pavement, EPA 832-F-99-023, Office of Water, US EPA, September 1999

## Purpose of this Brochure

This brochure introduces operations and maintenance needs of habitat friendly development practices.

# HABITAT FRIENDLY DEVELOPMENT PRACTICES

## BROCHURE SERIES:

- WHY?
- HABITAT BENEFIT AREAS (HBA)
- SITE ASSESSMENT
- CLEARING & GRADING
- SITE DESIGN & SOLUTIONS
- LOW IMPACT DEVELOPMENT TECHNIQUES (LID)
- CREDITS
- OPERATIONS & MAINTENANCE



City of Beaverton  
Planning Services Division

March 2007

## Website:

[www.beavertonoregon.gov/departments/CDD/habitat.html](http://www.beavertonoregon.gov/departments/CDD/habitat.html)

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# Habitat Friendly Development Practices

## ...OPERATIONS & MAINTENANCE

City of Beaverton



## Eco Roofs and Roof Gardens

*Multnomah County Building,*  
Courtesy: City of Portland

### Inspections:

- eco-roofs 2 times/year & roof gardens 4 times/year

### Log Book:

- inspection dates, observations, horticultural cycles

### Maintenance:

- structural components, drainage components, drain inlets
- minimum 90% coverage, plant removal and replacement
- invasive or nuisance plant removal
- irrigation as needed



## Roof rainwater collection systems

Courtesy: Stormwater Solutions Handbook, BES, City of Portland

### Inspections:

- complete regularly

### Maintenance:

- debris removal from the roof
- gutter cleaning
- downspout screens cleaned and in good condition
- pre-filters cleaned monthly
- filters changed every 6 months
- UV units cleaned every 6 months and bulb changed at 12 months (for potable water)
- inspect, clean, and chlorinate storage tanks quarterly

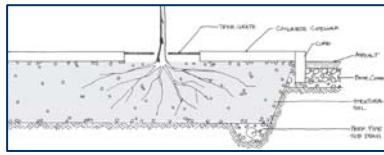


## Raingardens and bioretention cells

*Buckman Heights,*  
Courtesy: City of Portland

### Maintenance:

- watering until plants are established
- erosion control of flow entrances, ponding area, and surface overflow areas
- weeding
- occasional plant material replacement
- annual mulching
- nutrient amendments and pesticide application should not be needed.



## Soil Amendment

*Structural Soils,* Courtesy: City of Emeryville, California

### Maintenance:

- minimize foot traffic and equipment to prevent compaction and erosion
- plant immediately after amending soil
- minimize or eliminate use of pesticides and fertilizers



## Alternative Pavements

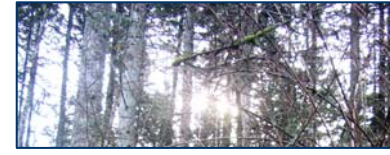
*155<sup>th</sup> Avenue,*  
Courtesy: City of Beaverton

### Inspections:

- several times during the first few months following installation and annually thereafter
- annual inspections should take place after large storms, when puddles will make any clogging obvious
- the condition of adjacent pretreatment devices should also be inspected

### Maintenance:

- manufacturers should be consulted for specific maintenance requirements
- pavers:
  - annual or semi-annual sweeping or vacuuming of surface debris is recommended
  - if clogging occurs, the filtration media below the surface may need to be replaced
- pervious pavements:
  - vacuum sweeping at least four times a year followed by high-pressure hosing to open pores in the top layer and keep from clogging
  - potholes and cracks can be filled with patching mixes unless more than 10 percent of the surface area needs repair
  - spot-clogging may be fixed by drilling 1.3 centimeter (half-inch) holes through the porous pavement layer every few feet.



## Trees

*THPRD Nature Park,*  
Courtesy: City of Beaverton

### Maintenance:

- watering in the summer during the first one to three years
- raking and disposing of leaves and debris annually
- weeding annually
- pruning dead branches annually
- controlling pests



## Contained Planters

*Federal Building, Portland,*  
Courtesy: City of Gresham

### Maintenance:

- watering
- weeding
- checking drainage



## Flow-Through Planters

Courtesy: Stormwater Management Manual, BES, City of Portland

### Maintenance:

- replace overgrown or dead plants
- remove sediment
- clean and repair pipes
- maintain proper drainage
- periodic debris removal from Inlet areas



## Infiltration Planters

*ShoreBank Pacific, Ilwaco, WA,*  
Courtesy: LCREP

### Maintenance:

- replace overgrown or dead plants
- remove sediment
- clean and repair pipes
- clear debris from inlets

See the City's *Habitat Friendly Development Practices Guidance Manual* for additional information on.