impervious

surfaces

SUMMARY SHEET

category: WATER QUANTITY

BMP: POROUS AND MODULAR PAVEMENT

sub-category: IMPERVIOUS SURFACES

OBJECTIVES

To maintain or increase recharge levels by providing a hard pervious surface where an impervious surface is normally used.

WHERE APPLICABLE

Any development where significant areas of parking are proposed, or where plazas or large pedestrian pathways occur in the design.

Porous pavements are applicable on any site providing proper site preparation is exercised. This measure is particularly advantageous for sites in critical recharge areas, providing water does not undergo contamination prior to infiltration.

PROS

1. Maintains groundwater recharge.
2. Reduces load on drainage facilities.
3. Serves as receptor of runoff from impervious surfaces.
4. Aids preservation of natural drainage patterns.

CONS

1. Insufficient data on availability
2. Special maintenance considerations needed to prevent clogging.
3. Possibility of higher construction costs where curbs are necessary
4. Questionable applicability to highly traveled road surfaces.

IMPLEMENTATION CONSIDERATIONS

1. Porous pavement

Local conditions such as soil characteristics, drainage, wearing capacity, traffic load, and storm frequency and volume will dictate the design of porous pavement. Normally, there are four layers in typical asphalt porous pavement

a) open grade asphalt with higher void volume than conventional asphalt
b) washed crushed stone
c) coarser washed crushed stone than (b)
d) uncompacted subsoil

Details on engineering and design considerations can be found in (1) and (5).

a

Incentives that could be offered to developers at the local level are:

1. Increasing allowable parking area if porous pavement is used.
2. Decreasing size of drainage facilities required for stormwater runoff.
3. Offering municipal vacuum sweepers to aid in maintaining performance.

2. Modular Paving

Also a potential option to conventional concrete and asphalt are preformed modular pavers in brick and concrete blocks. These are restricted to well or moderately-well drained soils and flat areas. These have many applications such as road shoulders, outdoor malls, and surrounding tree bases on sidewalks.

For Additonal Information

1. Thelen, E. and Howe, L.F. Porous Pavement. Philadelphia, PA: The Franklin Institute Press, 1978

2. Veltman, J. "Streets That Soak Up The Rain," November, 1973

3. The Franklin Institute Research Labs. Investigations of Porous Pavements for Urban Runoff Control Series. EPA Water Polution Series. Washington: EPA, 1972.

4. Northeast Watershed Research Center, Storm Water Detention and Ground Water Recharge. Univ. Park, PA: USDA, September, 1977.

5. Urban Land Institute, Water Resources Protection Technology, Tourbier, 1981.

b

SUMMARY SHEET

category: *WATER QUANTITY*

BMP: *ROOF COLLECTION SYSTEMS*

sub-category: *IMPERVIOUS SURFACES*

OBJECTIVE

To increase volume of water infiltrated to groundwater supplies by guiding roof run-off to permeable surfaces.

WHERE APPLICABLE

Methods illustrated in this fact sheet are most applicable to residential dwellings. Modifications can be made to allow for sites with poorly drained soils.

PROS

1. Increases recharge volume
2. Helps maintain water budget
3. Reduces load on storm sewers
4. Increases water availability to plants

CONS

1. Adequate infiltration must be provided to accommodate peak roof discharge and avoid erosion
2. Seepage into basements may occur if discharge from downspouts is not directed away from buildings to infiltration devices.

IMPLEMENTATION CONSIDERATIONS

1. New Construction

   Roof gutters should be avoided so that run-off can be dispersed more evenly. If roof gutters are used, as many downspouts as is reasonable should be used to reduce concentration of stormwater. Stormwater from roofs without gutters can be allowed to infiltrate the ground in a variety of ways:

   a) downspouts discharge into a splashblock (concrete) which is placed on a grass apron spanning the perimeter of the building. The discharge is then directed to a sand or gravel-filled, grass, or modular/porous pavement dutch drain(s). Design and sizing should be performed with care (see ref. 1: 1.3, 1.4).
   b) downspouts discharge onto a concrete apron and then to a wide planting bed which has been excavated, filled with a layer of crushed rock, topsoil, then coarse gravel and planted.
   c) downspouts discharge to a perforated pipe which runs into and through a dutch drain.

2. Existing Buildings

   If possible, existing structures should be retrofitted for on-site discharges as described above.

a

For Additional Information

(1) Urban Land Institute, Water Resources Protection Technology, Toulbier, 1981

(2) Volusia County, Florida, The Potential Water Recharge Area Preservation Ordinance

b