

know where
it goes

take simple
steps to reduce
STORMWATER POLLUTION

Permeable Pavement

A valuable green infrastructure tool

Overview

Impervious surfaces such as rooftops, driveways, roads, and parking lots change the flow of water over the land. Conventional stormwater management focuses on quickly removing runoff from a developed area, most often by using pipes to move water to sewers or directly to nearby waterways. In Rhode Island, we know that excessive stormwater runoff entering our coastal waters can cause problems including harmful algal blooms and beach closures. Permeable pavement options make it possible to manage runoff by slowing and dispersing the flow of water, allowing it to soak into soils. ¹

When stormwater is filtered into the ground, natural processes change pollutants into useful soil components, ² keep nuisance flooding down, recharge groundwater supplies, and help to keep drinking waters healthy.

Permeable pavement is a system of load-bearing, durable infrastructure surfaces that allow infiltration of stormwater into the ground. Many, though not all, permeable pavement systems have crushed rock subbases that temporarily store water before allowing infiltration to soil or facilitating drainage elsewhere.



Above, porous asphalt lot at URI with grassed islands that allow stormwater to seep into the crushed rock reservoir that underlies the pavement and the islands. Below, block pavers being installed over crushed rock reservoir at Charlestown Wine & Spirits.

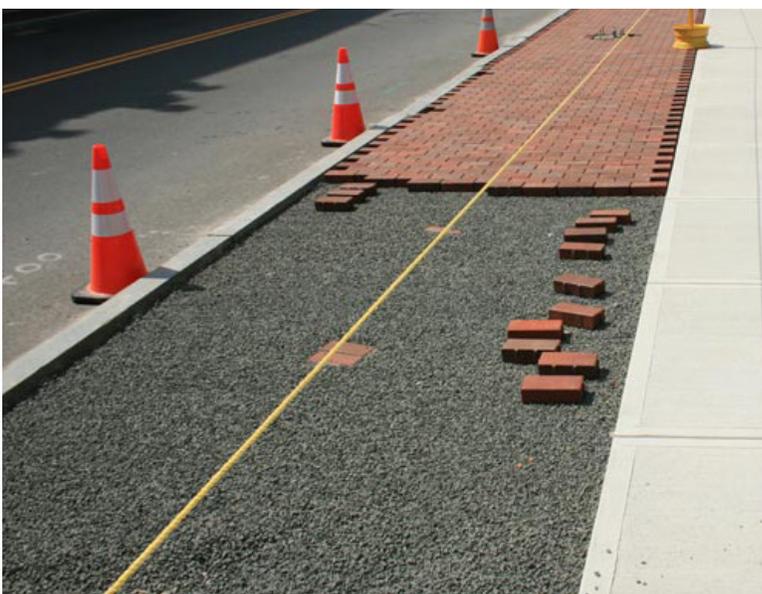


Design Criteria

There are different permeable pavement designs for a variety of uses, such as pedestrian walkways, overflow parking areas, parking lots, and residential roads. In the design stage, a few key factors must be considered when undertaking a project involving permeable alternatives.

- 1. Choose the correct pavement.** Permeable pavement options vary based on light, moderate, or heavy use. In general, plastic grid pavers can be used for light to moderate use, porous pavement is for moderate to heavy use, and block pavers are for the heaviest use. Be sure to find the right material for the expected use.
- 2. Install properly by preparing the subbase.** Choose the appropriate subbase preparation for the application. The type of subbase and depth of the materials determines the amount of infiltration provided, as well as durability over time. In many cases, the manufacturer will install, oversee the installation, or recommend certified contractors.
- 3. Understand and carry out maintenance requirements.** Good maintenance practices are critical to the durability of permeable materials.

Contractors, homeowners, and designers interested in using permeable pavement in LID can visit <https://www.icpi.org/> for more information.



At left, block pavers are installed over the recharge bed. Photo courtesy of University of Connecticut Cooperative Extension.

Role in Low Impact Development

Permeable pavement's primary role in Low Impact Development is to protect water quality by reducing the amount of polluted runoff reaching surface waters, but permeable pavement fulfills other LID functions as well. The use of permeable pavements...

- Reduces the amount of polluted runoff reaching surface waters by allowing runoff to soak into the ground where pollutants will be filtered out.
- Preserves woods and other open spaces by eliminating the need for another surface stormwater treatment system adjacent to an impervious surface.
- Leads to improved drainage so that pedestrians and motorists do not have to contend with large puddles.
- Encourages faster snowmelt and drainage, meaning less snow and ice accumulate, which reduces the need for road salt.
- Is comparable to the cost of impervious pavement plus the cost of a conventional stormwater system.
- Reduces the warming effect in urban areas when conventional asphalt is replaced with block pavers.

Limitations

There are many factors related to location that must be taken into account when installing permeable pavement. Some of the site specifications to consider for permeable pavement are:

- Setbacks are required from various structures to avoid seepage into basements, contamination of groundwater, etc. See *Rhode Island Stormwater Design and Installation Manual*, Table 5-2, for more information.
- Underlying soils generally need to have an infiltration rate of at least 0.5 inch/hr, and soils must be less than 20% clay and 60% silt. ⁶
- The seasonally high water table should be at least three feet below grade and bedrock should be at least four feet below grade.
- May only be used on gentle slopes (< 5%). ⁴



The porous asphalt lot at URI during construction.



Block paver installation on High Street in Sprague, CT. Photo courtesy of the Unilock New York Inc.

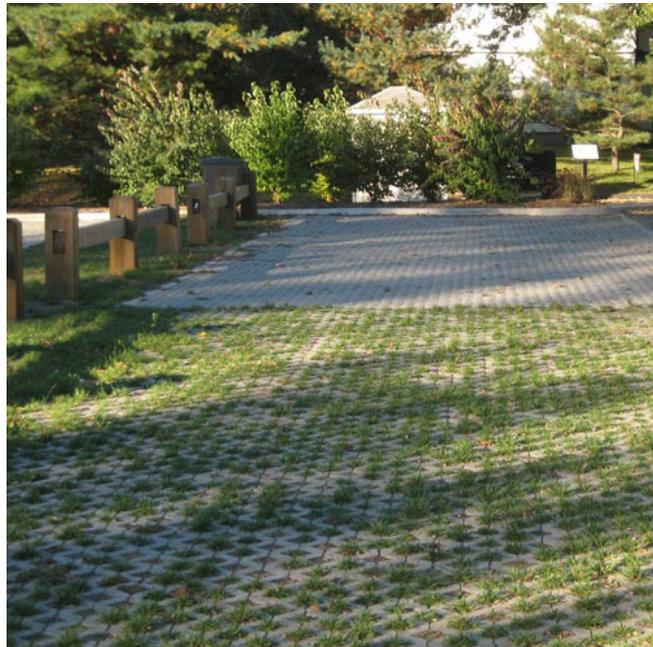


Photo of grass-planted block pavers in grid design courtesy of the University of Connecticut Cooperative Extension.

Sources

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- 4 Massachusetts Low Impact Development Toolkit. "Permeable Paving." Fact sheet. Metropolitan Area Planning Council. Boston, MA. n.d. Web.
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