iTRaC

Helping Communities face the challenges and impacts of growth while maintaining their character and sense of place.

Porous Pavement

iTRaC is the Nashua Regional Planning Commission's new approach to community planning that focuses on integrating transportation, land use and environmental planning. The program was developed to assist communities in dealing with the challenges of growth in a coordinated way that sustains community character and a sense of place.

What is Porous Pavement?

Porous pavement is a type of road way and parking area system that allows for direct infiltration of onsite precipitation. It is an innovative stormwater management application that can help in managing stormwater onsite, rather than utilizing more traditional storm sewer and site drainage systems.

How do Pourous Pavements Work?

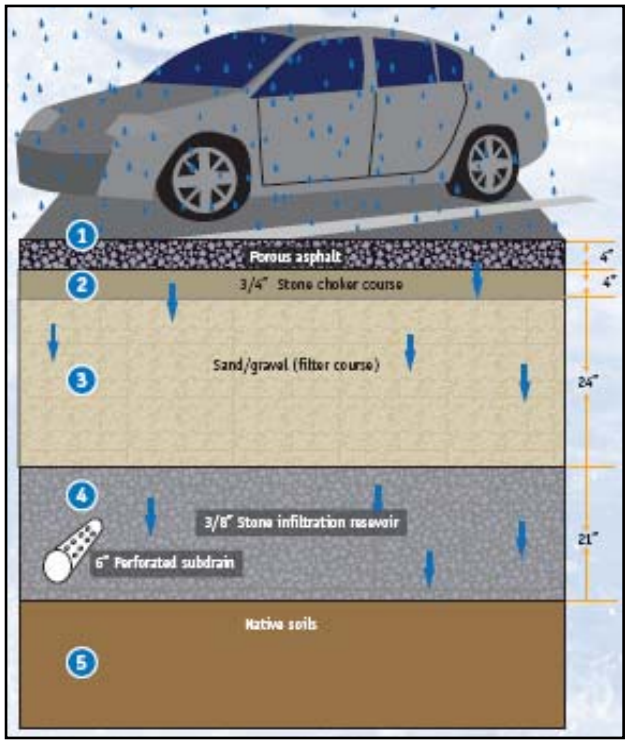
Porous asphalts and concretes have a high void content, or air space (typically 18 - 20 %), which allows water to very quickly infiltrate directly into underlying native soils. This prohibits both pooling of water on the surface and off-site transport of pollutants and nutrients. With pourous pavement, stormwater infiltrates downward in the soil column rather than moving laterally through storm drains or surface waters.

Porous pavements are constructed differently than traditional surfaces. They are specifically designed to create an increased infiltration capacity while preserving structural integrity. Porous pavements consist of three primary layers: porous asphalt at the surface, a stone base, and a fine filter material (ex. sand) as the sub-base.

The benefits of using porous pavement include:

- attenuation of off-site peak flow discharges, in terms of both rate and time
- improvement of water quality in any remaining off-site runoff
- recharge of groundwater resources
- reduced need for plowing and salting applications

Cross-section of a Typical Porous Pavement System



Source: University of New Hampshire Stormwater Center 2007 Annual Report.

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Porous Pavement Specifications and Uses

Pervious Pavements vs. Traditional Surfaces
Advantages and Disadvantages

Porous Pavements

- ✓ Provides water quality treatment, groundwater recharge, and flood control benefits.
- ✓ Requires quarterly vacuum sweeping for optimal performance, but reduced need for deicing operations and costs.
- ✓ Requires a soil permeability between 0.25 and 3.0 inches per hour with 3 to 5 feet of separation from seasonal high groundwater. Sub-drains can be used where proper drainage may be an issue to prevent frost damage.
- ✓ Quality control of material production is essential for success.
- ✓ Most appropriate in settings where vehicular traffic is light and turning movements are few in number or at low speeds, such as residential roadways and parking lots.
- ✓ Material cost is approximately 20-25% more than traditional asphalts.

Traditional Pavements

- ✓ Contributes to higher peak flow discharges and erosion potential.
- ✓ Requires maintenance that is familiar and expected by most municipal public works crews.
- ✓ Can be used in virtually any soil environment or depth to groundwater.
- ✓ Traditional asphalt and concrete batches are easy to find and readily available with little oversight of contractors necessary.
- ✓ Can be used in any traffic or volume setting, but will contribute to urban heat island effects and need for increased stormwater management system components.
- ✓ Total project cost is comparable to porous systems when impervious pavements require the addition of conventional stormwater management infrastructure.

What about the Winter?

Concerns about winter performance may be one of the main fears that keep people from using porous pavements in new development projects. Fortunately, the Stormwater Center at the University of New Hampshire has studied porous pavement under worst-case maintenance conditions (i.e. no maintenance) over a number of years. Results show that infiltration remained high throughout the winter season, with good performance in nutrient removal, as demonstrated through monitoring of parking lot effluents (Roseen et al 2009). Furthermore, because the pavement pores are generally able to remain open throughout the winter, surface freezing in porous systems allows for "between zero and 25 percent of the salt routinely applied to impervious asphalt to achieve equivalent, or better, deicing and traction" (UNHSC 2007).

Where can I see porous pavements in my community?

There are numerous examples of porous pavements being successfully used both within our region and the greater New England area. Please visit the NRPC iTRaC website for a list locations employing this technology: www.nashuarpc.org/itrac/ref_pavement.