Research Links for Permeable Paving
11.17.05

WEB RESOURCES:
  o Research on watershed benefits of permeable paving surfaces
  o Maintenance and cost information (e.g. http://www.lid-stormwater.net/permeable_pavers/permpavers_maintain.htm)
  o Information on specifications, installation, and maintenance
  o Example of a company doing integrated design and installation
  o Fact Sheets and Articles on a wide range of urban watershed issues
  o Good diagrams; appears to be an unfinished product concept
  o Some installation guidelines and resources
  o British company with interesting diagrams
  o Author: Bruce K. Ferguson, Publisher: Holding Publisher
  o Examples of permeable paving projects.
- Bay Area Stormwater Management Agencies Association (BASMAA). http://www.basmaa.org/index.cfm

Overall Comparisons/ Descriptions/ Reviews
Better Site Design: Alternative Pavers
Porous Pavers - Competitive Analysis
Grass Pavers Compared
BuildingGreen.com - Grasspave Review
Tree-friendly drainage solutions make developers, owners & ADA happy.

TYPES OF PERMEABLE PAVING

1. “There are three general types of permeable paving surfaces. The first is loose stone, which tends to become less pervious over time, especially when used as a mixed grade with stone fines.” (from http://en.wikipedia.org/wiki/Permeable_paving):

Examples:

- Traditional techniques, such as cobblestones and bricks
  o However, any cobblestone and brick roadways are not particularly permeable surfaces because of the way that they were built. Some newer ones are actually laid over concrete, while some older ones are either mortared or laid over a dense-grade aggregate that prevents absorption of most water.
- http://www.uni-groupusa.org/uni-eco-.htm, UNI Eco-Stone® pavers
  o UNI Eco-Stone® is a true interlocking concrete paver that can support heavier vehicular loads, unlike some other types of permeable pavement systems. UNI Eco-Stone® can be installed in running bond, basketweave, and herringbone patterns for residential, municipal and commercial applications such as patios, courtyards, driveways, and parking or storage areas.
2. “The second involves the use of hard paving materials, either concrete, asphalt or paving blocks, that are constructed to be porous and to allow water to pass through the material.” (*from wikipedia, see above*)

**Examples:**

- Central Concrete. [http://www.centralconcrete.com/pervious_concrete.html](http://www.centralconcrete.com/pervious_concrete.html)
  - Bay Area concrete company with pervious concrete
  - Document describing the product: [http://www.centralconcrete.com/pdf_files/Pervious_5_18_04.pdf](http://www.centralconcrete.com/pdf_files/Pervious_5_18_04.pdf)
Permapave Permeable Pavers are natural stone pavers which have a flow through rate of up to 30 litres per second.

  - Resin Pavement binder emulsion is mixed with aggregate materials to produce compacted pavement surfaces that retain the natural coloration and texture of the constituent aggregate material. SSPCo’s environmentally friendly Resin Pavement mixtures contain no petroleum ingredients and are appropriate for use in sensitive natural environments, including access to beach, estuary and riparian areas.

3. “The third, sometimes called open paving, involves the use of generally impermeable materials, but these are placed to maintain open space between them, as in the “hopsack” method, to allow permeable areas of soils or other fill between the material placed. "Hopsack" is a method of placing oblong blocks so that space is permanently maintained between them. Special spacers are also available on the market. Open-type paving is usually intended for applications where grass will grow in the spaces between the blocks or other materials. This is a highly desirable feature in parking areas and low-impact roadways, being esthetically more pleasing, and has the additional benefit of reducing summer heat buildup due to inert pavement materials absorbing solar radiation and reradiating it as ambient heat.” (from wikipedia, see above)

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- http://www.uni-groupusa.org/uni-eco-.htm. UNI Eco-Stone® pavers
  - UNI Eco-Stone® is a true interlocking concrete paver that can support heavier vehicular loads, unlike some other types of permeable pavement systems. UNI Eco-Stone® can be installed in running bond, basketweave, and herringbone patterns for residential, municipal and commercial applications such as patios, courtyards, driveways, and parking or storage areas.
Turfstone provides an intelligent solution to the problem of permanently destroying green space to build occasionally used parking areas or fire and emergency roads. The design with 40% open areas allows ground cover to grow while still providing the necessary structural strength for any traffic. Turfstone also provides excellent erosion control and soil stabilization to slopes, embankments, low flow channels and dikes, ponds or reservoirs where there is no extreme wave action. Strong as concrete, sweet as grass.

4. Reinforcement of vegetated turf, using plastic cells, wire mesh, or some combination of the above.

Examples:
  - The porous pavement system, manufactured from up to 100% recycled polyethylene, is a series of interlocking blocks designed to offer turf protection and load support in areas used by heavy vehicles. The units create a flexible structural bridge system within the topsoil layer to support and distribute concentrated loads.
Grasspave² is a structure which provides incredible load bearing strength while protecting vegetation root systems from deadly compaction. High void spaces within the entire cross-section enable excellent root development, and storage capacity for rainfall from storm events. Stormwater is slowed in movement through and across Grasspave² surfaces, which deposits suspended sediment and increases time to discharge. Suspended pollutants and moderate amounts of engine oils are consumed by active soil bacteria, which are aided by the system’s excellent oxygen exchange capacity.

  o Cast on site cellular reinforced concrete system with voids created by plastic void formers.

- GRASSYTM PAVERS. http://www.rkmfg.com/grassypavers.asp
- Minimum 97% post-consumer recycled, reinforced high density Polyethylene (HDPE). UV stabilized. 48 hexagon cells each 2-1/8" base opening and 1/2" perimeter openings. 1/8" cell wall and base thickness.

- GrassTrac reinforced grass areas. [http://www.grasstrac.com/index.htm](http://www.grasstrac.com/index.htm)
  - GrassTrac is heavy duty wire mesh with torsioned flat wire reinforcement. It is used for load distribution in applications where driving or parking on turf is desirable. GrassTrac comes in large rolls of various widths for quick and easy installation with limited equipment. The GrassTrac system can be installed over existing turf for the same long lasting service.

- EZ Roll™ Grassroad Paver™
  - EZ Roll™ Grassroad Paver™ is a load transfer paving system, designed to be rolled out over a class II compacted gravel road base, allowing for easy installation and savings on labor costs. The honeycomb cell paver design allows light to heavy vehicular traffic.

5. Integrated design of paved landscape, incorporating adjacent swales, underground stormwater storage, constructed wetland, etc. (see Web Resources section above for further information)

**INSTALLERS:**

- ETGeo grasspave installers
- 2020 ENGINEERING grass paving city of bellingham
- ValleyCrest Landscape Development
- Wheeler Zamaroni
PUBLICATIONS:


