6.3 Permeable Pavement

**6.3.2 design & construction**

**figure 6.3.9**

The aggregate median provides a connection and overflow protection from the pavement surface to the aggregate base.

Source: Adopted from Cahill

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**Gravel detention storage below ground shown in typical section (aka 'Gravel Gallery')**

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Wearing course or surface layer

The wearing course provides support (in conjunction with the aggregate base) for the designed traffic loads while maintaining adequate porosity for storm flow infiltration. In general, permeable top courses have very high initial infiltration rates with various asphalt and concrete research reporting 28-1750 inches per hour when new. Various rates of clogging have been observed in wearing courses and should be anticipated and planned for in the system design. Permeable paving systems allow infiltration of storm flows; however, to prevent freeze-thaw damage and retain infiltration capability, the wearing course should not become saturated from excessive water volume stored in the aggregate base layer.

Water quality treatment

Currently, no water quality treatment credit through Ecology is associated with stormwater passing through a standard permeable pavement wearing course or the aggregate base. However, enhanced treatment can be attained using one of the following design approaches:

- Infiltrate 91 percent of the annual stormwater runoff file into subgrade soils that have a cation exchange capacity of ≥ 5 milliequivalents/100 grams dry soil, minimum organic matter content of 0.5 percent and a maximum infiltration rate of 12 inches per hour (short-term or measured rate). The soil must have the above characteristics for a minimum depth of 18 inches.
- Design a treatment layer into the aggregate base that has the characteristics described above for subgrade soils.

Can be used with non-permeable soils, see next page (document page 181).
Applications include but are not limited to: parking lots, residential access and collector roads, light arterial roads, pedestrian and bike paths, and utility access.

Soil infiltration rate
- See Chapter 5 of Volume V of the 2012 SWMMWW for minimum infiltration rates. Soils with lower infiltration rates may require underdrains or elevated drains to prevent periodic saturation within 6 inches of the bottom of the pavement (wearing course) section.
- Surface flows directed from adjacent areas to the pavement surface or subgrade can introduce excess sediment, increase clogging, result in excessive hydrologic loading, and should only be considered with particular attention to sediment control, infiltration capacity of the subgrade, and adequate maintenance.

Subgrade
- See Section 6.3.2.1 Common components and design criteria for permeable pavement systems for guidelines and construction techniques to reduce compaction.

Under-drain.
- An under-drain or elevated drain can be used for installations with seasonally high groundwater or subgrade infiltration rates to prevent periodic saturated conditions within 6 inches from the bottom of the pavement. An orifice can be used to improve detention. See under-drain design details in Section 6.3.2.1 Common components and design criteria for permeable pavement systems.
- On extremely poor soils with low strength and very low infiltration rates, use an impermeable liner with under-drains.
- Installations should have an observation well (typically 6-inch or 15-cm perforated pipe) extended to the subgrade surface and installed at the furthest downslope area.

Aggregate base/storage bed material
- Minimum base depth for structural support should be 6 inches for pedestrian use and 12 inches for vehicular loading (Porous Asphalt Summit, 2009).
- Maximum depth is determined by the extent to

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**Figure 6.3.13**

Porous asphalt section.

Source: AHIU