Performance of porous asphalt pavements: stormwater quantity and quality mitigation

Anand Jayakaran  
*Washington State Univ., United States*, anand.jayakaran@wsu.edu

Thorsten Knappenberger  
*Auburn Univ., United States*, knappi@auburn.edu

John D. Stark  
*Washington State Univ., United States*, starkj@wsu.edu

Curtis Hinman  
*Herrera Environmental Consultants, Inc., United States*, chinman@herrerainc.com

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Performance of Porous Asphalt Pavements - Stormwater Quantity & Quality Mitigation

Ani Jayakaran¹, Thorsten Knappenberger², John Stark³

¹Assoc. Prof., ³Prof. - Washington State University, Washington Stormwater Center
²Asst. Prof. - Auburn University

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1) Porous asphalt QUANTITY – ability to attenuate stormwater, and effect of maintenance on infiltration rates

Attenuates peak flows, absorbs a LOT of rainfall

2) Porous asphalt QUALITY – pollutant treatment in general, effect of drain depth

Great for particulate matter!
Permeable Pavements

Pervious Concrete

Porous Asphalt
Porous Asphalt Experiment

Street dirt applied
Porous asphalt outflow
Porous asphalt – water quality

Porous asphalt

Concrete weir (6")
Surface drain
Pervious asphalt (3")
Elevated drain

22.7 liter sampling container

Aggregate subbase (18")

Impermeable cell liner

Tipping bucket flow gauge

Automated Sampler
Native soil
Water Quality Results
PAHs

Median Removal on a per storm basis (%)
Performance Goal: The Basic Treatment Menu facility choices are intended to achieve 80% removal of total suspended solids for influent concentrations that are greater than 100 mg/l, but less than 200 mg/l. For influent concentrations greater than 200 mg/l, a higher treatment goal may be appropriate. For influent concentrations less than 100 mg/l, the facilities are intended to achieve an effluent goal of 20 mg/l total suspended solids.
TSS concentrations by location (all storms)
- Phosphorus Treatment: 50 percent removal of TP for influent concentrations ranging from 0.1 to 0.5 mg/L.
Thank you!
anand.jayakaran@wsu.edu
- Basic Treatment: 80 percent removal of TSS for influent concentrations that are greater than 100 milligrams/liter (mg/L), but less than 200 mg/L. For influent concentrations greater than 200 mg/L, a higher treatment goal may be appropriate. For influent concentrations less than 100 mg/L, the facilities are intended to achieve an effluent goal of 20 mg/L TSS.

- Enhanced Treatment: Provide a higher rate of removal of dissolved metals than most basic treatment facilities. The performance goal assumes that the facility is treating stormwater with dissolved copper typically ranging from 0.003 to 0.02 mg/L, and dissolved zinc ranging from 0.02 to 0.3 mg/L. Data collected for an “enhanced” best management practice (BMP) should demonstrate significantly higher removal rates than basic treatment facilities.

- Phosphorus Treatment: 50 percent removal of TP for influent concentrations ranging from 0.1 to 0.5 mg/L.

- Oil Treatment: No ongoing or recurring visible sheen, a daily average total petroleum hydrocarbon concentration no greater than 10 mg/L, and a maximum of 15 mg/L for a discrete (grab) sample.
Conventionals Loads

Median Removal on a per storm basis (%)

- TSS
- SC 62.5–125 μm
- SC 3.9–62.5 μm
- SC 250–500 μm
- SC 125–250 μm
- SC 1–3.9 μm
- SC > 500 μm
- SC < 1 μm
- pH
- o-Terphenyl
- Motor Oil
- Hardness
- Fine Sed.
- Diesel H.
- COD
- Coarse Sed.
Nutrient Loads

 Median Removal on a per storm basis (%)
PAH Loads

Median Removal on a per storm basis (%)

- Pyrene
- Phenanthrene
- Naphthalene
- Fluorene
- Fluoranthene
- d14-Dibenzo(a,h)anthracene
- d10-2-Methylnaphthalene
- Chrysene
- Benzo(a)pyrene

Location
- Under