Permeable Pavement for Stormwater

MIDS Group, May 18, 2012

p-gen3-14j

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Engineers • Scientists
Business Professionals

Work Order Status

- Permeable Pavement Tech Team prepared two drafts of Design Guidance
- Core team members reviewed and commented, out to full team for review shortly
- Wenck team working with Tech Team, MPCA, and Barr to review and comment on guidance and calculator
- Collecting cost data and case studies
- Finalize package for discussion at June meeting

Review of Permeable Pavement Design Guidance

- Developed by Permeable Pavement Tech Team
- Based on guidance from State of Virginia
- Has been initially reviewed by industry leaders
- Comments incorporated into Draft 2
- Today: review key parts of the Guidance

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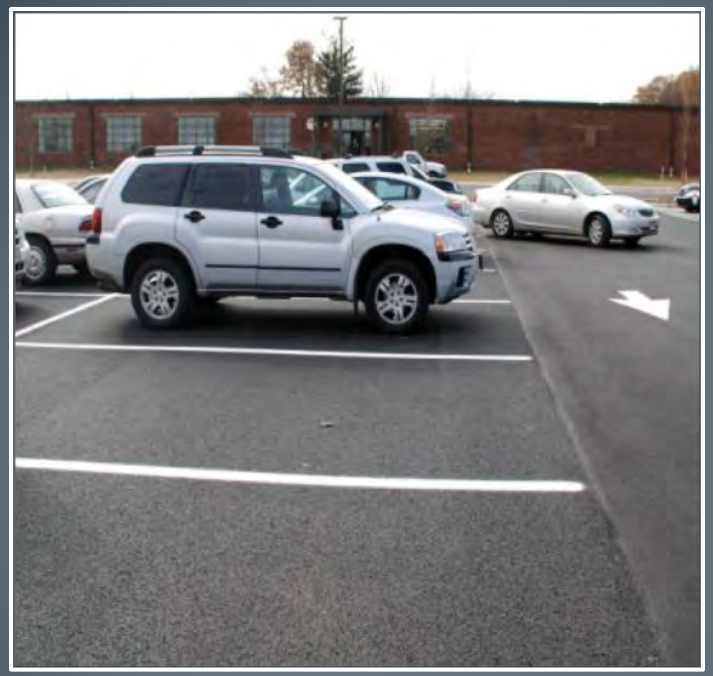
Permeable Pavement



Porous asphalt

Pervious concrete

Permeable interlocking concrete pavement (PICP)

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Performance

- Full infiltration – 100% of the runoff volume to 1.1 inch depth is retained; 100% pollutant reduction for that volume
- Partial infiltration – less than 100% is retained; some part is collected and discharged; pollutant reduction depends on volume retained
- Overflow volume from larger events directed into overflow system with no pollutant reduction for that volume

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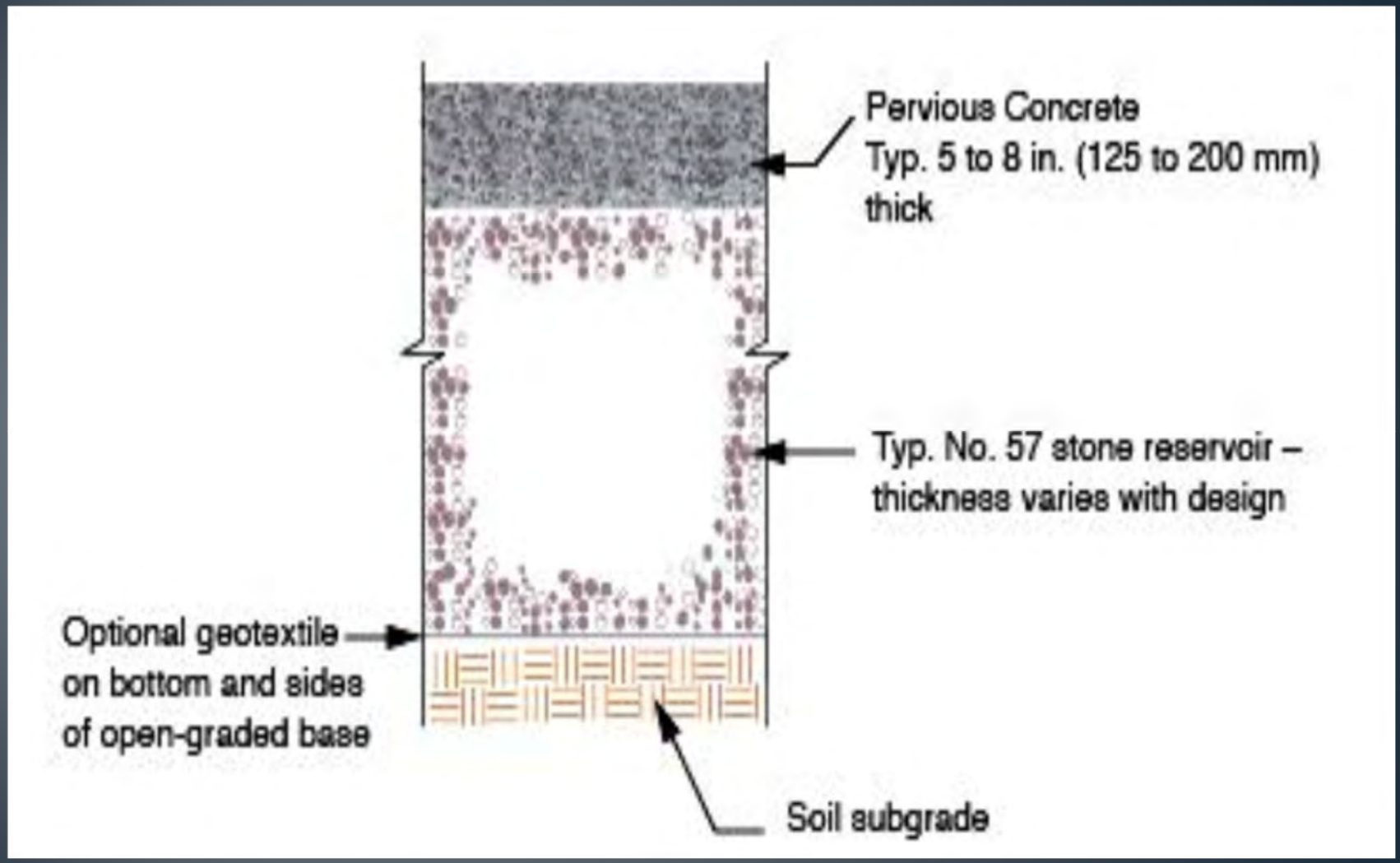
Pervious Concrete Typical Section



MIDS Permeable Pavement Design Specification

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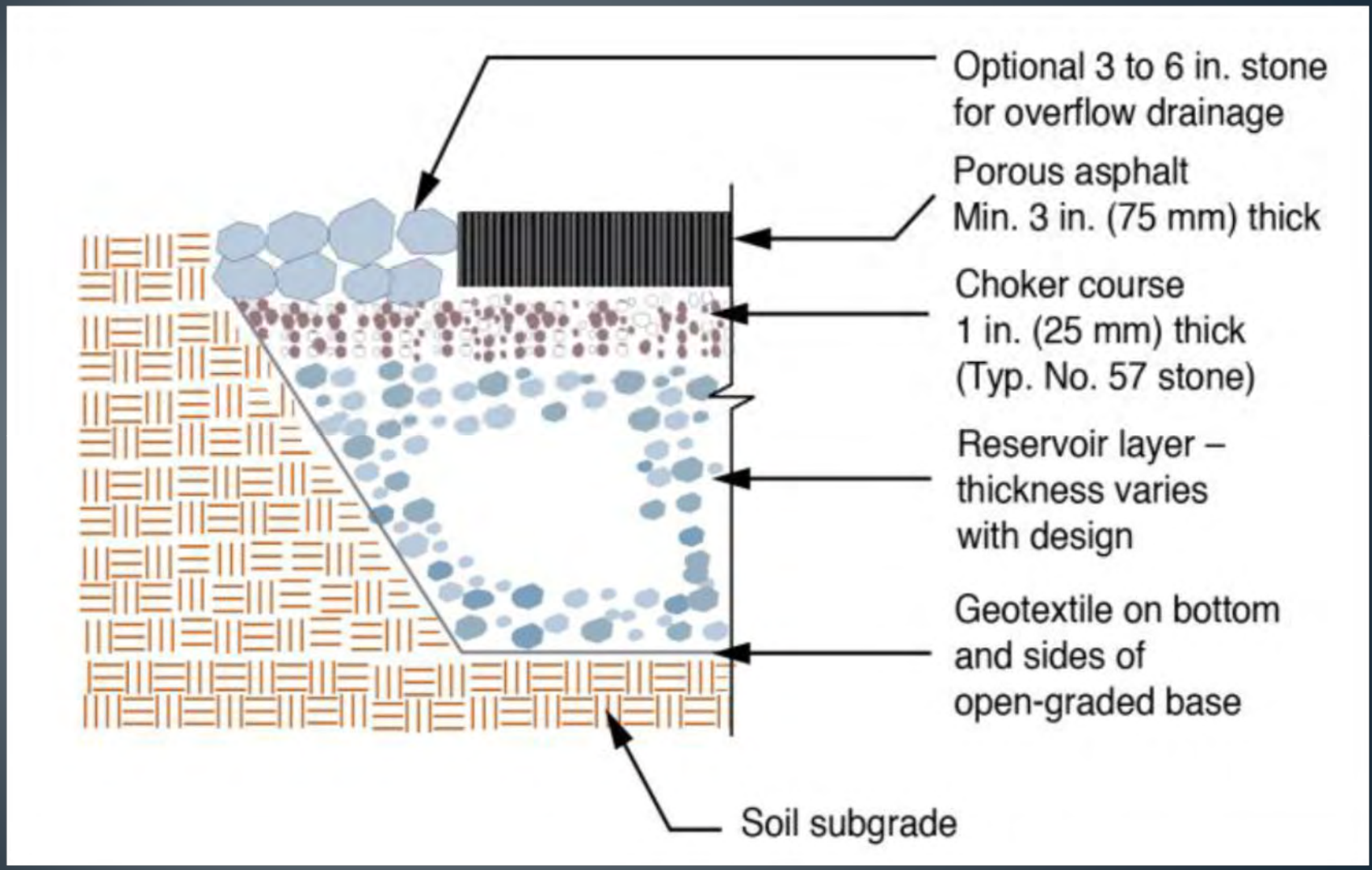
Porous Asphalt Typical Section



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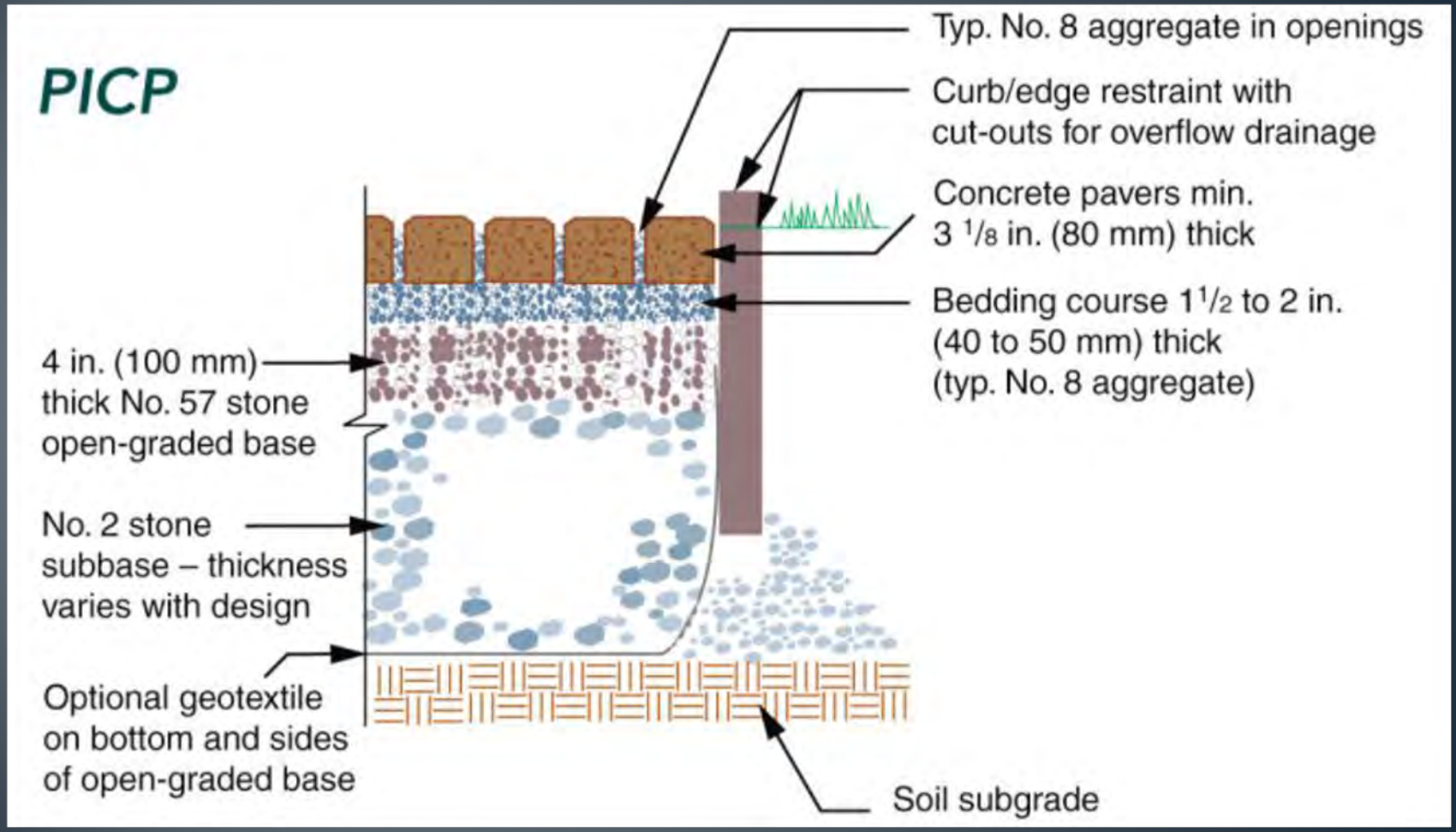
PICP Typical Section



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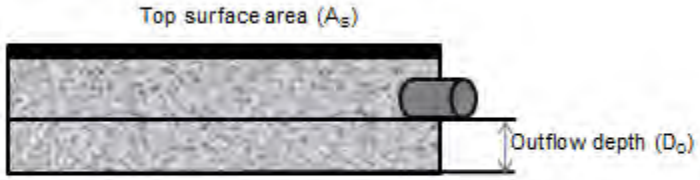
Permeable Pavement Volume Retention Calculator

Pervious Pavement

$$V = [A_S * D_O * n]$$



Notes
If outflow drain tile does not exist set outflow depth equal to total depth

	1 - Pervious pavement
Required treatment volume (RV) [ft^3]	92
Top surface area (A_s) [ft^2]	100
Outflow depth (D_o) [ft]	2
Media porosity (n) [ft^3/ft^3]	0.4
Volume reduction capacity of BMP (V) [ft^3]	80
Volume of retention provided by BMP (BMPV) [ft^3]	**80**

Legend

- User input cells
- Calculation cells
- Constant values
- Value obtained from upstream value
- Value obtained from another sheet
- No data needed

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Site Selection

- Best candidates:
  - Low volume residential
  - Alleys
  - Parking lots
- Best performance with HSG A or B soils
- Less successful candidates:
  - High volume streets, highways
  - Pavement with heavy truck traffic
  - Areas with short turning radius

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Stormwater Management Functions
D R A F T

Stormwater Management Function	Full Infiltration	Partial Infiltration
Annual Runoff Volume Retained		
Total Phosphorus (TP) Removal	Composite: 100% for infiltrated volume, minimal for bypassed large event volume	Composite: 100% for infiltrated volume, minimal for bypassed volume
Total Suspended Solids (TSS) Removal	Composite: 100% for infiltrated volume, minimal for bypassed large event volume	Composite: 100% for infiltrated volume, minimal for bypassed volume
Winter Maintenance Impacts	Potential reduction in chloride application for ice control	
Channel Protection	Design additional (optional, as needed) storage in reservoir layer to accommodate larger storm volumes	
Flood Mitigation	Partial. May be able to design additional storage into the reservoir layer by adding base depth/storage or by using underground storage chambers.	

Ongoing Issues

- Agreement on scientific basis of annual volume and pollutant load removal numbers for calculator
- Technical issues:
  - Consistency with wellhead protection guidance
  - Use in sensitive karst areas
  - Post-construction acceptance criteria
  - De-icer use and other maintenance issues
  - Mn/DOT specification development
  - Definitions and language consistency

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