

# Permeable Pavement Design for Storm Water Management

## *DNR Technical Standard 1008*



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# Topics

- Background
- Permeable Pavement System Features
- Water Quality & Quantity Control
- Operation & Maintenance



# DNR Post-Construction Technical Standards

Post-construction Standards	Number	Effective Date
1. Bioretention for Infiltration <a href="#">[PDF 689KB]</a> <a href="#">Tech Note</a>	1004	Nov-10
2. Compost <a href="#">[PDF 90KB]</a>	S100	Oct-04
3. Infiltration Basin <a href="#">Form 1003 [PDF 181KB]</a> <a href="#">Tech Note</a> <a href="#">Fig. 1 [PDF 315KB]</a> , <a href="#">Fig. 2 [PDF 259KB]</a> , <a href="#">Fig. 3 [PDF 83KB]</a> , <a href="#">Fig. 4 [PDF 118KB]</a>	1003	Oct-04
4. Sizing Infiltration Basins and Bioretention Devices <a href="#">Tech Note</a>	n/a	n/a
5. Infiltration Trench <a href="#">[PDF 167KB]</a>	1007	May-12
6. Permeable Pavement <a href="#">[PDF]</a> <a href="#">Tech Note [PDF]</a>	1008	Feb-14
7. Proprietary Storm Water Sedimentation Devices <a href="#">[PDF 193KB]</a>	1006	Apr-09
8. <i>Rain Gardens: A how-to manual for homeowners</i> " <a href="#">[PDF 3MB, Exit DNR]</a>	n/a	Aug-05
9. Site Evaluation for Stormwater Infiltration <a href="#">[PDF]</a> *	1002	03/2014
10. Vegetated Infiltration Swales <i>Updated 5/10/2007</i> <a href="#">[PDF 228KB]</a>	1005	May-07
11. Wet Detention Pond <a href="#">Part 1 [PDF 721KB]</a> , <a href="#">Part 2 [PDF 21KB]</a>	1001	Oct-07

# Permeable Pavement Technical Standard Development Team



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# Permeable Pavement - Definition

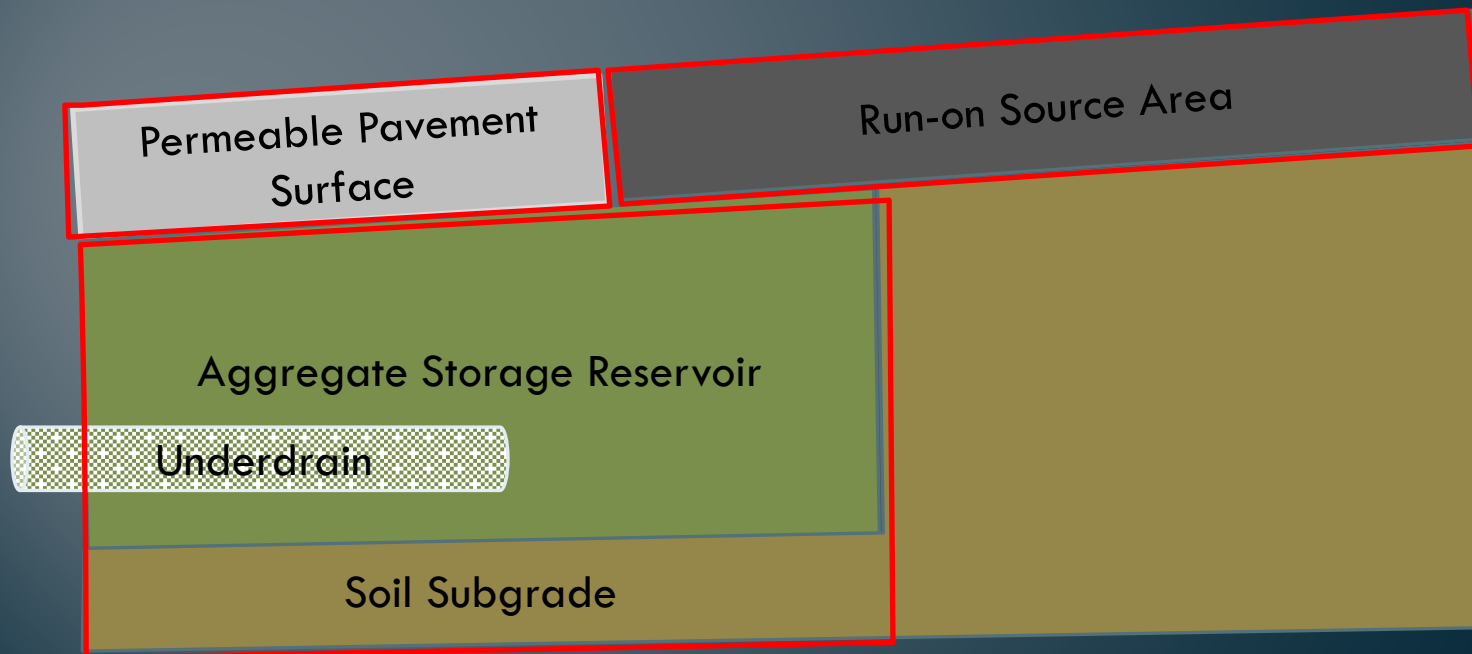
A pavement system designed to achieve water quality and quantity benefits by allowing movement of stormwater through the pavement surface and into a base/subbase reservoir. Examples include *pervious concrete (cast-in-place or precast)*, *porous asphalt* and *permeable pavers/blocks*.



# Permeable Pavement - Conditions Where Practice Applies

- Alternative to other pavements and storm water control measures (Run-on?)
- Most effective in areas where soil and groundwater conditions are suitable for storm water infiltration (Infiltration pre-treatment?)
- May be used in areas where infiltration is prohibited or limited when liners and/or underdrains are installed (Filtration-Sedimentation-Adsorption?)

# Permeable Pavement System



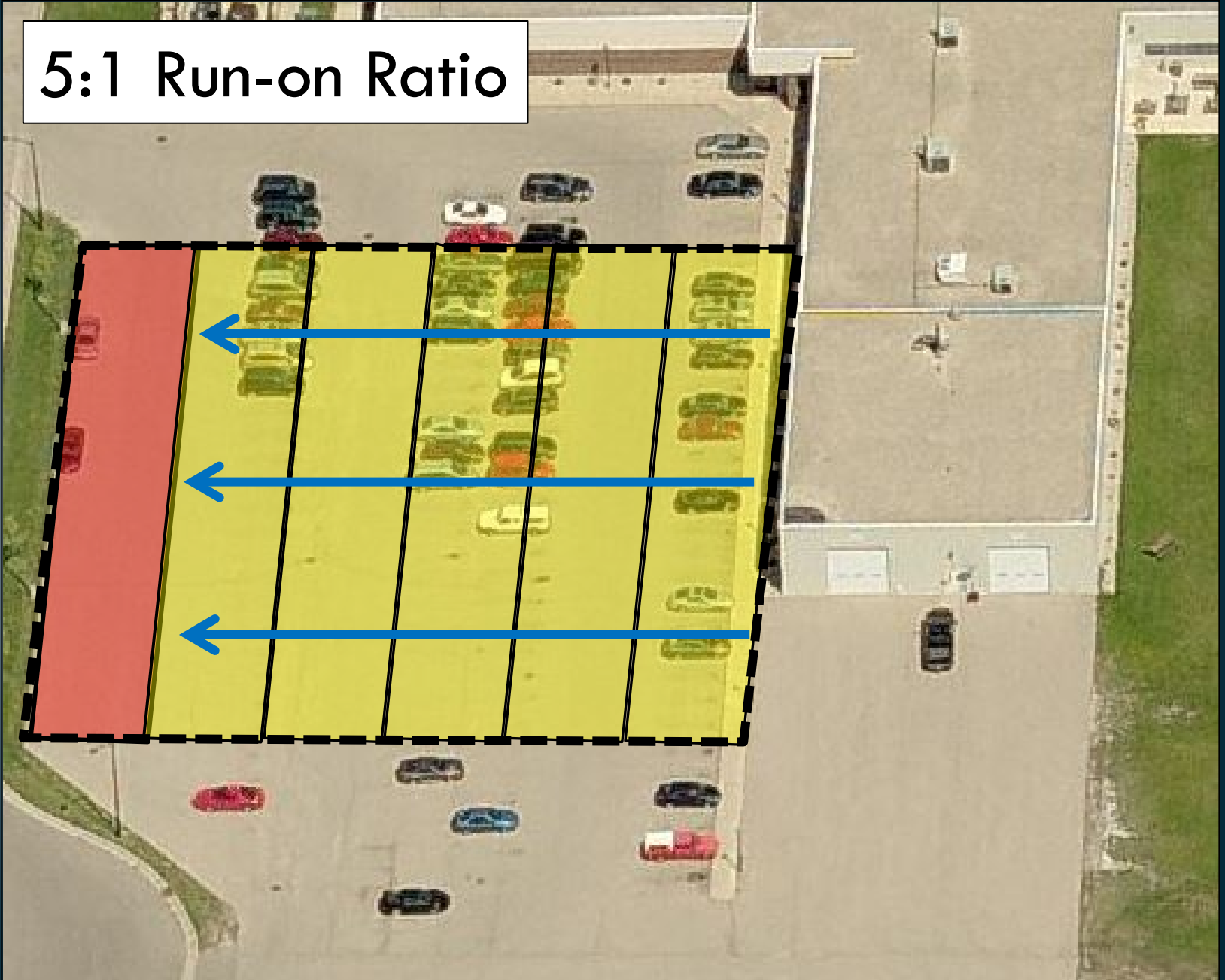
# Permeable Pavement System

## *Run-on*

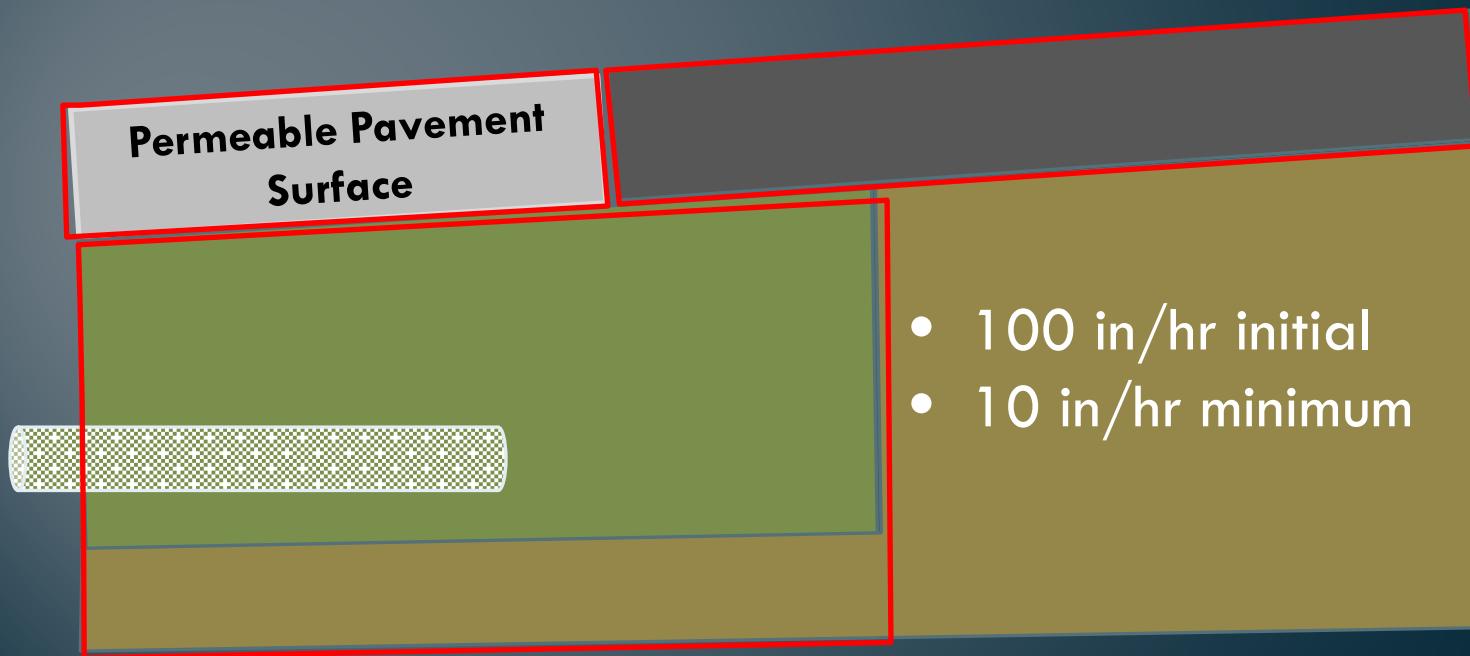




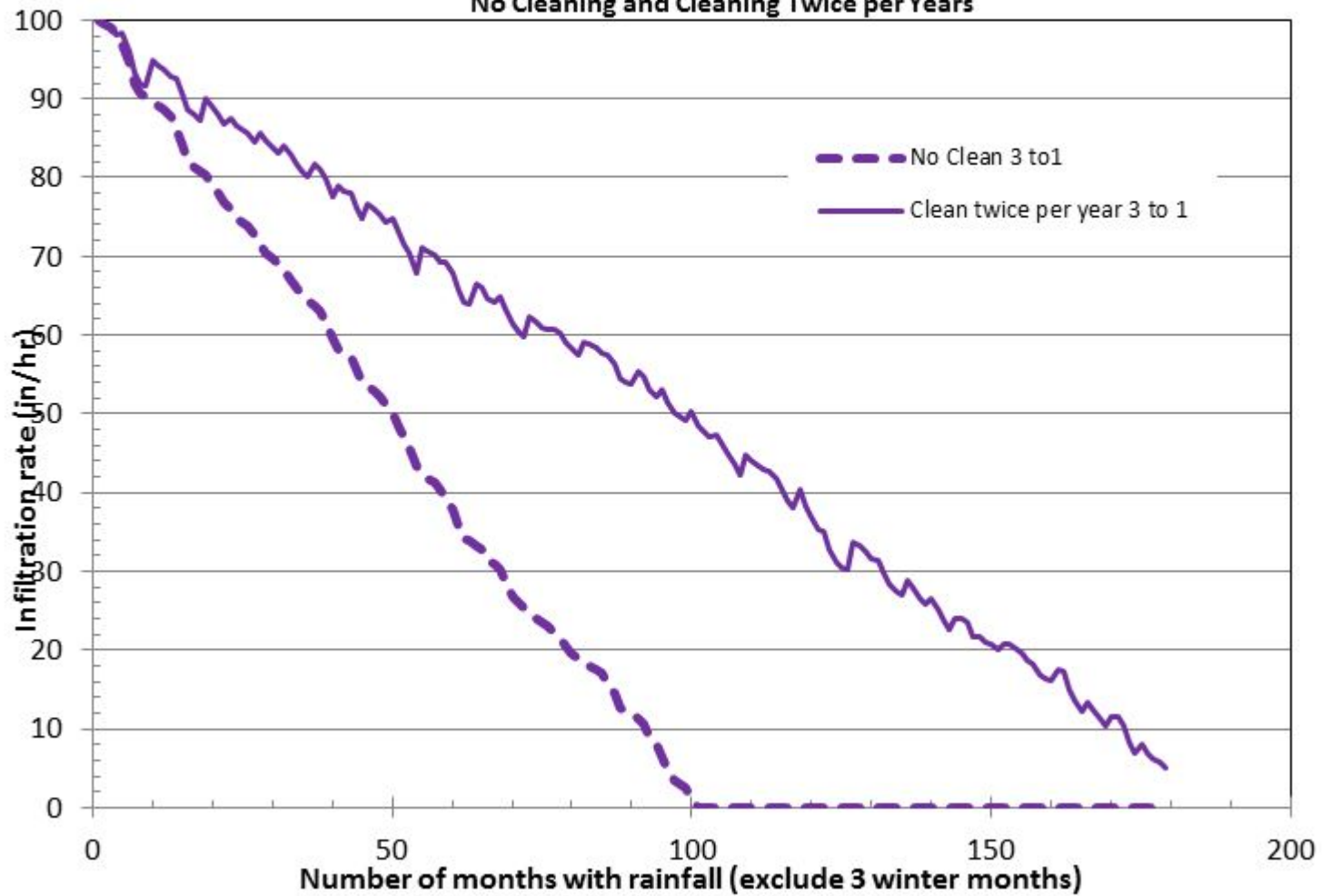
# 5:1 Run-on Ratio



# Permeable Pavement System Surface

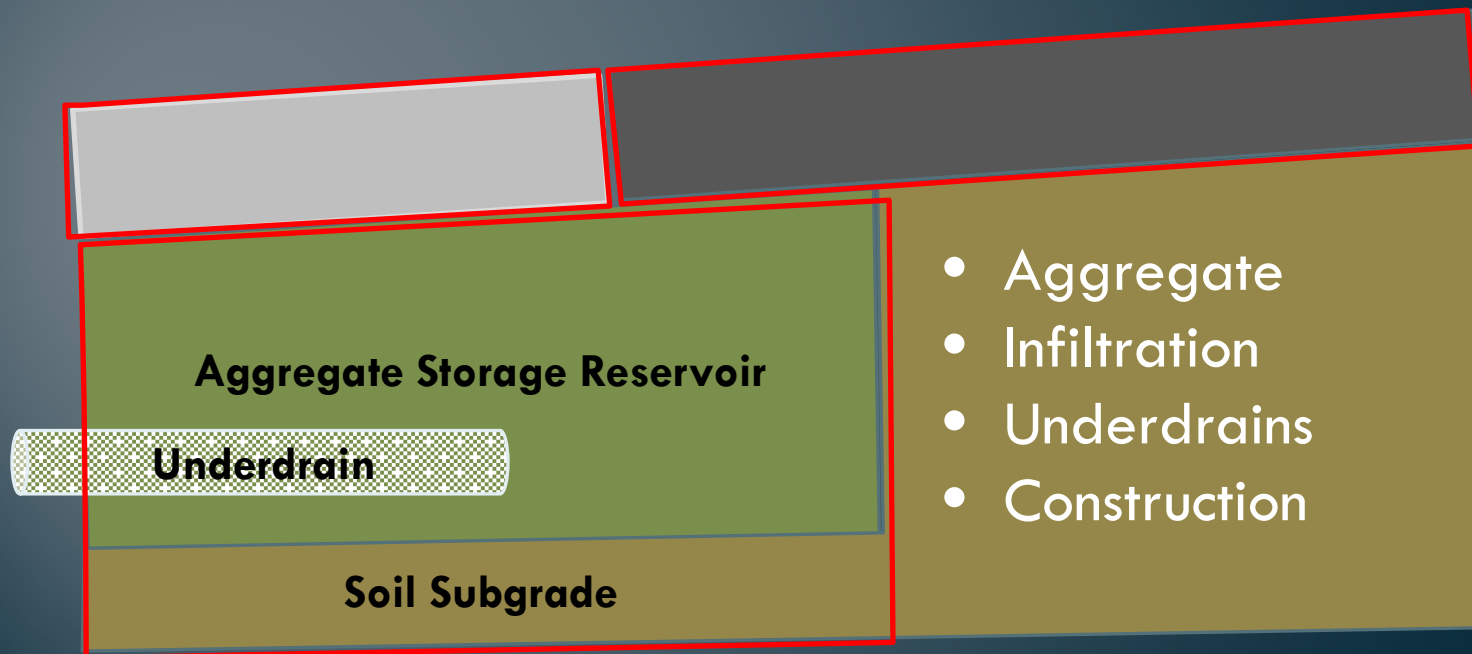


Average monthly infiltration rate on 3:1 ratio of  
Permeable Pavement when Loading Rate is 0.6 lb/sq-ft  
No Cleaning and Cleaning Twice per Years



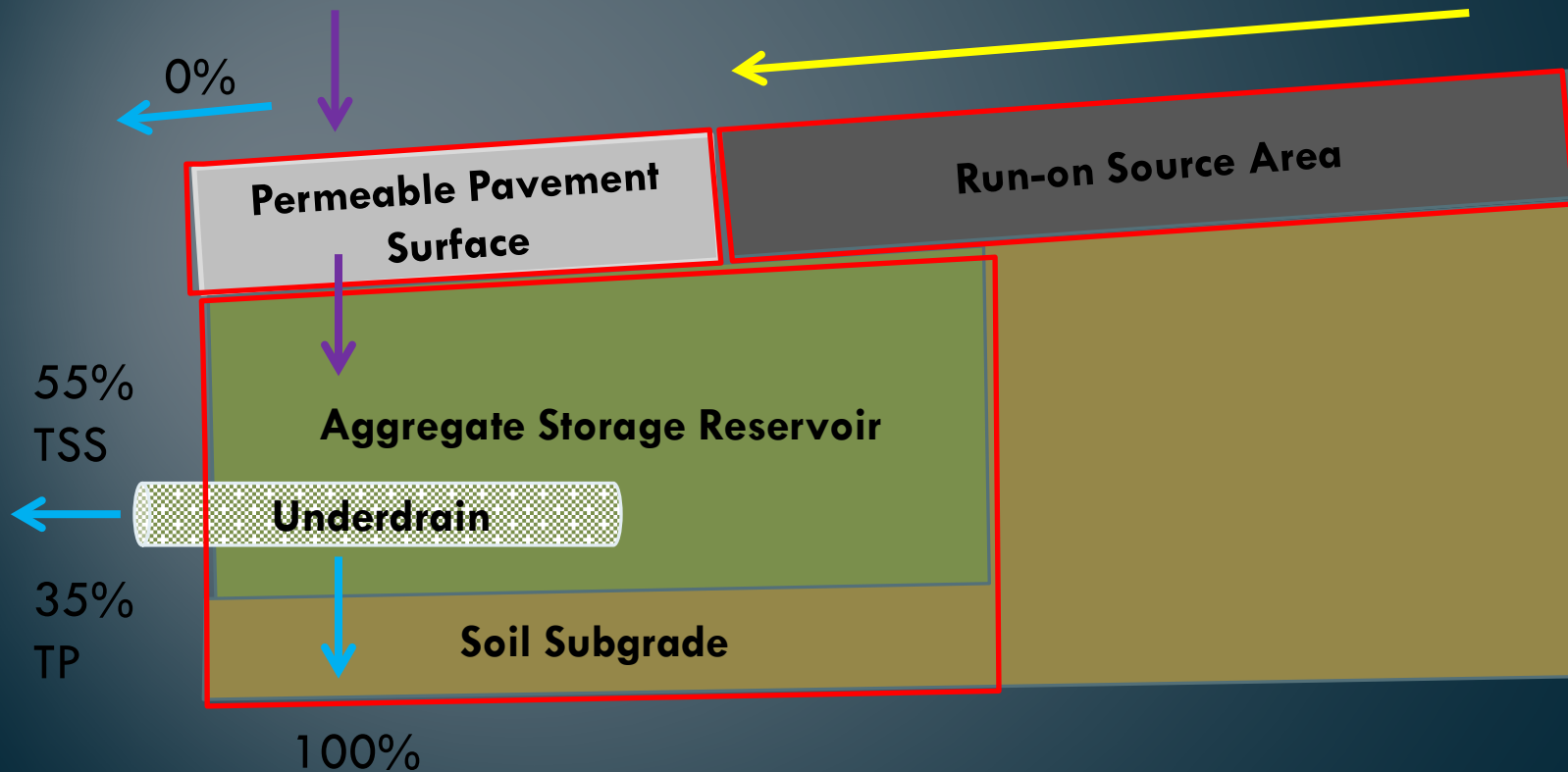
# Permeable Pavement System

## *Aggregate Storage Reservoir*

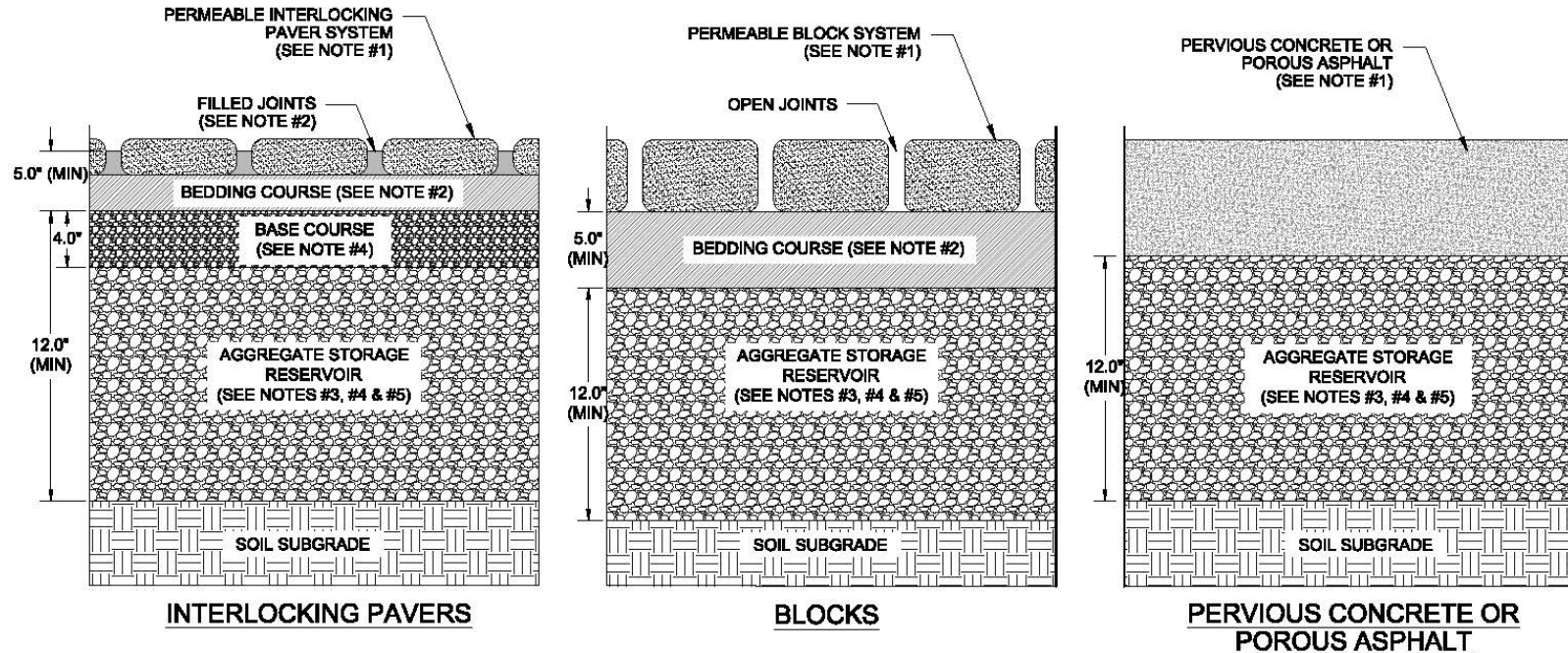


# Permeable Pavement System

## TSS & TP Removal (Madison Study)



# FIGURE 1. CRITERIA FOR UNDERDRAIN DISCHARGE AND INFILTRATION PRETREATMENT CREDITS



**NOTES:**

1. PAVEMENT SURFACE PERCENT VOIDS SHALL BE LESS THAN 25%.
2. JOINT STONE AND BEDDING COURSE SHALL CONSIST OF ASTM C-33, 8, 9, 89, OR 57 AGGREGATE.
3. AGGREGATE STORAGE RESERVOIR DEPTH SHALL BE A MINIMUM OF 12 INCHES.
4. BASE AND / OR SUBBASE COURSES WITH MINIMUM POROSITY OF 30% CAN BE CONSIDERED AGGREGATE STORAGE RESERVOIR. BASE COURSE FOR PERMEABLE INTERLOCKING PAVERS SHALL BE 4.0" DEPTH OF ASTM C-33, 57 AGGREGATE AND CAN BE CONSIDERED PART OF THE AGGREGATE STORAGE DEPTH.
5. UNDERDRAINS CAN BE LOCATED WITHIN OR BELOW THE AGGREGATE STORAGE RESERVOIR. UNDERDRAINS (OR EQUIVALENT) ARE REQUIRED IF THE AGGREGATE STORAGE RESERVOIR DRAIN DOWN TIME WILL EXCEED 72 HOURS.



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 TECHNICAL STANDARD No.  
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 REVISION DATE  
 NOT TO SCALE

# Operation & Maintenance

- Minimum surface cleaning frequency of twice per year using industry recommended method
- Annual inspection of surface and subsurface drainage

