Maintenance Advances in Permeable Interlocking Concrete Pavement
Our Agenda

- Permeable paver applications
- Inspecting & cleaning
- Maintenance options
- Maintenance research
Porous/Pervious/Permeable Paving

- Pavers w/ permeable joints
- No. 8 bedding material
- No. 57 stone base for water storage
- No. 2 stone subbase for water storage

- 3”
- 2”
- 4”
- 6”
All SCMs Require Maintenance
Maintaining a Detention Basin
Permeable Pavements Need Maintenance
Contributory Run-on and Maintenance
Sedimentation is Biased
PICP Performance - Clogging

Clogging ≠ Sealing

# 1 Inspection Tool
When is Remedial Maintenance Required?

When Routine Maintenance is Not Performed
Industry Recommended Maintenance

• Inspect & clean annually

• Use appropriate equipment to remove surface sediment

• Adjust maintenance schedule based on sediment loading

• Check surface infiltration using ASTM C1781
PICP Maintenance – Starts with Inspection

- Evidence of ponding
- Check drains and outfalls
- Check observation wells
- Inspect pavers
- Inspect perimeter
- Confirm joints filled

This determines if seasonal or remedial maintenance is required
Important – Keep Joints Filled
Permeable Joint Fill Replacement
Easy to Repair/Replace/Adjust Pavers During Maintenance
PICP Performance in Winter

- Eliminates black ice
- Aggregates not frost susceptible
- Surface does not heave
- Snow melts faster – deicing salts not needed

Toronto, Canada
Snow Removal
ASTM C 1781-Surface Infiltration Testing
ASTM C1781 Measuring Surface Infiltration
### ASTM C1781 – Ponding & Infiltration

<table>
<thead>
<tr>
<th>Seconds to infiltrate 40 lbs water</th>
<th>Minutes to Drain</th>
<th>Approximate Surface Infiltration Rate inches/hr</th>
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<td>1000</td>
</tr>
<tr>
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<td>1</td>
<td>600</td>
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<tr>
<td>100</td>
<td>1.7</td>
<td>360</td>
</tr>
<tr>
<td>200</td>
<td>3.3</td>
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<tr>
<td>360</td>
<td>6</td>
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<tr>
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</tr>
<tr>
<td>3600</td>
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</table>
PICP Industry Recommendations

• ASTM C1781
  – Acceptance testing, Min. 100 in./hr.
  – In-service, Min. 10 in./hr.
Many Variations of Pavement Cleaning Equipment
PICP Maintenance Equipment Options

- Mechanical Sweeper
- True Vacuum
- Regenerative Air
- Power Air & Vac Systems
- Water-enhanced
True Vacuum Cleaning
Regenerative Air Systems
Mechanical Sweepers
High Pressure Air/Vac System
Lancaster Brewery Demonstration
Badger – Super Sucker
PICP Captures Sediment Near the Surface
Sediment Capture Research

Morton Arboretum Workshop
Dr. Hunt-NCSU 2009

Most Sediment travel limited to upper top 1-2”
Figure 1: Measured Surface Infiltration Rates during Accelerated Clogging
Vacuum #1
Regenerative Air #2
Mechanical Sweeper #3
Pressure Wash – Water Injection  #4
High Pressure Air / Vacuum – Hybrid  #5
RESULTS:
All methods significantly improved infiltration rates!
Permeable Pavers – Maintenance Summary

- Long-term surface infiltration rates can be maintained
- Distributive LID infiltration solution
- Safety – removes surface water
- Provides detention & water quality benefits
- 2 Functions in 1 – pavement & SCM
- Sediment captured near surface allows for easy maintenance
For More Information

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