Slow That Flow- How Green is the Grey?

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Background

Permeable pavements (PP)
- Provide better onsite stormwater management
- Increase the infiltrating water, hence less runoff
- Provide better hydrologic performance and water quality
- Available forms like PICP, PC and PA
- Performance may decrease with time

Objective:
Verification of the hydrologic performance (HP) of permeable pavers after five years of operation

Experimental Setup and Methodology

Employee Parking Lot at the Lake Street Service Center (LSSC), St. Catharines (110 kms from UofT)
- No Exfiltration Permeable Pavement System
- 5 year old; No maintenance performed; High traffic load
- Has PA, PC and PICP along with Asphalt (“control”)
- Results from Jan-Oct 2016 compared to previous studies
- Hydrologic performance (volume & peak flow reduction) measured using V notch and compound weir
- Surface Infiltration capacity using single ring method conforming to ASTM C1701 and ASTM C1781

Future Work

- Improving volume reduction in low permeability soils (like Ontario)
- Provincial design guidelines to assist PP installers
- Testing Maintenance strategies for Permeable Pavements
- Research for installations other that lot level
- Long term data on Hydrologic Performance and Water Quality to quantify the changes over time

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Location and Test Setup

Results and Discussion

Pavement Type | Average Infiltration Capacity (mm/hr)
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PICP | 223
PC | 8540
PA | 640

Spatial Variability of Infiltration Capacity

Porous Asphalt | Pervious Concrete | PICP

Future Work

- Infiltration Capacity of PA and PICP is significantly lower than PC
- Since it is a no exfiltration system, a higher volume reduction indicates that most of the precipitation is lost as surface runoff for PA and PICP
- Porous Concrete is performing better than PICP and Porous Asphalt after 5 years of operations

Important Conclusions

- Performance has declined compared to the installed state and requires maintenance
- All PP still have an appreciable infiltration capacity after 5 years of operation
- PPs effectively capture a 2 year return period storm (except at failed locations)

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