

## DESIGN/CONSTRUCTION OF A PERMEABLE PAVEMENT DEMONSTRATION SITE AT THE EDISON ENVIRONMENTAL CENTER

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### IMPACT STATEMENT

This project will allow the U.S. Environmental Protection Agency (EPA) to provide a scientifically defensible estimate to municipalities on the performance of the three permeable surfaces: porous concrete, porous asphalt, and interlocking concrete pavers. The lot, which was open for use on October 28, 2009, will not only function as a research site, it will also serve as a highly used parking lot for Edison Environmental Center staff and visitors. In addition, the lot will serve as a demonstration site for other federal facilities and will be used as a public outreach tool displaying green stormwater management.

### BACKGROUND:

At present, there is little information on the performance of this stormwater management practice that practitioners can use to design a stormwater management plan. There is also little information of temporal changes or maintenance practices. This project is being conducted to generate reliable data on the stormwater management control. The Water Supply and Water Resources Division of EPA's Office of Research and Development's (ORD's) National Risk Management Research Laboratory (NRMRL) solicited advice and opinions from each trade group associated with the permeable surface installed to assure that the design and construction meet the associations' specifications.

### DESCRIPTION:

NRMRL has funded this research project in support of its Aging Water Infrastructure (AWI) Research Program. The demonstration site is located at the Edison Environmental Center, which is the largest EPA-owned property, and provides ORD with the unique opportunity to conduct research at this scale. This project will measure the water quality parameters for at least ten years, to establish the performance changes associated with seasonal patterns and with elapsed time (facility use). This allows measurements of changes in performance with maintenance practices, and also allows measurement of temperature profiles under each surface to detect heat island patterns. The project will establish the observational data on ancillary parameters such as the ability to plow snow, and the use of deicing chemicals.

Unique features of the research:

- Demonstration of three side-by-side permeable surfaces under the same conditions: porous concrete, porous asphalt, and interlocking concrete pavers
- Long-term monitoring; robust experimental design utilizing controlled drainage areas;
- Monitoring of full-scale, functioning parking lot;
- Evaluation of maintenance practices

The project also includes several unique features and green components:

- Use of recycled concrete aggregate as the base layers beneath the parking lot surfaces
- Stormwater management features (infiltration of parking lot runoff and rain gardens to infiltrate runoff from roofs and conventional asphalt areas)
- Potential urban heat island mitigation (reduction of built up areas that are hotter than nearby rural areas)
- Potential reduced salt application
- Potential groundwater recharge
- Low power usage light emitting diode (LED) lighting

EPA GOAL: Goal #2 - *Clean & Safe Water*; Objective 2.1.1- *Water Safe to Drink*

ORD MULTI YEAR PLAN: Water Quality (WQ), Long Term Goal - WQ-3 *Source Control*

#### RESEARCH PARTNERS:

*Collaborators:* EPA's Region 2 and Office of Administration and Resources Management

*Contractors:* Complete Technical Services as mentored by S&E Services with multiple sub contractors; Beatty Harvey and Associates; Morris & Ritchie Associates; PARS Environmental, Inc.

*TRADE ASSOCIATIONS:* National Ready Mix Concrete Association; Interlocking Concrete Pavement Institute  
National Asphalt Pavement Association

### EXPECTED OUTCOMES AND IMPACTS:

This research project aims to provide sound methods for measuring the performance of similar stormwater controls installed in less controlled environments that can be executed by others. The project also provides statistically defensible performance results. Measurements will enable scientists to determine whether permeable surfaces will help cities:

- cool more effectively during summer evenings than areas paved with conventional surfaces;
- reduce stormwater volume flowing to receiving waters; and
- improve water quality by removing solids and other environmental contaminants.

All of the rain falling on the parking lot will infiltrate into the soil with no runoff reducing the environmental footprint of this EPA facility.

### OUTPUTS:

Current and expected outputs consist of reports, presentations, and a peer-reviewed journal article.

### RESOURCES:

Aging Water Infrastructure Research Program: <http://www.epa.gov/awi/>

NRML Urban Watershed Management Research: <http://www.epa.gov/ednrmrl/>

Demonstration of parking lot's porous concrete: [Video \(WMV\)](#) (3.8 MB)

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Water Quality



Aging Water Infrastructure