



Caltrans Division of Research,  
Innovation and System Information

Research

Notes

Environmental

MAY 2016

Project Title:  
UTC - Sustainable Mitigation of Stormwater  
Runoff through Fully Permeable pavement

Task Number: 2982

Start Date: April 1, 2016

Completion Date: March 31, 2017

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## Sustainable Mitigation of Storm Water Runoff through Fully Permeable Pavement

To develop a new fully permeable pavement design to use in heavy truck traffic roadway areas for sustainable storm water management and best management practices (BMP)

### WHAT IS THE NEED?

A preliminary catalogue-type design procedure based on region (rainfall), storm event design period, design , traffic, design truck speed, surfacing (HMA or PCC), subbase type, and the shear stress-to-shear strength ratio at the top of the subgrade has been developed by the University of California Pavement Research Center (UCPRC) for preliminary design of fully permeable pavement test sections in California.

The main objective of this research is to validate and calibrate a new fully permeable pavement design for sustainable storm water management and best management practice (BMP) to provide low-impact infrastructure and efficient system operation. The pavement structure will be designed to serve as a reservoir to store water during storms periods to minimize storm water runoff. Rigid (concrete) and flexible (asphalt concrete) fully permeable pavement options will be considered.



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## WHAT ARE WE DOING?

Develop a permeable pavement design section layers, storm design (period, inches) and number of road lanes to be drained. The scope of work will consist of working on the pavement design tasks.

- Select surface type- look at concrete pavements (PCC) and Hot Mix Asphalt (HMA).
- Determine design traffic/speed, identify layer thickness. Design method assumes water should reach top of granular base layer, not stored on surface layer of pavement to improve durability. The design method is suitable for subgrade soils with high permeability, since storm water will percolate through the subgrade.
- Build a test section with instrumentation such as load cells and strain gages. Conduct traffic counts.
- Conduct data analysis of test section results, develop pavement design recommendation, and produce a final report.

## WHAT IS OUR GOAL?

This study will help incorporate a fully permeable pavement design method for pavement use, mitigate storm water runoff and provide a green construction alternative. Pavement to be used for high truck traffic areas and not fail due to clogging of the permeable surface and pavement raveling due to rainstorms. It should be fully permeable (drain off water) to reduce hydroplaning (tire skidding), reduce infrastructure cost and provide a sustainable alternative for storm water mitigation.

## WHAT IS THE BENEFIT?

This study will produce a fully permeable, durable structural pavement design that will withstand high speed/truck traffic on roads, remain structurally sound and provide a sustainable and operable storm water management best management practice (BMP) while minimizing the adverse effects of storm water runoff.

## WHAT IS THE PROGRESS TO DATE?

This project was executed (contract began) on April 1, 2016. In the process of building pavement test section and hiring a student.