

Abstract

Pavements are surface structures that are constructed above the ground water table but are routinely exposed to seasonal climate conditions. Water contents under the pavement are generally below saturation and thus are governed more by unsaturated hydrology than ground water aquifer hydrology. The current pavement drainage design is based on saturated flow models and thus does not appear to have broad relevance for pavement conditions. The goal of this thesis research was to characterize the effects of material properties and drainage practices on pavement base and subgrade water content and stiffness. Specifically this thesis research deals with (1) the effects of material properties on aggregate equilibrium water content, (2) effect of drainage design on pavement performance, and (3) effect of a geocomposite capillary barrier drain on pavement base and subgrade moisture and stiffness.