



## Florida Department of Transportation Research

Development of Field Permeability Apparatus:  
Vertical and Horizontal Insitu Permeameter (VAHIP)  
BD545-15 (12/07)

Soil permeability is a measure of how well water can flow through a soil's pore space. It is a critical factor for designing holding ponds because it determines how long retained water will take to drain through a pond of any given size. If permeability is underestimated, an unnecessarily large pond may be built, costing more than necessary. If permeability is overestimated, a pond that is too small may be built, and untreated water may overflow onto adjacent ground or the pond may foster insect breeding. Remedial action would be required, incurring additional costs.



*Vertical and Horizontal Insitu Permeameter (VAHIP) Probe*

Traditional field tests are time consuming and expensive, and engineers do not always have confidence in their results. Engineers needed a method that could quickly, accurately, and inexpensively measure both vertical and horizontal permeability simultaneously at multiple depths.

Researchers developed and tested a prototype Vertical and Horizontal Insitu Permeameter (VAHIP). The VAHIP allows users to measure both vertical and horizontal flow rates in a single operation. The user inserts the device into the ground. A dual ported valve then opens to let water flow horizontally through slots along its side to measure horizontal flow. Without moving the device, the operator can close the slots and open the vertical port to obtain vertical flow. An electronic flowmeter measures both rates. The user can drive the probe further down to obtain measurements at a different depth.



*The VAHIP Probe, showing the Stage I vertical permeability test mode position on the right and the Stage II horizontal permeability test mode position on the left*

VAHIP test results compared favorably with standard permeability test results. FDOT has requested production units for implementation.

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