**TRANSPORTATION POLLED FUND PROGRAM**

**QUARTERLY PROGRESS REPORT**

Lead Agency (FHWA or State DOT): Virginia Department of Transportation

**INSTRUCTIONS:**

*Project managers and/or research project investigators should complete a quarterly progress report for each calendar quarter during which the projects are active. Please provide a project schedule status of the research activities tied to each task that is defined in the proposal; a percentage completion of each task; a concise discussion (2 or 3 sentences) of the current status, including accomplishments and problems encountered, if any. List all tasks, even if no work was done during this period.*

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| **Transportation Pooled Fund Program Project #**TPF-5(229) | **Transportation Pooled Fund Program-Report Period:** √ Quarterly 1 (January 1—March 31) Quarterly 2 (April 1—June 30) Quarterly 3 (July 1—September 30) Quarterly 4 (October 4—December 31) |
| **Project Title:**Characterization of Drainage Layer Properties for MEPDG |
| **Name of Project Manager(s):**Brain K. Diefenderfer | **Phone Number:**(434)293-1944 | **E-Mail:**Brain.Diefenderfer@VDOT.Virginia.gov |
| **Lead Agency Project ID:** | **Other Project ID (i.e., contract #):**VTRC-MOA-11-005(98289) | **Project Start Date:**September 1, 2010 |
| **Original Project End Date:**August 31,2013 | **Current Project End Date:**August 31,2014 | **Number of Extensions:**1 |

Project schedule status:

On schedule On revised schedule Ahead of schedule √Behind schedule

Overall Project Statistics:

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| **Total Project Budget** | **Total Cost to Date for Project** | **Percentage of Work Completed to Date** |
| $360,000 | $360,000 | 99% |

Quarterly Project Statistics:

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| **Total Project Expenses and Percentage This Quarter** | **Total Amount of Funds Expended This Quarter** | **Total Percentage of Time Used to Date** |
| $0/0 | $0 | 100% |

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| **Project Description:**The objectives of this pooled fund study are to develop methods for characterizing the elastic modulus and strength of pavement drainage layers for the Mechanistic-Empirical Pavement Design Guide (MEPDG), to perform analysis of the stability and failure of the drainage layer in the pavement structure, and to develop specifications for required minimum porosity for effective drainage. |

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| **Progress this Quarter (Includes meetings, work plan status, contract status, significant progress, etc.):**A 2nd draft version of the final report was distributed to the technical committee in March 2016. Comments are due by April 1, 2016. We are expecting to have a project close-out meeting during the second week of April 2016 to complete the study.  |
| **Anticipated work next quarter:**The final report will be submitted and the project will be completed. |

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| **Significant Results:**1. The study identified methods to assess the void content of highly permeable drainage materials.
2. The study also identified appropriate stress levels and temperatures at which dynamic modulus testing can be conducted without causing plastic deformation within the test specimen.
3. The study developed a modified model (based on NCHRP 1-37A) to predict the dynamic modulus of drainage layer materials based on volumetric properties.
4. The study developed recommendations, based on finite-element modeling, for the location of the drainage layer to reduce permanent deformation within the pavement structure.
5. The study showed that the drainage layer does provide some structural contribution to the pavement. This is significant since most design philosophies ignore this contribution.
6. The study identified an optimal void content to balance the needs of permeability and stiffness for the materials studied.
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| **Circumstance affecting project or budget. (Please describe any challenges encountered or anticipated that might affect completion of the project within the time, scope and fiscal constraints set forth in the agreement, along with recommended solutions to those problems).**Significant delays were encountered with completing the draft version of the final report. It is expected that the final report will be completed next quarter. |

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| **Potential Implementation:**This study offers three points for implementation. The first is a model that can be used to estimate the dynamic modulus based on volumetric properties. The second is a set of dynamic modulus values that can be used in mechanistic design for the materials studied. Third is an approach for other agencies to follow to design a permeable drainage layer that balances both permeability and stiffness. |