Title: Post Construction Storm Water Research: Informing TDOT MS4 Strategies by Quantifying Performance of Current Practices

Scope and Significance:

The current TDOT MS4 Permit requires TDOT to identify and catalog all post-construction stormwater management BMPs in the Right Of Way (ROW). However, it's not clear what highway drainage structures and vegetated landscaping (e.g. swales) really constitute a beneficial BMP and which are simply a stormwater conveyance. Most swales/ditches were designed to move water away from the ROW as quickly as possible and not allow it to potentially damage the structural integrity of the roadbed. This project is intended to be a data gathering study whereby initial quantification of swale performance as a stormwater BMP is achieved. This information is intended to support TDOT's efforts to meet their current and future permanent stormwater management permit requirements by utilizing cost-effective and practical grassy swales as stormwater BMPs.

Goals / Purpose:

The goal of this project is to install hydrologic monitoring equipment in the grassed median of a section of highway to determine the storage volume and water quality improvements provided by the system. Water quality and flow data will be compiled to determine influent and effluent mass loadings for the system. From this, a removal efficiency ratio can be developed to determine the percentage of pollutant removal achieved in the system. However, studies have shown that removal efficiencies can mask system function, being highly influenced by influent pollutant values. Thus, effluent pollutant concentrations will also be compared to matching studies from literature and to systems present in the International Stormwater BMP Database. Through these efforts the purpose of the study will be fulfilled, that is, the performance of the system will be characterized allowing a better understanding of water quality and hydrologic function.

Expected Outcomes:

This data will provide a building block for the development of Standard Operating Procedures (SOPs) for proper design, installation, and maintenance of grassy swales as effective and approved permanent stormwater management BMPs. Additional benefits of this project include gaining knowledge which can be used in the development of a methodology for field definition of ROW BMPs for mapping/cataloging purposes and how to determine if maintenance is required for these systems. Overall, this research will quantify the runoff reduction and water quality benefits provided by current TDOT roadway drainage designs in preparation for forthcoming MS4 permit requirements. This will aid in defining what is achieved under the current design specifications, and thus what additional actions may be necessary to meet permit requirements.

Project Time Period: October 2015 – March 2018

Current Status: ongoing

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