

AN ABSTRACT OF A THESIS

CHARACTERIZATION OF PARKING LOT RUNOFF IN COOKEVILLE, TN

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The washoff response of urban storm water runoff from a parking lot in Cookeville, TN was evaluated for events occurring between January 17 and February 22, 2001. The study employed ultrasonic flow meters and discrete-automated samplers to measure runoff flow and collect stormwater samples. Samples were analyzed for total suspended solids (TSS), chemical oxygen demand (COD), and polycyclic aromatic hydrocarbons (PAH). Assumptions commonly used in the modeling of washoff response and for the development of best management practices (BMPs) are evaluated. This includes an assessment of the assumption of exponential decay of pollutant load and concentration with cumulative runoff volume, the so-called washoff model, and an assessment of the first flush phenomenon. The study findings show that the washoff model may not adequately describe the washoff response when other important hydrologic parameters, such as rainfall intensity, play a role; hence, leading to uncertainty in estimation of pollutant loads and event mean concentrations (EMCs). The first flush phenomenon occurs only in the most general sense. More rigorous definitions that have been proposed for determining its occurrence, including the half-inch rule and the 30/80 definition, are rarely satisfied. For each runoff event, measured and predicted loads and Event Mean Concentrations (EMCs) of TSS, COD, and PAH were determined using the midsample method and the exponential washoff model, respectively. For one event the values from both methods were compared and showed percent differences between 30% and 80%. When the average EMCs for all events were compared to other published values it was found that the parking lot runoff was similar to 40-45% impervious highway sites. Differences in rainfall intensity, runoff volume, and antecedent conditions were found to have effects on the pollutant washoff response.