

Decision Support System for Determination of Types and Locations of Low Impact Development Practices

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Abstract

Low impact development (LID) practices has become important to mitigate the damage from natural disasters in urban areas. Thereby many hydrological simulation models can simulate the hydrological impact of LID practices. However, commonly used models are not able to provide specific information to most users such as where LIDs should be placed and what kind of LID should be designed. In this study, a decision support system which can be used with the EPA's SWMM was developed for the determination of LID types and locations of LID practices, named Water Management Prioritization Module (WMPM), was applied to a urbanized university campus. Eight sub-catchments were selected as feasible candidate areas for the planning of LID practices. Pre-designated infiltration trenches and permeable pavements were applied to each selected sub-catchments, followed by peak and total runoffs comparison between before/after planning of LIDs. Moreover, TOPSIS, one of a multi-criteria decision analysis method was used in the procedure of selecting target sub-catchment areas and final prioritization of LID types and locations. As a result, sub-catchments S4 with permeable pavements and S16 with infiltration trenches has shown the most decrease in total and peak runoffs, respectively. Therefore, WMPM was found to be effective in determining the best alternative among various scenarios generated and simulated.

Keywords: low impact development, decision support system, Water Management Prioritization Module, TOPSIS

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