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A Review on the Hydrologic and Hydraulic Performances in Low Impact Development-Best Management Practices Treatment Train

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Abstract : Bioretention system is one of the alternatives to approach the conventional stormwater management, low impact development (LID) strategy for best management practices (BMPs). Incorporating both filtration and infiltration, initial research on bioretention systems has shown that this practice extensively decreases runoff volumes and peak flows. The LID-BMP treatment train is one of the latest LID-BMPs for stormwater treatments in urbanized watersheds. The treatment train is developed to overcome the drawbacks that arise from conventional LID-BMPs and aims to enhance the performance of the existing practices. In addition, it is also used to improve treatments in both water quality and water quantity controls as well as maintaining the natural hydrology of an area despite the current massive developments. The objective of this paper is to review the effectiveness of the conventional LID-BMPS on hydrologic and hydraulic performances through column studies in different configurations. The previous studies on the applications of LID-BMP treatment train that were developed to overcome the drawbacks of conventional LID-BMPs are reviewed and use as the guidelines for implementing this system in Universiti Teknologi Petronas (UTP) and elsewhere. The reviews on the analysis conducted for hydrologic and hydraulic performances using the artificial neural network (ANN) model are done in order to be utilized in this study. In this study, the role of the LID-BMP treatment train is tested by arranging bioretention cells in series in order to be implemented for controlling floods that occurred currently and in the future when the construction of the new buildings in UTP completed. A summary of the research findings on the performances of the system is provided which includes the proposed modifications on the designs.

Keywords : bioretention system, LID-BMP treatment train, hydrological and hydraulic performance, ANN analysis
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