EVALUATING HYDROLOGICAL PERFORMANCE OF THE LID MODULE IN MIKE URBAN; A CASE STUDY IN GREFSEN, OSLO

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ABSTRACT

Paved surfaces, increased precipitation amount and intensity, and a limited capacity in the sewer systems cause a higher risk of urban flooding and frequent combined sewer overflows (CSOs). This is a common problem in Oslo, Norway, and cities around the world. Low impact development, also referred to as green stormwater controls, is a possible solution to mitigate the consequences by managing some of the stormwater locally and reducing the amount of water routed into the sewers. One of the critical CSOs in Oslo is located in the Grefsen catchment. Frequent overflows contribute to significant pollution loads to Akerselva, an important, historical and recreational river flowing through Oslo. The objective for the next decade is to reduce this CSO to a maximum of three events every third year. To evaluate the effect of LID locations, the green roof and the bioretention modules in the MIKE URBAN model have been used. The first step of the method was to evaluate the hydrological performance. Observed data from two pilot green roofs in Oslo and a bioretention cell were used to evaluate the performance. Nash- Sutcliffe efficiency coefficients have been used to assess the power of the model. To simulate the water movement and overflows in the Grefsen catchment area, a calibrated model was applied using the previously evaluated LID modules. MIKE URBAN has been proven to be a satisfying tool when modelling stormwater controls. The case study approach has been valuable to test the real life complexity typically faced in modelling urban combined systems. Moreover, modelling is important to identify possible placements for stormwater controls making it an important tool for planning and managing storm events in the future.

Keywords: Urban drainage; CSO; Mike Urban; LID; Hydrological modelling; Decision-making