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EFFECTS OF RAINFALL ON REDUCTION OF URBAN NON-POINT SOURCE POLLUTION LOAD IN A LID RESIDENCE COMMUNITY IN SHAANXI, CHINA

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Abstract

In order to study the influence of different rainfall processes on the total pollutant load of non-point sources and pollutant load reduction rate of the low-impact development facilities, this paper took a Low Impact Development (LID) community of Tianfuheyuan, Fengxi new city, Xixian new district in Shaanxi, China as an example, and constructed the storm water management model (SWMM) of the study area. The computed results demonstrate that the storm patterns have obvious effects on the pollutant load and its reduction. The effect trend is similar to the runoff and runoff control process by LID measures. With the increase of the return period, the total pollutant load increases and the pollutant load reduction rate decreases. That is, the higher the rainfall intensity is, the less pollutant the LID measures could mitigate. Compared with the return period of 1a, the total pollutant load increased by 74.36% – 248.26% and the pollutant load reduction rate decreased by 3.67% – 10.27%, respectively, when the return period is 2a – 10a. The rain peak location has slight impact on the urban non-point source pollution. Compared with the rain peak coefficient of 0.2, the total pollutant load is decreased by 2.24% – 6.95% and the pollutant load reduction rate is increased by 0.24% – 0.74%, respectively, when the rain peak coefficient is 0.3 – 0.6. This research can help understand the mechanism of the non-point source pollution mitigated by the LID measures, and plan or design the LID measures.

Key words: low impact development, non-point source pollution, pollutant load, runoff control, SWMM model

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