

# Monitoring and Evaluating Rainfall-Runoff Control Effects of a LID System in the Future Science Park of Beijing

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## Abstract

The actual rainfall–runoff control effects of a low-impact development (LID) system comprising multiple facilities within a large-scale area need to be monitored and examined, including not only the rainfall volume capture effect but also the rainfall control mode, which is influenced by the confluence relationship. The confluence relationship between an impervious surface and LID facilities can be manifest as a series or parallel system. For individual rainfall events smaller than the designed rainfall, rainfall control operates in event-capture mode for a series system and in partial-capture mode for a parallel system. Although the rainfall volume capture ratios of series and parallel systems might be equivalent, a series system is more suitable for water quality improvement and peak flow reduction. This study considered the Future Science Park of Beijing as a case study site. Monitoring indicated that the rainfall volume capture effect is acceptable because the average runoff coefficient is approximately 0.10; however, rainfall control operates in partial-capture mode. Investigation and analysis showed that runoff is generated by three mechanisms: impermeable road surfaces, infiltration excess, and pipe storage-water emission. When rainfall volume is less than the designed rainfall, the little runoff that occurs is generated mainly by the impermeable road network. The rainwater infiltration capacity of permeable facilities might reach 44 mm. In future, to improve rainfall–runoff control effects, impermeable roads and green belt areas alongside the roads should realize series confluence.

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