

## Comparison of On-Site Stormwater Detention Real Performance and Theoretical Simulations

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**Abstract :** The purpose of On-site Stormwater Detention (OSD) system is to promote the detention of addition stormwater runoff caused by impervious areas, in order to maintain the peak flow the same as the pre-urbanization condition. In recent decades, these systems have been built in many cities around the world. However, its real efficiency continues to be unknown due to the lack of research, especially with regard to monitoring its real performance. Thus, this study aims to compare the water level monitoring data of an OSD built in Belo Horizonte/Brazil with the results of theoretical methods simulations, usually adopted in OSD design. There were made two theoretical simulations, one using the Rational Method and Modified Puls method and another using the Soil Conservation Service (SCS) method and Modified Puls method. The monitoring data were obtained with a water level sensor, installed inside the reservoir and connected to a data logger. The comparison of OSD performance was made for 48 rainfall events recorded from April/2015 to March/2017. The comparison of maximum water levels in the OSD showed that the results of the simulations with Rational/Puls and SCS/Puls methods were, on average 33% and 73%, respectively, lower than those monitored. The Rational/Puls results were significantly higher than the SCS/Puls results, only in the events with greater frequency. In the events with average recurrence interval of 5, 10 and 200 years, the maximum water heights were similar in both simulations. Also, the results showed that the duration of rainfall events was close to the duration of monitored hydrograph. The rising time and recession time of the hydrographs calculated with the Rational Method represented better the monitored hydrograph than SCS Method. The comparison indicates that the real discharge coefficient value could be higher than 0.61, adopted in Puls simulations. New researches evaluating OSD real performance should be developed. In order to verify the peak flow damping efficiency and the value of the discharge coefficient is necessary to monitor the inflow and outflow of an OSD, in addition to monitor the water level inside it.

**Keywords :** best management practices, on-site stormwater detention, source control, urban drainage

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