Redesign of the Existing Combined Sewer System (CSS) of Novi Sad

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ABSTRACT

The city of Novi Sad with the catchment area of 1960 ha and the current population of 300.000 has a combined sewer system (CSS) constructed during the 1950s. Stormwater and wastewater are discharged directly into the river Danube through two central pump stations with no pretreatment. The drainage system was designed for wastewater and stormwater drainage with the return period of 2 years for the development level at the time. The system was surcharged and overflowed many times during the first decade of this century due to the city development and increasing population. Overflows at numerous locations in the city caused hours-long traffic jams and enormous structural damages. The hydraulic-hydrologic analysis has indicated the requirement for the CSS redesign. The paper presents the methodology applied to redesign the existing system into the combined sewer system with storage tank and overflow (CSO). The system surcharges of once in 5 years and once in 3 years are designed for the central city area and residential area respectively. The analysis of the existing and designed drainage conditions is made using the urban water management modelling 3DNet. The storage tank with overflow is designed for the reduction of the river Danube pollution. The designed flow to the future wastewater treatment plant (WWTP) is determined to be $2Q_{DWFm}$. The redesigned CSO can provide significant reduction in the system surcharge and overflow, favourable hydraulic flow conditions in pipelines, reduction in pollutant overload in the river Danube as receiving water as well as optimal flow relevant for the dimensioning of WWTPs in Novi Sad.

KEYWORDS

Combined sewer, modelling, overflow, storage volume