

# Proposal of a procedure to asses Pollutographs. Application to Murcia's Combined Sewer Overflows (CSOs).

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## Abstract

Directives 91/271/EEC and 93/481/EEC set norms regarding the management of Combined Sewer Overflows. European Commission monitors the implementation status and implementation programmes. In fact, during the year 2019 all the utilities should be able to quantify the pollution spilled during storm events. And afterwards, plans have to be developed in order to reduce the impact of such events. In this paper, we proposed a method to estimate the transported pollution during events as well as to serve as a tool for developing plans to lessen the corresponding pollution.

The procedure is divided into three steps:

A. Periodical measurements of all relevant pollutants, e.g. total suspended solids and chemical oxygen demand, in wet and dry weather. Such pollutant "concentrations" are correlated with the turbidity, updating the relation among them [1].

B. Continuous measures of the turbidity. Turbidity is continuously register in the sewer areas near overflow spillways. Turbidimeters are a very convenient equipment for this purpose [2]. Actually, it is reliable, its measures are very correlated with the total suspended solid concentration and its maintenance is easy. In this way, combining A. and B. turbidity measures provide us a real-time estimation of the pollutant concentration. on real time.

C. Assesment of each catchment hydrograph. Depending on the available data, this step could be based on a design, a measured or a simulated hydrograph. In order to apply this methodology to Murcia's Combined Sewer System, we have used simulated hydrographs based on real measured rainfall. Murcia's utility has developed a calibrated SWMM model, and therefore, using the rainfall data, it is possible to estimate hydrographs for all the relevant points of the system.

D. Estimation of each catchment pollutograph. Combining the pollutant concentration, estimated in the previous steps, with the hydrographs, we can asses how the mass of pollutants are transported. This information allows us to comply with EU Directives, but it will also be useful to design Murcia's strategy to minimize environmental impacts.

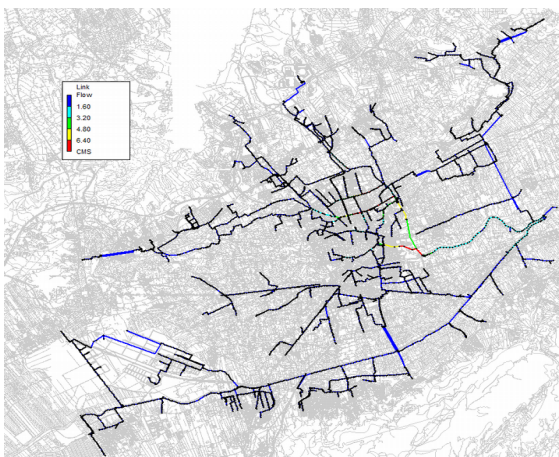


Figure 1: Example of one time step of the storm simulations carried out using Storm Water Management Model (SWMM).

## References

- [1] García, J.T., et al. (2017). Urban Runoff Characteristics in Combined Sewer Overflows (CSOs): Analysis in Southeastern Spain. *Water*, 9 (5), 303-318.
- [2] Bersinger, T., et al. (2013). Continuous monitoring of turbidity and conductivity: a reliable, easy and economic tool for sanitation management. *WIT Transactions on Ecology and the Environment*, 171, 151-162.

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