

ACTIVE TRADE EFFLUENT CONTROL AT SOURCE

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This paper aims to explain the rationale behind Active Trade Effluent Control at Source and provide a detailed account of the recent research project carried out by Yorkshire Water to trial this control philosophy. It concludes with a view on the future for this application.

The vision of Active Trade Effluent Control at Source is the automatic control of the diurnal release of significant trade effluent at source in order to minimise its impact on the Wastewater Treatment Works (WwTW).

The rationale of this control application is that the performance of a WwTW could be optimised by balancing the flow from a trader using their on-site storage facilities and subsequently discharging the trade effluent to sewer in a controlled manner according to a pre-determined set of control rules.

To demonstrate the technical feasibility and financial viability of implementing Active Trade Effluent Control at Source, a pilot project was undertaken. The North Yorkshire catchment of Masham was chosen as the study area – the criteria for selection are briefly explained in the paper.

The main objectives of the project were: –

- i) To determine and deliver the required diurnal flow and load profiles to the WwTW inlet
- ii) To establish the benefit at the WwTW resulting from the reception of these profiles
- iii) To assess the regional applicability of this control strategy.

To achieve these aims, it was decided to use flow and quality monitoring and water quality computer modelling technologies to enable the development of trader control rules.

The project's major challenge was to construct a water quality model of a catchment that was not only verified in response to normal diurnal domestic loads but also to the trade loads present. Following this, a strategy was then required to be developed for determining the trade effluent discharge regime that would be of most benefit to the WwTW.

The modelling section of the project was separated into three distinct areas: –

- i) To build and verify a PC-based mathematical model of the Masham sewerage system – this was to facilitate accurate hydraulic analysis of the system in dry and storm conditions.
- ii) To build and verify a quality model to allow extensive water quality analysis of the Masham sewerage system.
- iii) The evaluation of four test scenarios based around trader discharge criteria.

Each of these topics are discussed, with particular reference to problems encountered and results gained.

The logistics of implementing the newly developed control rules are described, along with examples of the monitoring results obtained at the WwTW before and during the operation of the new discharge regime.

The reception at the WwTW of the required diurnal profiles resulted in benefits for both Yorkshire Water and the trader – the project's many achievements are presented with regard paid to the study's original objectives.

The paper concludes with some thoughts on the future for Active Trade Effluent Control at Source as a wastewater network control application.