

Pollution load based sewer management in Cologne

ENTfrachtEN – Development of an integral process measuring and control technology concept for pollution load based real-time control of wastewater discharge with the aim of surface water relief. Kanalnetzen zur Entlastung der Gewässer

Together with the Stadtentwässerungsbetriebe Köln and NIVUS GmbH, a management concept is to be developed and implemented for the combined sewer system in Cologne-Rodenkirchen, in which the control of weirs and pumps, especially in spillways, is based on loads. As a parameter for these loads, the TSS load is determined by a new measuring system from NIVUS GmbH. The project is funded by the DBU and will run for three years until October 2024.

In the DBU-funded research project „ENTfrachtEN“, the possibilities and potentials of a sewer network management with the help of a load-related discharge control are investigated. Since sewer network management using a discharge control system has been discussed among experts for more than 30 years, but applications have only been found in isolated cases so far, the project is intended to make a contribution to improving the usability and dissemination of sewer network control systems beyond the application case at StEB Cologne. While most of the implemented concepts are based on a volume-oriented optimization of combined sewer overflows, ENTfrachtEN tests a load-oriented control in the sense of an integral consideration of catchment area, sewer system, wastewater treatment plant and water body. The goal of optimizing the material flow management in the combined sewer system is to be realized with the instrument of controlled

wastewater discharge in the sewer network. The load-based control makes an important contribution to the relief of the water bodies and can additionally be used for the stabilization of the loads in the inflow of wastewater treatment plants. This is being investigated using the Cologne-Rodenkirchen catchment area as an example. The sewer network in the pilot area is characterized by its representativeness with regard to the special structures and control elements it contains as well as the types of development and use in typical combined sewer systems, which simplifies the transferability of the project results to other systems. In combination with an innovative measurement approach for load-based management using the NivuParQ 850 ultrasonic probe from the project partner NIVUS GmbH, significant new findings for measurement in mixed systems can be expected for the results of the project. The probe is capable of measuring concentra-



Controllable stormwater holding tank. © StEB Köln



Installed Nivu probes in the Rodenkirchen sewer network. © Nivus GmbH

tions of total suspended solids (TSS) in wastewater using a multi-echo system to evaluate the contaminant load. This data can be read out in real time and, together with the flow sensors that are also mounted, can be used as a basis for decisions on the control of controllable sewer network components.



Installation of the probes. © Nivus GmbH

After commissioning of the sensors, their data will be verified with the help of laboratory samples. At the same time, the development of a control concept with the aim of optimizing the use and protection of the water body will begin. The results obtained are to be abstracted and parameterized in order to be able to create an adaptable model with transferability to other catchment areas. For an exemplary transfer, a suitable water body with a comparable catchment area and more sensitive water body will be identified. Based on the results obtained in the project with regard to the influence on solid loads, potential estimates for the reduction of load inputs from spillways into sensitive receiving waters by means of a load-related channel network control can thus be derived and implemented in follow-up projects.

The results will then be compared with the environmental relief potentials of an uncontrolled discharge and a volume-based control. The results of the research project are expected to provide new insights into the interaction of discharge and pollution load in combined sewers. Furthermore, an implementable and transferable solution for online load data acquisition in the sewer is to be found and described.

Project overview

PROJECT TITLE

ENTfrachtEN – Entwicklung eines integralen Mess-, Steuerungs- und Regelungstechnik-(MSR-) Konzepts zur frachtbasierten Echtzeit-Steuerung der Abwasserableitung in Kanalnetzen zur Entlastung der Gewässer

PROJECT PERIOD

2021 – 2024

PROJECT PARTNERS

StEB Köln, NIVUS GmbH

FUNDING/PROJECTDRIVER



Deutsche
Bundesstiftung Umwelt

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