Implementation of a monitoring system in a sewage network

Bogotá, Colombia

1. Objective

The main objective of this innovation pilot is to implement a monitoring system of the quality and quantity of wastewater transported in the sewage network. Often, chemical substances are discharged into the sewage system, affecting the capacity of treatment plants to treat the sewage and damaging the environment and water bodies at final discharge. The monitoring system should rely on sensors that measure, in real time, basic parameters such as conductivity, temperature, pH and flow, as well as presence of chemicals affecting the quality of inflow to the treatment plant. The system should allow the Empresa de Acueducto y Alcantarillado de Bogotá (EAAB-ESP) to identify areas of discharge with highest impact, and define corrective and control actions to guarantee the proper functioning of the sewage system.

2. The water supply system

EAAB-ESP operates the sewage network of the city of Bogotá. The Approximate length of sewage networks is 7,000 kilometers. The current capacity of the wastewater treatment plant is 4.1 m3 / second and with the planned expansion it will treat 7 m3 / second with secondary treatment with disinfection. Currently, the El Salitre WWTP serves approximately 2.8 million people. The network receives wastewater discharges from 158,000 non-residential users. These discharges often present physicochemical characteristics that cause damage to the sewage networks. The environmental and health risks generated by the overflows of wastewater on the premises or public space generally impede the development of productive and social activities around the facility. Additionally, non-residential effluents arriving at the sewage plant increases the cost of treatment. Despite the existing national and local pollution control regulations, compliance with, and reporting about key water quality parameters is deficient. Through the application of effective monitoring technology, the utility could characterize key parameters throughout the system, and identify the origin of discharges to be able to mitigate these negative impacts.

In response to this problem, EAAB-ESP implemented its Industrial Effluents Program, which allowed the utility to focalize on critical areas in the city. Specifically, the Montevideo area, between 68 and Boyacá avenues, and between 13 and 22 streets, stood out as critical given the type of discharges, the high industrial density and the decline of the sewage network due to physicochemical characteristics of discharges to the network and to surface water bodies. Damage to the network is also caused by inappropriate dumping and clogging of the network, which in turn increases the risk of flooding as well as the maintenance and rehabilitation costs.

3. The Challenge

The monitoring system to be implemented should contain all necessary hardware and software to identify key pollution parameters and events throughout the pilot testing site, to be able to control non-domestic discharges upstream in the network. The system should allow the Empresa de Acueducto y Alcantarillado de Bogotá (EAAB-ESP) to identify, in real time, areas of discharge with highest impacts. The monitoring system should rely on top-of-the-line water quality testing and communication hardware and software devices and systems, in order to inform the utility managers and network operators on the need for corrective and control actions.

4. Pilot Project General Structure

The implementation of a water quality monitoring system in Bogota's sewage network would be aimed at monitoring non-domestic discharges, and entails the following activities, among others:

- Review of cadastral/records of non-domestic water generating users in the area of interest, and theoretical characterization of sewage discharges (with and without on-site pre-treatment). This includes records from various sources and authorities (water, environment, industrial, health, etc.)
- Review of existing data on physicochemical characteristics of the water quality from previous network samples within the area of interest, and their behavior over time. This includes outstanding events due to high volumes of discharge, high concentration of pollutants, flood events or health emergencies due to water quality hazards.
- Review of existing data base/GIS of the sewage network, with geo-referenced information on non-domestic users/discharges, and use of network analysis/hydraulic modeling systems to complete the characterization of water quality.
- Design and habilitation of a monitoring system in the area of interest, with hardware and software in place and an option of real time sewage sampling devices
- Demonstration during a given testing period, with dashboards containing analytics and results.

5. Relevant Company/program information.

Presentation by EAAB-ESP on water quality monitoring in the sewage network, including the Montevideo sector in the city,

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