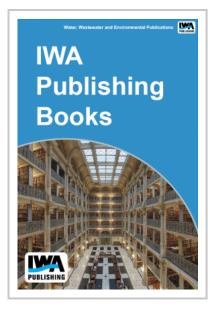# Optimization of Wastewater Lift Stations for Reduction of Energy Usage and Greenhouse Gas Emissions

One of the largest contributions of GHG emissions from wastewater treatment facilities results from the energy used by the pumping regime of the lift stations. This project demonstrated an energy-efficient control method of lift station system operation that utilizes hydraulic modeling results generated from site-specific conditions to optimize the pumping units and reduce simultaneous running cycles. The new control system, which features new generation Supervisory Control and Data Acquisition (SCADA) configurations, allows data communication directly from each lift station to the wastewater central control room. This configuration eliminates slow, conventional two-way communication via aging radio, telephone and hardwired copper networks that require data to pass through data concentrators located miles away from the central control room. This new method of operation reduced operating pressures in the common force main, reduced the energy demands of the pumping units, and stabilized the influent flow into the wastewater treatment facility. Pilot tests conducted in this study demonstrated that the energy savings obtained through such operational optimization is approximately 15%.

A set of guidelines developed in this study detail how lift stations can be optimized using advanced hydraulic modeling and new generation SCADA systems. The findings of this study should allow wastewater utilities to:

- Reduce greenhouse gas emissions from the wastewater facility;
- Reduce force main operating pressures, total dynamic head and power consumption;
- Reduce facility operating cost by designing system capacity based on optimized system operations; and
- Schedule motor and pump operating cycles to increase service life and reduce service calls.

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