Optimisation of enhanced biological phosphorus removal in MBR-process

Background
Stockholm is rapidly growing which requires increase in capacity for wastewater treatment. Stockholm Vatten och Avfall (SVOA), a municipal water utility in Stockholm, is currently rebuilding Henriksdal wastewater treatment plant (WWTP) to a process based on membrane bioreactor (MBR). One of seven treatment lines is already rebuilt and two more are going to be taken in operation during spring 2024. The new process configuration have been extensively tested together with IVL Swedish Environmental Research Institute in pH2040 project (Andersson et al. 2023). Since 2024, pilot tests on process optimisation and evaluation of membrane lifetime are run in cooperation between SVOA and IVL at Sjöstadsverket Water Innovation Center (SWIC).

During the pilot trials within the pH2040 project it was discovered that a prat of phosphorus is removed via enhanced biological phosphorus removal (EBPR) pathway. This spontaneous EBPR was investigated in a previous Master Thesis project (Roberts et al. 2020). Some EBPR activity was also observed in the first full-scale line at Henriksdal WWTP.

Project proposal
In order to better understand the possibility for EBPR integration into the MBR-process, the pilot plant at SWIC was adapted to provide favourable conditions for phosphate – accumulating bacteria. The aim of this Master Thesis project is to evaluate the performance of the EBPR process and study different strategies for maximizing the biological phosphorus removal without compromising energy efficiency and carbon source consumption.

This Master Thesis project is experimentally oriented and will involve operating a pilot plant, performing chemical analyses, running batch trials, calibrating sensors, and evaluating online data.

Organisation
Most of the work will be performed at SWIC (Lindarängsvägen 99, Stockholm). Daily attendance is required. Some batch trials might also be performed at Henriksdal WWTP.

Industrial supervisor: Andriy Malovanyy (SVOA), andriy.malovanyy@svoa.se
Practical help: Gabriel Persson (SVOA) and IVL staff

The applicants are invited to send a motivation letter, a CV, and a transcript of records from education on university level to Andriy Malovanyy. In line with SVOA policy, a successfully completed Master's project is rewarded with a compensation of 30 000 SEK (pre-tax).