

Presentation Title: Pump Design and Optimisation

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Water companies face the never-ending challenge to making the most of their aging assets and optimising their networks to be as efficient as possible. As technology has evolved the way we assess the systems has changed, with advances in real time network monitoring and optimisation. This paper explores aspects of pump design and optimisation such as:

Evaluation of existing assets – The first stage is to understand what's currently in the ground, the condition, age and functionality of the assets. Typically, the information kept on pumps are from their install date but, how are they performing 20 years later?

There are various methods of testing their current performance for example, logging, end to end testing and verification, with the aim of producing a model with how they are working now. This allows us to calculate the existing performance and costs of running the pumps, providing a benchmark to assess improvements.

Choosing the right assets – The key question when choosing the assets is what the client intends to use them for: like for like replacement, increased site output, changes to where the water is sent, etc. Modelling allows us to calculate the requirement of the pumps (Head, flow, and operation), producing a set of criteria to choose the right pump. How will the new pump perform? How can we use the model to estimate cost savings?

Pump Schedule Optimisation – To provide valuable insights and updates on the optimization of pump scheduling using advanced software and dynamic hydraulic models, showcasing the benefits of efficient pumping routines and their impact on cost savings and operational performance.

A trial has been completed using the concept of pump schedule optimization using advanced software and dynamic hydraulic models. The presentation explains how this approach differs from traditional methods and highlight the potential benefits, such as energy savings, reduced operational costs, and improved system performance.

Design criteria identified during the trial helped achieve smoother pumping profiles. This should lead to reduced wear and tear on equipment, better energy utilisation, and enhanced system stability / calming.

The presentation demonstrates the solution that emerged from the trial, which involved building storage capacity ahead of high tariff or high demand times. We will also discuss the rationale behind this approach and provide examples of how it can mitigate operational challenges and financial impacts.

There are significant advantages when using near real-time modelling capabilities in pump scheduling, the technological developments can empower water management professionals to make timely decisions, respond to unexpected events, and optimize pumping routines on the fly.