

# VALIDATION OF THE WAIKATO R2R INFOWORKS MODEL: A CRUCIAL TOOL FOR IMPROVING AUCKLAND'S DROUGHT RESILIENCE

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## **ABSTRACT**

Watercare is water services provider to around 1.7M people and utilises multiple hydraulic models – among them a single “Transmission” (bulk) Water Supply model of the metropolitan network. The model is undergoing a rolling re-validation to improve confidence for testing shutdowns and current / future operational scenarios. The 175MLD upgrades to the Waikato River to Redoubt Reservoir (R2R) segment had been underway since 2015 and were nearing completion however as the 2019-2021 drought began to unfold, it was determined that Watercare needed to accelerate operation of the system beyond 175MLD - up to the physical limits of the Waikato #1 pipeline.

Since the SCADA-informed model and associated assumptions were considered insufficient to provide the required levels of confidence, GHD was commissioned to urgently validated the R2R Infoworks model to support the design and implementation of several further water supply resilience projects. Working collaboratively with a team of operators, controls engineers, design partners and field technicians, the validation was achieved through deploying live loggers, analysing as-built drawings and performance literature, and conducting high-flow performance tests on the R2R system. This project timeframe was tight, as the team needed urgent answers to support long-lead equipment procurement, and this also tested the ability of Infoworks WS Pro to simulate some aspects including the water treatment plant pump (WTP) controls.

A range of upgrade scenarios were successfully tested, including the integration of the newly constructed Pukekohe East 50ML reservoirs (an important component of the 175MLD upgrades), increasing the speed of the existing WTP motors to accommodate the additional 50MLD Waikato-A WTP, changes in existing WTP pump and redoubt reservoir inlet controls, and the various shutdowns required to complete each project component. A significant win for Watercare was the close correlation between modelled and observed data, which reduced the previously conservative friction factor of the 20+ year old Waikato #1 watermain and also gave confidence to support the inline boost pump project, which is now delivering up to 225MLD.

Overall, an outcome focussed, collaborative approach allowed Watercare to maximise the use of a crucial tool to support design and operational decisions, assisting in the mitigation of drought impacts for Auckland residents.

## **KEYWORDS**

Modelling, drought, pipeline, pump, water treatment, resilience, water supply