

OptiFacts



Optimatics

Water Systems Optimization

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“Optimatics solved complex and integrated problems to develop a long term master plan for Auckland’s Trunk Water Main System. This provided Watercare with the confidence and context to continue with the implementation of major capital works.”

Client Reference:

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Optimization of Auckland Network to the Year 2057 50 year bulk water master plan

WATERCARE SERVICES LIMITED (WSL) is the bulk supplier of water and wastewater services to the Auckland region. With the population of the Auckland region predicted to grow by up to 60% over the next 50 years, WSL engaged Optimatics to identify the optimal 2057 strategy.

Background

- Five treatment plants
- 400 km of pipe
- 50 storage facilities
- Numerous pumping stations.

The Project

Optimatics worked as a team with Opus International and Montgomery Watson Harza on the Watercare treated water network, one of the most complex systems considered by Optimatics to date.

The Optimatics Genetic Algorithm was applied to the system to develop a solution satisfying growth requirements of the system to 2057.

Key Outcomes

Once a solution addressing the growth requirements for the system was developed, additional analyses were run to determine if the infrastructure would cover a number of security of supply cases, such as pipeline breaks. Solutions developed considered both operational responses as well as infrastructure upgrades to mitigate adverse effects of break cases considered.

The security of supply cases were designed to allow greater operational flexibility and redundancy, covering both possible mains breaks and planned maintenance activities.

Finally Optimatics ran a number of scenarios for alternative

boundary conditions related to sources, treatment plant locations, pipe routes, etc. This gave Watercare managers confidence in immediate and future capital investment choices.

Watercare are now considering how to capitalise on the work invested in developing these optimization models. One option is to incorporate the Optimizer

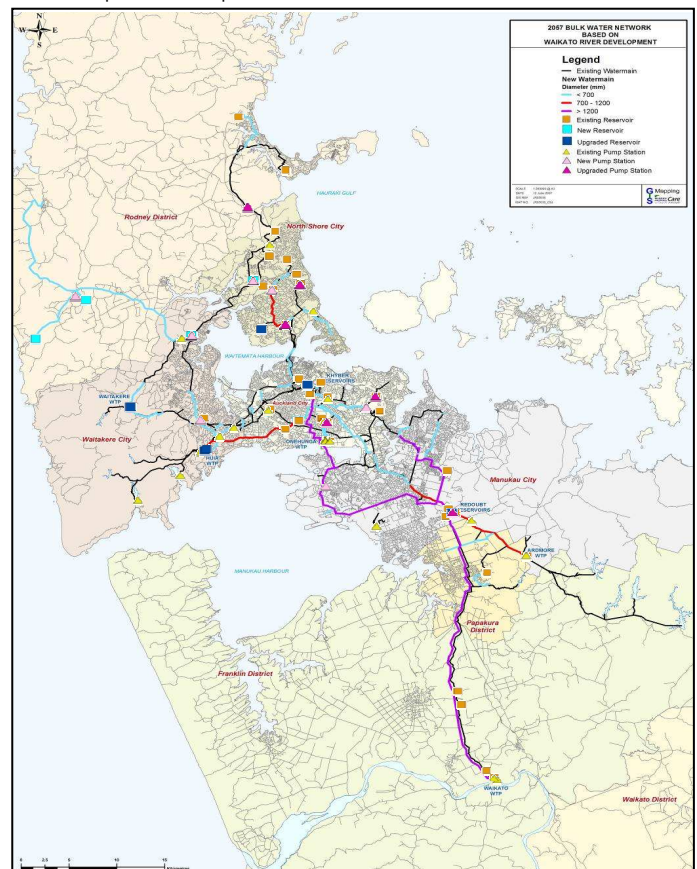
software in-house to be able to continue running “what if” scenarios.

Benefits

This project highlighted the advantages of the new technology currently available and the teamwork that was carried out between the parties involved, resulting in an excellent outcome.

KEY POINTS

- Whole of Auckland bulk treated water network analysis
- Consideration of growth and security of supply over a 50 year design period



Solution showing recommended pipe routes and asset selection