



Real-time Monitoring of Water Quality

Adroit and Spark NZ has installed a real-time sensor network in the Ōtākaro Avon River that will give Christchurch City Council an unmatched insight into the water-quality in this important waterway. In Sweden, **Ericsson and Telia** are working with Stockholm to address water, environmental and climate related issues by using **LTE and NB-IoT technology**.

Program Approach in New Zealand

Christchurch in New Zealand is home to some of the purest drinking water the world, drawn from deep aquifers situated below the city, flowing from the mountains of the Southern Alps to the sea. But here it is subjected to the impacts of over 100 years of extensive urban and surrounding agricultural development, river and stream bank modification, stormwater input, earthquake damage and other human interventions.

In response, the Christchurch City Council is working to begin to understand the water quality in the Ōtākaro Avon River Catchment and to take action.

The Council's goal is to help restore good quality water. A healthy waterway provides a place for the whole community to swim, fish and enjoy the environment.

Objectives and Solution

As part of its Smart Christchurch programme Christchurch City Council put out a request for proposal to install new smart technologies and sensors in the Ōtākaro-Avon River, with the objectives of:

- > **Providing greater insight on water quality and potential impacts from contamination and weather events**
- > **Providing real-time environmental datasets and conditional alerts/warnings to inform management and remediation activities across agencies**
- > **Collaboratively advancing knowledge and the stewardship of fresh water across the community.**

Adroit designed and installed monitoring stations to provide accurate water quality data, measuring and reporting water quality parameters in real-time, such as Nitrates (NO₃), sediment (including turbidity and

total suspended solids), dissolved oxygen, temperature, conductivity and pH.

Data from the sensors is transferred to the Adroit Platform via the Spark LTE-M network.

Program approach in Sweden

Ericsson is collaborating with, the City of Stockholm, the Royal Institute of Technology, Stockholm Water, Stockholm University, Linköping University and Telia Company on the Water Monitoring Networks project. Ericsson recognized an opportunity to enable real-time water quality monitoring using a massive system of IoT (Internet of Things) sensors located throughout Stockholm's entire water system. The network is monitoring basic water quality parameters such as conductivity, pH, temperature, dissolved oxygen, and oxidation-reduction potential. In addition, big data analytics are used together with development of water modelling algorithms that will be able to filter through the sensor data and give bigger picture information about water quality changes. Such changes could alert the city and the water utility to events such as an algal bloom or a discharge of contaminated industrial wastewater, while giving them information about where and when it occurred.

The sensors are being deployed in three phases:

- 1. Source water:** monitor changes to water composition and detect pollution in lakes & rivers, such as Lake Mälaren (Stockholm's water source).
- 2. Distribution network:** monitor proxies for bacteria contamination in freshwater.
- 3. Sewage water:** monitor the sewage and stormwater system to detect pollution.

Results & Benefits

- > Addressing the global lack of water quality data.
- > Collective action across sectors to find solutions to shared water challenges in Stockholm.
- > Predictability and early warning for water quality changes.
- > Ease in identifying changes in water quality parameters because of IoT wireless technology.
- > Manual sampling for laboratory analysis can be directed to specific locations where changes in water quality appear