Industrial applications of the PowerSpout

Introduction

Every city has a water storage reservoir. Many of these facilities are 80-100 years old and are being upgraded with modern instrumentation and control systems so that the water resource can be better managed.

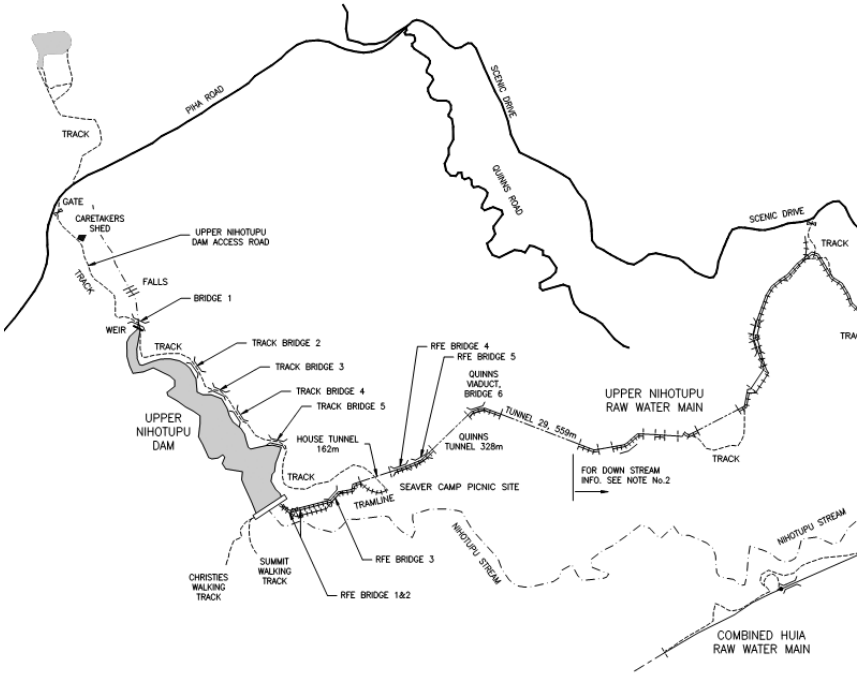
Five reservoirs within the Watakere Ranges supply water to the Auckland region. The ranges receive on average over 2,000 mm (79 inches) of rainfall annually while the corresponding rate in the city is less than half that. As weather systems approach across the Tasman Sea their path is blocked by the ranges causing a small uplift sufficient to meet the water needs of a large city.

Two of these reservoirs and associated dams (Upper Nihotupu and Upper Huia) were never connected to the national grid. Very small power demands were met with Photo-voltaic PV panels in recent years.

In preparation for a proposed upgrade the demand for electrical power was projected to increase to well beyond what was practical from a PV array when taking into account the low sunshine hours and a site exposed to vandalism/theft.

The cost to hook to the national grid was estimated at close to $1,000,000 NZ and was ruled out as prohibitively expensive. As the dam is required to discharge water to allow for a residual flow in the river bed, it was decided to look at onsite small hydro generation to meet the power demands of the site and meet the residual flow resource consent conditions.

Upper Nihotupu Dam



Site Map

Upper Nihotupu dam

Commissioning and final install

EcoInnovation undertook the supply and installation of 2 PowerSpout turbines and associated equipment. One turbine is optimised for when the dam is full (30m) and the other for when the dam is empty (10m). The turbines provide all the site power with battery backup and are fully monitored remotely.

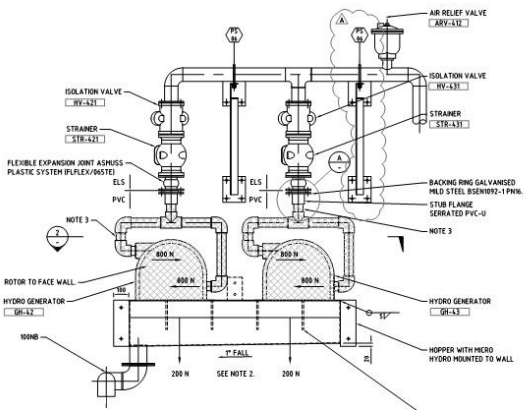
Turbines have been operating since December 2009 without any issues to date. This was the very first install of the new PowerSpout turbine by EcoInnovation.

Upper Huia Dam

The Upper Huia Dam presented a similar problem to the Upper Nihotupu Dam and the power problem was solved in a similar way with two PowerSpout hydro turbines.

Turbines have been running since December 2010 and were mounted within the existing building infrastructure at the site.

Upper Huia Dam



Drawing and installation of turbines

Turbines in operation

Conclusion

This brief overview of these 2 installations illustrates how a renewable energy technology can be employed to utilise energy that would otherwise be wasted and save the rate payers of Auckland the considerable expense of hooking to the national grid.

There are many similar small industrial applications in remote places that can employ PowerSpout hydro turbine as the solution for onsite power needs.