

Westmount Service Reservoir Refurbishment

by
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With a history dating back to 1882, Jersey Water is the oldest company established on the Island of Jersey. Jersey Water currently supplies treated water to 90% of the Island's population of approximately 90,000. In a typical year, 95% of the Island's water supply is derived from surface water collection with the remaining 5% being abstracted from boreholes. During particularly dry summers, Jersey Water has the only large-scale desalination plant operating in the UK. The Reverse Osmosis plant at La Rosiere is capable of producing up to 6ML of clean permeate per day at an efficiency of 45%. Peak demand for treated water through the network in summer reaches up to 28ML per day.



Photograph of Tank 1 under construction in 1921

Courtesy of Jersey Water

As part of the treated water system, Jersey Water operates twin Service Reservoirs at the head of a low-level gravity system that supplies the heavily populated areas of St. Helier and the South coast.

The Service Reservoirs at Westmount were constructed in 1921 and 1965 with capacities of 4.5ML and 6.0ML respectively. The 1921 tank (Tank 1) was constructed with mass concrete walls 1.8m thick and with concrete-encased steel columns and roof framework. The 1965 tank (Tank 2) is of more modern reinforced concrete. The construction of the more recent tank had been planned well, as floor levels between the two tanks are very similar.

The two service reservoirs had previously been inter-linked during construction works in 1965 however, the nature of the original feed pipe-work to the tanks meant that the inlet & outlet were from a

common pipe and thus failed to promote treated water turnover inside the tanks. From studying original 1965 plans to Tank 2, Jersey Water found that suggestions had been made for future improvement works, but had never been implemented.

Although daily testing of water quality in recent years has not highlighted any problems, a scheduled internal cleaning inspection and a water retention test had shown that the older of the 2 tanks was leaking some 5m³ per day and that the opportunity to improve the reservoir layout could be carried out in tandem with the leak repairs.

Works commenced in January 2008 with the following scope;

- Install new DN450 inlet, outlet & overflow pipes to Tank 1.
- Seal Tank 1 internally to resolve leakage.
- Isolate the existing 9" common feed pipe.



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- Install non-return valves to make flow through both tanks unidirectional.
- Rearrange pipework feeds to both tanks to allow maintenance & control.
- Fix baffle curtains to Tanks 1 & 2 to promote water mixing.
- Install new Magflow flowmeters and Siemens ultrasonic level controllers.
- Incorporate new data onto corporate SCADA system.

Works required careful logistical planning as the site was bounded on 3 sides by public roads and by the Jersey Water offices on the 4th side. In addition to the roads layout, one other constraint was that one of the service reservoirs had to remain operational at all times during the works.

Jayen (Jersey) Ltd. were employed as civil engineering contractor and responsible for excavation, pipe & duct laying and concreting works. Jayen installed some 200m of new Inlet / Outlet pipework in a layout to provide maximum flexibility to the Operations department at Jersey Water. The new pipework installed to Tank 1 meant cutting 2No. 1.5m x 0.8m x 1.8m deep holes through the old concrete tank walls, removing 90 year old concrete and re-sealing the tank walls.

The successful sealing of Tank 1 involved high-pressure jetting at 6,000 psi to remove the existing bituminous coating prior to application of hypalon bandage to cracks, fleece to junctions of floors to walls & columns, followed by the application of two coats of Thoroseal FX100 coatings. Jersey Water employed the services of specialists Concrete Repairs Ltd. to complete the sealing works.



Photograph showing the cutting through the 1.8m thick walls of Tank 1 to install new outlet pipe work

Courtesy of Jersey Water

Baffle curtains were designed and installed by Landline Containment Solutions to both of the tanks. The curtains are designed to promote the mixing and turnover of water in the two tanks. In Tank 1, lightweight beams were installed locally to support the baffle curtains, as drilling into the original beams was not advisable being steel I-beams encased in only 25mm of concrete. Landline completed their works over two visits to Jersey and provided a prompt service with very satisfactory results.

New Siemens ultrasonic level controllers have been installed (2 per tank) with cables running externally from the tanks. Although only 1 controller is in use at a time, the twin cables mean that if the unit fails for any reason, then it is possible to switch to the 2nd unit without having to enter the tanks. The electronics were installed and commissioned in-house at Jersey Water.

The data being generated by the level controllers and the new bi-directional flowmeters is being relayed to the Jersey Water SCADA system in real-time. As water demand fluctuates over a 24hr cycle we are able to trend and predict tank behaviour.

During the final phase of the works, Jersey Water operatives carried out a full clean down of the service reservoir and a maintenance overhaul of the main control valves to Tank 2. The two tanks are now operating as expected between capacity ranges of 40% - 70%.

Thanks to the refurbishment works;

- Leakage has been stopped.
- Water turnover has been significantly improved.
- Great operational flexibility has been provided.



Photograph showing completed works in Tank 1, with sealant coating applied and baffle curtains installed

Courtesy of Jersey Water

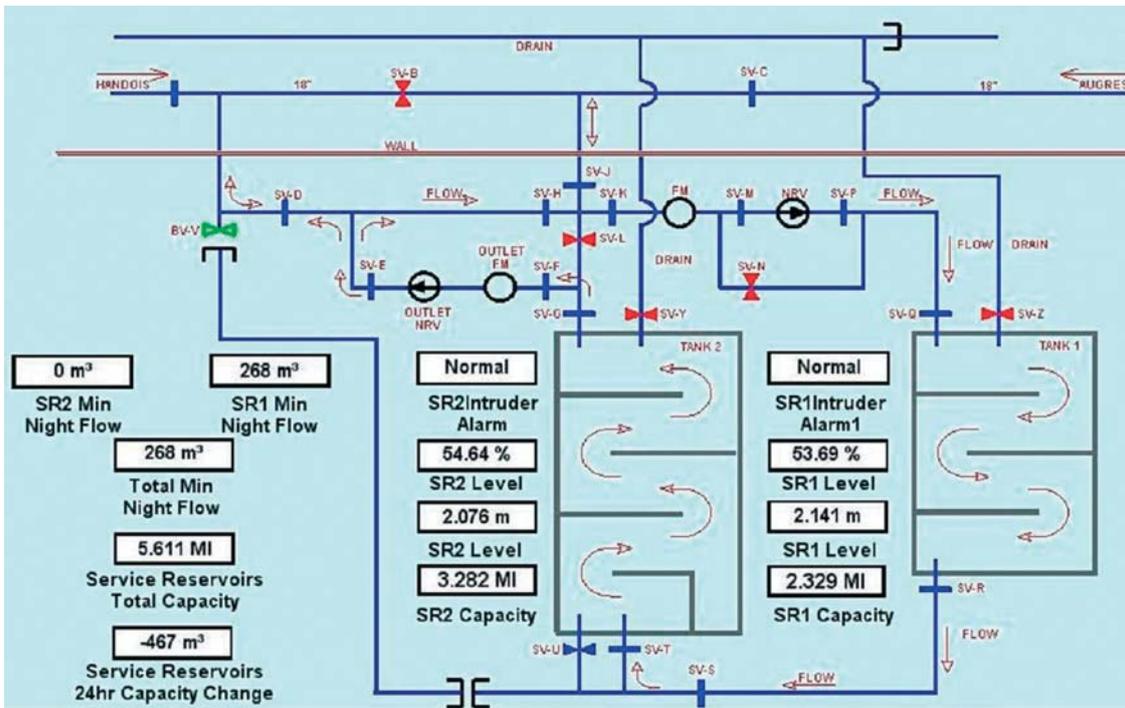


Diagram showing SCADA system data from completed Service Reservoir works

Courtesy of Jersey Water

- Improved data and understanding of water demand has been gained.
- Improved inlet, mid-point and outlet sampling points have been installed for monitoring chlorine residuals.

the operational life of this essential service reservoir site and we can continue providing the island of Jersey with good quality water for many years to come.

The project has been very successful for Jersey Water; there have been no disputes or problems. The finished works have prolonged

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