£2.2m Washwater Recovery Scheme for Jersey

new plant will benefit island's aquatic environment

by Eur Ing Jonathan Howard BSc, CEng, FICE, FIMechE, FCIWEM
&
Hugo Willson BSc

Two water treatment works on the 45 sq mile Channel Island of Jersey serve between 86,000 and 120,000 residents, visitors and businesses. To improve the quality of discharged washwater and sludge produced by the treatment processes at both works - Handois and Augres - Jersey New Waterworks Company Limited (JNWW) the potable water utility, has undertaken to provide a £2.2m Lamella washwater recovery plant. Design and investigation works have been comprehensive and allows for increased future capacity, with the plant expected to reach full output by 2030.

Jersey Washwater Recovery Scheme: Thickener Bridge. courtesy The Jersey New Waterworks Company Ltd

The new plant brings the discharged water into compliance with EU guideline standards. Although Jersey is not part of the EU, rigorous discharge consents have been set by the enforcement authority: The States of Jersey Planning & Environment Committee. The works consist of:

Washwater & sludge reception tank

This tank is a 7m x 8m x 4m deep reinforced concrete structure, partitioned to allow a 195m^3 capacity for Handois treatment works washwater and a 21m^3 capacity for Handois clarifier sludge. Prior to flow entering the tank, it passes through a grit separator, to remove excess sand and anthracite from the Handois dual-media filters.

Due to the high water table in the area the tank was constructed within a permanent sheet-piled cofferdam, with continuous de-watering. The close proximity of an adjacent 1960s treated water tank, meant that piling operations were carried out utilising high - frequency piling plant. The vibrations were monitored closely to prevent damage to the existing structures.

Lamella plate clarifiers.

Two *Vexamus LS120/60-10+F* Lamella Plate Clarifiers Units were installed complete with flocculation tanks and mixers. The lamella plates allow a high rate of settlement for the suspended waste, aided by the addition of polyelectrolyte and are inclined to force flows to take a long path, enabling a highly compact process. One of

the units will process **Handois** washwater, with the second processing **Augres** combined clarifier sludge and washwater. The design enables either lamella to be used for either source of influent.

Settled sludge discharges hydrostatically to the Thickener Feed Buffer Tank. Supernatant produced is discharged to an adjacent brook, via a monitoring point with *Hach Scatter Turbidity Meters.*

Combined sludge thickeners & thickener feed buffer tank
A single reinforced concrete structure incorporates two separate processes. A low level 120m^3 tank holds the combined sludge produced from the lamella plate clarifiers and sludge transfers from the 21m^3 sludge reception tank. This is fitted with submersible mixers, pipework, valves, overflow and ultrasonic level indicators. Two variable speed centrifugal pumps transfer the sludge from the thickener feed buffer tank to one or both of the sludge thickeners.

Situated above the thickener feed buffer tank are two 5m diameter sludge thickening tanks with a water depth of 3.6m complete with variable speed drive (VSD), rake mechanisms mounted on bridge supports, with dual sludge feed lines, dual inlet piping and dual polyelectrolyte dosing points. These thickeners are suitable for a continuous sludge thickening operation.

Thickened sludge buffer tank
One reinforced concrete tank, constructed in two halves receives sludge from the thickeners. This allows independent filling and draw-off, with each half having a volume of 200m^3. The completed tank will have two separate feed lines, with both automatic and manual isolation valves. Two VSD progressive cavity pumps feeds the thickened sludge from the buffer tank to the centrifuge, housed in the centrifuge/MCC building.

Centrifuge/(MCC Building)
A 30m x 10m structural steelwork building houses the MCC for operation of the new works, together with a centrifuge for spinning excess water from the sludge and a polyelectrolite preparation and dosing area. The centrifuge, supplied by *Alfa Laval* operates at approximately 4,000rpm. Supernatant from the centrifuge is returned to the washwater tank for recycling. Sludge cake (minimum 14% solids) is discharged onto trailer units for disposal to landfill.

Main contractor for the work was *M.J. Gleeson (Jersey) Ltd.*, with successful lump sum tender price of £2,2m. Gleeson employed *Faber Maunsell* as their Consulting Engineers for design of the works. Mechanical/Electrical sub-contract was by *CEES Ltd., of Dorchester*. JMWW employ an independent water and effluent treatment consultant, *WET Ltd (Water & Effluent Treatment Ltd, Somerset).*

The contract was let under the IChemE 'Red Book' together with modifications necessary due to the location of the works outside the UK and within the territorial jurisdiction of the States of Jersey.

Work commenced on site in mid-August 2002 with take over tests being carried out in January 2004.

This project will provide much improved treatment to the waste products from potable water production and will aid long term improvements to Jersey's aquatic environment. ■

Note: *Jonathan Howard is Senior Engineer & Hugo Wilson is Resident Engineer, Jersey New Waterworks Company Limited.*