

Hardham WSW

washwater treatment and sludge processing system improvements

by Stephen Mackintosh

Hardham Water Supply Works (WSW) provides water to more than 200,000 customers in the north of West Sussex. Improvements are being made to the current washwater treatment and sludge processing system at the facility. The project requirement was for the design development and construction of a reliable washwater treatment, sludge thickening and sludge dewatering system. It will provide adequate and robust capacity for the site and ensure compliance with the new EA discharge consent and meet the statutory undertaking date of 1 December 2014.



Existing picket fence thickener - Courtesy of Trant Engineering

Existing washwater treatment

The existing washwater treatment system comprises a single DensaDeg clarifier unit with no standby provision. If the DensaDeg is unavailable the untreated washwater is discharged to the local river.

Existing sludge treatment

The existing treatment of both main works clarifier sludge and settled sludge from washwater clarification is by picket fence thickening and the use of a temporary centrifuge for dewatering. Currently, sludge is discharged to the picket fence thickeners intermittently with these tanks acting as both thickeners and sludge storage prior to dewatering. The original plate presses installed for dewatering are no longer in use.

Project delivery method

Due to the challenging programme, Southern Water chose the early involvement of contractor route for the delivery of this

project. Barhale Trant Utilities (BTU) was appointed in July 2013 to undertake the following:

- Investigation and optioneering to identify a single agreed preferred solution for the improvement work.
- Carry out sufficient outline design to enable the negotiation and agreement of a fixed price for the work.
- Design, construction, installation, testing and commissioning of the improvement works to meet the required new EA discharge consent and the statutory undertaking date of 1 December 2014.

BTU appointed Grontmij to assist with both the investigation and optioneering work and the outline design development work.

One of the major design constraints at Hardham WSW was the need to minimise the residual polyacrylamide (monomer) concentrations in the water being recycled within the works.

An options report was submitted to Southern Water in September 2013. Four options proposed complied with Southern Water's specifications but only two complied with its policy of minimising water wastage. CAPEX and OPEX costs were prepared for all four options. The option selection was confirmed, and the subsequent outline design completed, in November 2013.

A fixed price quotation was submitted in December 2013, and in January 2014 Southern Water issued an early procurement order, followed by a formal contract award for the full design and construction work in early February 2014.

Design solution – washwater treatment

In order to reinforce the existing washwater treatment system a new flocculation and lamella solids separation system is being installed to provide an additional 100% (2 x 50% units) washwater treatment capacity.

This additional treatment system will be complete with the associated polymer preparation, polymer dosing, sludge removal and supernatant transfer equipment together with the necessary instrumentation, quality sampling and control.

An additional MCC complete with PLC/HMI designed and manufactured by Trant Systems Electrical (TSE) is being provided to control the additional washwater treatment equipment.

Design solution – sludge treatment

New sludge balancing and thickening facilities are being installed comprising a 180m³ pre-thickened sludge balancing tank, pumped tank mixing, thickener feed pumping, WRC thickeners and thickened sludge transfer pumping. The additional thickening facilities will be complete with the associated polymer preparation and polymer dosing equipment together with the necessary instrumentation and local control.

The 2 (No.) existing picket fence thickeners will be converted to thickened sludge holding tanks with the removal of the existing picket fence mechanisms and the installation of external 'low shear' mixing pumps.

The 2 (No.) existing 1,500mm x 1,500mm plate presses are to be fully refurbished with replacement polypropylene filter plates, filter cloths and controls. A single new additional 1,500mm x 2,000mm plate press is to be installed complete with controls in order to provide a combined total press volume of 14,658 litres.

The 3 (No.) existing hydraulic ram pumps and high pressure cloth wash pump are being refurbished together with the provision of a new service water break tank, air compressors, air receivers and extensions to existing press sludge feed, press liquor drainage and cloth wash systems to connect the new additional plate press.

The existing sludge treatment MCC is being replaced under this contract with a new MCC complete with PLC/HMI designed and manufactured by TSE.

Construction

Work commenced on the site in mid-March 2014 with ground investigation, soil testing and various other enabling works. At the time of writing this article (April 2014) excavation to foundation levels for the new equipment bases has been completed, setting out has commenced and the excavation for the installation of buried services was also well under way.

The close working relationship between Barhale Trant Utilities and the Southern Water delivery and operations teams has been essential to the rapid progress to date on this fast-track project.

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Existing plate press prior to refurbishment - Courtesy of Trant Engineering