High Royd Waste Water Treatment Works

£3 million upgrade at Yorkshire Water's Calder Valley Site

by
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High Royd WwTW is located alongside the picturesque Calder River in West Yorkshire, less than a mile to the West of Sowerby Bridge. The works is sandwiched between the Rochdale Canal and the River Calder and receives sewage from two gravity sewers carrying effluent from the area around Luddenden. The works serves a resident population of 11,000, due to rise to 11,500 by 2015.

High Royd: New inlet works, MCC Kiosk, PST's & HST's *courtesy Scott Wilson & Yorkshire Water Services*

Existing facilities

The original High Royd works were constructed in the early 1900s then rebuilt in 1958, with subsequent minor upgrades over the last 40 years. Immediately prior to the current upgrade the works included coarse screens, constant velocity grit channels, storm separation and storage, primary treatment in three rectangular Primary Settlement Tanks, biological treatment through four mineral media biological filters and tertiary treatment through a series of tertiary treatment lagoons, prior to discharge to the water course. All sludge generated on site was retained on site in Sludge Lagoons with sludge liquors being returned to the head of the works.

Project need

High Royd WwTW was required to meet several new consent constraints under the Urban Wastewater Directive and River Quality Objectives. These constraints imposed a revised 2015 consent of 25mg/l BOD, 125mg/l COD and Ammonia Consent of 8mg/l (95%ile). The principal difference with this revised consent was the addition of an Ammonia constraint and improved screening requirements with up to Formula A flows now being screened to 6mm in 2D.

In addition to this legislative requirement it was anticipated that the existing Tertiary Treatment lagoons were 70% full with Humus Sludge. The proximity of the sludge lagoon directly adjacent to the River Calder imposed an increased risk of a pollution incident if flooding occurred. General asset condition of process units and MEICA equipment also dictated a full upgrade.

Scope of works

Six options were identified at feasibility stage involving a combination of additional process units and reuse or abandoning the tertiary treatment and sludge lagoons. The final options adopted for the scheme included for the abandonment of both sets of lagoons, a new inlet works, primary settlement and humus tanks combined with

the re-use of the mineral media biological filters **but including a continuous recirculation facility and the potential to construct additional filter beds if required in the future.** The existing rectangular primary settlement tanks were to be modified and transformed into storm storage tanks.

New works

The new works is, effectively, a new Waste Water Treatment Works, with only the biological filters, two pumping station's wet wells and the modified primary settlement tanks being reused. The full works now comprises:-

* new inlet works capable of accepting and screening Formula A flows, including duty/standby escalator screens, Jeta® grit removal, storm separation and flow control;
* new primary settlement tanks complete with rotating half bridge scrapers, scum removal and gravity desludging facilities;
* replacement of mechanical equipment on the mineral media filters with motor driven distributors;
* new interstage filtered effluent pumping station located within an existing wet well;
* new Humus Tanks complete with rotating half bridge scrapers, scum removal and gravity desludging facilities;
* new biological filter bed recirculation variable flow pumping station;
* new storm tanks re-using modified rectangular primary settlement tanks;
* new ancillary pumping stations for return liquors, storm return and primary sludge transfer;
* new glass coated steel sludge holding tanks complete with manual dewatering facilities;
* new intelligent MCC and welfare facilities located within a new GRP kiosk;
* STEM Drive® Mixing systems on both storm tanks and sludge storage.

Unique MCC and Storm Storage

The version of intelligent MCC adopted for this scheme is unique to YWS. The MCC was unique by the fact that it was the first of its type to incorporate Mitsubishi DPV1 and Simocode Pro V systems, along with Profibus control on the actuated penstocks. Control of all plant on the site is local to the MCC and accessed through HMI, which also details all plant status.

Also unique to YWS was the trialing of STEM Drive® Fluidic Mixers within the new Storm Tanks (converted Rectangular PST's) to prevent sludge settlement and facilitate the return of storm flows to the process stream. The installation required 6 equally spaced mixer jets fixed to the base of each tank, compressed air is delivered to each sequentially to provide even mixing.

Implementation

The scheme formed part of Yorkshire Water's AMP3 programme with implementation originally scheduled for construction to begin in November 2004. However, the works was delayed by 12 months to allow for the relocation of the Greyhound Sanctuary, which had been using a portion of the site for several years. Construction commenced in November 2005 and was completed in March 2007. Yorkshire Water obtained beneficial use of the works in the same month. Handover is expected in May 2007.

Scott Wilson, in association with *KBR*, were contracted by *YWS* to carry out the initial feasibility studies. This was followed by preparation of the Tender and Contract Documentation. Thereafter, *Scott Wilson* performed the role of *NEC Project Manager, Planning Supervisor and YWS Clients Representatives on the Scheme.*

The project was tendered as a design and construct contract under NEC Option A. The contract was awarded in June 2004 to *MJ Gleeson,* who engaged *Faber Maunsell* as designers, *Galglass* for tank major civils construction and steel tanks. The MCC sub-contract was awarded to *Lintott Control Systems Limited.*

Particular constraints on implementation cited by the contractor included groundwater issues, the presence of Japanese Knotweed and Himalayan Balsam, as well as the particularly flat site and lack of available gravity head. ■

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