

Seamer WwTW & Skirlaugh WwTW

innovative solutions with a joint delivery team environment

by
Andrew O'Sullivan BEng (Hons), MSc, CEng, MIET, MCMI
&
Christopher Dean BSc (Hons) and Keith Bowden BEng (Hons)

These £2.2M and £1.7m schemes undertaken by Costain MP for Yorkshire Water Services (YWS), represent solutions to specific local challenges and were undertaken within a project environment that encourages best whole life costs through innovation, team working and efficient design and construction. The first of these schemes Seamer WwTW is located four miles southwest of Scarborough, Yorkshire. In spite of its proximity to the sea, the receiving watercourse flows inland; joining an ecologically - sensitive river and thus the works is required to meet a strict discharge consent.



Seamer: Inlet works under construction

photo courtesy Costain Ltd

As well as the town of Seamer, the works serves several villages to the west and numerous caravan sites on the coast. These holiday sites add nearly 15,000 to the residential population of 21,000, which together with a small amount of trade effluent, gives a design population equivalent of 38,293 on a 2020 design horizon. The project was aware that a substantial additional development of up to 10,000 population was likely to be approved, so the JDT decided that whilst the M&E works would be designed for the lower confirmed 2020 population, the civils structures would be designed and built to allow for easy uprating to cope with the additional unconfirmed population.

The solution

The existing inlet works was beyond its asset life, so it was decided to construct a new inlet works rather than enlarge and refurbish the existing.

With the gravity inlet sewer 3m below ground level and the discharge into the primary tank distribution chamber some 9m higher, a range of options were considered based on the location of the screens and grit removal below ground, at ground level or elevated, with pumping

before and/or after to suit. Although the elevated option was cheaper, the ground level option was chosen for its ease of operation and maintenance.

The gravity inflow to the works passes through an overflow chamber, where any storm water overflows into a pumping chamber allowing duty/standby submersible pumps to deliver it to the storm tanks. Flows of up to the consented flow to full treatment are raised 4m by a single duty screw pump supplied by *Spaans Babcock Ltd*. This was delivered with an integral steel channel to minimise and simplify the civils work required on site, with installation completed in one morning. As a standby to the screw pump, a submersible pump was provided within the storm pumping well. These innovations produced a substantial saving in Civil and M & E costs and shortened the construction programme.

The raised flow passes through duty/standby travelling fine screens, with the anticipated future flow increase catered for by an allowance for increased flow depth. Screenings are washed and dewatered in duty/standby units and deposited into skips for disposal off-site. A single detritor removes grit prior to the second pumping stage, where

a pair of duty/standby variable speed submersible pumps delivers FFT onwards to the primary tank distribution chamber.

Costain MP are also delivering a number of other schemes on this site during the AMP4 period, these included: Refurbishment to the Storm Tanks, New Main Works MCC; Pollution risk alleviation and Phosphorus Removal (including primary and secondary chemical dosing, uprated sludge storage and new sand filters). These process upgrades required an increased secondary power supply capability - the existing standby generator being too small. As part of work elsewhere in the catchment, Costain MP became aware of a redundant standby generator on a different site, and the decision was taken by the JDТ to refurbish and re-use it at Seamer.

The works was commissioned in October 2007 and the old elevated works demolished shortly afterwards. The effective removal of screenings and grit has allowed the primary tanks to be cleaned and the auto-desludging reinstated.

Skirlaugh WwTW

Background

Skirlaugh WwTW is located in a rural area six miles northeast of Kingston-upon-Hull and serves a population equivalent of 1,994 on a 2020 design horizon with a DWF of 6.5l/s. Flows from the catchment gravitated into an obsolete terminal pumping station within the village from where they were pumped at a rate of 20 l/s to the treatment works.

The original requirements for the project involved necessary enhancements to the treatment process to meet the Environment Agency's requirements for improved levels of treated effluent from Skirlaugh WwTW by 2010 under the Freshwater Fisheries Directive.

The solution

The original proposal required a complete rebuild of the works including an oxidation ditch, inlet screening, primary and final settlement tanks, sludge storage and storm tanks. However, after extensive optioneering, it became clear that a preferred option was to abandon the existing works and pump the flows to an adjacent catchment, the effect on which was demonstrated to be negligible.

A new pumping station, complete with duty/standby pumps, was constructed on the site of the redundant works and connected to a new 6km long, 180mm OD rising main discharging flows to the adjacent catchment. Gravity flows from Skirlaugh village were diverted to the new pumping station, which enabled the old terminal pumping station also to be abandoned, with consequential opex savings. The emergency overflow consent required 4 hours DWF storage of 100m³, which was provided in the form of an on-line tank upstream of the new pumping station.

The route of the new rising main cut across agricultural land with the potential for archaeological and environmental impacts as well as disruption to delicate land drainage systems. These issues were mitigated with careful selection of route in consultation with landowners, together with appropriate construction methods including the use of a narrow trenching machine and auger boring.

The new pumping station was commissioned in March 2008 and the redundant treatment works demolished.



Narrow trenching machine at Skirlaugh courtesy Costain Ltd

The Team

Both projects were delivered for YWS by the AMP4 Waste Water (East) Joint Delivery Team (JDТ), which comprises YWS and Costain Ltd. Mouchel provides design consultancy services. All staff involved, working together as Costain MP, are co-located at offices in Castleford, West Yorkshire. ■

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ABC Stainless Limited

Empson Road, Eastern Industry, Peterborough PE1 5UP
Telephone: +44 (0) 1733 314515 Facsimile: +44 (0) 1733 315273
Email: graham.groves@abcstainless.co.uk
website: www.abcstainless.co.uk

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Spaans Babcock Ltd.

305 Phoenix Close, Heywood, Lancashire, OL10 2JG
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