

Camborne, West Cornwall

new sewage treatment works and pumping stations

by
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Camborne and Redruth, in west Cornwall, have extensive sewerage systems that were largely built during the early part of this century to carry wastewater away from two towns and to dispose of it into the sea via two crude outfalls at North Cliffs and Portreath respectively. The present facilities were simply inadequate and scheduled for improvement in South West Water's "Clean Sweep" programme by December 2001. As well as improving the quality of local bathing waters for the benefit of the local community and visitors, it will enable planning embargoes to be lifted in the area.



Portreath Pumping Station under construction (photo:: Still Imaging, Chudleigh , Devon; courtesy S.W. Water)

The development of proposals for a sewage treatment works to serve the communities was the subject of extensive public consultation beginning in 1998. An initial site was chosen close to the A30 trunk road. From a planning point of view it was ideal and supported by Planning Officers. However, local opposition was very strong, an action group was formed and the planning application was consequently refused. Following further evaluation of alternative sites and with the agreement of the action group, a further application was submitted and planning approval received in July 2000.

The site selected was at Kieve Mill some 800 metres from the original site outside of Camborne. Planning conditions required off-site road improvements to be complete prior to construction commencing. These were completed by 29th September 2000 and start was made on site on 4th October 2000.

The scheme

The scheme itself involved the construction of two sewage pumping stations and associated storage. Each transferring up to around 200 litres/second to the works. At Portreath, the Redruth



Camborne STW under construction 2001 (photo:: Still Imaging, Chudleigh , Devon; courtesy S.W. Water)

flows were intercepted and the Camborne flows were intercepted at Reskadinnick. A 7km ductile iron sewage transfer pipeline was laid from Portreath to Kieve Mill.

The pumping station at Portreath was difficult to construct due to the confined nature of the site. At the bottom of a steeply sloping, wooded valley only one site was available. Eventually, to avoid taking spoil off site and returning it, agreement was reached with the local school to use most of their playing field as a working area and a spoil tip. This arrangement benefited all parties with the savings in not transporting the spoil being shared with the school. Construction of the wet and dry wells utilised a cofferdam technique. Precast concrete units were installed beneath the playing field to provide the necessary stormwater storage capacity. This gave both programme and cost advantages. The standby generator was located in a disused quarry remote from the pumping station site.

The shaft at Reskadinnick pumping station was constructed with underpinned one pass segments. Further storage was again considered cost effective utilising a combination of precast culvert units and 2.3m diameter concrete pipes.

The new sewage treatment works with an equivalent population of 73,000 was built at Kieve Mill. The plant was designed to utilise well proven technology and consisted of primary settlement, activated sludge and final settlement. Due to the nature of the

catchments, the grit plant was installed upstream of the inlet screens. The inlet works and control buildings were timber clad to minimise visual impact and blend in with the surrounding environment. The treated water is then discharged via the North Cliffs outfall by the existing gravity sewer in accordance with the consent issued by the Environment Agency. Sludges resulting from these processes and imported from some smaller local works and septic tank waste are dewatered using centrifuges to around 25% dry solids and removed from site in sealed containers for further treatment. The inlet works, primary settlement tanks and sludge areas are all linked to the odour control system to prevent odour release.

Other works associated with the scheme were the laying of new surface water sewers in selected areas to remove known infiltrations of storm water and the upgrading of three combined storm overflows.

South West Water provides its major capital works through Partnering. The team selected for the Camborne project had already achieved a successful track record in delivering the Newquay and Falmouth sewage treatment schemes. The team was *Pell Frischmann Water* - Civil Design; *Alfred McAlpine* - Civil Construction; *Purac* - Process Design and Installation. The team had been formed prior to the first planning application, an approach which ensured that the partners had a deep appreciation of the site and conditions together with a high confidence in the

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accuracy of the scope of work and costings. Using this team ensured a quick start could be made on site. Being mature, the team had already made a number of step changes in performance, particularly in relation to construction methods and programme acceleration. This was continued at Camborne.

Examples of how efficiencies were obtained are:

- * precast concrete structures were selected for primary and final settlement tanks as well as sludge holding tanks
- * process design was tuned to ensure tanks of the same diameter on all sites;
- * development of a buried hybrid precast/cast in situ version for aeration tanks;
- * the traditional central wall was omitted to further reduce costs, as it was found that adequate mixing was possible without this in place;
- * multidiscipline programming to allow work to proceed on several fronts to enable activities to proceed in parallel;
- * deletion of expensive buildings for process plant whenever feasible. Plant was contained in specific enclosures, acoustically attenuated and odour controlled. This also allowed building services and lifting facilities within buildings to be deleted;
- * continuous learning and feedback on plant performance from the completed plants allowed cost savings on the M & E equipment;

- * supply chain management was critical. The team used South West Water's framework suppliers whenever available and also developed close downstream arrangements with both the electrical installation sub-contractor and the precast civil works supplier.

With South West Water's strategic partners, commercial arrangements are a high level umbrella agreement. This covers partnering methodology, risk sharing, rates, fees etc, with individual contracts let on each project between the water company and partners in the team. Contracts are IChemE 'Green Book' target cost reimbursable with pain/gain mechanism. There is a single target cost, parties gain or lose with the team.

Target cost for the scheme was £20 million and the project was completed with a 10% saving.

First flows were introduced to the works in mid-November and the works completed by compliance date on 1st December 2001. ■

Note: *Andy Dawe is Programme Leader, South West Water. Associated with him in the production of this article were: Dave Elsdon, Design Manager, Pell Frischmann; Mervyn Mitchell, Construction Manager, Alfred McAlpine Construction; Giles Leonard, Process Manager, Purac Ltd.*
