

Severn Trent Water's AMP3 Programme delivery of small sewage treatment works projects

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Severn Trent Water's AMP3 Capital programme contains a significant number of projects to replace existing treatment processes at small works, the main drivers being improved river quality and asset renewal. The preferred process for these projects utilises RBCs or SAS, sometimes in conjunction with a Reed Bed. In line with STWs contract strategy, a 'batched' approach was adopted to deliver the schemes by engaging a team that would work together for the duration of the AMP.



Gringley on the Hill STW (courtesy Severn Trent Water Ltd).

With a large number of sites being in the north and east of the region, a contractor and consultant was appointed specifically for these projects. Following submission of a competitive tender *Interserve Water* was selected as the preferred contractor and *Pick Everard*, who have a successful track record of delivering similar projects, were appointed as consultant.

By the end of March 2003 work had been completed, or was nearing completion, at a total of 20 sites. Work at a further seven sites commenced during Spring 2003.

Supply chain management

With the majority of projects including the installation of one or more RBCs it was recognised that the RBC supplier would be a key player in the successful delivery of this and other similar projects throughout the company. To build up the relationship that would be a key enabler to that success, a Framework Agreement was set up with two suppliers; *Tuke & Bell* and *Copa*. That Agreement is also focussed on ensuring that the RBC units being installed within the

Severn Trent Water region operate reliably and are a robust process solution.

For the projects in this batch of projects *Tuke & Bell* was the selected supplier. To take advantage of the opportunities for cost savings that arise from managing a large number of projects, and with a view to improving the product to the benefit of both *Tuke and Bell* and STW a Product Development Team was established. That team includes representatives from the operational and maintenance functions and has realised significant improvements of which the following are examples:

- * a proprietary control panel design has been developed that reduced costs and eliminated the need for a panel kiosk;
- * the need for a standby compressor has been eliminated;
- * design of the RBC covers has been revised to reduce the number of hatches thereby reducing costs;
- * a prototype descumming assembly has been successfully piloted.



Rowthorne STW -- SAF installation. (courtesy Severn Trent Water Ltd).

The uncomplicated nature of this project has meant that the supply chain is limited with a few key players. These key players have been involved through each project from the design phase, through target pricing and construction and then during reviews to ensure continuous improvement. It is extremely important from the client's point of view to give value for money as well as robust and reliable installations.

Programme development

The project team recognised that there were a number of barriers to the successful delivery of this number of projects. In particular if delays occur the impact on the programme for the delivery of later projects could be significant. In addition, a number of sites required the purchase of land and/or the granting of planning permission both of which are associated with uncertain time scales. Furthermore, there are clear benefits to be gained by delivering the projects on a geographical basis and by minimising construction work activities during the winter months. To manage all of these aspects the project team has worked together to produce an overall project delivery programme that focuses on both the longer-term plan and the short term deliverables. The programme also allows delivery time scales to be adjusted to take into account geographical considerations.

A further advantage of this approach is that it allows accurate predictions in respect of RBC requirements to be made, which is of benefit to *Tuke and Bell* as they seek to optimise their production programme.

In summary, Severn Trent Water, Interserve Water and Pick Everard have come together as an integrated team, recognising that the most efficient delivery of this batch of projects would be secured by adopting and implementing a programme management approach.

Health & Safety

The project team identified H & S issues at an early stage by carrying out Design Risk Assessment. Once identified, both constructional and operational hazards are designed out where possible, with any residual risks being minimised and appropriately managed. The project at Stoke Heath STW provided a number of examples that demonstrate the benefits of the teamwork approach:

Inlet PS excavation and construction

* Ground conditions were verified by pre-contract trial holes and determined to be sand/peat, with a water table up to 1.0m below existing ground level. Peat overlaid mudstone at a depth of 6.0m. To eliminate the health and safety concerns associated with temporary works, the agreed approach was for a top down caisson 5.0m dia. smooth bore shaft, installed by a specialist sub contractor, with continuous dewatering. The operation went smoothly utilising this safe method of working. A precast concrete cover slab was manufactured on site, in factory conditions, to avoid constructional risks associated with in situ concrete structures.

RBC excavation

* Ground conditions were water-bearing sand and the combined excavation for the three RBCs was originally proposed to be 23 x 18 x 4m depth. Following a review by the team, the depth of the excavation was reduced to 3m, so that the main water bearing strata was just below formation level. This minimised construction risk and created a safer working environment. Temporary works comprised a large close-sheeted excavation installed by the dig and push technique constructed in three stages. The ground support system consisted of two horizontal frames with intermediate horizontal struts, all of which had to be craned into position. The base was cast so that it acted as a support and the lower level frame

and intermediate struts were then removed to create a clear and safe working environment. Following installation of the RBC GRP tanks the concrete surround and backfilling, using excavated material was completed prior to removing the upper level. In addition, the sheets were oversized to provide a 1.0m barrier around the excavation.

Project cost management

The Project Team has adopted a Value Engineering Approach from the outset and the ongoing delivery of similar projects by that team has ensured that cost savings identified for one site can benefit subsequent projects. In addition, the management of risk through the development of Risk Registers has ensured that risks to successful project delivery have been identified and managed. For example, where initial site investigations have identified poor ground conditions, detailed investigations have been carried out to provide accurate information upon which designs and construction methods can be based.

A number of projects have been very challenging to deliver within the client's cost constraints. The project team has sought to identify those projects at an early stage and then subjected them to a critical review. A good example has been the development of a combined storm and flow to full treatment pumping station, thus eliminating the need for an additional sump and overflow arrangement. The team worked closely with *ITT Flygt pumps*, another framework supplier to refine this design.

The success of this project team was recognised when they were awarded the accolade of Severn Trent Water's 'Process Team of the Year at the Company's annual achievement awards ceremony in November 2002. *Interserve Water's* performance has resulted in them being awarded similar contracts in the south of Severn Trent Water's region. ■

Note: The author of this article, Kevin Gaunt, is Principal Engineer, Severn Trent Water.

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