Rye Meads STW Improvements

refurbishment & upgrade to meet new consent

by

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Rye Meads STW was built in the 1960s to serve the new towns of Stevenage in Hertfordshire and Harlow in Essex and currently treats a population equivalent of 400,000. The works consists of primary sedimentation, activated sludge and secondary sedimentation processes. Effluent is passed through 8 tertiary lagoons prior to discharge to the Toll House Stream which, within a short distance, joins the River Stort.

Refurbished primary de-sludging plant *(courtesy Thames Water Utilities Ltd).*

£10m improvements

Over the past three years there has already been significant investment at Rye Meads:

* to remove accumulated solids from the environmentally sensitive tertiary lagoons (part of a Site of Special Scientific Interest and a component of the Lee Valley Special Protection Area):
* to ensure production of regulatory compliant sludge;
* to provide improved storm flow separation and treatment.

These works have had a total cost of some £10m.

Works performance

Rye Meads has a current consent of 15/8/3 (SS/BOD/ammonia), which is to be revised during AMP3 to 15/6/2 (SS/BOD/ammonia), together with a phosphorus limit of 1 mg/l. It was always recognised that significant work would be required to achieve the new consent, with investment to most works processes. The problem has been exacerbated, however, by the fact that Rye Meads is prone to power cuts and this, in conjunction with being a hard water area, has led to accelerated deterioration of the aeration domes. There had been a consequential reduction to optimum performance of the works. Ensuring continuing production of a compliant effluent, together with handover of multiple tanks for engineering works, would require very close cooperation and planning between the Engineering Team and Operations.

Solution

From the early development stages, through to final commissioning planning, there has been extensive use of Risk Management and Value Engineering techniques. These led to the strategic decision to increase the aeration and final settlement capacity of the works to achieve improved consent, rather than by the addition of iron salts at the front end. This decision also allowed increased flows to be received at the works from proposed future development in the area.

Key elements of the works are centred around:

* improvements to the performance of the eight rectangular
- primary sedimentation tanks by re-furbishment or replacement of existing plant:
* construction of 15% additional capacity to aeration lanes along with total redoming of existing plant;
* installation of new aeration blowers in a new building;
* construction of four 24m dia. final settlement tanks along with improvements to performance of the 22 existing tanks;
* installation of iron dosing to deliver the phosphorus consent;
* additional SAS thickening capacity.

In total, the project was budgeted at approximately £25m.

Delivery strategy

In setting the strategy for the delivery of the works, Thames Water decided to build on existing initiatives aimed at significantly improving delivery performance in terms of quality, time and cost.

Refurbished final settlement tanks *(courtesy Thames Water Utilities Ltd).*

New aeration tanks with membrane diffusers *(courtesy Thames Water Utilities Ltd)*

New air distribution mains to existing treatment diffusers *(courtesy Thames Water Utilities Ltd).*

The project is thus being implemented within Thames Water's AMP3 Alliance arrangements using an integrated team from *Thames Water Engineering and Operations along with Alliance Designers (Hyder Consulting) and Construction Contractors (Laing O'Rourke).* A key objective of the Alliance operation is the achievement of continuously improving performance and focus on co-operative working in fully integrated teams. The arrangement utilises an amended Green Book target cost contract.

The whole team (including designers) has been based on the Operational site throughout the whole project period. The resulting improvement in the speed and effectiveness of communications, the improvement in decision making and the development of a focused and highly motivated team have been key factors in securing the excellent performance that has been achieved to date. Throughout the project period there has been a full time Operations Liaison Engineer based within the delivery team who has ensured that all issues affecting the Operations Team are identified and resolved speedily in the overall interests of the project objectives. Also there has been input from key works staff at all levels to draw on the full depth of experience existing on the site.

Delivery process

The current phase of construction being carried out at Rye Meads started in March 2002 and was programmed for completion in June 2004.

Release of tanks by Operations had always been seen as a potentially serious problem, as maintenance of a compliant effluent during the construction period was of paramount importance. The decision was made at an early stage to provide temporary iron dosing at the front end of the works to reduce the load to the aeration tanks. This would create additional primary sludge and allowance was also made to provide temporary sludge thickening plant. Ultimately, this has not been necessary. To date, the strategy has been successful with no compliance issues and all tanks have been handed over on programme for the required refurbishment. Since construction commenced, whilst there have been wet periods, the weather has generally been conducive to construction activity. This has been of benefit to the overall programme.

Thames Water believe that the initiatives which were pre-planned into the project have had a significant impact on the anticipated outturn. The project team have received a special Thames Water Engineering Award for continuous challenge and innovation. The project is now expected to finish at least 3 months early and at a cost some 10% to 15% below budget - all this has been achieved whilst maintaining an excellent record of safe construction. ■

Note: *The author of this article, Keith Mansell, is Senior Project Manager, Thames Water Utilities.*