Bridgewater Unsatisfactory UIDs - Phase 2

£5 million project cures overflows from six pumping stations

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Bridgewater in Somerset, population equivalent 28,000 is located on the River Parrett, and sewage discharges affect a designated EU bathing water. A number of unsatisfactory intermittent discharges, UIDs, from the town's sewerage system during periods of heavy rainfall have been addressed by two major schemes within AMP3. The second of these has improved the overflows from six sewage pumping stations, to meet the Urban Wastewater Treatment Directive at a project cost of £5 million. The means of improvement was by constructing storm water storage tanks to reduce both the spill frequencies and overhaul spill volume, and to fine screen the discharges to reduce visual impact.

Internal view of large storage tank - 2350m^3 at Taunton Rd PS under construction *courtesy: Wessex Water*

Existing works

The six pumping stations range in size from a small two pump PS rated at a Formula A flow of 17 l/s, to the terminal PS for Bridgewater STW rated at 355 l/s.The pumping stations all featured unscreened storm overflows with no additional stormwater storage above that inherent within the sewerage system itself.

New works

New works entailed constructing additional storm water storage tanks at each of the sites along with fine screening. The tanks ranged in size from 10m^3 and 30m^3 at the smaller sites to 100m^3 above 300m^3, 1500m^3 and 2350m^3 at the larger ones.

Because of the constrained nature of some of the sites a strategy had to be developed with the Environment Agency to achieve a 'best fit' solution to the global problem. This entailed building extra storage at some sites to make up for shortfalls at others. Two daisy chain sites were linked by low powered radio to allow the inhibiting

of upstream pumps in order to utilise system storage fully and prevent premature spills at the downstream site.

The largest tank, with a capacity of 2350m^3, is situated at Taunton Road PS on a small area of land between the river and the Bridgewater & Taunton Canal accessible only by an old canal bridge. It is close to a school, which closed for a day while 1200 tonnes of concrete was brought in and poured for the base of the 9 metres deep, 25 metre diameter shaft. The second largest tank with its approximate 13m depth and 17m diameter is in a car park on a housing estate.

Some of the sites were in sensitive environmental areas, and care was taken not to adversely affect nearby wild life, including badgers. All of the work has been subject to Bridgewater's notoriously poor ground conditions, which are due to the fact that it is built mostly on land reclaimed from the sea, Boreholes were sunk as part of the preliminary work for the scheme, so that the contractor was well prepared for the adverse conditions and could choose appropriate construction methods.

Three of these shafts have been constructed using cutting rings, with each section being jacked down one ring at a time. The largest tank was constructed by undermining and then constructing each ring below the previous one. The combination of methods allowed the saving of a considerable sum of money. To minimise the risk of odour complaints and operational problems mixers were installed in the four larger tanks to keep solids in suspension. The tanks were also fitted with ventilation ductwork to allow for the retrofit of odour control units at a later date if this proves necessary.

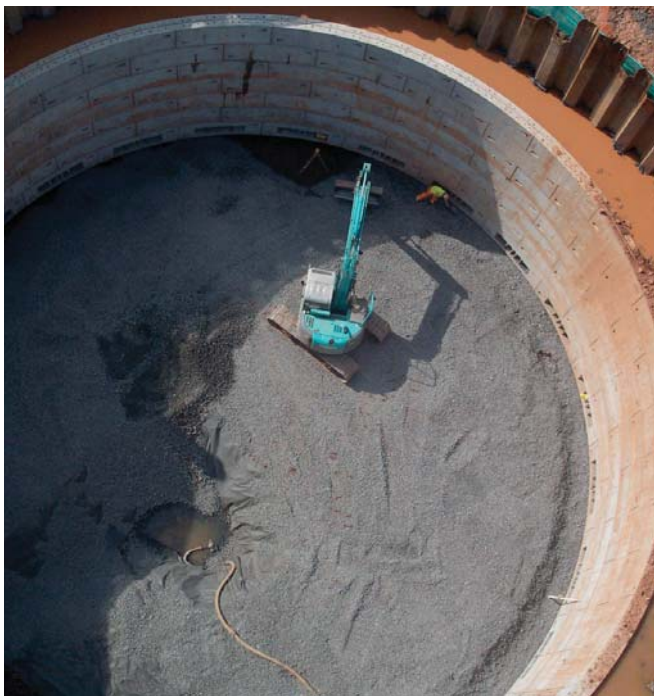
'Intelligent' MCCs have been used on all the sites, with permanent standby generation provided at the four largest ones.

Construction/contractors

The contract was competitively tendered under NEC Option C conditions (target cost with activity schedule), with Bath based contractor *Lawrence* being successful as main contractor and *Pell Frischmann* acting as design consultant. Major subcontractors included: *B & W (shaft construction); SPI (sheet piling); J. Bridges(Iintelligent MCC & M & E installation); Addicotts* standby generators).

Lessons learned/conclusions

The work was completed in time for the March 2005 regulatory date and the project was a great success due to the following factors:



25m diameter tank at Taunton Road, under construction 2004

* early realisation of the complexity of the project and the many third party issues to be overcome:
* appropriate levels of risk management to reduce cost and allow the contractor uninterrupted access to all work faces once mobilisation had taken place;
* good co-operation between the contractor and operations and engineering functions of Wessex Water to ensure that appropriate provisions were made in the development of the the design, and that process risks were discussed, understood and managed during key tie-ins;
* early consultation with operations and survey work to assess the uncertainties inherent with assets that have incomplete record drawings. ■

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