

Stirling WwTW

new pumping station & associated works

Sirling Wastewater Treatment Works, situated to the south of the town in an area known as Sprinkerse, was built in 1964 on land owned by a local benefactor, The John Cowan Trust, which at that time was remote from the town. Two main interceptor sewers deliver sewage to the treatment works. The sewer serving the north part of the town and the works pumping station are being replaced. A tunnel sewer is being built between the Lovers Walk area of Stirling and the treatment works which will allow for the abandonment of the existing pumping station at this location.



New feed channel (courtesy Scottish Water)

Phase 1 (Tunnel sewer, complete)

- * approx 1200m of 1.6m dia precast concrete pipes at a depth of some eight to 15 metres;
- * pipejacking, using intermediate shafts as drive shafts;
- * Herrenknecht tunnel boring machine;
- * ground conditions - cobbles & boulders.

Phase 2 (pump station)

The existing works pumping station is being replaced with a new lifting station utilising the reception pit for the Phase 1 tunnel. The contractor - *Johnson Construction Limited*.

Main pumping shaft (civil works)

20m diameter with a depth of 22m, due to hydraulic

considerations. The size of the shaft and anticipated instability of the ground precluded the use of standard bolted linings or caisson construction. The preferred solution was diaphragm walling with a suitable ground water control regime to work in parallel with the shaft excavation.

Work included:

- * dewatering/base pressure relief;
- * construction of diaphragm wall (one metre thick);
- * base construction/internal walls, benching.

The shaft was partitioned into three wells, a reception area and two pump wells. Flow to full treatment is passed forward, storm flows are screened before discharge to river.



New pump station (courtesy Scottish Water)

Phase 2 contract details

Johnson Construction were appointed under Form G90 conditions of contract to construct:

- * reinforced peripheral channel to the top of the Shaft 1 to collect pump discharges and pass them onto the existing inlet works via a new reinforced concrete overhead discharge channel with a connection to an existing syphon;
- * Design and installation of piling works to the channel and MCC building;
- * reinforced concrete foundation for and supply and erection of a new overhead crane, including all electrical work and commissioning. The mobile crane has the facility to traverse the full length of the pumping station and directly off-load pumps onto a lorry:
- * an overflow from Shaft 1, including pipework, chambers and outfall works with steel piling protection to the tidal River Forth, involving 7m deep excavations;
- * a reinforced concrete storm overflow chamber from the reinforced concrete peripheral channel atop Shaft 1, including pipework, chambers, thunderbox and outfall works to connect to above Shaft 1 overflow;
- * design and installation of metalwork flooring to peripheral channel atop Shaft 1 and main "T" wall. Extension to existing washwater mains;
- * abandonment of existing underground chambers and sewers, including backfilling;
- * design and installation of pumps and associated discharge pipework within Shaft One; 8 FSD pumps rated at 300 l/s and 2 variable speed drives pumps also rated at 300 l/s;
- * installation of conventional electrically powered 6mm perforated brushed storm screens designed to pass a flow of 1690 l/s to be installed within the reinforced concrete storm overflow chamber above;
- * construction of motor control centre steel framed building, including all cabling and level controls, PLC programming and

- UPS backup;
- * installation of standby generator, power and control systems and MCC panel;
- * commissioning of new pumping station upon completion followed by a diversion of the existing St Ninians sewer (dia approx 750mm) into Shaft 1, including manholes, chambers and DI backdrop arrangement some 12m high;
- * divert the existing Stirling town sewer into the Forthside tunnel sewer;
- * landscaping of an area to the west and north of the site and reinstatement of landscaping with tree planting, including specialist willow wall construction and remedials to an existing willow wall. Supply and erection of security fencing to perimeter of extended WwTW site.

Design of all temporary works including overpumping and dewatering.

Phase 2 was completed in December 2001.

Phase 3 (tunnel sewer - commencement date 29/10/01

Byzack Limited was appointed to lay a tunnel sewer between Forth Street and Lovers Walk:

- * 1200mm internal diameter;
- * length 900m;
- * depth varies between 10 to 15m;
- * construction in silt/clay/cobbles;
- * completion anticipated end March 2002.

Contract due for completion October 2002.

Overall cost of the upgrading is around £10 million. ■

Note: *The Editor & publishers wish to thank Scottish Water for supplying information and photographs contained in the above article.*