



# CASE STUDY SEWAGE TREATMENT WORKS



## PILING

### CLIENT



### MAIN CONTRACTOR



### SCOPE OF WORKS

Precast piling

## Project Brief

The contract was for the design, manufacture, delivery, installation and testing of 1,381 no. permanent piles to support new structures at Clay Mills Sewage Treatment Works, Stretton, Burton upon Trent, Staffordshire.

The management of settlement, and in particular, differential settlement is important for any structure. It becomes even more important with liquid containment and crucial for structures on sewage treatment works, where differential settlement cannot be accepted because of flow characteristics, and the contents of the tanks.

Sewage treatment works are normally located near rivers for discharge purposes. Ground deposits can be inconsistent overlying more stable layers at depth.

Large areas of the existing site had been filled or built up with spoil from previous excavations and was unsuitable on which to found the proposed structure. Following a detailed site technical soils survey, a piled solution was sought.

Because of the soft material at and near the surface a working platform was designed, using standard methods, which produced a platform of imported crushed stone 600mm thick.

An alternative was proposed which took the existing soil and treated it with Roadcem. RBL worked closely with the site team to ensure that the working platform was adequate for the rigs.

The adequacy was proven, and the soil modification was adopted for the working platform, saving over 600 lorry movements across a busy rail crossing.





# PILING



## Key Issues/Requirements

- Works were carried out adjacent to a Victorian Pumping Station with site access across a Network Rail level crossing.
- The top 3.0m of made ground was remediated and a 'RoadCem' stabilised 250mm platform constructed for the RBL 'Quiet Hammer' driven piling rig.
- Various services were located and identified passing through the working area including: 450mm diameter ductile iron pumping main, 1200mm diameter Victorian brick culvert and 1500mm diameter Weholite pipe.

## Solution

- The main structures piled were: 6 no. Final Settlement Tanks 36m dia (FST) and associated distribution chambers, ASP (Activated Sludge Plant) 70m x 70m x 6.5m high concrete structure and Inter Stage Pump Station 20 x 7 slab foundation.
- RBL selected the precast pile because of the following reasons: a "displacement" pile eliminates the need for spoil removal. Often low lying ground is water bearing and a pre-formed, driven pile therefore satisfies the need for absolute integrity.
- Roger Bullivant Limited (RBL) proposed the use of RB driven pre-cast piles utilising 250mm x 250mm, 300mm x 300mm and 350mm x 350mm square section piles driven to a depth of 8.0m to carry safe working loads (SWL) up to 900kN in 2 sections to eliminate waste.
- 3 no. preliminary test piles were installed and statically tested to confirm the design, size and bearing capacity of the proposed system with recorded pile settlements at SWL of less than 6mm.  
A sustainable, zero-tolerance to waste is also of paramount importance. A driven precast pile satisfies this requirement, and it also satisfies the requirement for lorry-movement minimalisation to and from the site.
- With sewage treatment works often near built up areas, reduction in all pollution creating activities must be considered.



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