

CASE STUDY

DARLINGTON STATION GATEWAY



PILING

CLIENT

Willmott Dixon Construction

SCOPE OF WORKS

**Continuous Flight Auger
(CFA) Piles
Sectional Flight Auger (SFA)
Piles**

ACHIEVEMENTS

**Completed on time
Completed on budget**

Project Brief

Roger Bullivant Limited (RBL) worked with Willmott Dixon Construction to provide a foundation solution for the multistorey car park at the recently constructed Darlington Station.

The team from RBL North East presented proposals for Continuous Flight Auger (CFA) and Sectional Flight Auger (SFA) piling methods to support the construction of the car park. The pile design included three different pile diameters of varying lengths with caps consisting of 2 to 6 piles, along with larger bases to support the steel frame.



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PILING



Ground Conditions

- The site had a ground composition consisting of made ground overlying firm sandy clay and moderate to highly compacted clayey silty sand.

Solution

- The piles were designed to be a specific length within the resistant natural ground layer. The necessary depths for the piles ranged from 15 metres to 24 metres.
- Working in proximity of the live network rail meant that considerations had to be taken to avoid disruption to operations.
- RB utilised the 7007 Enteco rig, the largest rig in the fleet, to install the required pile diameters of up to 25 metres in length.
- Considering the wide range of pile loads beneath the proposed cark, the team collaborated closely with Willmott Dixon and the Design team to determine the loads for the final layouts. Three pile sizes (350mm, 450mm, and 600mm in diameter) were proposed.
- Piles with a diameter of 350mm and 324 piles with a diameter of 450mm were used. Opting for the smaller 450mm diameter size resulted in reduced concrete volume, transportation requirements, installation time, and overall savings. Additionally, the design development allowed for reduced tension loading on some piles, resulting in less required reinforcement.
- The CFA piles were designed according to Eurocodes, with maximum design actions specified as follows for the apartment blocks: 1565kN DA1C2 compression, 112kN DA1C1 horizontal, 145kN DA1C1kN moment, and 75kN DA1C1 tension. To validate the design's compliance with the specification, static testing was performed on six working piles, which all successfully met the requirements.
- Due to the proximity of the live network rail line, a different approach was adopted, involving the installation of piles with diameters of 350mm, 450mm, and 600mm using the Hutte 204 restricted access rig. SFA piles were employed in this case. The Hutte 204 has a shorter mast requiring the piles to be constructed using Sectional Flight Augers but reducing the risks associated with taller masted rigs working close to the live rail liner.
- RBL was well-equipped to offer a combination of solutions tailored to different structural requirements, site conditions, and loadings. The North East team assisted the client and their design team throughout the project, starting from the development of foundation proposals to accommodating minor changes requiring redesign during the construction phase. This project exemplifies the advantages of early engagement with a multidisciplinary specialist.



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