P J EDWARDS & CO (UK) LTD

PJE

CASE STUDY

DUNDEE RAILWAY STATION

DUNDEE

This project involved the redevelopment of Dundee Railway Station as part of the Dundee Waterfront Project. It required the construction of a five-storey curved building which will have first and ground floors dedicated for passenger concourse, ticketing facilities, as well as restaurant and retail space. Three additional floors above the concourse will house a new hotel. The structure spans the East Coast Main Line rail tracks as they emerge from Dundee Station.

The piles required were...

- 51no bridge piles constructed in 2 rows, each one immediately adjacent to the rail tracks and designed to carry the structural steelwork spanning the tracks. These piles were 400mm diameter founded at depths of up to 19.9m below ground level and reinforced with 8B25 main bars full length.
  The rail tracks were located several metres below the piling platform. Existing retaining walls provided the lateral support and were monitored for movement during the course of the piling works. As such the bridge piles were designed not to transmit any load onto the retaining walls. They were detailed as having twin permanent steel casings to effectively isolate the inner pile with an annulus of 30mm for a distance of 5.0m below pile cut off level.
  Due to the varied nature of the igneous bedrocks an advance programme of pile testing was carried out on two preliminary trial piles simulating the bridge pile methodology.

CLIENT
Dundee City Council

CONSULTING ENGINEERS
Jacobs Engineering

MAIN CONTRACTOR
Balfour Beatty

ROLE
P J Edwards & Co (UK) Ltd acted as Piling Contractor

SPECIFICATION
Specification for Piling & Embedded Retaining Walls 2007

PILING RIG
Llamada P90TT Piling Rig
Llamada P140TT Piling Rig

CONTRACT PERIOD
December 2015 – April 2016

CONTRACT VALUE
£735k

Piling immediately adjacent to the railway behind safety screens which permitted normal daytime working

The first trial pile was constructed to a depth of 19.7m below ground level and achieved a 4.0m rock socket into the Basalt bedrock. It was load tested to a maximum load of 3,775kN.
The second trial pile was constructed to a depth of 12.7m below ground level and achieved a rock socket of 2.5m into the Breccia bedrock. It was load tested to 21kN horizontally prior to being load tested vertically to a maximum of 2,563kN.
Both trial piles were fitted with strain gauges to evaluate the load shed from the piles into the ground.
The positions of the trial piles had been carefully selected to penetrate these varying materials.

- 137no bearing piles again constructed on either side of the rail tracks and designed to carry the remaining structure. These piles were 600mm diameter founded at depths of up to 9.55m below ground level and reinforced with 9B25 main bars full length.

All piles were installed as Continuous Flight Auger piles in conjunction with Down The Hole Hammer (DTHH) techniques where necessary to penetrate the harder bedrocks.

Bridge piles being trimmed showing double permanent casings used to isolate them from load shedding over their upper length