

Civil Engineering

CTRL 105 St Pancras Station

London, UK



Specialist Geotechnical works and project management for the delivery of an underground station box, live station extension and station refurbishment.

The Channel Tunnel Rail link was built by London & Continental Railways and is Britain's first major new railway built for over a century. This high speed railway connects the Channel Tunnel and terminates at St. Pancras Station.

Bachy Soletanche in a joint venture partnership with Costain, Laing O'Rourke and Emcor Rail combined to construct this £600m project. The works involved the construction of a 360m long, 105m wide extension to the existing live station, a 380m long, 24m wide underground station box, and the refurbishment of the existing Grade 1 listed station, originally built in 1860.

The J.V. were awarded the contract in August 2001, with a start on site in January 2002 with demolition and piling works.

During all the works, the live existing station had to be maintained, for services to the Midlands and the North. The site was criss-crossed with roads, gas mains, electrical services and sewers including the Fleet sewer, all of which had to be diverted before Piling could commence.



Ariel view of St Pancras Station showing new extension and the newly refurbished old station

CLIENT: Union Railways (North) Ltd

MAIN CONTRACTOR: Joint Venture of Costain, Laing O'Rourke
Bachy Soletanche, Emcor Rail

CONSULTING ENGINEER: Rail Link Engineering

DURATION : Jan. 2002—Dec. 2007

Works Quantities

Station Extension 450 no. , 1800mm dia., 34m deep,
L.D.A. rotary piles.

Thames Link Box 974no., 1200mm long contiguous piles
380m long, 24m wide underground box



Thameslink Box excavation, also showing the contiguous piled wall

The Thames link box, pictured above, had to be constructed during a 8 month closure possession during the Winter of 2004/5.

The 12m high retaining walls for the underground station were a combination of contiguous and secant piles. Secant piles were used where the wall went through former underground gas storage tanks that were backfilled with stone, but still capable of storing water.



Piling to the west side of the deck extension

Because of the complexity of constructing the station extension works around a live station and tunnel, the works were split into several phases.

This allowed for an interim station to be built using the eastern side of the station deck extension. Once completed access was gained to the Western side and to the train deck of the St Pancras Shed, as shown above.

In total 285 no. piles were installed during phase 1, and 165no. in phase 2. The reduced number in phase 2 was due to Thames Link Box being situated under the footprint of phase 2.



L.D.A. rotary rigs piling the station extension

In the concourse area which was just in front of the existing station a number of plunge columns were installed to facilitate top down construction. This allowed the deck extension to pass over the top while the concourse was being excavated and completed below.

The piles for the deck extension were up to 1800mm in diameter and 34m deep. Where the Thames water ring main passed under the site there were a number of under-ream piles constructed because of the restricted depth.

In other areas such as the access openings very heavy bespoke plunged columns were fabricated to carry the loads from the train deck above.

In addition to the permanent work piles, there were some 960 no. temporary works piles, including restricted access mini-piles, CFA and LDA piles.



C.F.A. Piling close to live rail

All the piling works were subject to Network Rail approval through the Safe Method of Working process by the CTRL rail compliance group CRG.

In some areas the works required piling very close to existing surface structures and substructures, such as to within 1.5m of the Thames Link tunnels. This required detailed works plans to be developed for CRG and other parties.



Station just prior to re-opening

Value Engineering was continually carried out to deliver optimum cost and programme improvements.