Tottenham Court Road Station Upgrade

Architects/Consultant Designers:	Arup, Atkins and Hawkins\Brown	
Contractor:	Taylor Woodrow Bam Nuttall Joint Venture (TWBN)	primary construction
	Vinci and BAM Nuttall JV	new northern line escalator box and the renovation of the tube station
	Gall Zeidler Consultants	three independent design check of the sprayed concrete lining and new Austrian tunnelling method (SCL / NATM)
	Balfour Beatty Morgan Vinci joint venture (JV) (BBMV)	the station box for the western ticket hall
	Laing O'Rourke	the western ticket hall
	BAUER Keller	FOUNDATION

Structural Element:

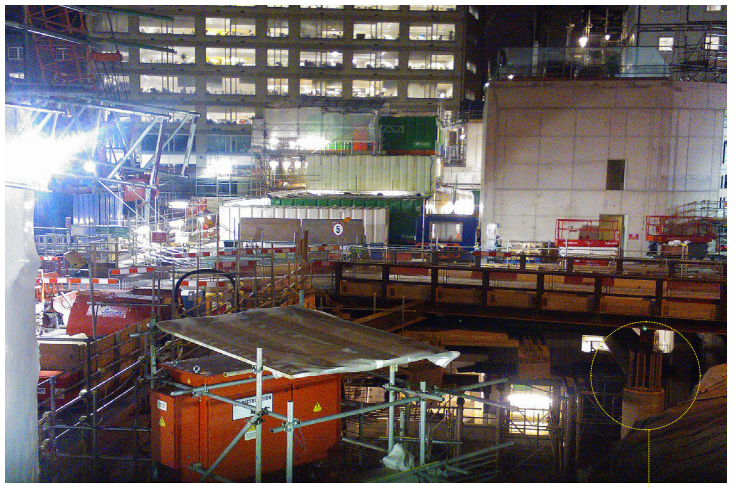
Cast in-situ Reinforced Concrete Plunge Columns (600mm x 600mm and 700mm X 700mm), up to 33 m long

A rotary bored pile is excavated to the required depth, a reinforcement steel cage is then installed and then the void is filled with concrete. This was first done with the removal of bentonite (impure clay which would affect the compressive strength of concrete. Whilst the concrete is still wet a hydraulic plunging frame is installed within the temporary casing and then the already assembled plunge column is installed to structural tolerances 7m into the pile. Two empty bores (ratholes) were constructed beforehand due to limited spaces on site and the frame in which the concrete stays workable. The installation of columns would not have been possible without them.

The columns would eventually support fibre reinforced Concrete slabs which makes up a new private development above the station.When all the plunge columns are installed, the construction of the structural frame above ground level can begin.

Material:

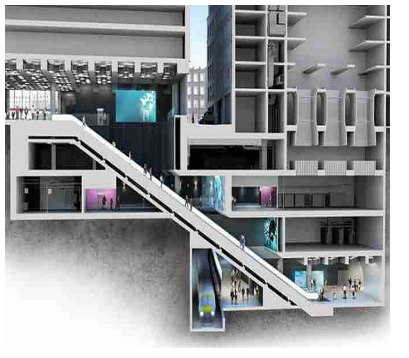
Concrete Mix - (1x cement, 1 x fine and 2 x course aggregates) – C60/75
•Reinforced Concrete, with dense aggregate
Density:2400 kg/m3
Young's Modulus : 15 - 40 kN/mm2
Poissens ratio :0,2 (BS 8110 part 1)
Thermal conductivity (5% moisture):1,6 - 2,2 W/m/K

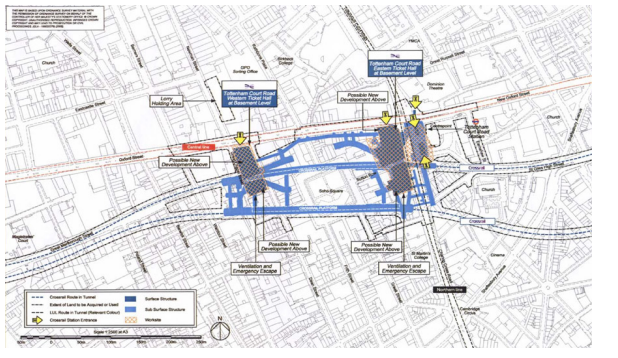


Plunge column

View from Centre Point

Installation of Plunge columns





Design Concepts for the project

Reference: http://www.bauertech.co.uk/pdf/Bauer%20TCR%20for%20web%20final%208%209%2011.pd
http://www.bacsol.co.uk/index.php/techniques/rotary_bored_piling/
http://bbge.com/_assets/client/docs/dm/1142-Plunge%20Columns%20Web.pdf

TS MATERIALS
Palita Rompotiyoke