

# Large Diameter Bored Piling

## Westminster Park Plaza Hotel

London, UK



### Enabling Works, Pile Removal, Secant Wall, Bearing Piles & Plunge Columns

#### Introduction

Client required a design and construction solution to form the foundations to a new prestigious 15 storey apart hotel on the banks of the River Thames, close to the Houses of Parliament. Bachy Soletanche were also required to facilitate "Top Down" Construction for the new development, to enable the superstructure to be constructed at the same time as the substructure. This offers programme savings.

The project was a typical city centre congested site, with space being at a premium, and a variety logistical challenges to negotiate, on this busy traffic island site, including the first stage of the 2007 Tour de France (see photograph)

During the contract Bachy Soletanche were delegated many of the responsibilities of a Principle Contractor by the named Principle Contractor GC Project Management.



Proposed Apart Hotel Development

CLIENT:	Gear Construction
PRINCIPLE CONTRACTOR:	GC Project Management
CONSULTING ENGINEER:	Taylor Whalley Spyra
ENGINEER:	Israel David
DURATION OF WORKS:	5 months

#### Works Quantities

Demolition of existing basement, probing, platform installation, guidewall installation, removal of obstructions including existing 1200mm to 1400mm diameter piles with under-reams up to 5.0m in diameter at a depth of 25m.

260 linear metres of 750mm dia. Hard/Firm Secant Bored Pile Wall, constructed using Large Diameter rotary equipment to depths of 35m, and the CSP technique to depths approximately 16m.

140 no. Large Diameter Bearing Piles to a depth of 38m with diameters between 1200mm and 2100mm, of which 137 no. included Plunged Columns weighing up to 36 tonnes



To enable the main piling works Bachy Soletanche had to remove the existing basement, probe for obstructions and install the tracked plant platform.

The site had over 60 No. existing piles which were a remnant of the previous structure. Their position was surveyed as the demolition phase was undertaken, and alterations made to the design where possible and the remainder removed. This was made possible through close cooperation between the BSL design department and the client's consultants.



Plunge column frame for "Jumbo" columns

A 260 l.m hard/firm Secant Wall was constructed around the entire perimeter of the site to form the basement retaining wall. The depth of this wall was generally 16.0m. This was constructed using the cased secant piling (CSP) technique with a high power Bauer BG28/36 rig (see photograph). The CSP rig included an in-house, specially designed, spoil handling system to deal with the top casing discharge typical of the CSP technique.



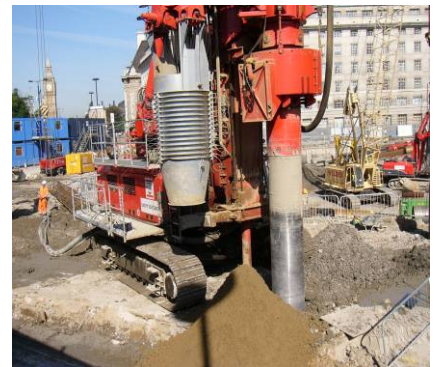
Tour de France heading towards site

A 70 l.m section of the basement Secant Piled Wall is load bearing and so due to the depths involved (up to 35m), this was constructed using 2no. large diameter rotary rigs. The main loading of the new structure is taken by 140 No. Large Diameter Bearing Piles which were constructed using conventional rotary bored equipment. The pile diameters ranged from 1200-2100 mm, up to a depth of 38.0m. The bulk of these (137 No.) included the installation of Plunge Columns to facilitate Top Down Construction by the follow-on sub-structure contractor. The plunge columns were placed in the pile bore using two specially developed, positioning frames.

"Jumbo" Plunge Column

Tight tolerances of +/- 10mm in plan and 1:300 verticality were required. The columns were plunged into wet concrete, and up to 4 columns were placed in any one day.

The project culminated with 4 No. specially designed plate welded column sections, up to 20m in length and 36 tonnes in weight. The plate welded columns were required to support a Vierendeel truss which would form a large ballroom in the first basement level whilst supporting the structure above.



BG28/36 CSP Rig with spoil handler

For the larger columns, various additional temporary works and a specialised frame was developed to place the columns to the same tolerances as the other Universal Columns. These columns were concreted after column placement to ensure sufficient time was allowed to achieve the onerous tolerances required.

