

Large Diameter Bored Piling

St George Wharf, Vauxhall, London

United Kingdom



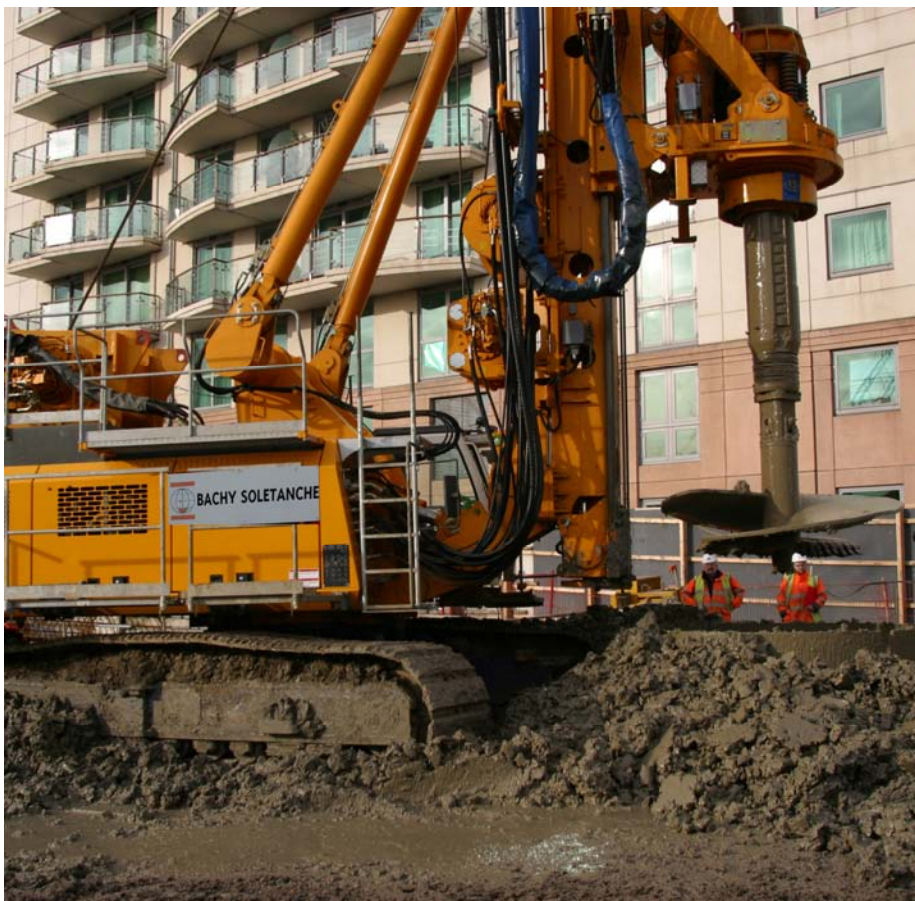
Large Diameter Rotary Bearing Piles with permanent casings

Introduction

St George Wharf is located 275m from the South Bank of the River Thames next to Vauxhall Bridge. This prestigious development has proved to be an extremely popular living location for city centre residents. Constructed in a number of phases, this has allowed residents to move into each block on completion.

Piling Works

The conforming scheme for this phase, was to use an under-ream solution, but these piles can only be constructed in stable clay soils, but due to the site's ground strata, including only a thin layer of London clay, the under-ream solution had to be ruled out. Therefore Bachy Soletanche (BSL) developed this alternative to accommodate high loads of 11MN to 41.5MN.



Boring of 2400mm dia. Large Diameter Rotary Bored Pile up to 63m deep, under bentonite and with a permanent casing up to 21.5m long



CLIENT: St George PLC

MAIN CONTRACTOR: J. Reddington Ltd

CONSULTING ENGINEER White Young Green

DURATION OF WORKS: 12 weeks

WORKS QUANTITIES

10no., 1800mm—2400mm diameter, 45-63m deep with permanent casings 14.9-21.5.



This site is surrounded by the previous phases of the development, main roads, the River Thames, Vauxhall Bridge and moreover, the Victoria tube line and Vauxhall LUL Station, which lies directly underneath the site. Consequently, BSL created an innovative piling solution to get the maximum load bearing capacity within the site's physical and geotechnical constraints, without damaging the LUL infrastructure.



This meant that 10 no. rotary piles with diameters between 1,800mm and 2,400mm were constructed to depths up to 63m using an extremely high torque, Bauer BG-40 rig.

These large piles were installed by drilling down to depth using the LDA Rotary process, with the aid of an extra long 'Kelly' bar to provide the extra long pile length required. The temporary casings were then installed followed by the permanent casings. Once the casings were in, the annulus was grouted prior to the concreting of the piles.

The de-bonded permanent casings were a requirement to prevent load transfer onto the underground tunnels and escalator shafts. They were also used to cut off the ground water, which is naturally high on this site.



The ground strata includes 10m of made ground, over London Clay, layers of Lambeth sands and clay, and then Thanet Sands.

The permanent casings were between 14.9m and 21.5m in length, which took them down below the tunnel invert level, and weighed up to 20 tonnes. It was their sheer weight which meant that the annulus between the permanent casing and temporary casing had to be grouted, as the grout also kept the permanent casings vertical. For that reason, BSL spent a lot of time carefully installing the piles, taking a week to complete each pile.



The first two days were required to install the casing and grout the annulus. The third day was spent drilling the bore to depths of up to 63m under bentonite. The next two days were used to clean the base, de-sand the bore and install the reinforcement cage. It is vital that there isn't too much sand left in suspension within the bentonite. The bentonite supports the bore and prevents the sands from collapsing. Once the cages are installed, concrete is then poured, with aid of Tremie pipes, straight to the base of the pile. The bentonite fluid is displaced by the concrete and removed by pumping, as the concrete level gradually rises.



With the LUL Infrastructure being so close to the piling works, a monitoring procedure was employed in order to detect any movement or vibration that may have affected the tube line tunnels and shafts. Due to the careful planning and coordination of the piling works, this became only a precaution, with the project running smoothly, on programme, to budget, and in a safe manner.