Contiguous Wall and Bearing Piles

Islington Square, London

Project Description

Central Piling were appointed by Galliard Homes to supply a piling solution to Islington Square - a new 4.5 acre residential development by Sager Group located on the site of the former North London Royal Mail sorting office on Upper Street, Islington, North London.

The complexity of the project called for a collaborative approach and Central Piling worked with the client and all parties during the early design stages to enable a value-engineered solution which delivered the project on time and within budget

The development comprised three blocks: Block A, which consisted of a new structure tied into the retained original Edwardian façade; Block B, which incorporated a single-storey retained façade with a modern zinc-clad structure above, and Block C which was probably the most challenging - a new-build over a deep basement.

Ground Conditions

The ground conditions comprised 2m of made ground over 2m of sand and gravel with sandy clay pockets occurring throughout and firm-to-stiff clay below.

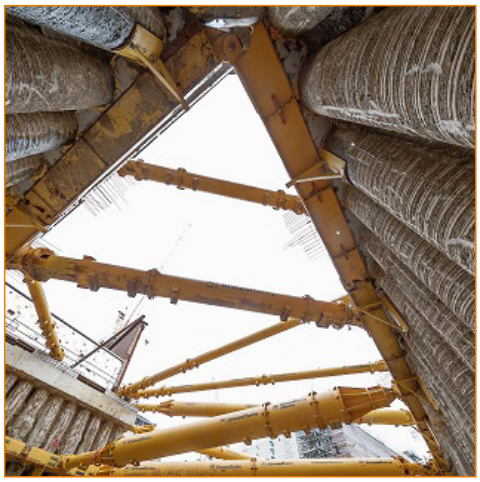
Challenges

The works were scheduled to be done in phases and Central Piling used five different rigs, ranging in size from 15 tonnes to 80 tonnes, to undertake the piling works.

The geotechnical works included the installation of several embedded retaining walls formed of CFA piles in diameters from 350mm to 750mm. The most challenging geotechnical task was the installation of the embedded retaining wall for Block C, designed to facilitate the construction of a 14m-deep basement.

The complexity of the Block C retaining wall design and installation demanded a highly collaborative approach and Central Piling's design team worked closely with the main contractor and all parties during the pre-construction design phase which was essential to the successful delivery of the project.

To ensure they achieved completion within the allotted timescale, they worked to a target of six piles per day – a considerable challenge on a site where numerous trades were working simultaneously, and so concrete deliveries had to be precisely scheduled so they could meet their target.



Client

Sager Group

Main contractor

Galliard Homes

Geotechnical consultant:

Card Geotechnics

Scope of works

- Installation of several embedded retaining walls formed of CFA piles in diameters from 350mm to 750mm
- Installation of an embedded retaining wall to facilitate construction of a 14m-deep basement

Plant

- Hutte 203, Soilmec R210, Soilmec R312, Soilmec SF50, Soilmec SF65

Solution

The most appropriate solution for the Block C basement retaining wall was determined as a propped contiguous piled wall comprising 210 CFA piles, each 750mm in diameter, installed to a depth of 20m.

The embedded retaining wall design tested the CFA piling rigs' capabilities with the requirement to install 20m fully-reinforced piles. A special concrete mix had to be developed that would facilitate the installation of the long reinforcing cages.

Using specialised Plaxis 3D software, a three-dimensional model was built of the geotechnical structures. This incorporated not just the new Islington Square sub-structures but also the foundations of neighbouring buildings including the Almeida Theatre. The 3D model enabled inspection of the likely foundation settlement. This was followed-up by a more detailed analysis of the impact of ground movements by Card Geotechnics.

Redundancy was built into the design of the contiguous piled retaining wall to compensate for piling deviation beyond tolerance. The allowable vertical deviation for CFA piles, according to the codes of practice, is 1 in 75. For a 20m-deep pile, this would amount to roughly 260mm of possible deviation for each pile, leading to a high risk of pile clashing. The redundancy built into the wall design accommodated the possibility of omitting a pile in the event of a clash without compromising the performance of the retaining wall.

By providing Groundforce, who supplied the propping solution, with essential information regarding lateral loads, Central Piling ensured the layout of the props was optimised right at the tender stage.

Despite the complexity of the geotechnical element, all the piling was completed successfully within the scheduled programme.

Two levels of temporary propping were required to minimise movement to adjacent structures

Rawden Enterprise Park, Sixth Avenue
Halstead, Essex, CO9 2FL
T: 01787 474000 F: 01787 472113
E: info@centralpiling.com