

The Citadel Development

Design & Construct Contract for Lateral Support, Bulk Excavation and Foundation Piling for a New Basement Parkade in Cavendish Road, Claremont, Cape Town



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Project Facts

Client

JV Atterbury Properties, Rowmore Investments & Citadel Investments (Pty) Ltd

Consultant

DG Consulting Engineers

Quantity

- 1, 870m² of Lateral Support
- 210 610mm Ø Franki Driven Cast-in-Situ Piles
- 21,000m³ Bulk Earthworks

Period of time

21/7/2014 to 27/3/2015

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With extensive knowledge in the design and construction of basements in Cape Town and in particular the Claremont area of the southern suburbs, Franki Africa was approached to negotiate the design and construction of a new basement in Claremont, Cape Town adjacent to the popular and busy Cavendish Shopping Centre.

This type of basement construction posed a number of challenges with regard to both the general design and the design of the lateral support requirements. The soils consist of a 3 - 4m layer of transported silty sand beneath which is highly decomposed granite consisting of weak clay in the form of kaolin. This extends to a considerable depth in excess of 20 m. A perched water table rests on top of these kaolin clays and is visible within the first 2m from natural ground level.

The very low shear strength of the kaolin, in which ground anchors were installed has a limiting effect on the maximum possible anchor loads. This combined with the disintegrating qualities of the kaolin when exposed to ground water, results in nominal maximum anchor loads of 450 kN. Lateral support movements can be considerable in these soils.



Product Description

Lateral Support

- 147 500mm Ø CFA piles to depths 16.5m
- 89 km of capping beam 500mm x 700mm
- 1,000m² of Gunite arches between the soldier piles
- 265 Ground Anchors 450 kN length from 18.0m to 24.0m long

Foundation Piling

- 210 610mm Ø Franki DCIS piles to 6.5m depth installed at basement final excavation level.

The basement, consisting of four levels, is approximately 50 x 50m, with a depth of 12m at the deepest wall height. One of the major difficulties on this project was the restricted access to the site, with only two access and exit points for materials, both existing onto the very busy Cavendish and Warwick Roads in the Claremont CBD.

As the lateral support progressed the perched water table was caught behind the gunite arches and transported to excavation level via drains. This required constant de-watering in order to prevent the disintegration of the kaolin into slurry/clay. A suitable hard standing and de-watering system was created at the final level, in order to provide a safe working platform for the installation of the foundation piles.

Given the depth of the kaolin, Franki DCIS piles were preferred to CFA piles as the more efficient foundation solution. This was mainly because the Franki piles could be founded at a shallower depth by forming an enlarged base.

In spite of the many challenges, Franki was able to provide an early start for the building contractor by giving partial handover of half the completed site. Franki Africa's experienced design-and-construct team have successfully provided yet another innovative lateral support solution.

