

Retaining Walls Stabilisation



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INDUSTRY

Residential

STRUCTURE

Retaining walls

PROBLEM

Sandy soil stabilisation

LOCATION

NSW, Australia

DURATION / YEAR

25 days / 2015

TECHNOLOGY

Permeation grout columns, chemical anchors, injection spears, TAM Crete UFC

BUSINESS UNIT

Mainmark Australia

Pictured:

- 1, 2, 3. Injection lances flushed into the ground.
4. Rear garden stabilised and excavated.
5. New retaining wall built.

Summary

Built on loose sands, a residential property in the Sydney suburb of Bondi was at significant risk of damage or even collapse.

The existing retaining wall, built 800mm from the property's rear façade, had failed and was experiencing significant rotational displacement. The house footings had also settled unevenly due to loose sands below.

The neighbouring five-storey apartment block was at risk too, as another retaining wall was located on the boundary line. If this wall collapsed, the driveway would have been destabilised, along with the footings of the building.

Due to the close proximity of the adjacent structures, constructing a conventional concrete retaining wall was not feasible. This necessitated excavation up to the property's boundary.

Mainmark was appointed to solidify loose sand and prevent it from falling in on the rear excavation, allowing a new retaining wall to be safely constructed. Over 25 days, a total of 197 columns were inserted at various depths. The columns were used to support both the eastern boundary and north façade from further settlement or movement.

Objectives

There were three key objectives for the project. First, it was essential to retain the sandy fill mass before the excavation. Second, the rear retaining wall needed to be moved to create a space for a paved courtyard. Third, ground improvement was required to arrest the movement of the house footings, enabling repairs to be made to the brickwork above.

Retaining Walls Stabilisation continued



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Solution

ACOR Consultants chose Mainmark's Permeation Grouting solution for the project.

Designed to strengthen sand and gravels, and repair structural formations at depths as great as 60m, Permeation Grouting produces a solidified mass to support higher loads and fill voids in the soil. It offers a safe solution for stabilising ground when excavation is required adjacent to another building or structure.

Microfine cement was grouted into loose sands, providing temporary support to allow excavation for a new retaining wall at the rear of the property and stabilisation of boundary wall.

110 columns were inserted to a depth of 2000mm on the eastern boundary to solidify the loose sands under the footpath and prevent further settlement.

A further 72 columns were inserted to a depth of 4500mm to help retain the mass of loose sand from falling in on the excavation, and 15 additional columns were used to support the north façade.

Furthermore, ground anchors were formed by

pneumatically driving threaded steel drill rods 3m to 6m into the sandy soils. The chemical ground anchors restrained the cement permeated soil block from rotating into the excavation. An expanding PUR was injected through the hollow centres of the rods and a 'bulb' of very hard-setting resin formed the anchorage deep into the sand.

The anchors were successfully tested after 24 hours to a withdrawal-resistance strength of 4.4 ton (4.4kn), and formed the foundation for a retaining structure to be constructed.

According to Mitchell Bell from ACOR Consultants, "Mainmark's outstanding solution stabilised the house to prevent further settlement and facilitated the safe construction of a new retaining wall."

"In addition, Mainmark was able to offer an alternative solution in the event of unfavourable subsoil conditions being encountered during the project, thus minimising risk."

"I would happily recommend Mainmark and we have continued to work with the company on subsequent projects."