

Cement Permeation Grouting to support foundations for a new basement excavation – Watson’s Bay, Sydney



The excavation of a new basement below an existing 19th Century cottage required a discrete solution.

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Project

The owner of a 100 year old cottage wished to extend his living space underneath his existing floor space. During initial excavation works it became evident that improvement of the soil below the foundations would be required to ensure stability.

Soil Conditions

The property was underlain by dry fine to coarse Aeolian Sands of loose to medium dense consistency.

Solution

Keller Ground Engineering was requested to stabilise the sands to allow the excavation of a vertical face of 1.8m below ground level and 1.2 m below the existing footings.

Keller proposed the use of permeation grouting to cement the sands insitu. Permeation Grouting uses a low pressure injection of a cement suspension grout to fill the voids between the soil particles. In this instance, due to the presence of fine sand particles, a fine grained cement known as ‘microfine cement’ was used to ensure the grout flow through the small apertures between the fine sand grains.

Construction

Due to extremely limited space on site the project was carried out with light, handheld drilling and injection equipment, while the grout was mixed and pumped remotely using electric colloidal mixers and low controlled volume piston pumps.

Following injection the grouted soil was left for 7 days prior to excavation sufficient time to allow the grout to achieve the required compressive strengths of greater than 1MPa, while 28 day results of >5Mpa were achieved.

Keller’s Permeation grouting system can be utilised to increase the strength and bearing capacity of soils and is suitable for the underpinning of structures, improving the bearing capacity of foundations and control of ground water flow.

Specialist Geotechnical Contractor:

Keller Ground Engineering Pty Ltd