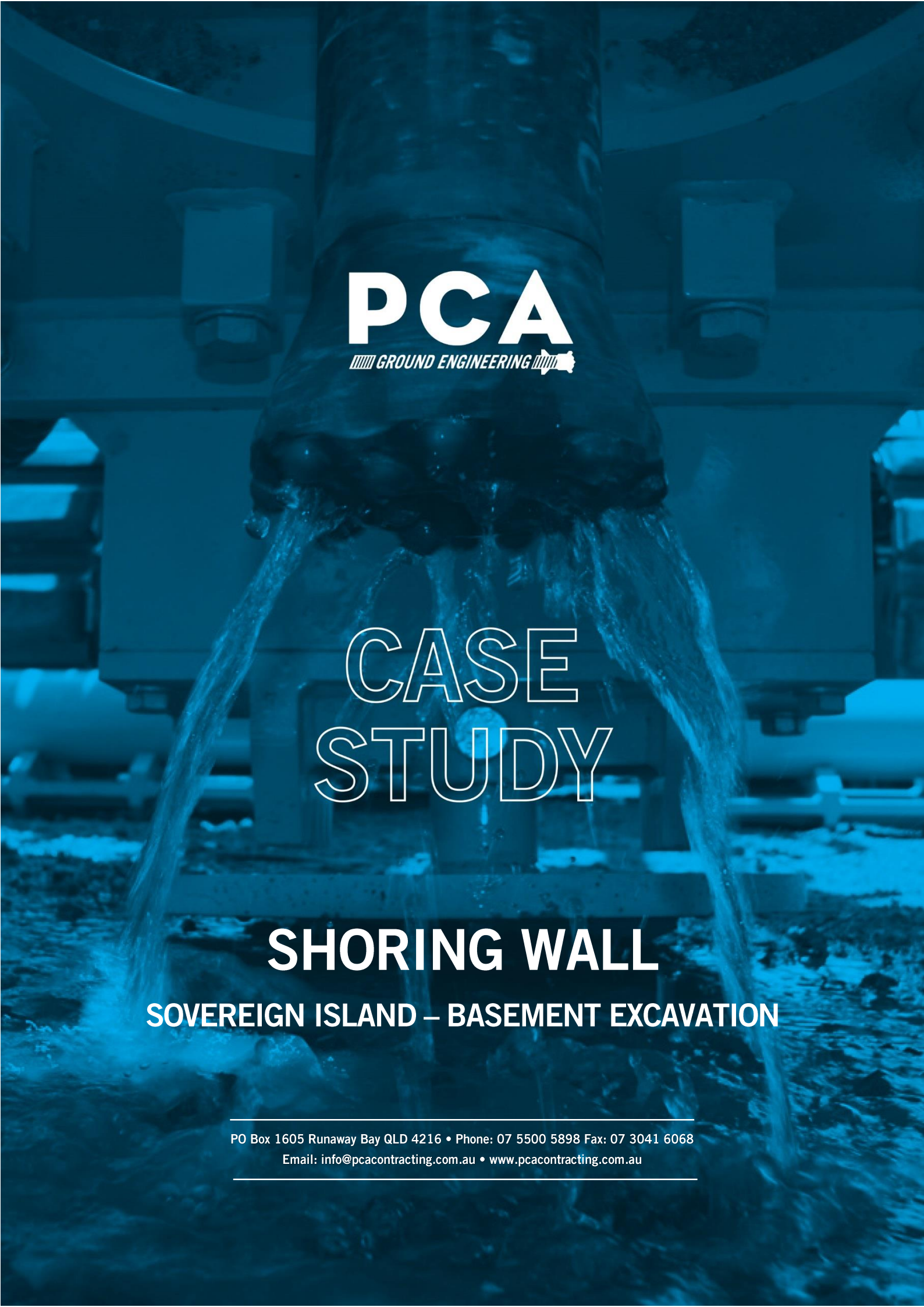


PCA

GROUND ENGINEERING

CASE STUDY

SHORING WALL

SOVEREIGN ISLAND – BASEMENT EXCAVATION

PO Box 1605 Runaway Bay QLD 4216 • Phone: 07 5500 5898 Fax: 07 3041 6068
Email: info@pcacontracting.com.au • www.pcacontracting.com.au

CASE STUDY

PCA GROUND ENGINEERING

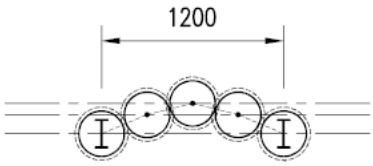
EARTH RETENTION | PILING | GROUTING | ENGINEERING GROUND IMPROVEMENT | CIVIL CONSTRUCTION

PROJECT TYPE: Shoring Wall for Basement Excavation

CLIENT: Alan Marks

MAIN CONTRACTORS: PCA

PROJECT ENGINEERS: A B Consulting Engineers



PROJECT DESCRIPTION AND CHALLENGES

Sovereign Island has been reclaimed using dredge spoil from the Coomera River and Gold Coast Broadwater. The typical geotechnical profile for residential house lots includes several metres of loose sand overlying layers of loose and dense sand to a significant depth. Houses are also built using the largest footprint possible which generally see them constructed to within 1.5m or so of the boundary. This close proximity to the boundary makes excavating a basement very tricky and usually requires some form of temporary or permanent shoring.

The project in Hampton Court at Sovereign Island had the added difficulty of a concrete fence which was installed on shallow foundations on the property boundary which required an excavation to within 500mm. Sheet piles or any other method that involved vibration were ruled out due to potential damage to the neighbouring fence and house.

The challenge was to design and construct a temporary shoring wall that could retain a 2.5m excavation using equipment and techniques that did not harm the adjacent property.

THE SOLUTION

A contiguous wall made up of a series of overlapping grout columns was installed using high pressure drilling and grouting techniques. The sandy soil allowed for the use of a small diameter drill string (52mm) with a high pressure drill bit that created a sand/grout mixed series of 400mm diameter piles to a depth of up to 6m.

The computer controlled mobile grout plant was able to pump grout at pressures up to 100 bar and 55L/min to cut and mix the sand and grout together to create a continuous diaphragm for the full length of the wall. Universal beams were installed at between 900mm and 1200mm centres to resist the overturning forces of the structure with N16 bars plunged down the intermediate grout columns to provide some additional shear strength.

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Two drill rigs were used. One was used to install the grout columns while the other installed the 6m long universal beams

Installing the 6m long universal beam

High pressure grouting was used to increase pile diameters to 400mm.

Exhumed test pile where pressure and flow rates were adjusted to determine the change in pile diameter

THE PCA ADVANTAGE

The low vibration and high pressure grouting techniques utilised by PCA are perfectly suited to tight sites and boundary wall construction where there are concerns over potential damage to adjacent structures.

With a cost that was equivalent to installing sheet piles, the Hampton Court shoring wall project on Sovereign Island was a robust solution with a small footprint that enabled the outer basement to be waterproofed prior to backfilling.

Having access to multiple drill rigs with state of the art grouting equipment enabled this project to be delivered on time and within budget with no variation claims or damage to the two adjoining properties.

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