

Balfour Beatty

Ground Engineering



JUMEIRAH PALM ISLAND, DUBAI

KEY DETAILS

// CLIENT

Nakheel Properties

// JOB SPECIFICATION

Deep vibrocompaction for land reclamation

// MAIN CONTRACTOR

Al Naboodah LLC

The Jumeirah Palm Island is an artificial island constructed off Dubai, forming a prestigious development of villas, apartments, retail and service facilities.

The island is largely built up using marine sand, hydraulically placed using 'Rainbow' dredgers. Before buildings and infrastructure could be constructed the sand needed to be compacted to consolidate settlements, increase bearing capacity and mitigate against seismic risk.

Working with one of Dubai's largest contractors, Al-Naboodah LLC, Balfour Beatty Ground Engineering (BBGE) provided equipment and technical expertise to carry out ground improvement on an area of some 350,000m² over a 14 week period.

The risk of liquefaction is significantly reduced following vibrocompaction treatment, with loose sands densified to increase bearing capacity, consolidate settlements and reduce the risk of seismic damage.

Seismic mitigation was needed within the founding sands to ensure the Palm development is able to withstand earthquakes. Vibrocompaction is used to mitigate seismic risk and prevent liquefaction (the process whereby loose water logged sands and soft clays act like a liquid when subjected to seismic shock waves, with sands spreading apart quickly resulting in the collapse of bearing capacity).

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In addition to assisting with the design and trials for the seismic mitigation and compaction scheme, BBGE's ground improvement equipment subsidiary Pennine provided assistance with training local operators in the use and maintenance of the vibrocompaction equipment.

In total ten sets of vibro equipment were provided by Pennine including BD300 & BD400 vibroflots, HD225 power packs, jetting pumps and ancillary equipment.

The flots were used to carry out vibrocompaction to depths of 14m, achieving a relative density of greater than 85%.

The Pennine vibroflots were found to be the only equipment capable of compacting the sand to the developer's requirements, with the BD400 the largest and most powerful vibroflot available in the world, designed to maximise reliability and minimise operational costs. The increased power of this system, coupled with BBGE's expertise, allowed greater columns widths and spacings to be achieved, in turn helping to minimise costs compared to conventional vibroflots as well as significantly reducing the programme times required for densification.

FOR FURTHER INFORMATION CONTACT:

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