

Project Location:

Richards Bay, South Africa

Method Applied:

Offshore Marine Stone Column Bottom Feed, maximum length 15m.

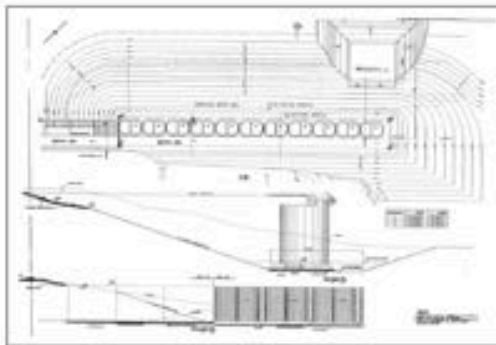
Geology

The site crosses a palaeo-channel which has been formed in the Cretaceous bedrock. A portion of the upper channel in-fill material comprising high proportions of silt and clay has been removed and replaced with inert soils by dredging methods. However, not all the silt and clay material was removed, according to the borehole records. The replacement

soil is essentially a sand with varying proportions of silt and clay. The water depth in the area of the quay wall is variable, to a maximum in the order of 15m.



Below: The plan view shows the existing berth 306 and the planned extension.



Right: View on the barge from above
Rigging up the Bottom Feed Stone Column rig on a confined space of a barge requires experience. This photo was taken from the top of the auxiliary crane

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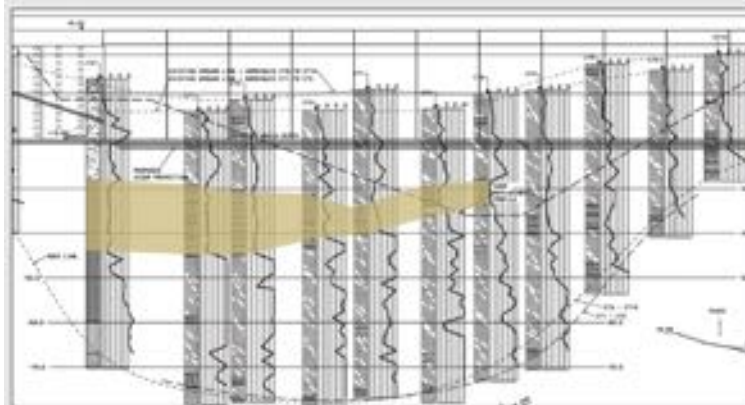
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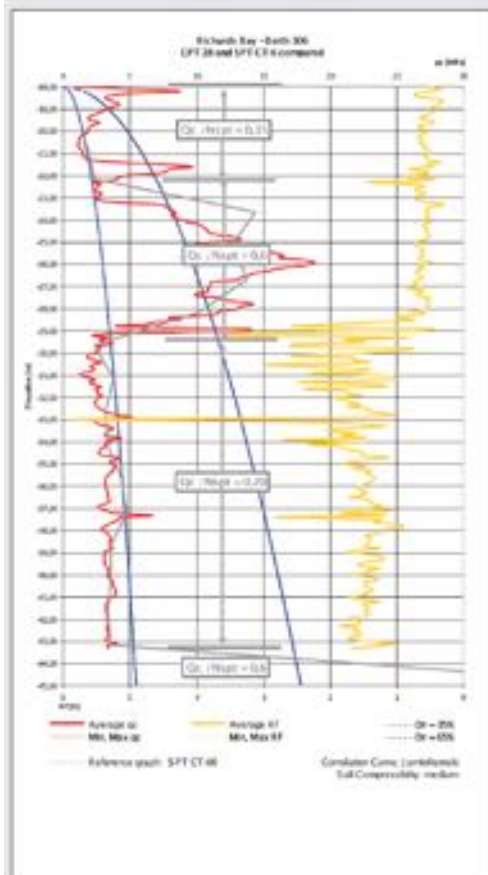
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The graph on the left shows the soil profile and in particular the brown shaded zone identifies the soft silty layer that requires stone columns.



Left: CPT and SPT comparison. The left CPT shows the qc-values (red) and the corresponding friction ratio in percent (yellow).

The two blue curves are the $D_r=35\%$ and $D_r=65\%$ relative density after Jamiolkowski. In the upper sands (friction ratio $<1\%$) there are zones with relative density of 35% and even smaller. In the lower silts (below elevation -29) the concept of relative density does not apply but stone columns can be useful as reinforcement for settlement reduction. Interesting is also the correlation between SPT and CPT.

The gray values show that there is no consistent correlation of the full depth range, not even within the same soil type.

As experienced from many reclamations before, the two sounding methods do not correlate as well as one would expect from literature.

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