LAND PAC

BS 2010/001

BENEFIT STATEMENT

Case Analysis

# eliminating a layer whilst improving the bearing capacity

MARKET SECTOR

**Industrial/ Commercial Development**

APPLICATION

**Deep In-Situ Compaction**

PROJECT PHASE

**Construction Phase**

## PROJECT REVIEW

The project was a new warehouse and yard for a Volvo distribution centre and the briefing was to establish whether the proposed design could be improved without additional cost.

## GEOLOGICAL REVIEW

According to the 1:250 000 geological map of the area, the site is underlain by sandstone, shale and coal beds of the Vryheid Formation, which is part of the ECCA Group. The upper subsoil was classified as loose silty sand in the top 8m of the soil strata. Ground water was encountered during the geotechnical investigation at a depth of 6-8m.

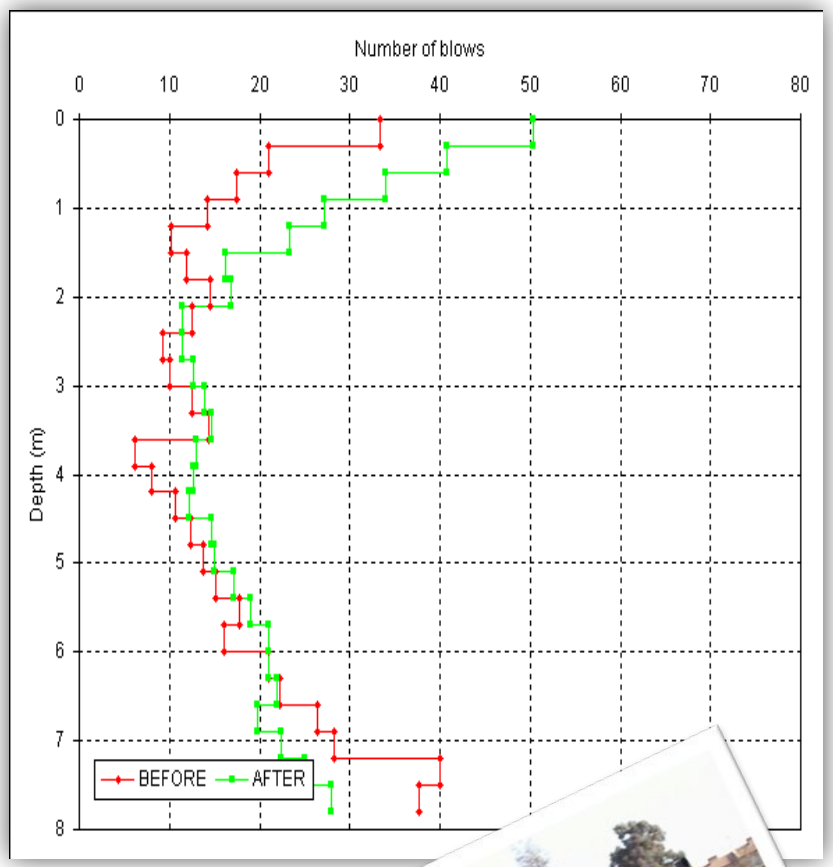
## TESTING AND RESULTS

A Dynamic Cone Penetrometer was used to quantify the improvement in the subgrade strength as a result of the compaction. The figure indicates the equivalent CBR values at various depths as computed from the chart showing the relationship between penetration rate (mm/blow) and Equivalent California Bearing Ratio (CBR) (%). It is important to note that CBR values derived from the penetration rates as determined by DCP tests are approximate.

The results do however offer a good indication of the relative improvement achieved if before and after results are compared. The equivalent CBR values improved on average from 16,9% to 27,3%.

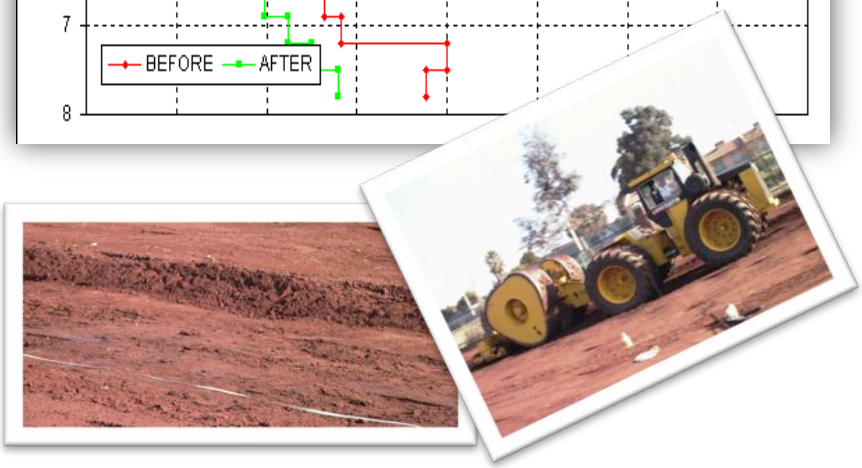
Ten Dynamic Probe Super Heavy (DPSH) tests were also conducted. The DPSH test is performed by driving a 60° cone into the ground by means of a 63,5kg hammer. The hammer is lifted mechanically and dropped over a distance of 762mm. The result is expressed as the number of blows per 300mm penetration. Each test was performed to depth of refusal.

The average number of blows required to penetrate 300mm at different depths are shown in the figure. From the results, it was evident that improvement down to 6m was achieved, with most of the improvement occurring in the top 2m of the soil profile.




## ORIGINAL PAVEMENT DESIGN

The original pavement design was to be founded on poor subgrade, with an expected equivalent CBR of less than 15% . The structure was then to be constructed with 150mm of a G7 material, 150mm G5 and finally 150mm G4 before finishing off with 50mm of a black top.



## FINAL PAVEMENT DESIGN

The improvement in the in-situ strength led to the reduction of the 150mm G7 layer without compromising the bearing strength of the original pavement design.

**SAVE UP TO 15% OF ORIGINAL EXPECTED COST.**

## SUMMARY

- Elimination of an imported pavement layer.
- Superior subgrade strength.
- Construction time savings.
- Cost savings.