Shallow foundation scheme may only be considered for non-essential and low-rise structures, or when soil improvement has been undertaken to arrest possible effects of liquefaction phenomenon and ground subsidence.

Both schemes are discussed in the following sections.

7.5.1. Piled Foundations

Based on the above discussion, the use of single-stick, prestressed, reinforced, precast concrete piles are recommended for the project. The single-stick is underlined for emphasis in anticipation of the required pullout resistance, as jointed piles may have questionable pullout resistance.

Considering the built-up surroundings (1-2 storey residential / commercial buildings), the use of static pile driver is recommended to eliminate noise and air pollutions and unwanted vibrations that may affect the operations of the surrounding residences / businesses / buildings.

Piles will have to bear directly on the medium dense layer (Layer C), with minimum depth of embedment at 24m reckoned from the existing ground surface.

In the event that the use of driven piles might not be plausible, bored piles maybe considered.

The advantage of using bored piles is that it can be drilled and socketed into the more dense material, thus offering higher shaft resistance.

Pile capacity estimates are graphically presented in the next page.

A suitable safety factors, typically 2.5 for compression and 2.75 for tension, may be applied to the calculated ultimate pile capacity to arrive at the allowable pile capacity.

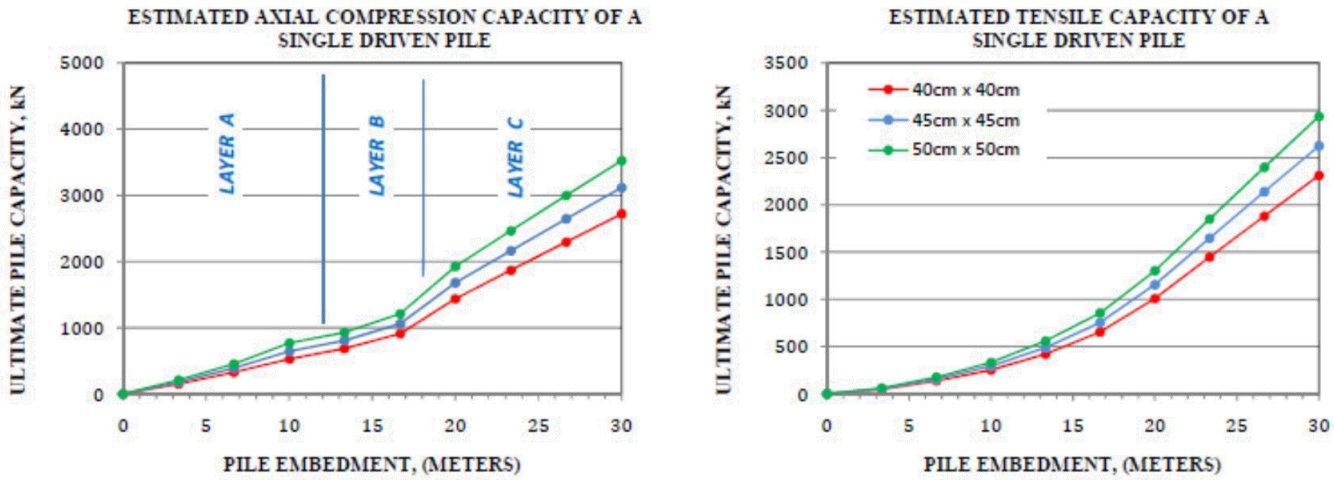

Figure 7-2. Estimated ultimate capacity of single-stick driven piles

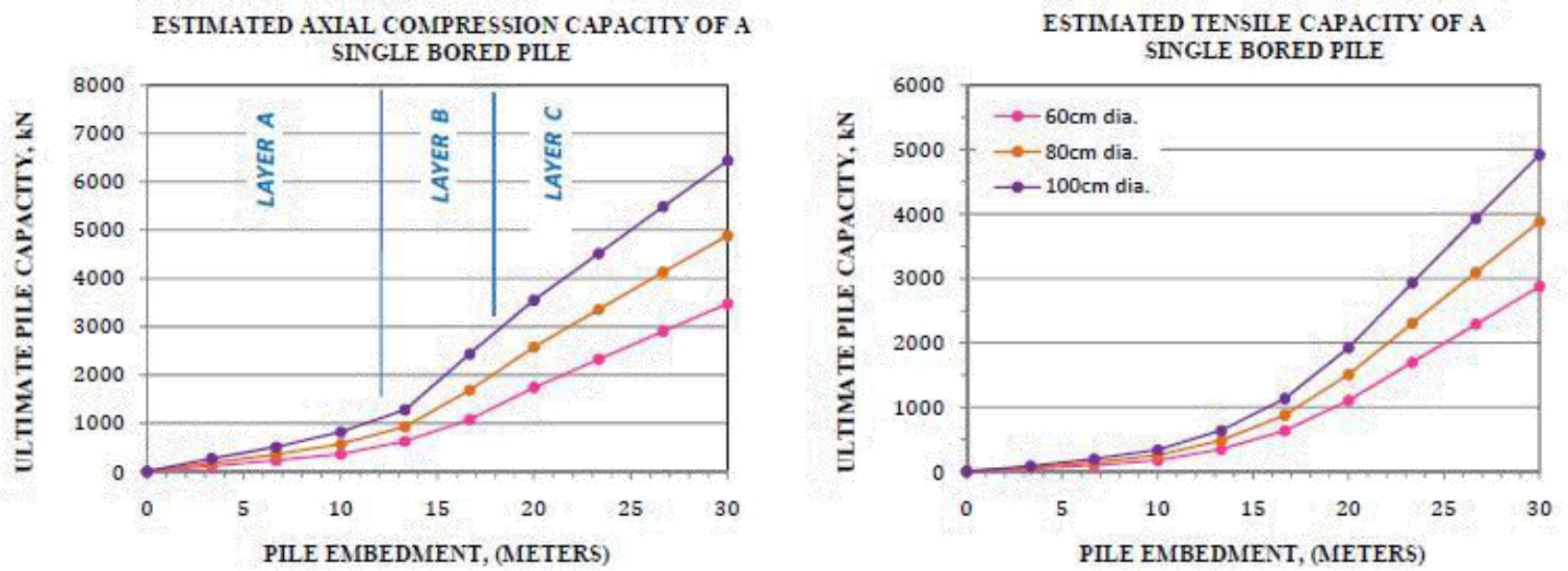

Figure 7-2. Estimated ultimate capacity of a single bored pile

7.5.1.1. Other Pile Design Considerations

Verification of Actual Pile Capacity& Integrity

The tabulated pile capacities are based purely on theoretical computations. The actual capacity of the piles will have to be confirmed / determined by actual pile load tests - either by the Static Test (ASTM D1143) or the Dynamic (ASTM D4945) Testing Procedures. The latter will be the more practical choice as more piles can be tested at a much lesser time and cost.

Foundation Quality Control during Construction

Quality control of piles may be best checked using appropriate testing methods such as Pile Integrity Testing (ASTM D 5882) &Cross-hole Logging Tests (ASTM D 6760) for integrity testing, and High-strain dynamic testing (ASTM D 4945) for capacity verification.

Pile Driving

Pile driving should be done continuously since relatively long stoppages would make re-driving difficult. A wave equation analysis (GRLWEAP) may have to be conducted to verify size of hammers suitable for driving to the prescribed or desired depth, and check driving stresses as well.