

Document type: Practice Note

Title: Foundation depth for buildings outside the scope of NZS3604:2011

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1. General

Before a building is erected on any site, all rubbish, noxious and organic matter (including vegetation) shall be removed from the area to be covered by the building. In suspended floor construction, firm turf and close cut grass may remain if the footing depth is taken from the underside of soil containing organic matter.

The minimum foundation depth for buildings within the scope of NZS3604:2011 is 200mm minimum below *cleared ground level* into *good ground*.

Problems have occurred with shallow foundations in many parts of Auckland City. To reduce the risk of excessive foundation movements, the foundation depth for residential buildings in Auckland City shall generally be a minimum of 450mm below the adjacent cleared ground level and into good ground.

2. Definitions

Cleared ground level means the ground level after completion of site excavation and removal of all harmful material, but before excavation for foundations

Good ground means any soil or rock capable of permanently withstanding an ultimate bearing capacity of 300 kPa (i.e. an allowable bearing pressure of 100 kPa using a safety factor of 3.0), but excludes:

- a. Potentially compressible ground such as topsoil, soft soils such as clay which can be moulded easily in the fingers, and uncompacted loose gravel which contains obvious voids
- b. Expansive soils being those that have a liquid limit of more than 50% when tested in accordance with NZS4402 Test 2.2 and a linear shrinkage of more than 15% when tested from the liquid limit in accordance with NZS4402 Test 2.6; and
- c. Any ground which could foreseeably experience movement of 25mm or greater for any reason including one or a combination of land instability, ground creep, subsidence, seasonal swelling and shrinking, frost heave, changing groundwater level, erosion, dissolution of soil in water and effects of tree roots

Natural ground level means the ground level before the site has been cleared

Finished ground level means the level of the ground against any part of a building after all backfilling, landscaping and paving have been completed.

3. Expansive clays

Where expansive clays have been identified, a soils investigation by a suitably qualified engineer should be carried out.

Note: extra care must be taken with foundation depths where expansive soils have been identified. In particular, unequal pile foundation depths can cause differential movement in the structure of the building due to seasonal movement of the soils. Care should also be taken where large trees are in close proximity to foundations.

Where building consents include differential embedment depths of pile foundations, these should be referred back to the designer as having the potential to cause structural problems.

4. References

NZS 3604:2011 Timber Framed Buildings: Section 1, Scope and Interpretation
AS2870:1996 Residential slabs and footings