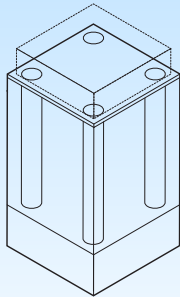
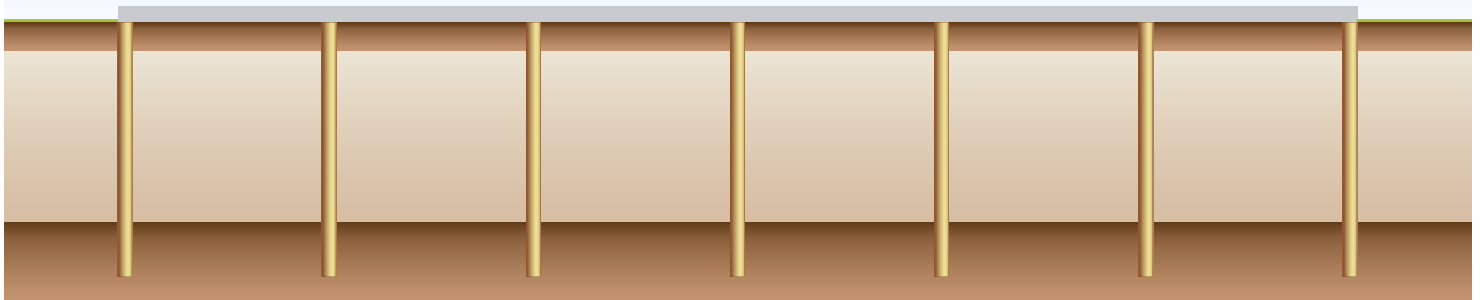


# TIMBER POLE DEEP PILE FOUNDATION



Deep Pile Foundations are designed for sites where a competent bearing stratum, at least 3.0m thick, is identified below ground

(as per MBIE Guidance 2012, section 15.2.2, p. 15.7).



## The system

### Foundations

Deep Pile Foundations use specifically designed MultiPole SED piles to transfer building loads to a bearing stratum, which can vary in depth between 1.0m and 20.0m (or deeper) below the ground. The piles are typically supplied up to 14.0m long in a single piece. To achieve greater depths, multiple pieces are joined together using MultiPole Connectors (simple pin connectors) during installation to form longer pieces.

### Floor

Residential foundations typically use 150–250mm piles and commercial foundations typically use 250–300mm piles. The piles are typically spaced 2.0–3.0m apart underneath a timber floor or up to 4.0m apart underneath a concrete floor.

After the piles are installed, either bearers for a timber floor (designed either to NZS 3604 or according to specific engineering design), or a concrete floor (such as an enhanced waffle slab) can be constructed directly on top of the piles.

## Design features

The piles can be designed for a dependable pile bearing capacity of more than 500kN, subject to ground conditions. The piles are also able to be designed for minor to moderate lateral movement (E.G. up to 300mm).

## Installation

Installation typically takes 2 days for a residential foundation. The piles are installed using a high frequency vibrator mounted on an excavator or Terex. This installation process leaves the piles structurally undamaged, doesn't generate excessive noise, and doesn't transmit excessive vibrations. Combined with fast installation, this minimises disturbance to neighbouring properties.

## Site requirements

Access to pile positions is generally required to be a flat, level, straight path that is 3.1m wide with 4.0m vertical clearance for a 25 tonne excavator. For smaller piles (up to 225mm piles that are 3.0m long) a Terex compact track loader (similar to a Bobcat) can install the piles. The Terex only requires access that is 2.0m wide with 2.3m vertical clearance. A gravel working platform may be required if the upper soil layers are too soft to support the piling equipment. Piles can generally be installed up to 1.0m away from existing structures.

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## Engineering design, testing and sign off

One of our geotechnical engineers will be able to complete site-specific engineering design for the piles based on the pile loads provided by a structural engineer, as well as the geotechnical report for the site. The pile design includes calculations, design drawings, Producer Statement PS1 – Design, and accompanying pile design report able to be used to support the consent application.

During pile installation, the bearing capacity of the piles is tested to verify that the design loads are being met. For residential foundations, pile testing usually involves measuring pile sets based on the Hiley Formula. For commercial foundations, a Pile Driving Analyser (PDA) is usually used. Combined with observation of the pile installation process to the satisfaction of the engineer and a Producer Statement PS3 – Construction from the pile installer, this will enable the engineer to sign off a Producer Statement PS4 – Construction Review.

## Additional design options

### Reinforcement

A reinforcing rod can be grouted down the core of the pile to provide a connection to the slab, if required.

### Ground Improvement

For sites where more than 300mm of lateral movement is expected for a future event, additional rows of closely-spaced shallow Ground Improvement piles acting as an in-ground retaining wall can reduce the lateral movement below 300mm to within the threshold suitable for Deep Pile Foundations.

Avon River Precinct, Christchurch, NZ



## Quick reference information

	Technical Category	Type of MultiPole used	Typical pole diameter	Typical pole length	Typical pole spacing	Typical installation method
Residential foundations	TC2 & TC3	SED	150–250mm	1.0–22.0m	2.0–4.0m	High frequency vibration
Commercial foundations	TC2 & TC3	SED	250–300mm	1.0–22.0m	2.0–4.0m	High frequency vibration