

# PowerPiles Re-support Apartment Building



## INDUSTRY

Residential

## STRUCTURE

Apartment Building

## PROBLEM

Ground Subsidence

## LOCATION

Elwood,  
Victoria, Australia

## DURATION / YEAR

5 days / 2015

## TECHNOLOGY

PowerPiles and Uretek  
Deep Injection

## BUSINESS UNIT

Mainmark Australia

**Above: Three Mainmark Operations teams installed 48 PowerPiles to completely re-support all internal and external walls in five days.**

## Summary

The two storey, double brick apartment block was built in the 1930s less than 100m from the Elwood Canal, in Melbourne. The building has solid brick internal and external walls on strip footings with timber and terrazzo elevated floors.

This section of Elwood is reclaimed land, with up to 2.4 metres of silty clays overlying natural clay. The tidal movement of water in the canal and frequent flood events wash water through the silty layer, causing settlement of the soil and structures above. Movement of the soil is further exacerbated by the mature plane trees in the nature strip.

## Objectives

The objective was to compact the foundation ground and assure that the building was completely re-supported.

## Solution

Several remedial systems, including conventional underpins and screw piles, were investigated by the body corporate and their engineer. They required a complete solution that supported both the external and internal walls, evenly, in their current position.

They decided that the best solution was to have Mainmark install Uretek PowerPiles. While not 'piles' in the traditional sense, PowerPiles increase building support as retrofitted pillars that compact weak ground under existing buildings, even when there is low headroom.

Installed PowerPiles are geotextile shells, filled with an expanded Uretek resin that can have a compressive strength of 1000 kPa to 5000 kPa, and more, if required. They are

## PowerPiles Re-support Apartment Building continued



Above, left: An array of PowerPiles. Above, middle: A PowerPile is prepared for placement. Above, right: Retro-fitting of PowerPiles from inside the building.

installed as prefabricated 32mm Ø tubes, inserted into 38mm Ø holes driven into the ground.

They are then filled with Uretek expanding structural resin through pipes down the tube centres. The shrink-wrapped shells expand, to as much as 340mm Ø, compacting the surrounding subsoils.

This apartment block was entirely re-supported by 48 PowerPiles plus Uretek Deep-Injection between the PowerPiles to complete the continuous support of the structure.

All walls internally and externally were re-supported onto the natural clays at up to 2.4m depth. DCP results proved increased compaction of the soil beneath the footings. This highly successful project took three Mainmark Operations units only five days to complete.



Above: Demonstration of PowerPile free-rise expansion and a diagram of actual installation expansion into ground of varying density.