

December 2016

An open letter to the people of Christchurch from Mainmark:

To rebuild or repair? How to fix earthquake affected structures earmarked for demolition

Many buildings currently slated for removal or rebuild in Christchurch and other earthquake affected geographies could be remediated with the help of proven ground engineering methods developed and tested by Mainmark. AMI Stadium at Lancaster Park is one such example.

Whilst Mainmark respects Christchurch City Council's proposal to rebuild a completely new stadium, as part of a new purpose built precinct, we also know through extensive experience that the process of re-levelling major buildings, can be done effectively and relatively quickly resulting in immediate community benefit and less expense than a complete rebuild.

In the case of AMI Stadium, the process of rebuilding is estimated to take up to seven years, requiring an investment in the hundreds of millions of dollars from council and government. Mainmark is very familiar with the ground conditions at the site and the settlement suffered. In fact, we have completed several repair assessments to date and are confident that remediation using Mainmark's innovative ground engineering technologies could have the stadium re-levelled **and** the ground improved much quicker, and for a maximum fixed price in the tens of millions of dollars.

Earlier this year, Mainmark received international recognition via the [Ground Engineering Awards](#) for its re-levelling of the Christchurch Art Gallery which experienced serious foundation damage as a result of the 2010 and 2011 Christchurch earthquakes.

The fixed price project saw Mainmark re-support and re-level the 33,000 tonne gallery in **just 52 days**. The re-levelling of the Christchurch Art Gallery was a landmark project for Mainmark and the industry, setting a new benchmark in earthquake remediation for large-scale buildings within a fixed price structure.

How was this achieved? The Christchurch Art Gallery was resurrected using low-invasive Jet Grouting and JOG Computer Controlled Grouting technologies to re-support and re-level the

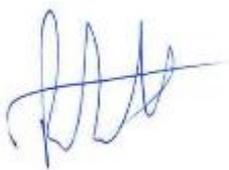
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6,500 square metre foundations, without requiring excavation, or the occupants or exhibits to vacate. [JOG](#) is a method for correcting subsidence of buildings and other structures, effectively 'floating' them back to their design level. This solution has successfully completed hundreds of projects in Christchurch and many more in other seismic regions, including Japan.

As you know, many buildings and structures in Christchurch have been affected by liquefaction, whereby soil suddenly loses strength and starts to react like liquid. When liquefaction occurs under buildings, the foundations and footings are compromised, putting the building at risk of collapse. As part of any re-levelling works, it is essential that asset owners incorporate ground improvement to help with the stability of the above ground structures.

Mainmark has developed a new Liquefaction Mitigation solution to reduce the impact of future seismic events, strengthening the ground beneath existing structures as part of the re-levelling process. This technology has been extensively tested in the ['Red Zone' trials](#), in partnership with the Earthquake Commission and the Ministry of Business, Innovation and Employment, with very consistent and positive results. It was also successfully implemented at the [Northwood Supa Centa](#). Mainmark's Liquefaction Mitigation process is the only known solution on the market that can be applied beneath an existing structure.

Signed,



Signed

Russell Deller, GM Mainmark NZ

Name & Title

14th December 2016

Date

About Mainmark

Mainmark provides a range of specialist ground engineering and asset preservation solutions for residential, commercial, industrial, civil infrastructure and mining sectors. Committed to excellence, Mainmark's state-of-the-art solutions are backed by more than 20 years of engineering expertise. Mainmark has 15 regional offices across New Zealand, Australia, Thailand and Japan. www.mainmark.com