



AGS QLD TECHNICAL PRESENTATION

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GEOTECHNICAL DESIGN INNOVATIONS FROM THE WAIKATO EXPRESSWAY PROJECT

Presented by Mark Argent

This technical presentation will provide details of the geotechnical challenges faced by the major New Zealand based project and innovations developed in response to these challenges.

Abstract

The Hamilton Section of the Waikato Expressway in New Zealand is being delivered by the City Edge Alliance and has just completed its second earthworks season. The project involves the construction of approximately 22km of expressway standard roadway with 17 grade separated bridges and five major interchanges. Mark was the earthworks design lead for this large infrastructure project which has numerous geotechnical challenges including sensitive volcanic ash soils, liquefaction prone pumiceous sands, and soft alluvial soils. The Alliance delivery model has allowed innovative geotechnical design methods to be explored and developed which have resulted in significant project benefits. These innovations have included:

- Using paleo-liquefaction studies to demonstrate that penetration based liquefaction assessment methods (SPT, CPT) overpredict the susceptibility to seismic loading of the volcanically derived but alluvially reworked Hinuera Formation soils. The reduced risk of liquefaction based on shear wave velocity assessment methods resulted in significant ground improvement savings for the project;
- Leaving topsoil in place below fill embankments built on sensitive, volcanically derived silts and sands. Traditional concerns regarding long-term settlement and 'seeing what you are building on' were addressed through the construction of a monitored trial embankment, targeted proof rolling, in situ testing and partial stripping;
- Implementing earthworks conformance testing methods that use a line of optimums approach and shear strength measurements to overcome the challenges posed by highly variable materials. The use of the line of optimums approach was the first of its kind for a road project in New Zealand. This methodology allowed for instantaneous advice to be provided at the time of field testing rather than 3 days later when the material is buried under a further metre of fill;
- Using a light weight deflectometer to assess the conformance of sand fill against design requirements; and
- Building a 3D geological model to interface with the mass-haul planning to achieve optimum earthworks delivery.

About Mark Argent

Mark Argent was the earthworks design lead and the Construction Phase Services lead for the City Edge Alliance during the first earthworks season of the project. He has since relocated back to Australia to become CMW Geosciences' East Coast Technical Manager, where he has led CMW's involvement in major infrastructure projects such as the City Link Tulla Widening (VIC), Mernda Rail Extension (VIC), Skye Road Grade Separation (VIC), Kingsford Smith Drive (QLD), Darlington Upgrade Project (SA) and Torrens Rail Junction Project (SA). Mark is a chartered engineer whose technical expertise includes problematic soils (soft soils, expansive soils, sensitive soils), ground improvement, retention systems and earthworks for both permanent and temporary works. He has developed a reputation for finding innovative solutions to ground engineering problems that ultimately deliver his clients value. Mark is currently the deputy chair of the SA Chapter of the Australian Geomechanics Society.



07 JUN



QLD



WHEN

THURSDAY 07 JUNE 2018
5.30pm Light Refreshments
6.00pm Presentation



WHERE

TREASURY CASINO HOTEL
130 William Street,
Brisbane, QLD



COST

AGS Members: **FREE**
Non-members: **\$30**



RSVP

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EVENT CONTACT

For more information please contact David Lacey via: dlacey@foundationspecialists.com.au



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