

# Liquefaction in Whakatane: Ground truthing Geotechnical Testing with Paleo-liquefaction Investigations



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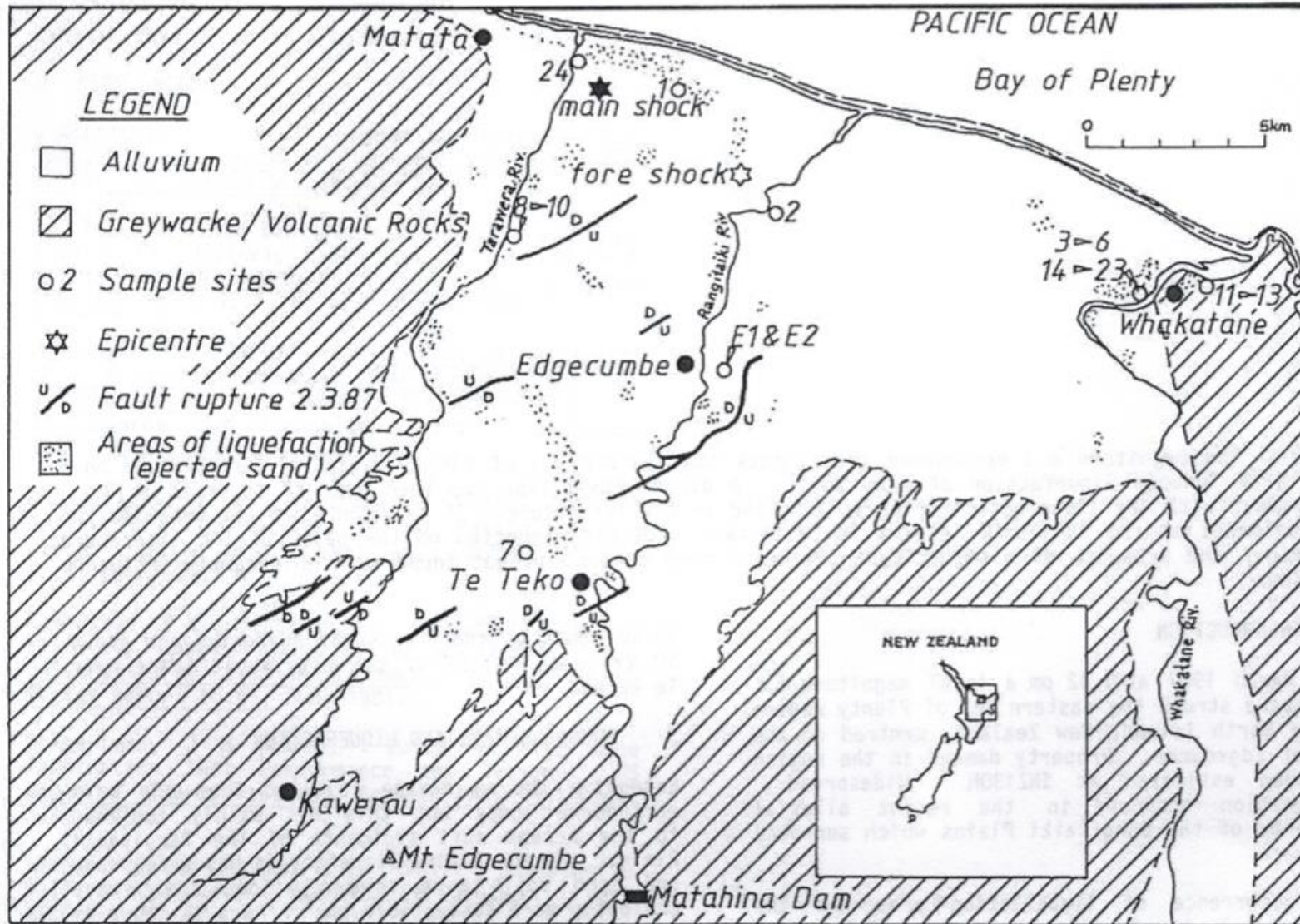
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QuakeCoRE  
NZ Centre for Earthquake Resilience

# The 1987 Edgecumbe earthquake



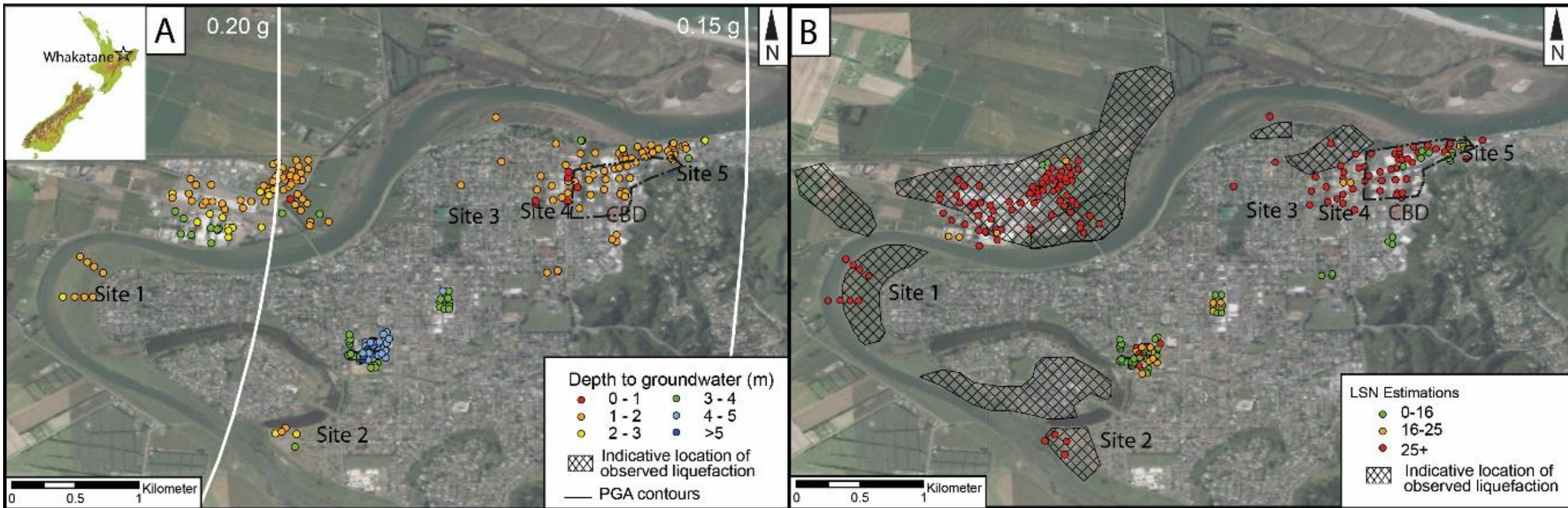
- MM 9;  $M_L$  6.1,  $M_W$  6.5,  $M_S$  6.6
- Localised liquefaction and lateral spreading across the Rangitiki Plains in the Bay of Plenty
- Severe damage to infrastructure and lifelines, including \$NZ 10 million worth of damage to flood control and drainage schemes

Jennings, 1988

Figure 1 : Map of Epicentre Locations, Fault Traces and Areas of Liquefaction

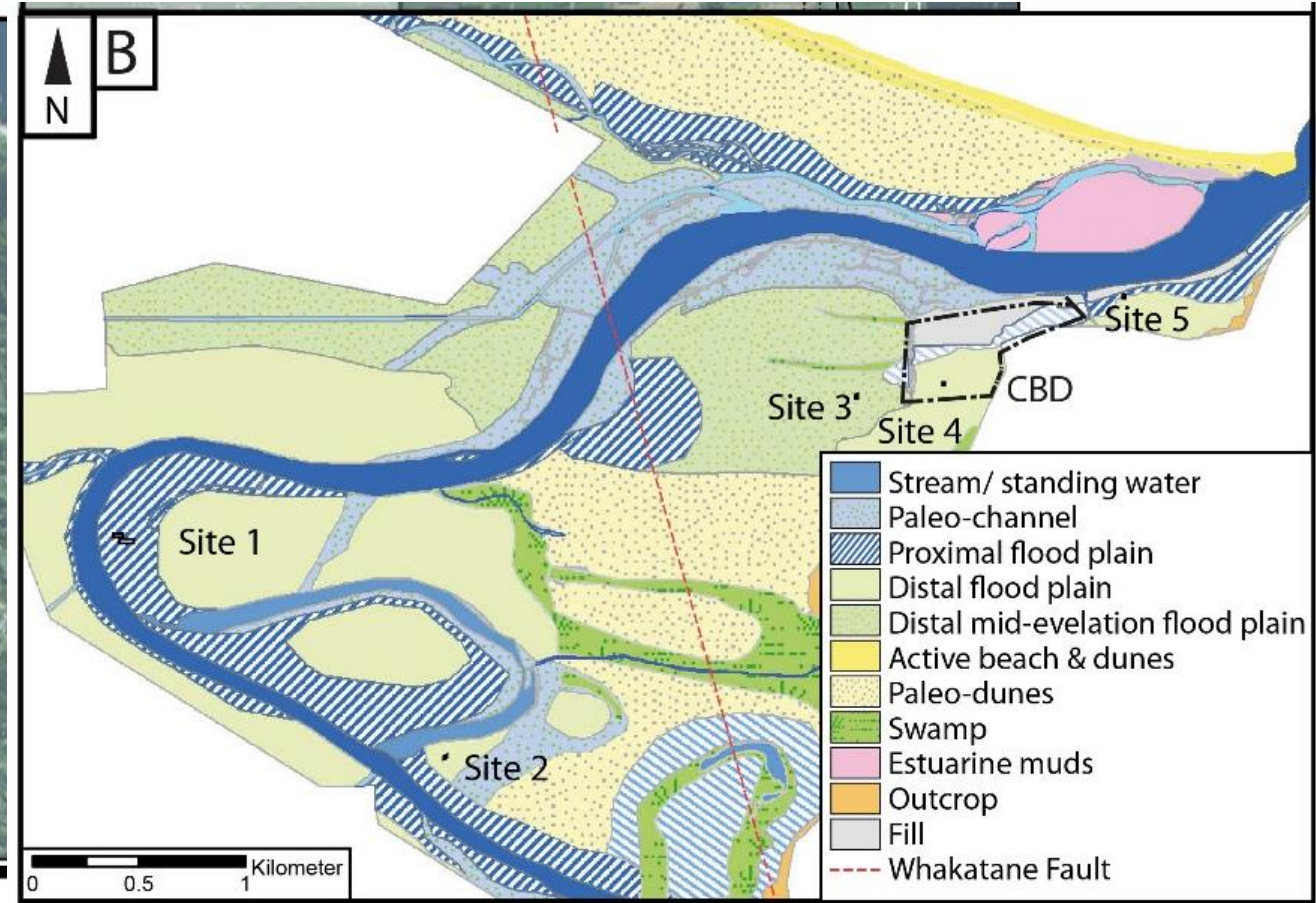
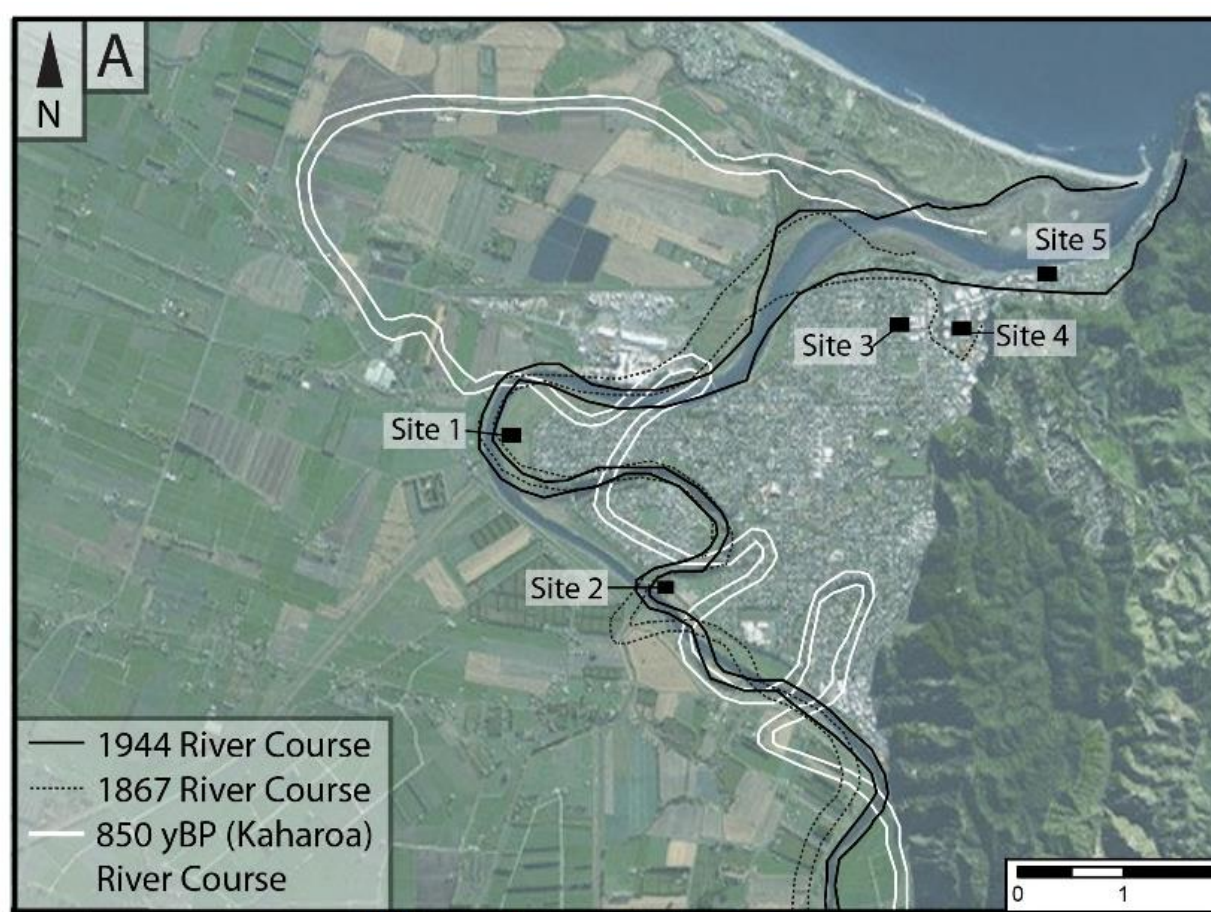


# Predicted and observed liquefaction in Whakatane

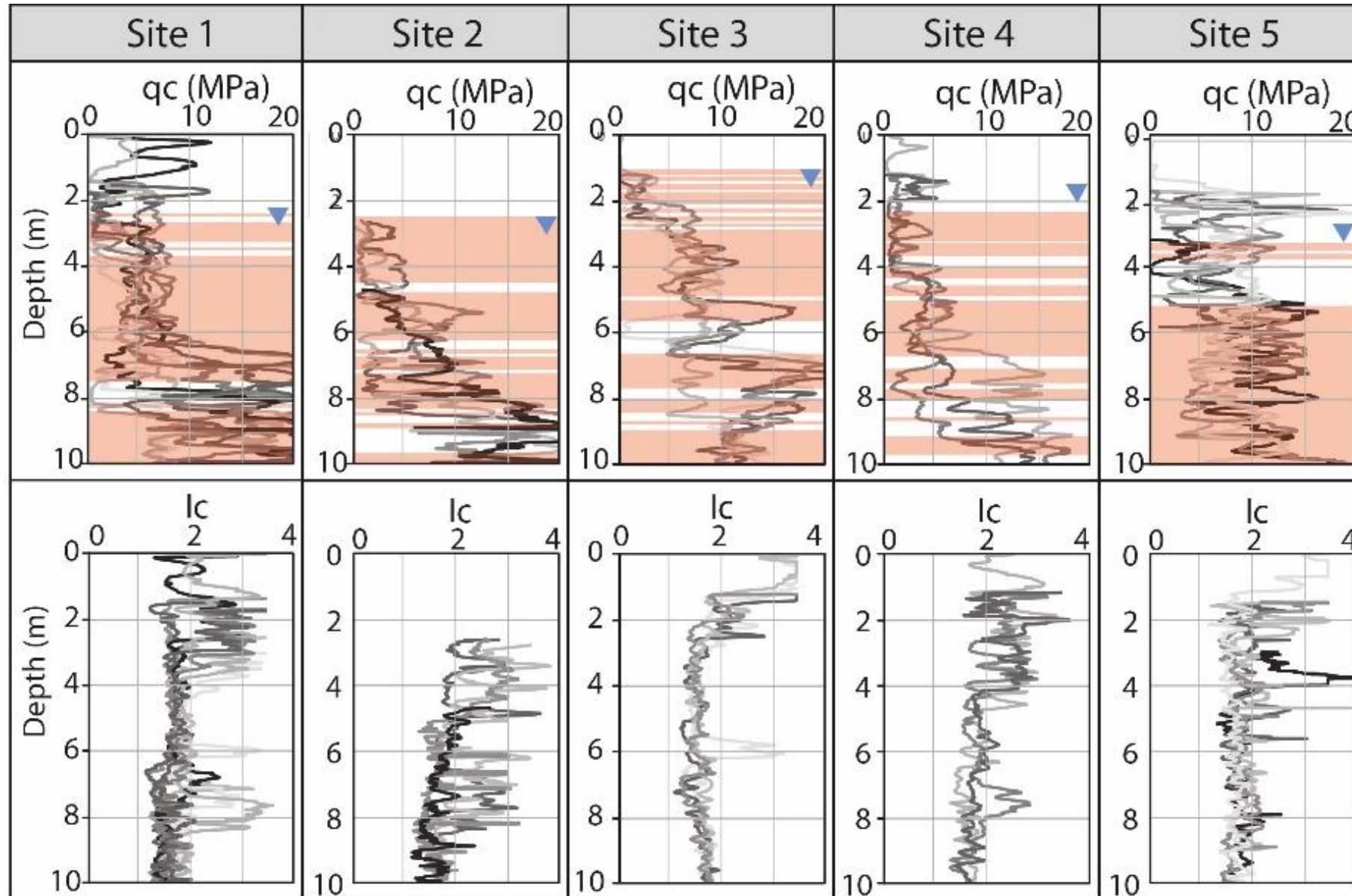




# Geomorphic setting of Whakatane

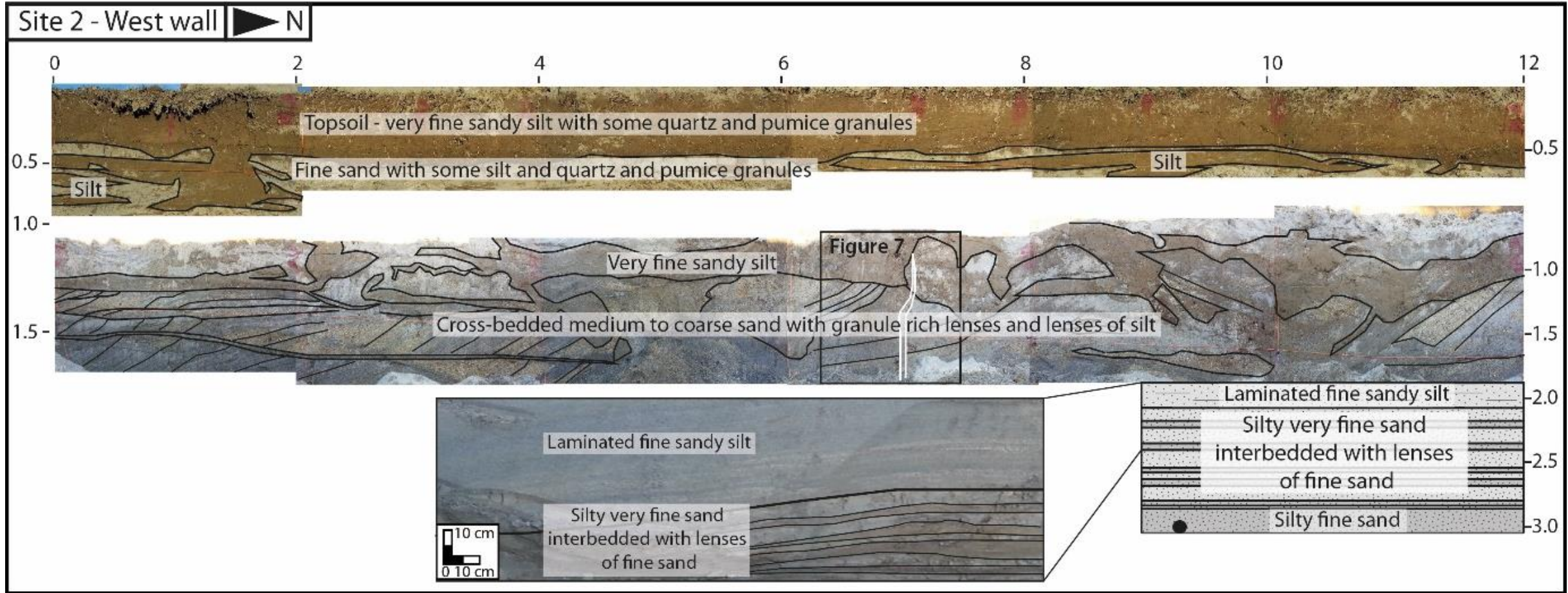


# Sub-surface characteristics of liquefaction and non-liquefaction sites



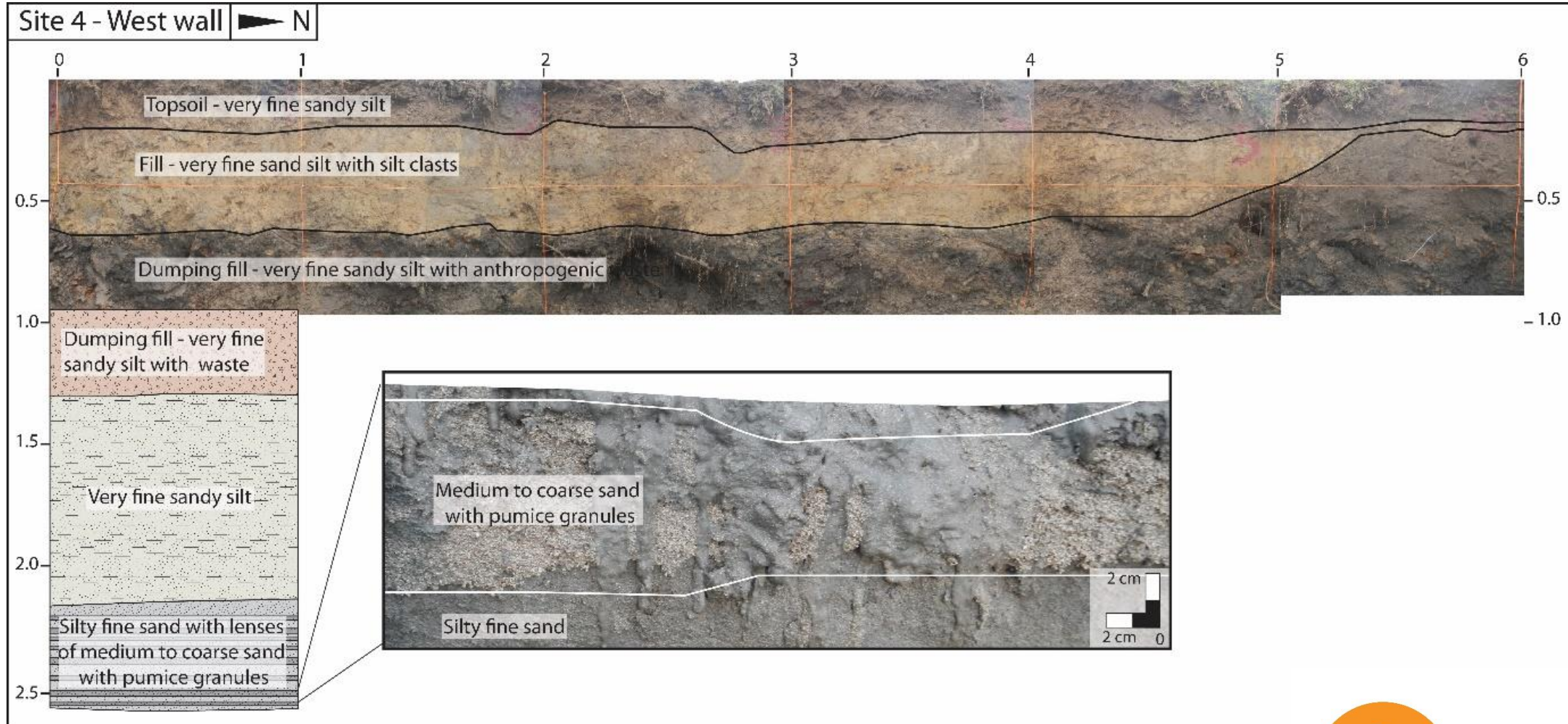


# Trenching at liquefaction sites in Whakatane



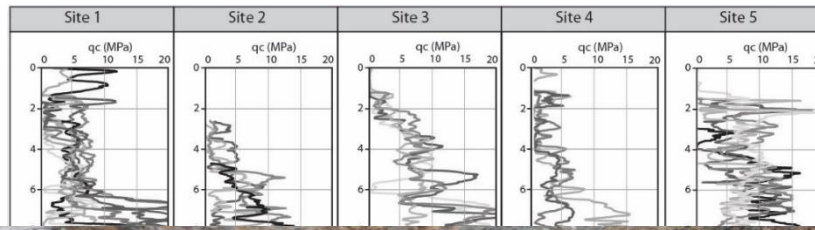


# Trenching at non-liquefaction sites in Whakatane

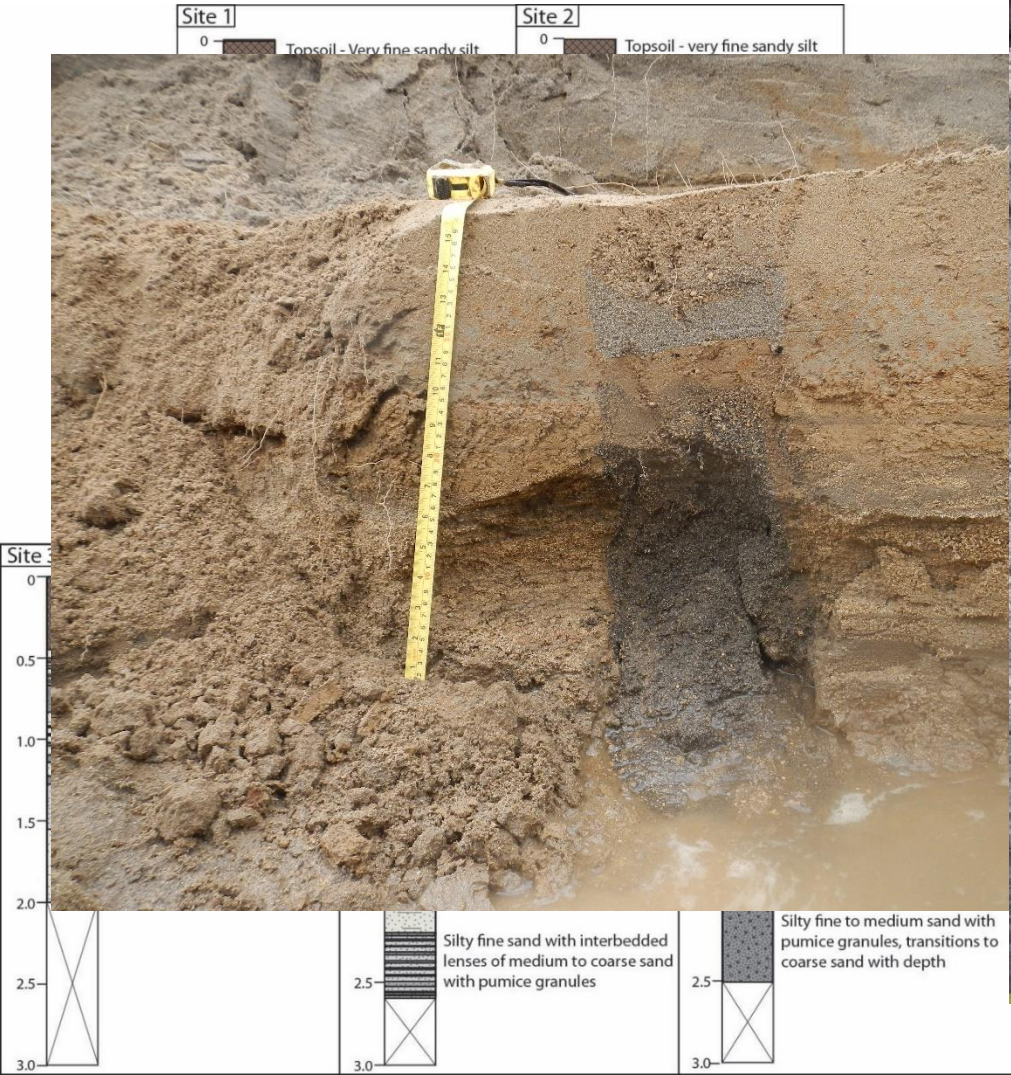




# Variability in the subsurface sediments



- Potentially liquefiable sediment at Sites 1&2 composed of fine sand and silt





# Project Outcomes, Further work, and Conclusions



- Current methods show inconsistencies between predicted and observed liquefaction
  - Potential applications of paleo-liquefaction
- **Project Outcomes**
  - Characterize the liquefaction susceptibility of Whakatane
  - Assist in the assessment of earthquake prone buildings
  - Inform future land-use development decisions
- **Further work**
  - Grainsize analysis of samples from trenches
  - Detailed geotechnical and laboratory characterization of subsurface sediments
  - Examine influence of pumice granules