

# Nelson-Tasman Dynamic Site Characterisation Study

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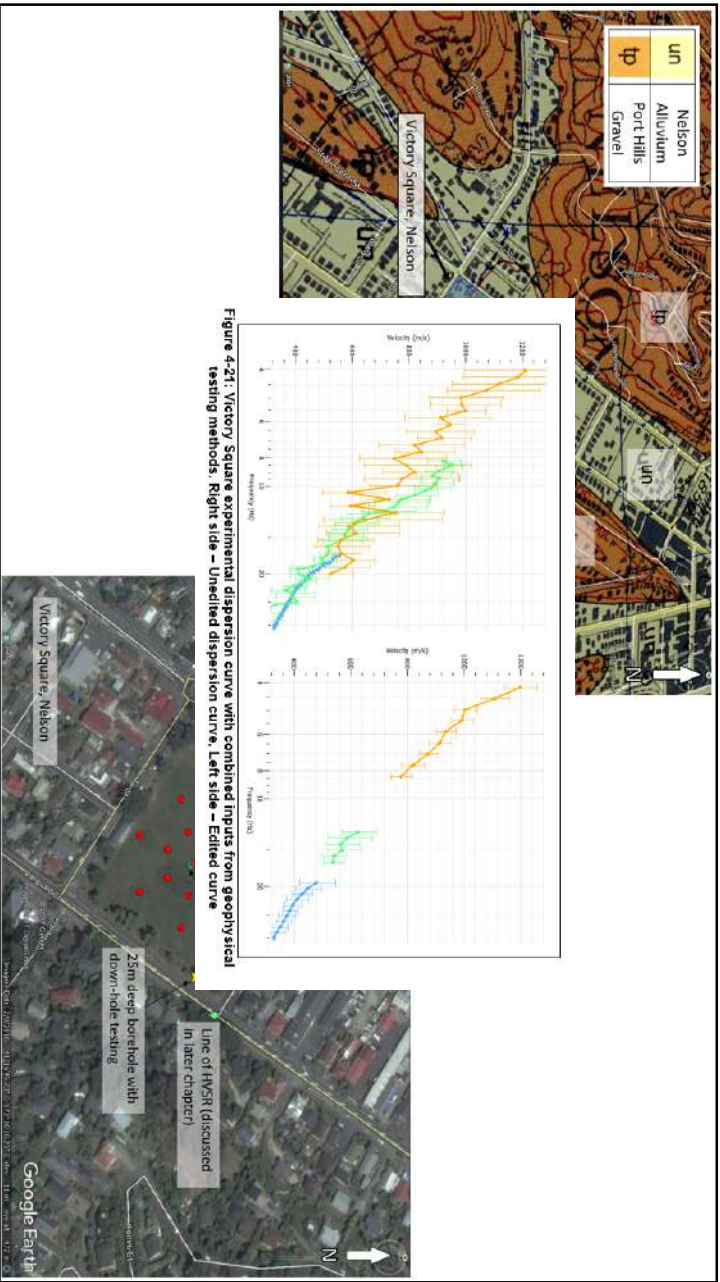
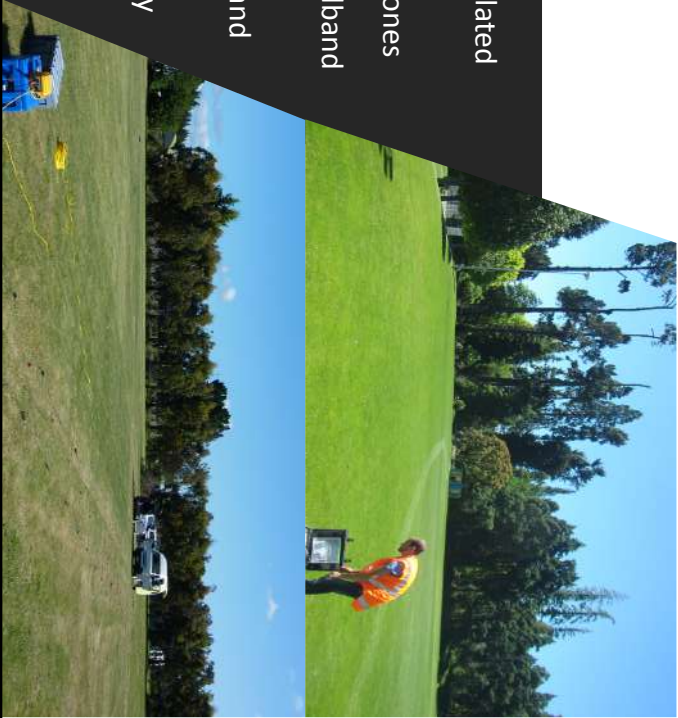
## Aim of the Nelson-Tasman Dynamic Site Characterisation Study

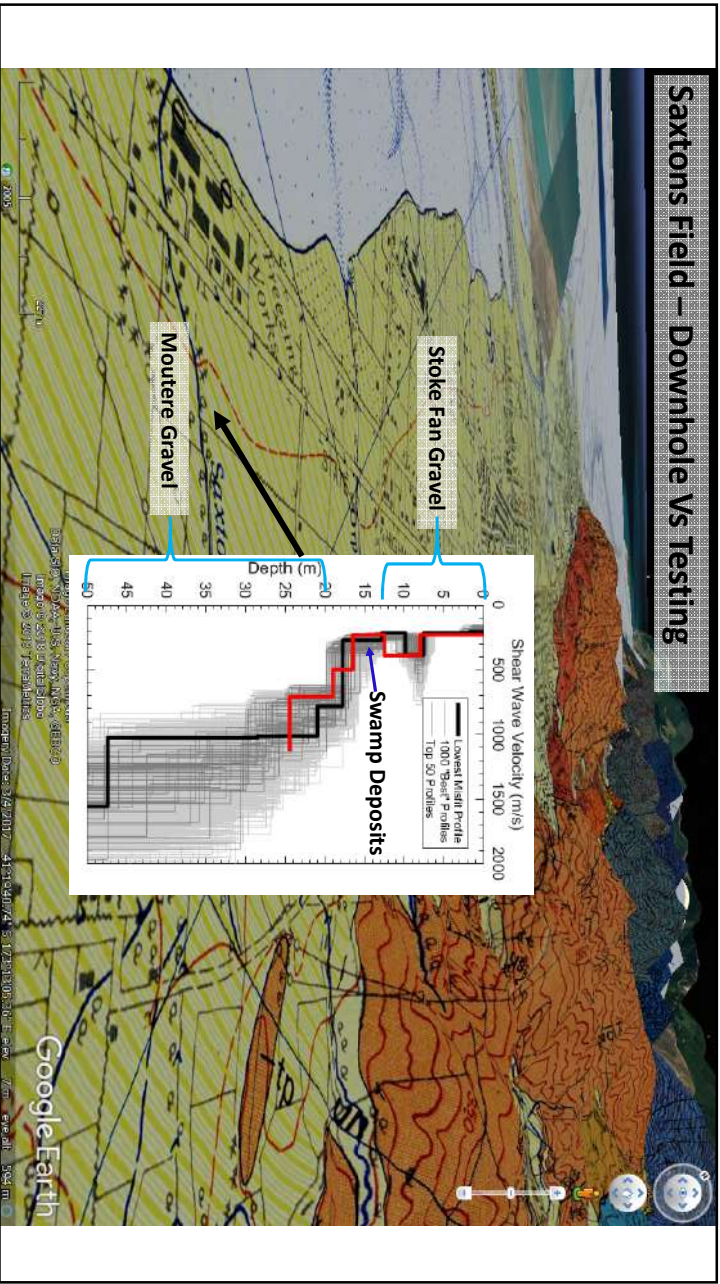
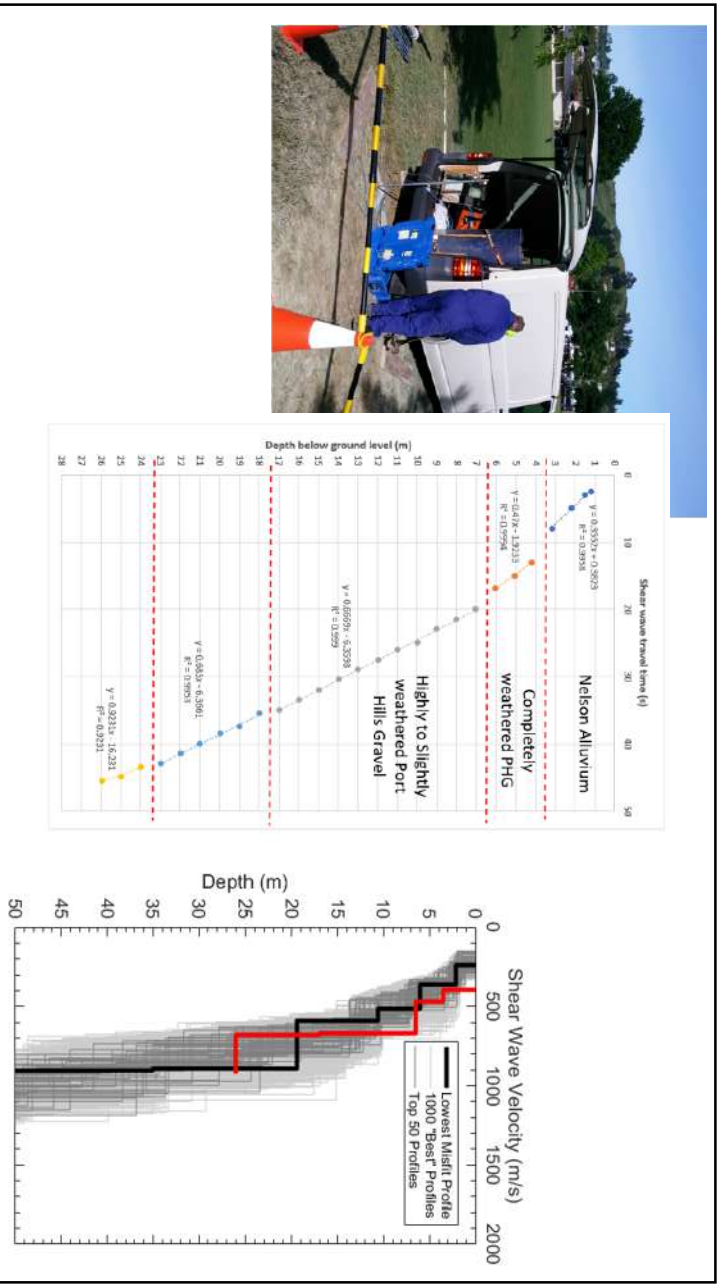
- Define geotechnical dynamic site characteristics across the Nelson-Tasman region
- Collect and interpret geotechnical and geophysical data
- Develop maps of subsoil characterisation metrics

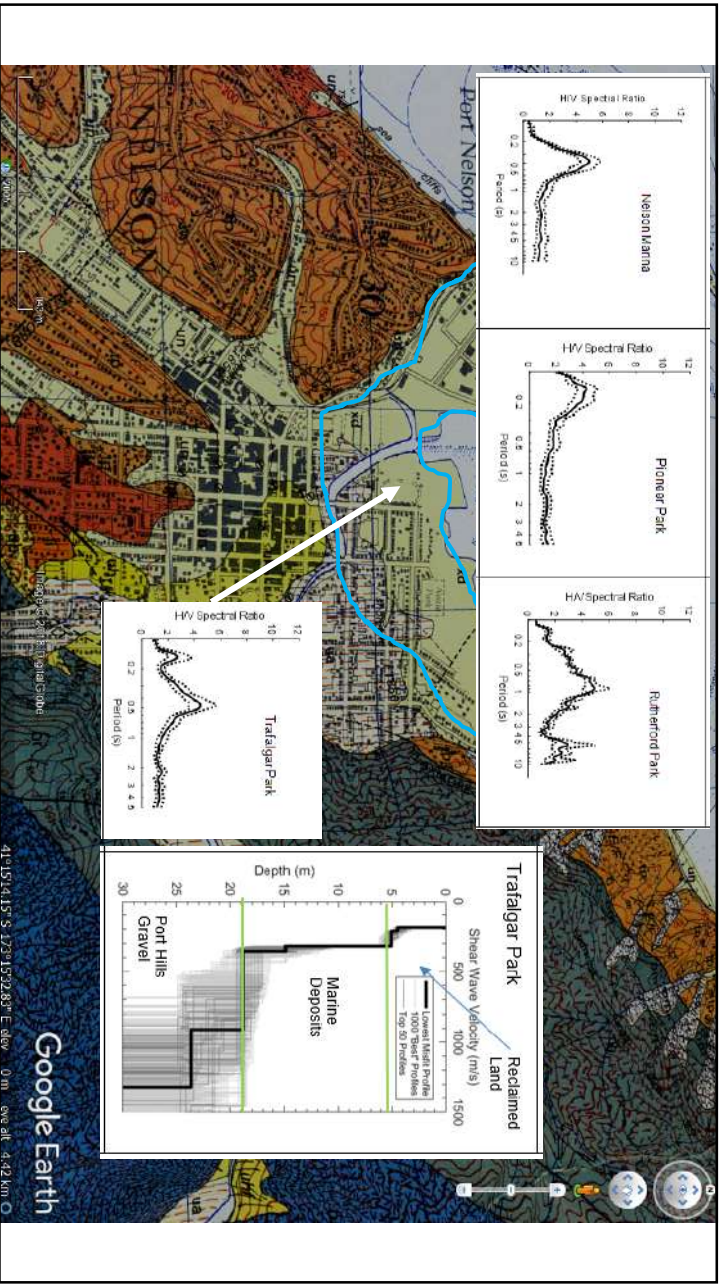


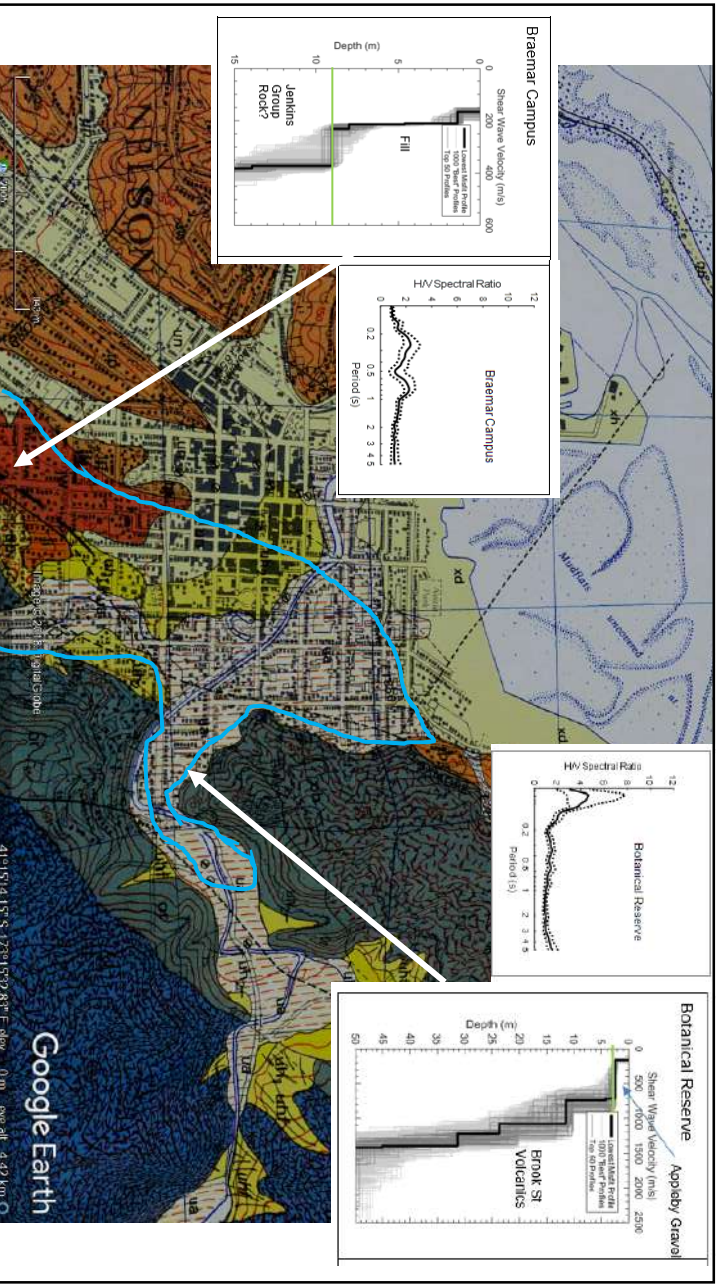
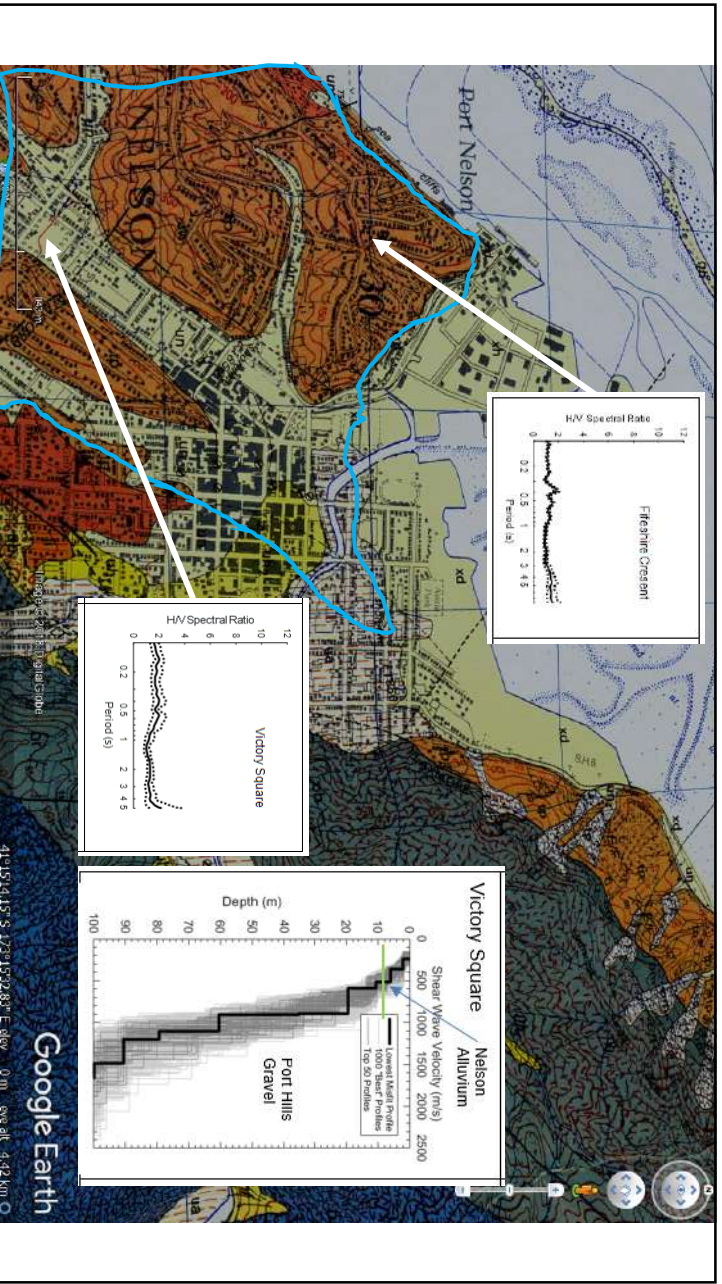
# Data Collection

- Factual geotechnical information collated in database (uploaded to NZGD)
- 1D and 2D array testing with geophones
- 1D H/V Ratio Measurements – Broadband seismometers
- 2D Large Circular Arrays – Broadband seismometers
- Downhole shear wave testing (by Sutherland Consulting Ltd)









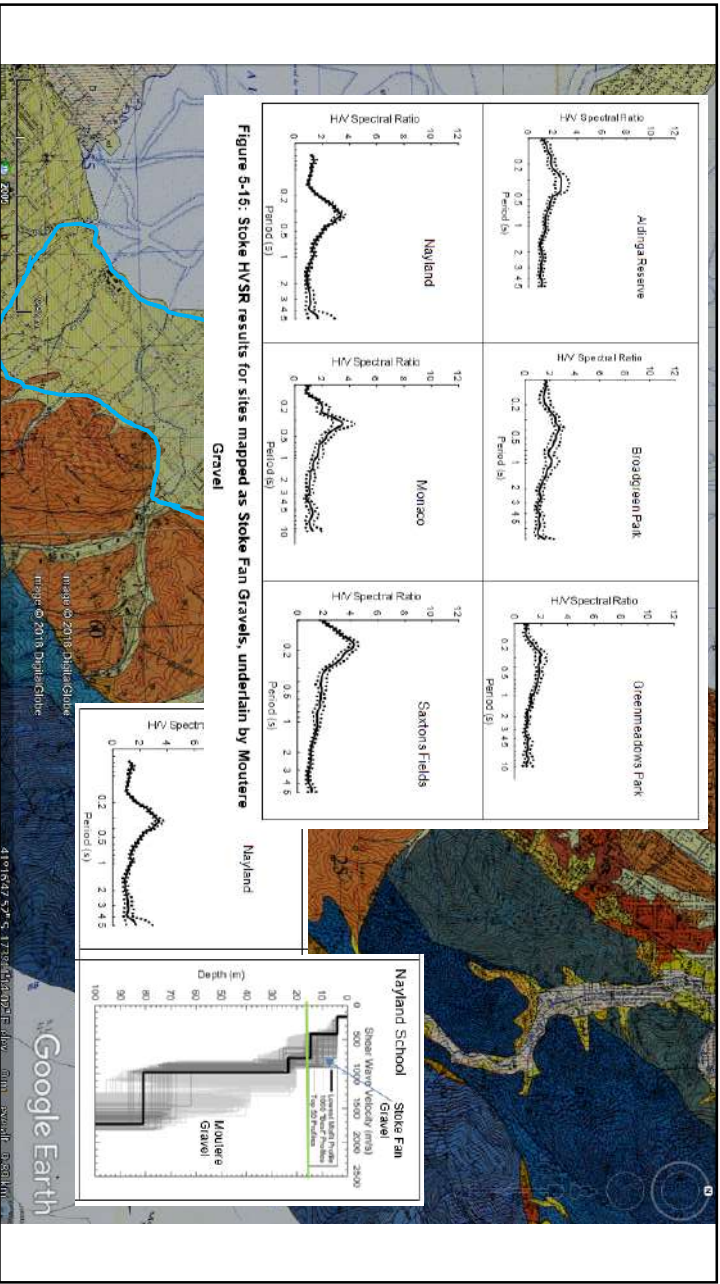
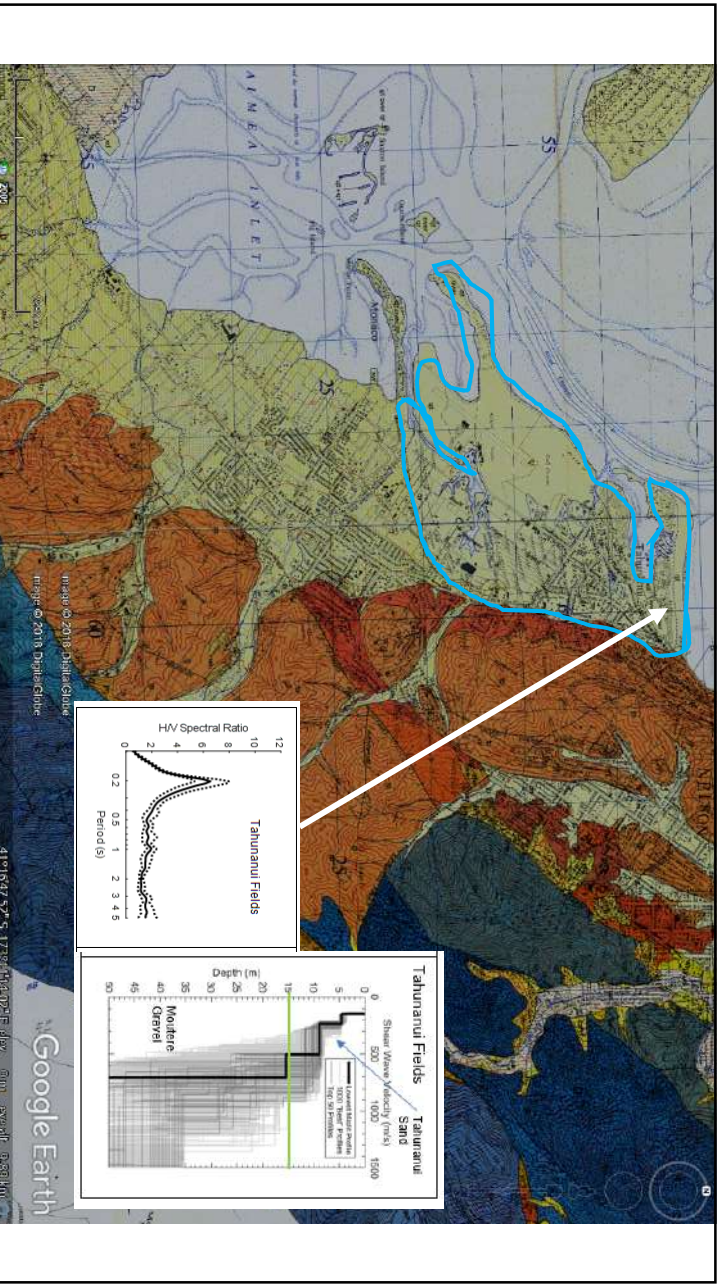
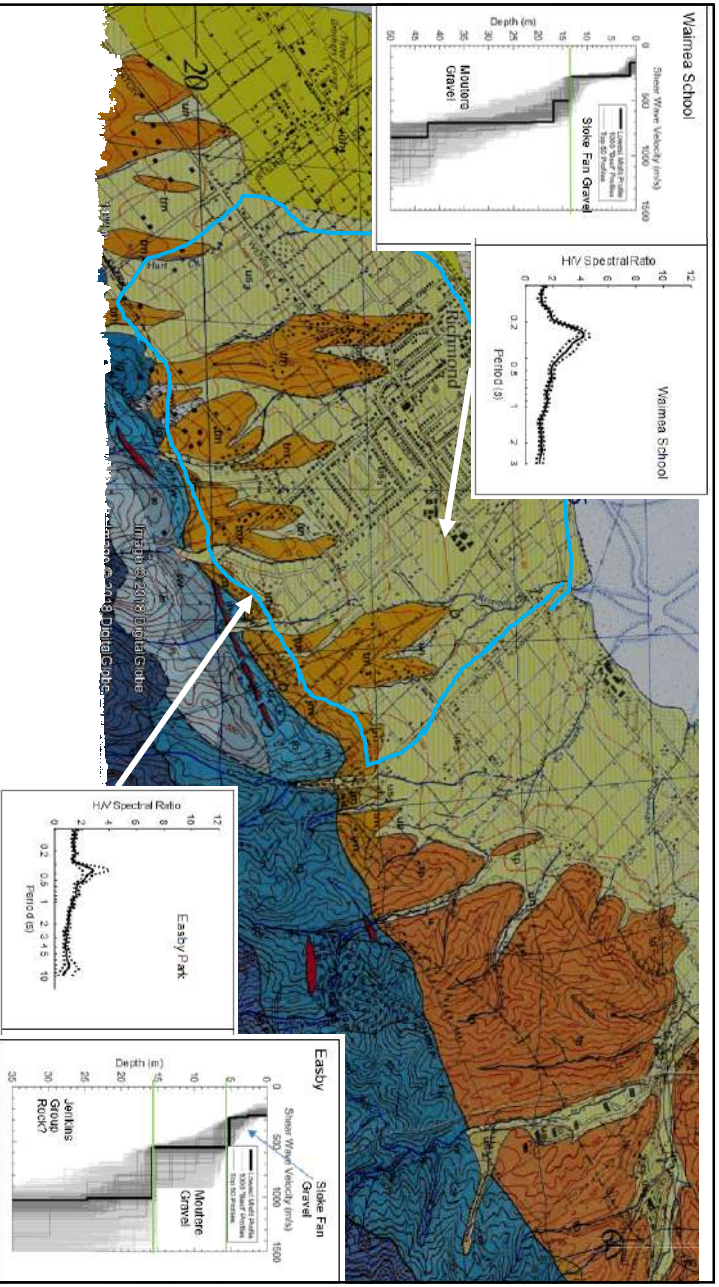
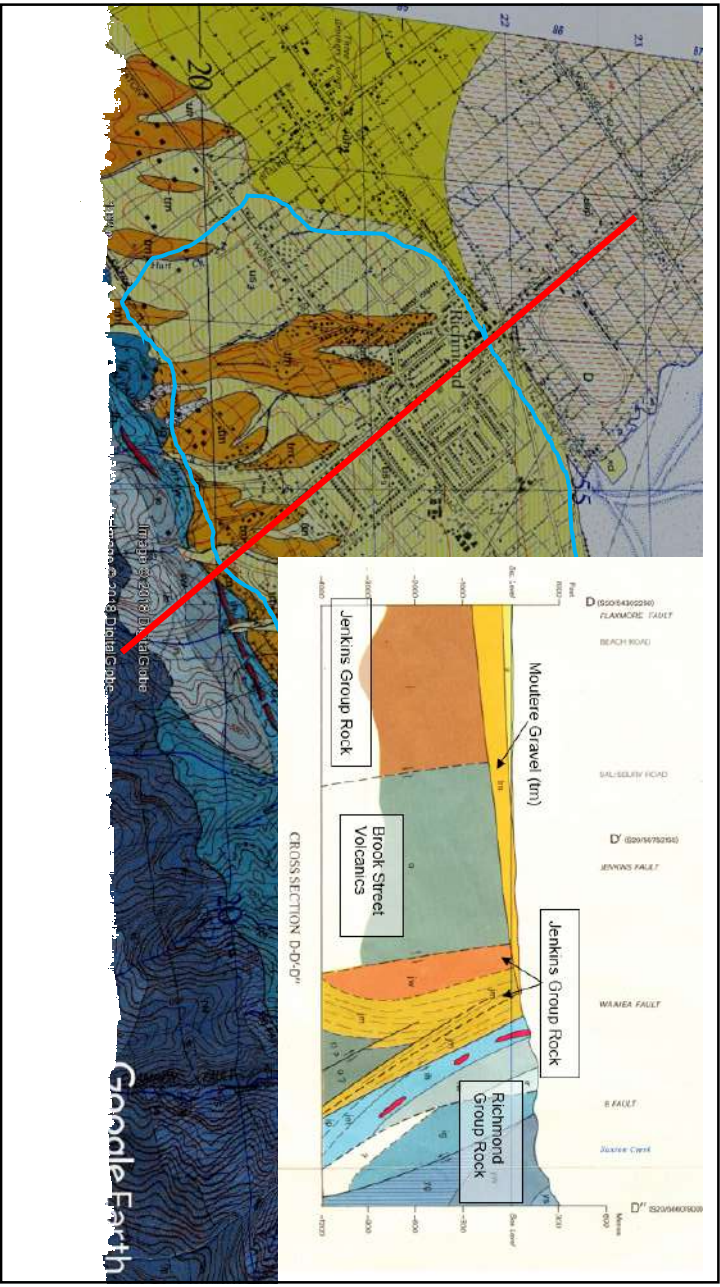
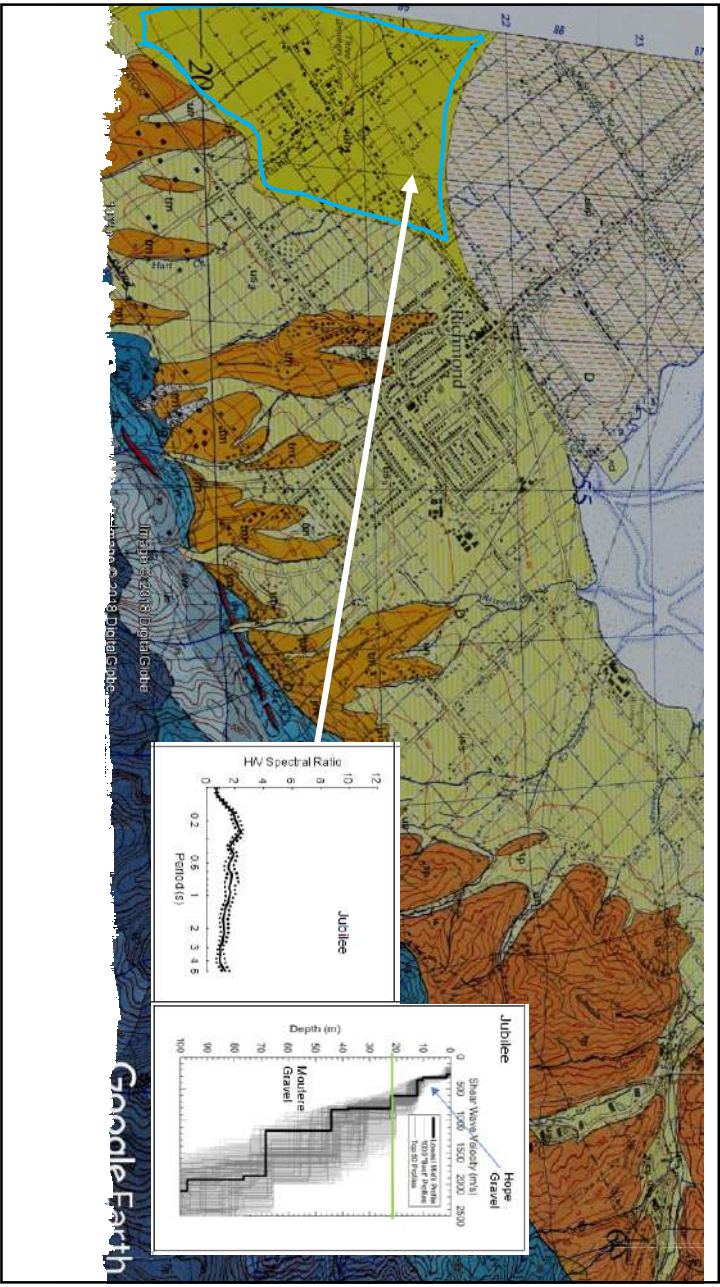
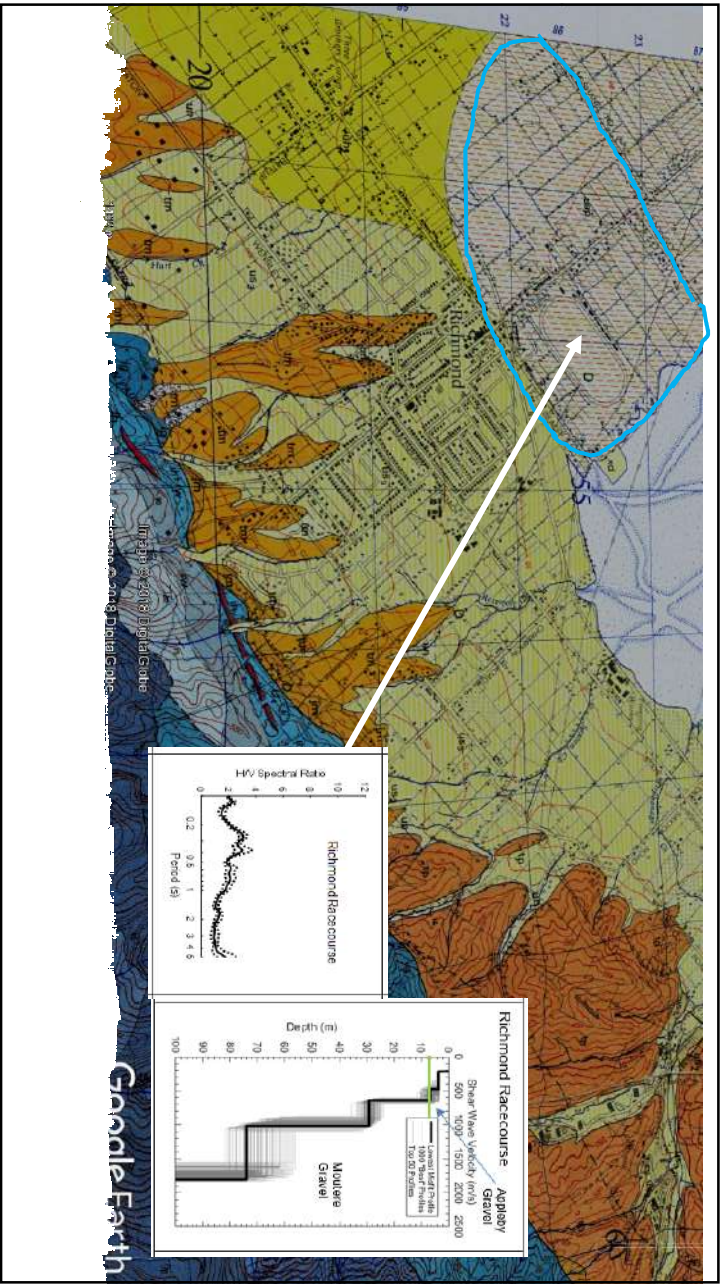
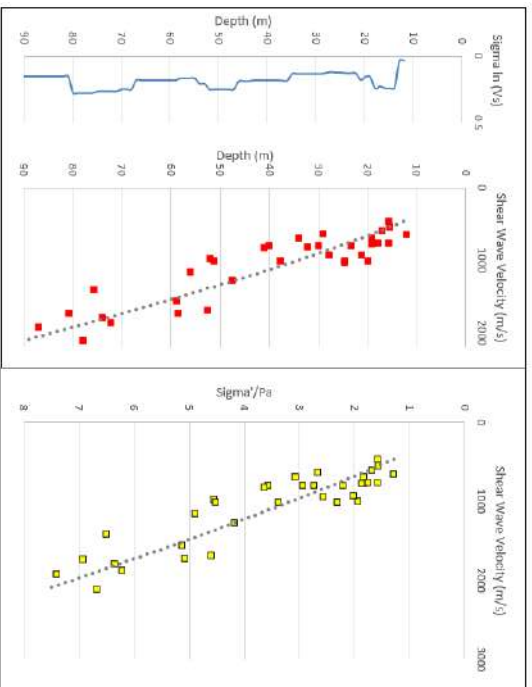


Figure 5-16: Stoke HVSr results for sites mapped as Stoke Fan Gravels, underlain by Moutere Gravel









$$V_s = A_s (\sigma'_o / P_a)^{n_s}$$

Lin et al (2014)

Where:

$A_s$  = Shear wave velocity corresponding to an effective mean stress equals to 1 atm.

$n_s$  = exponent of normalised effective mean stress

$(\sigma'_o / P_a)$  = mean effective stress normalised to 1 atm

Lin, Y. C., Job, S. H., & Stokoe, K. H. (2014). Analysis of the UTexas 1 Surface Wave Dataset Using the SASW Methodology. Geo-Congress 2014, Atlanta, Georgia.

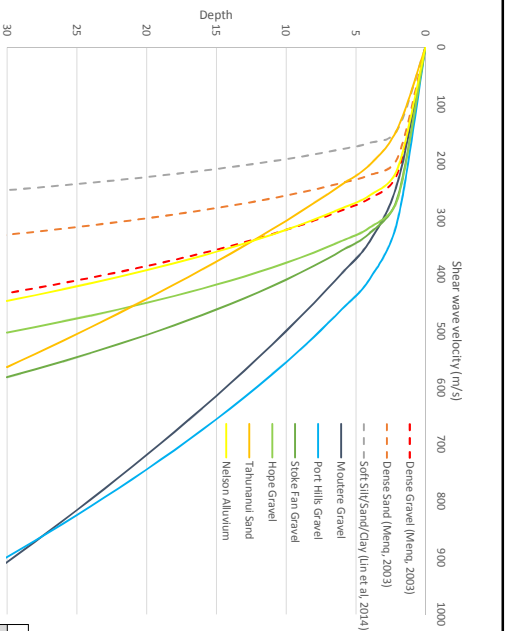
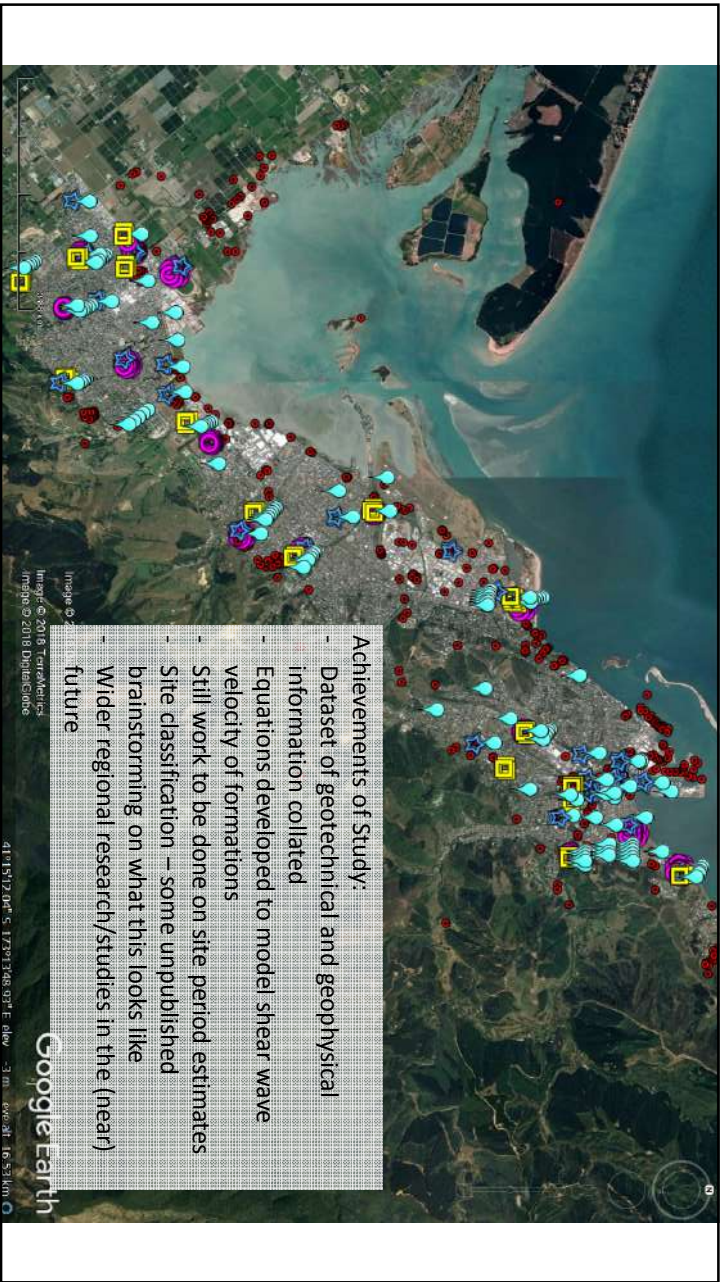


Table 6-1: Comparison of Lin et al (2014) equation coefficients to Nelson regional formations

Soil Type	$A_s$	$n_s$
Dense Gravel (Meng, 2003)	312 m/s	0.331
Dense Sand (Meng, 2003)	255 m/s	0.261
Imperial Valley Sort Sands, Silts and Clays (Lin et al., 2008)	192 m/s	0.273
Moultrie Gravel	470 m/s	0.663
Port Hill Gravel	528 m/s	0.593
Stoke Fan Gravel	395 m/s	0.390
Hope Gravel	369 m/s	0.312
Tahumani Sand (Silt/Sand/Gravel)	287 m/s	0.681
Nelson Alluvium	311 m/s	0.366



Achievements of Study:

- Dataset of geotechnical and geophysical information collated
- Equations developed to model shear wave velocity of formations
- Still work to be done on site period estimates
- Site classification – some unpublished brainstorming on what this looks like
- Wider regional research/studies in the (near) future

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Google Earth

41°15'12.04" S 172°01'34.84" E Elev: -3 m Ave. Alt: 16.53 km