QuakeCoRE
NZ Centre for Earthquake Resilience
Te Hiranga Rū

Site investigations at Wellington SMS – and – Site investigation data visualisation

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FP1 GMSV Call

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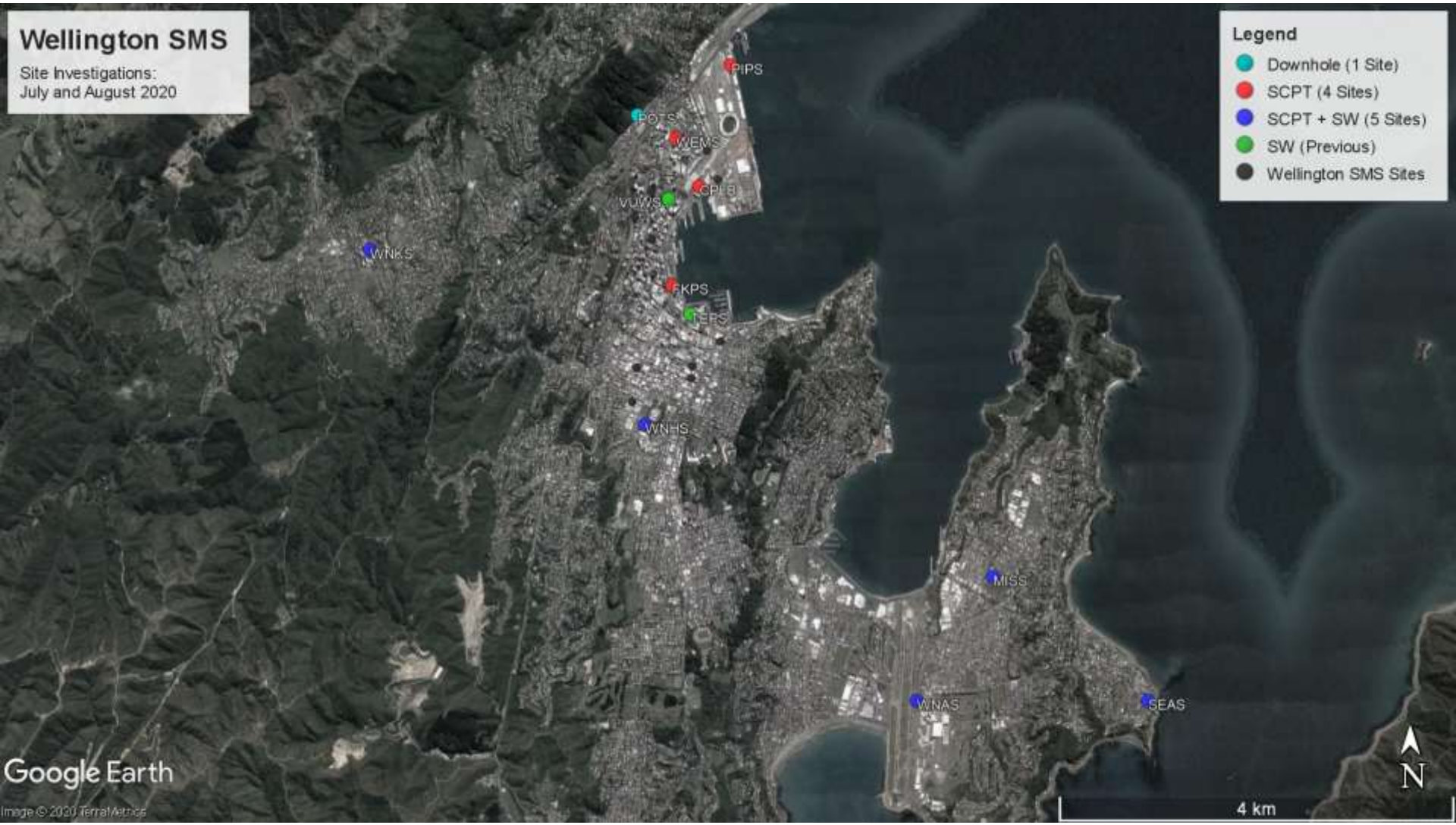
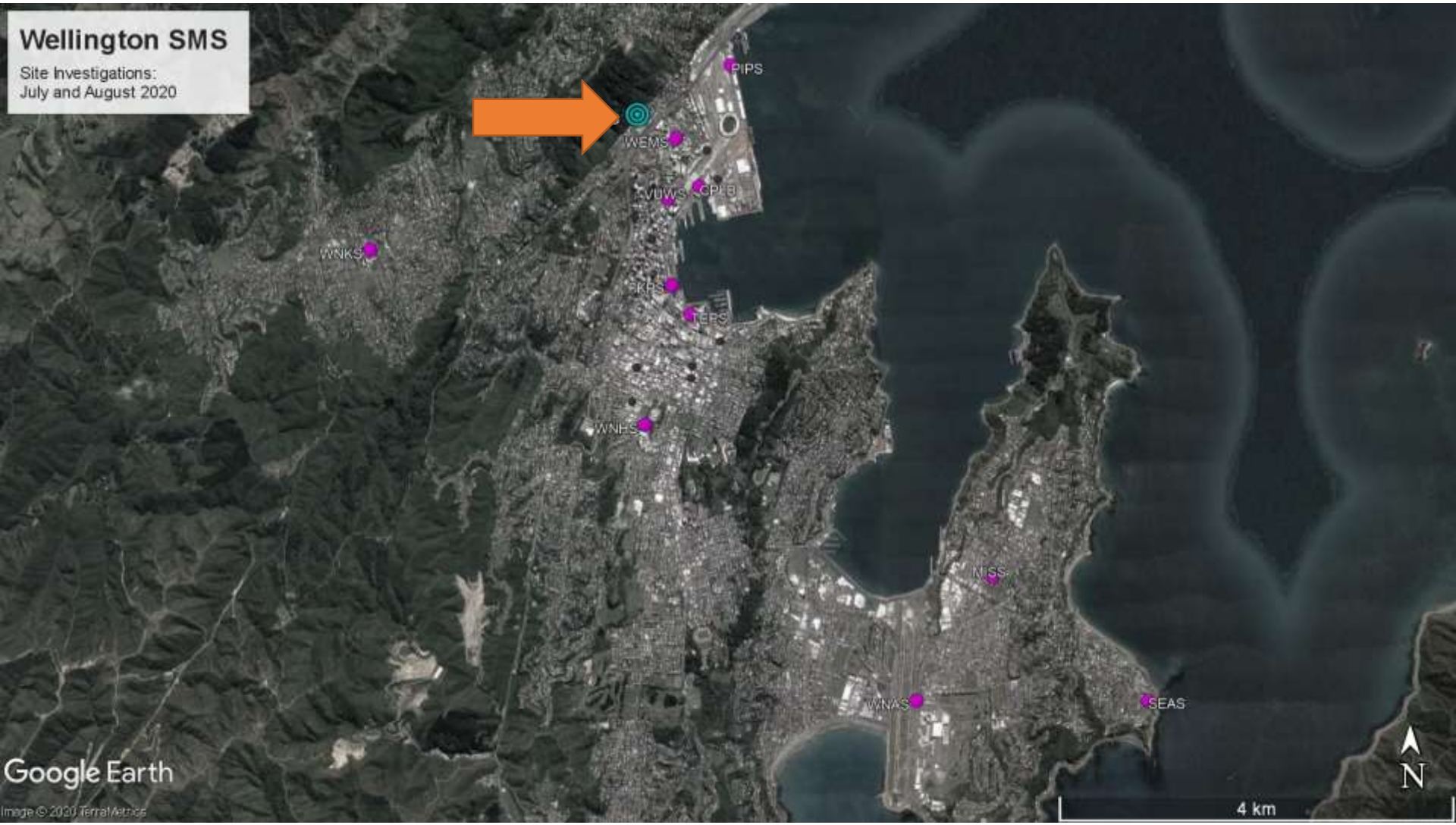
UC University of Canterbury · The University of Auckland New Zealand · Resilient Organisations · GNS Science Te Pū Ao · Massey University · Te Whare Wānanga o te Ūpoko o te Ika a Māui Victoria University of Wellington · The University of Waikato Te Whare Wānanga o Waikato · BRANZ

Recent Site Investigations



POTS: Downhole #2



POTS: Downhole

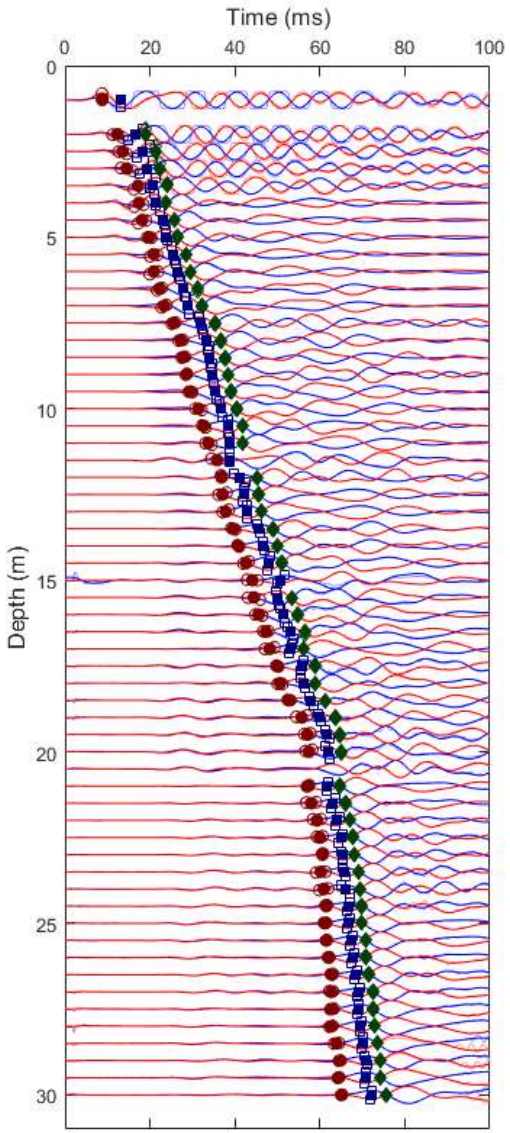
- Wellington Potters Association
- Reference “rock” site in Wellington
- 2nd borehole at site (EOH: 31.15 m)
  - 23.75 m of clayey gravel
  - 2.75 m highly-weathered Greywacke
  - Greywacke

POTS: Downhole

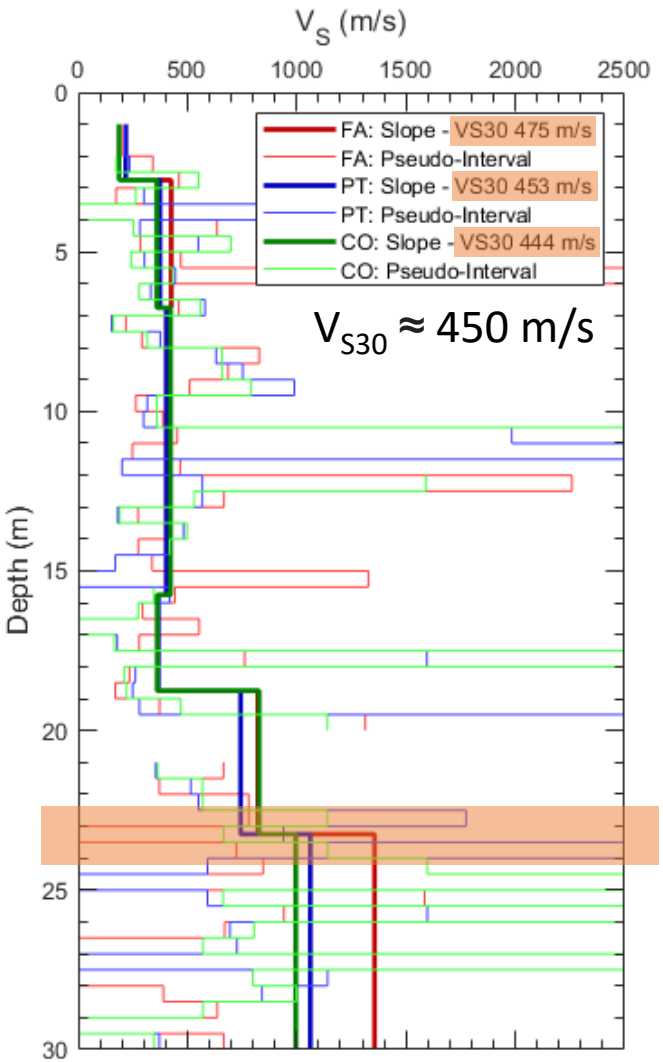
- Shear plank offset at 1.35 m
- Single 3-component receiver
- 0.5 m testing increment

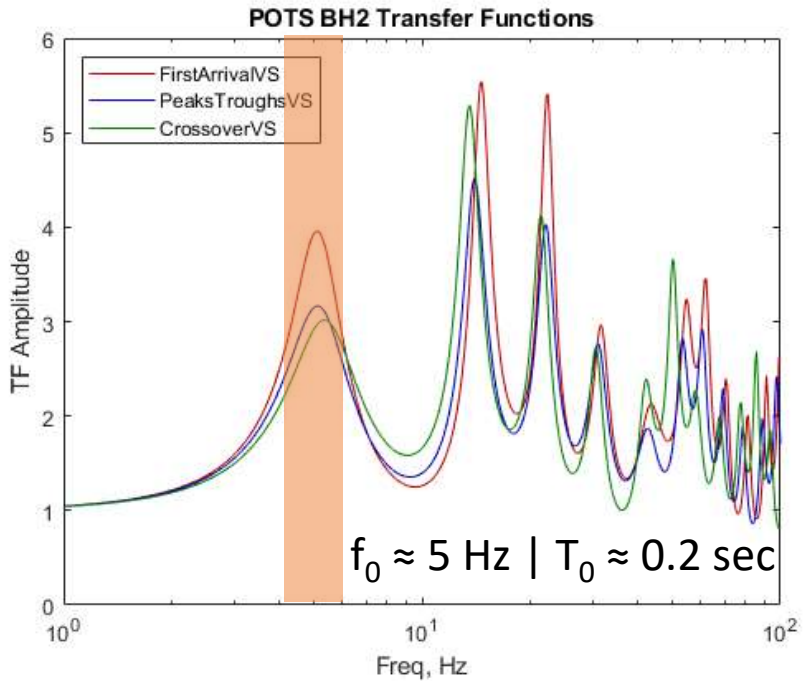
- Picks:
  - First Arrival
  - Peak/Trough
  - Crossover

- Velocity Analysis:
  - ~~Pseudo-interval method~~
  - Slope-based method



POTS: Downhole



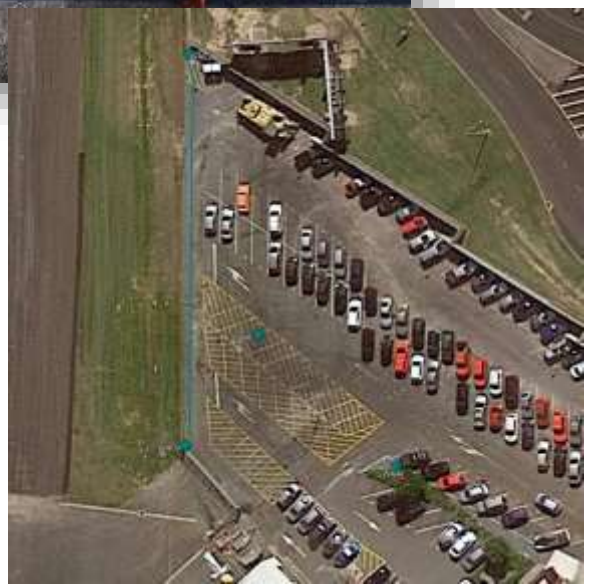


Weathered Greywacke

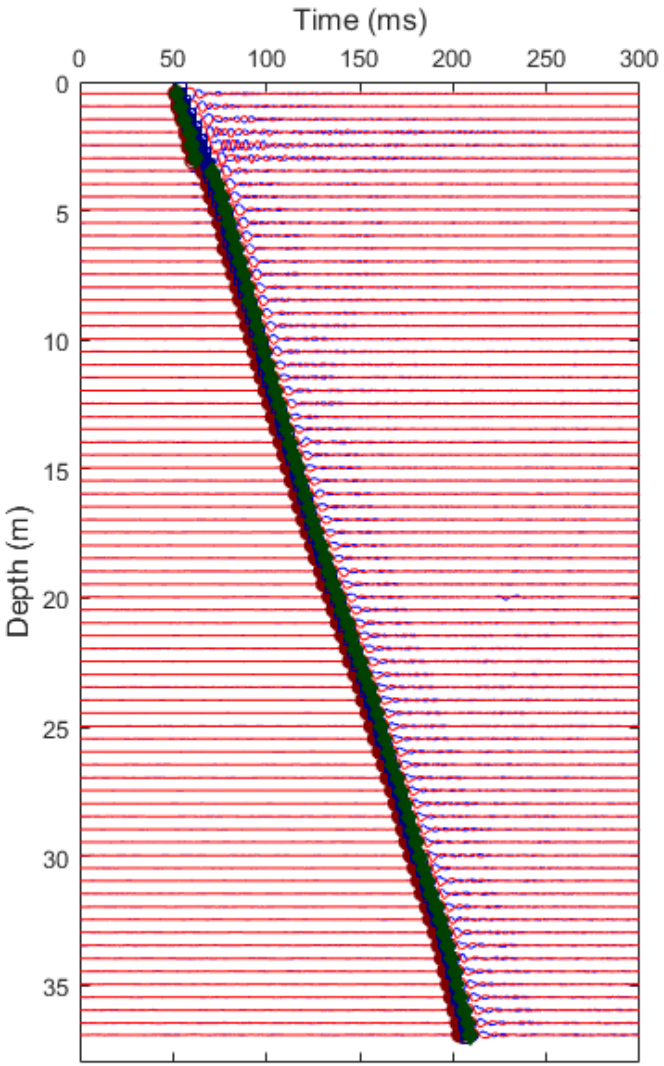
WNAS: SCPT + SW Testing

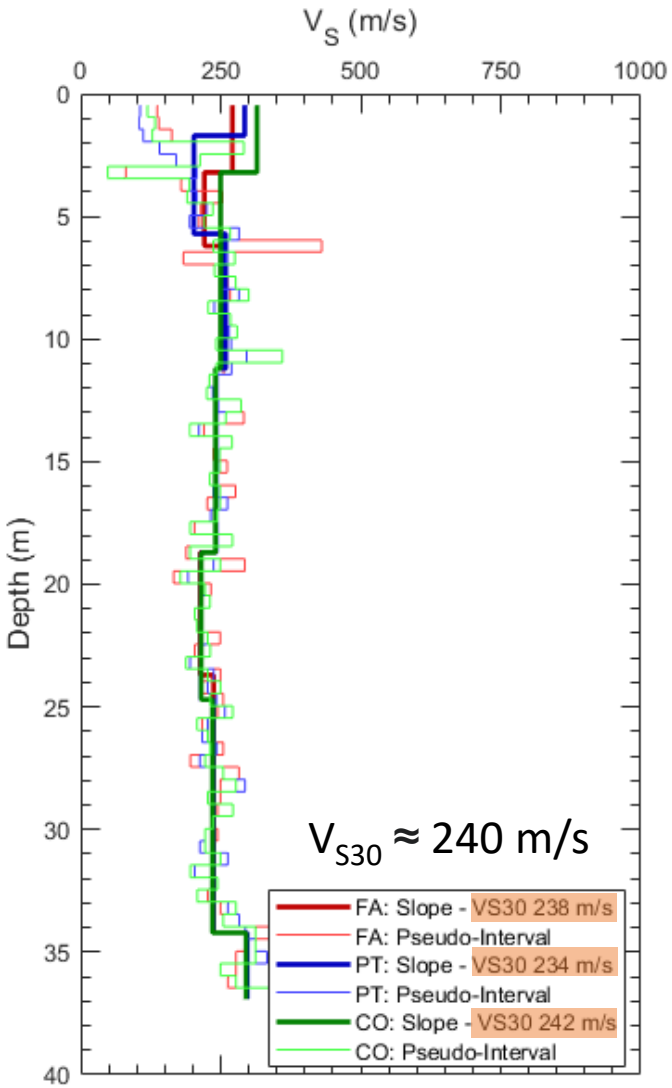
WNAS

- Wellington Airport
- Seismic CPT
  - Out of CPT rods at 37 m
- Surface wave testing
  - Active Source (MASW):
    - 24 X 4.5 Hz Vert. Geophones
    - 2-m spacing (46 m array)
  - Passive:
    - Impromptu Triangle
    - 4 Broadband Seismometers



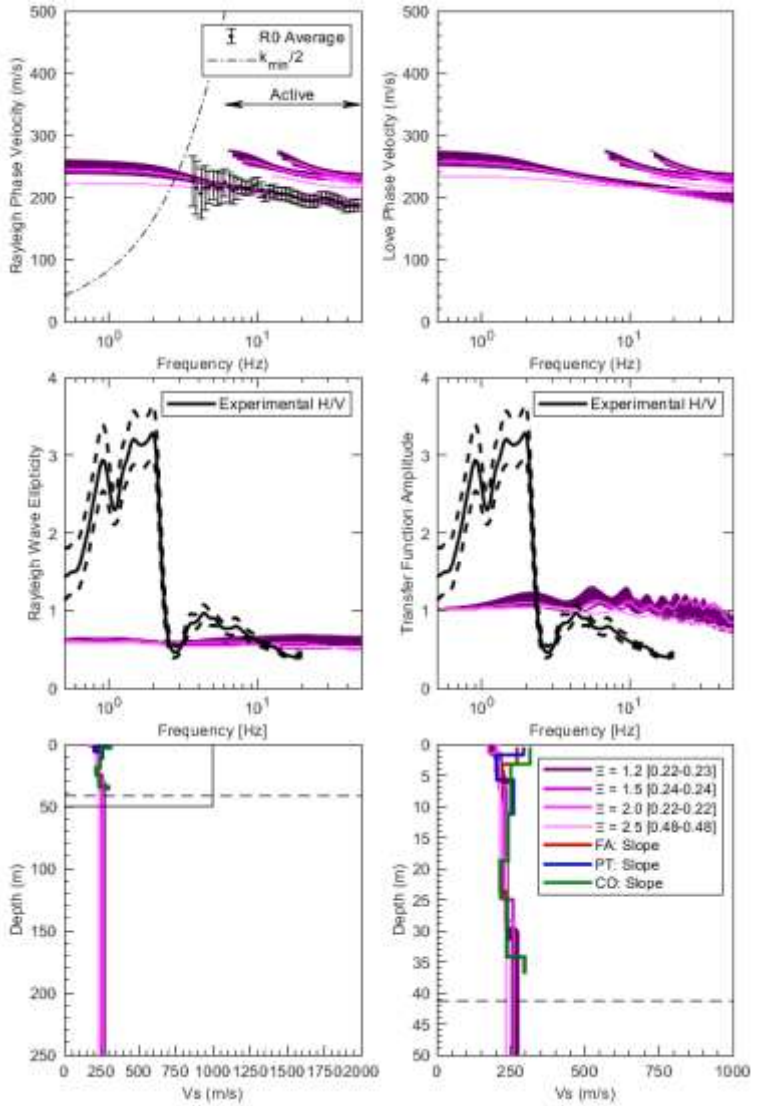
WNAS: SCPT


Time (ms)
0
50
100
150
200
250
300
Depth (m)
0
5
10
15
20
25
30
35

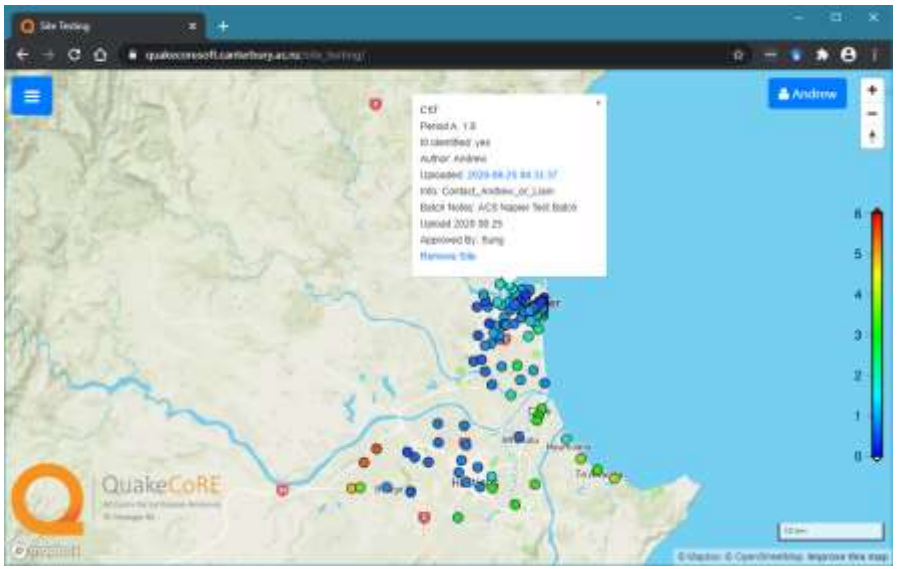

V_S (m/s)
0
250
500
750
1000
Depth (m)
0
5
10
15
20
25
30
35
40
$V_{S30} \approx 240$ m/s
FA: Slope - VS30 238 m/s
FA: Pseudo-Interval
PT: Slope - VS30 234 m/s
PT: Pseudo-Interval
CO: Slope - VS30 242 m/s
CO: Pseudo-Interval

WNAS: SW Testing

- Passive array was too small
  - Max depth is ~40 m
  - No constraint on bedrock
- Good news?!?
  - SCPT and blind inversion of SW data agree



Site Investigation Data Portal



Website to visualise seismic testing locations

- H/V test locations with site period map
- Upload points in CSV

Future work:

- Locations of V_S profiles
- Links to databases

Thanks to Viktor Polak

https://quakecoresoft.canterbury.ac.nz/site_testing/