

Hamilton Fault Research

Dr Willem de Lange & Dr Vicki Moon
School of Science



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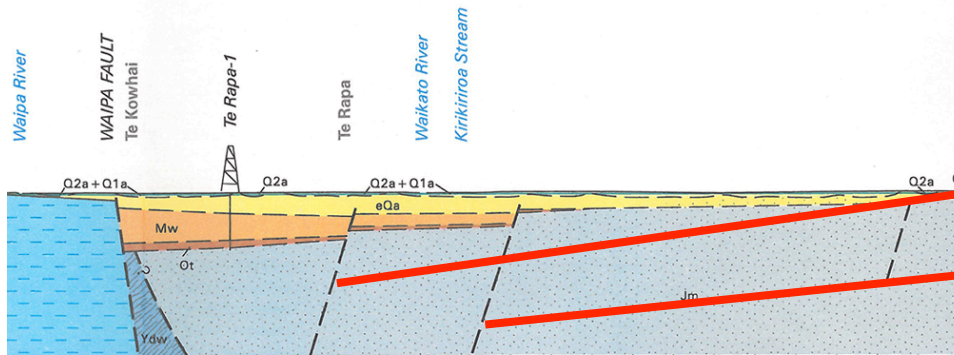
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Introduction

- We will present:
 - Summary of knowledge to date
 - Indication of immediate future work



- Greywacke basement indicates steep dip towards northwest.
 - Seismic, gravity + test wells
- Deep faults inferred
 - \approx parallel to depth contours & trends of Taupiri & Kimihia + Maungaroa Faults?
- Appear to cross Waikato River at paired right angle bends



Edbrooke, S.W., 2005. Geology of the Waikato Area, 1:250,000 Geological Map 4
Edbrooke *et al* 2009. GNS SCIENCE REPORT 2009/54

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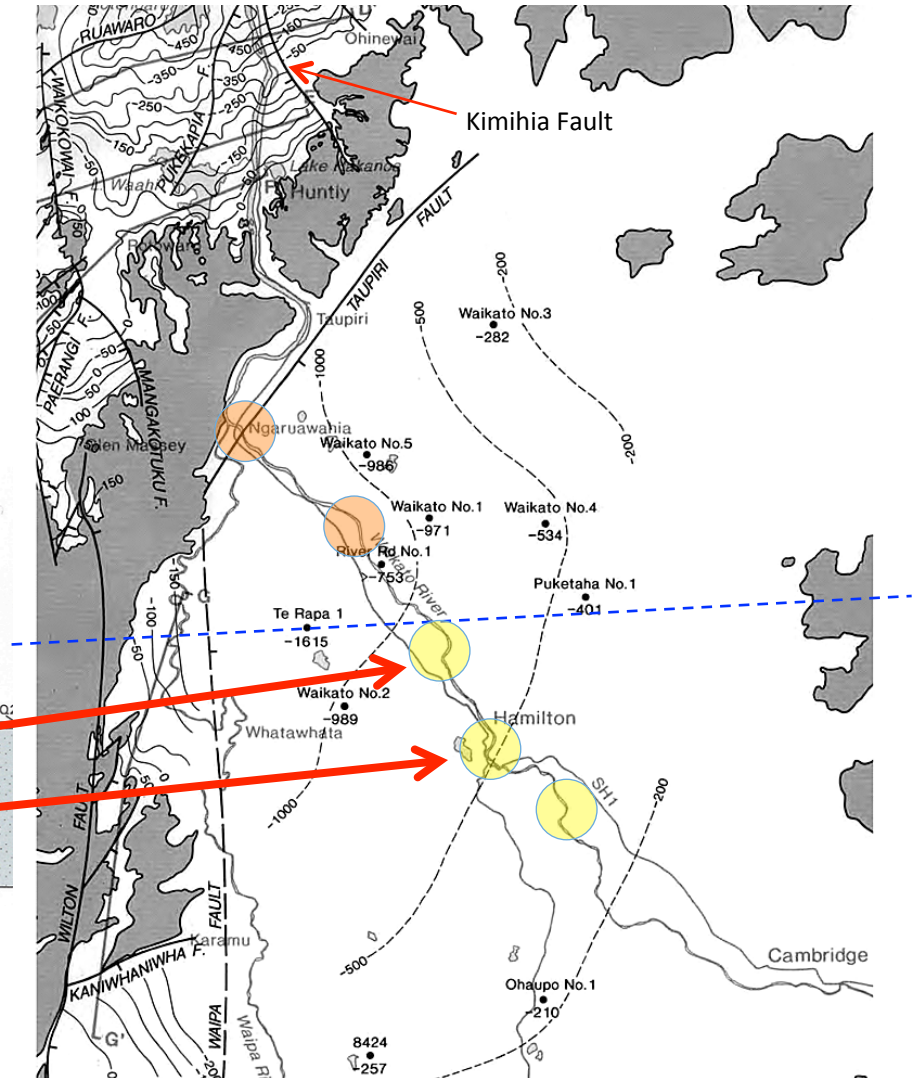


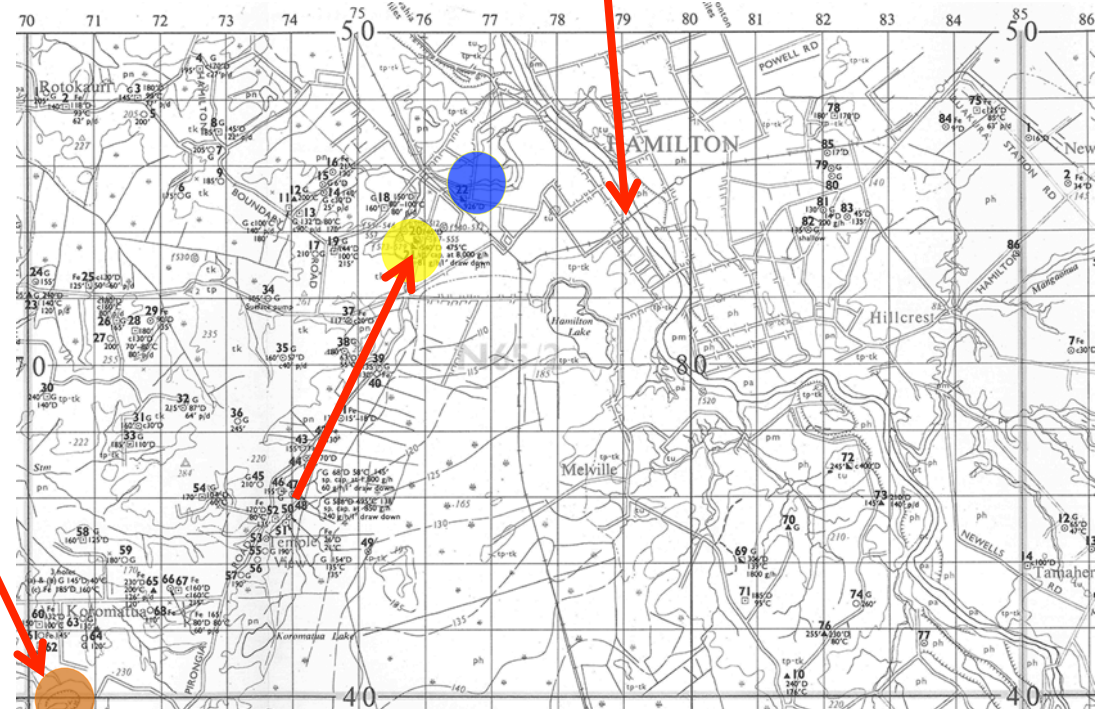
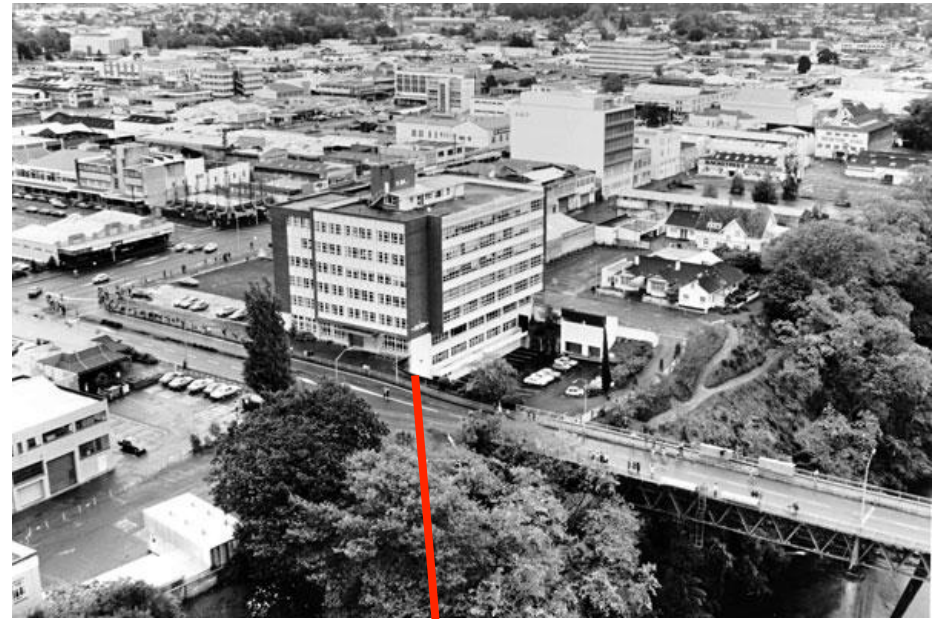
Figure 6.1. Northern Hamilton Basin with bordering basement hills (shaded), major faults and the locations of petroleum exploration wells. Approximate structure contours on basement (metres below sea level) show westward deepening towards Waipa and Taupiri faults.

Geothermal systems

- Two known geothermal systems in Hamilton Basin
 - Horotiu
 - Hamilton City
- Linear zone of geothermal bores extends from Temple View to Frankton on eastern edge of “Hamilton Hills”.
- Hottest bores located along Rifle Range Rd, near Aberfoyle Rd.
 - Used to heat a public swimming pool (now closed)
- Tangata whenua used a hot water spring in Waitawhiriwhiri gully in Maeroa.
- Rural Bank & Finance building used to be heated by a geothermal bore
- Two volcanic cones at Koromatua

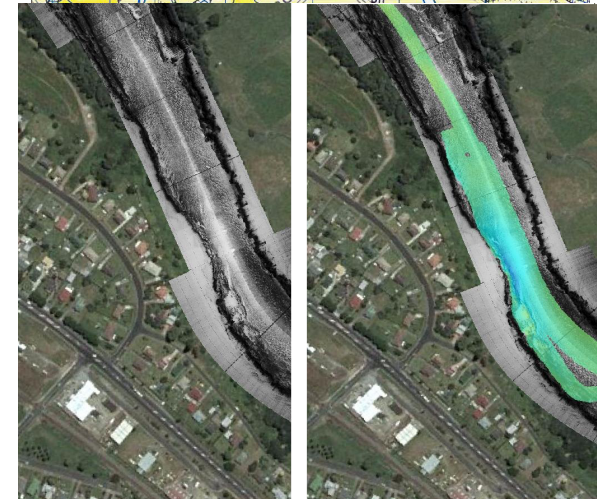
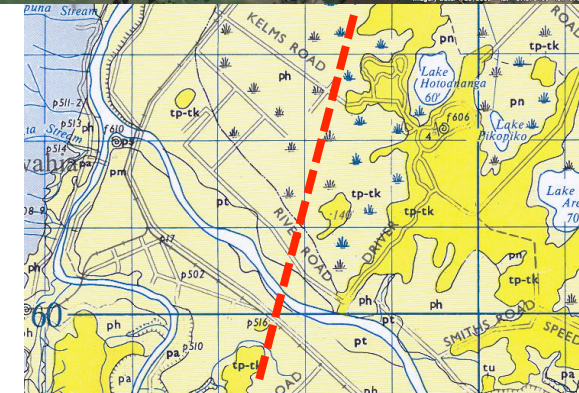
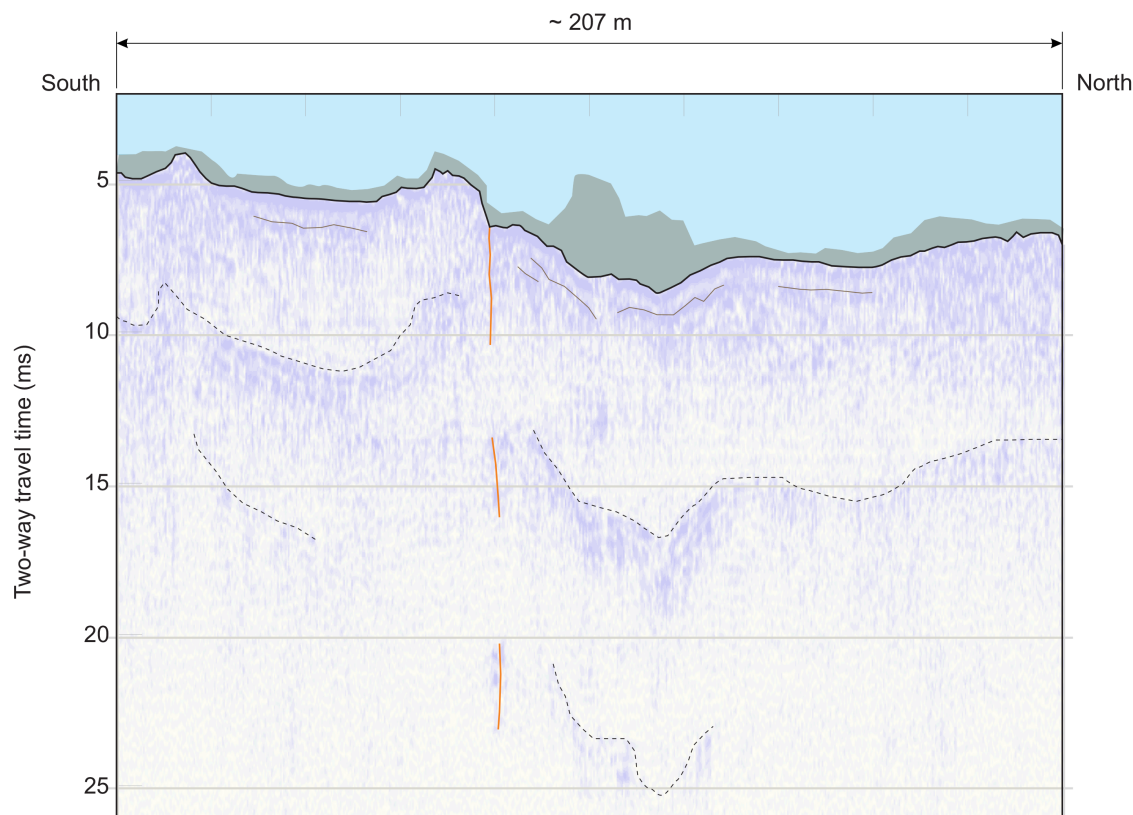
Schofield, J.C., 1972. NZGS Bulletin 89

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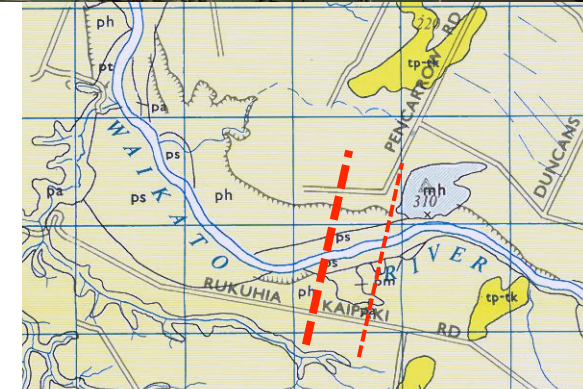
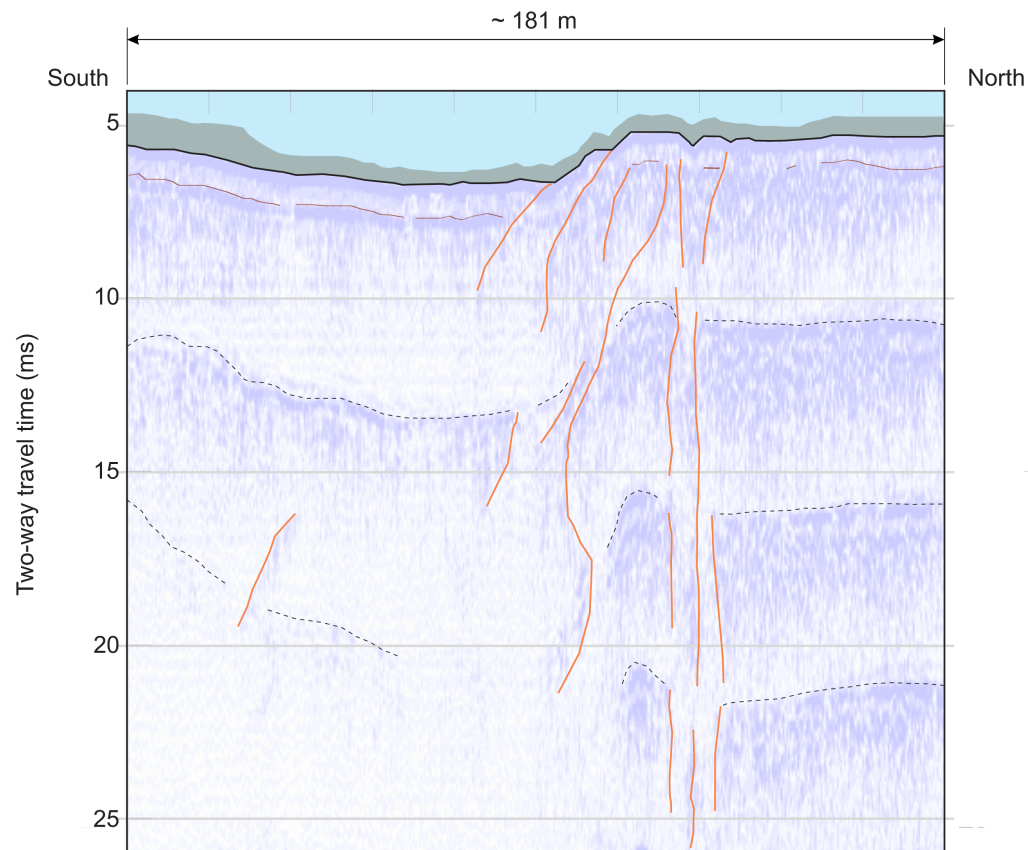
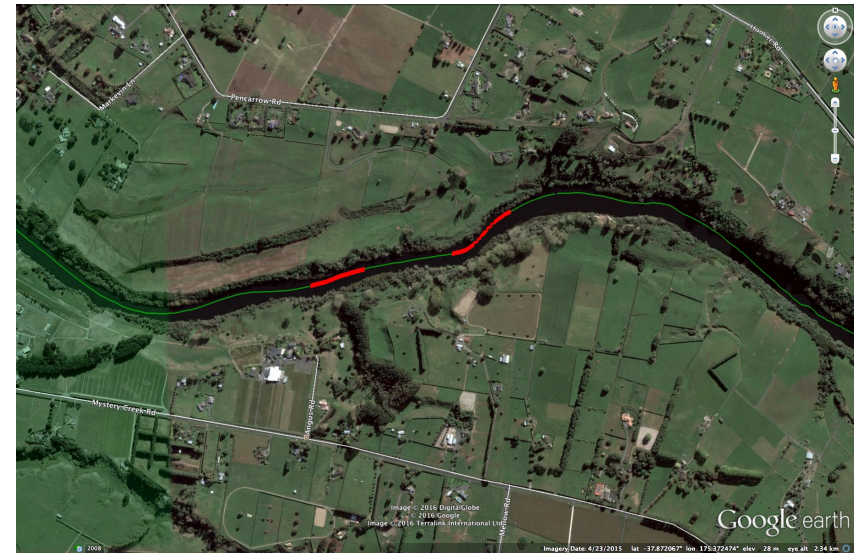
Taupiri Fault

- Known major boundary fault zone flanking Hakirimata Ranges



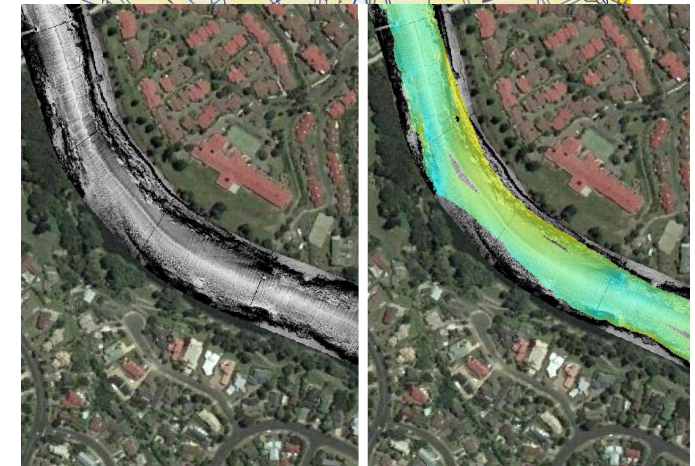
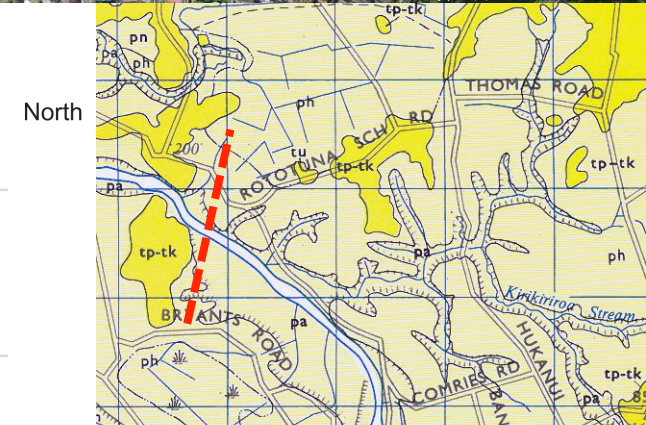
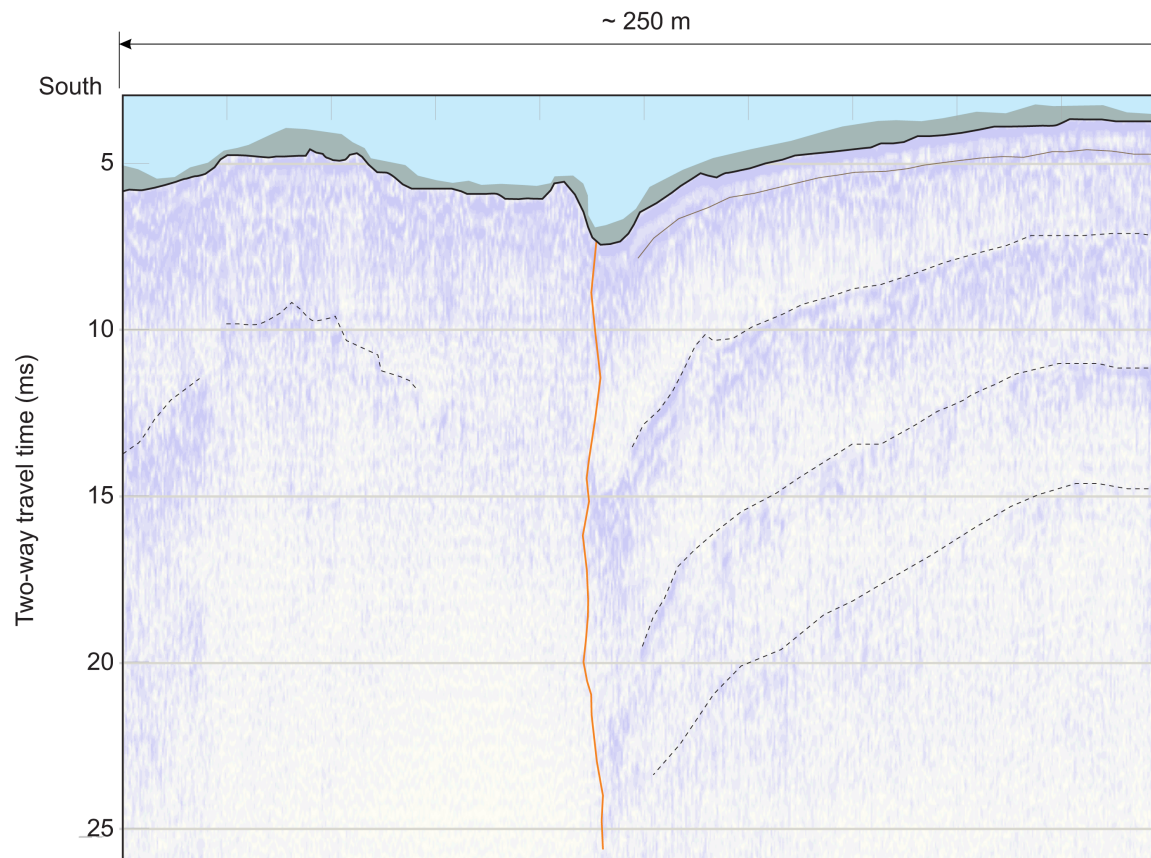
Mystery Creek

- Outcrop of basement greywacke
- Inconsistent terraces flanking river



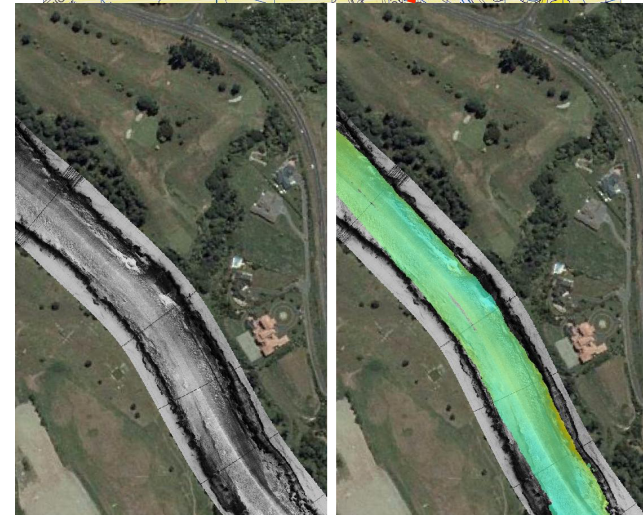
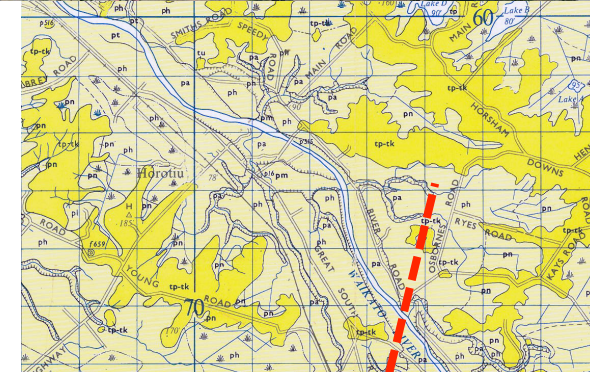
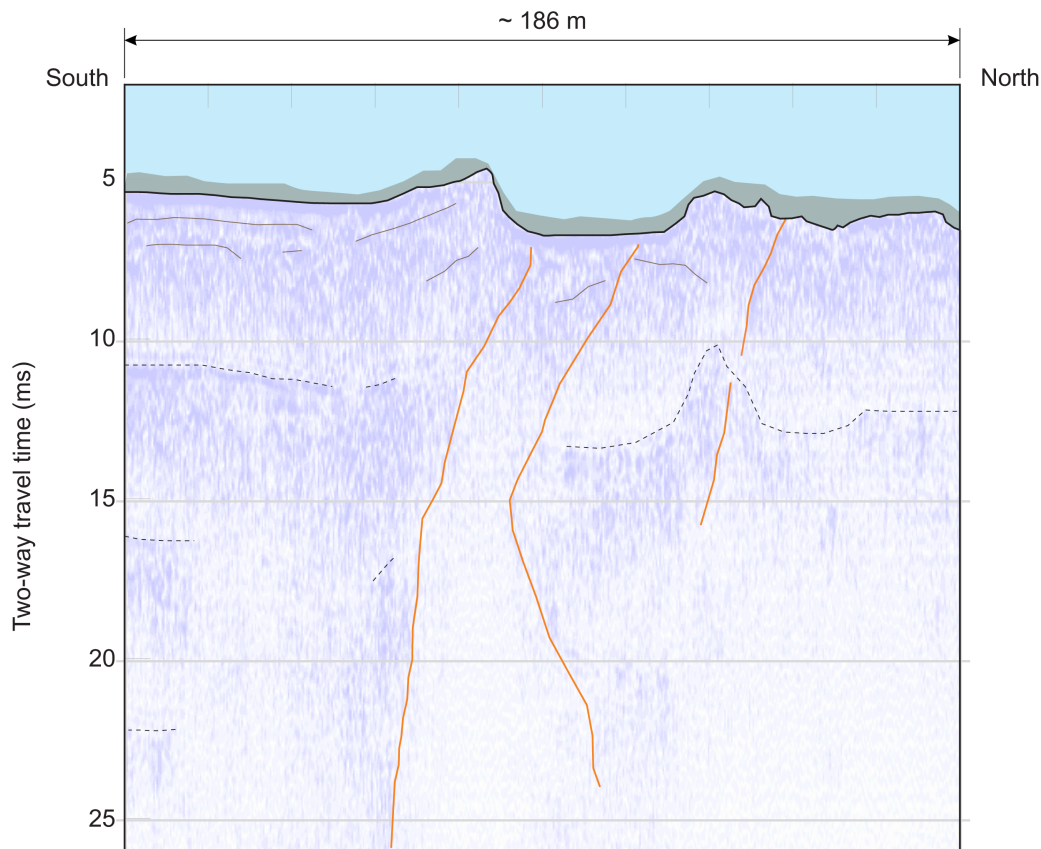
Flagstaff

- Associated with gully systems
 - Kirikiroa Stream
- Alignment of Hamilton Hills
- Puketoka Formation outcrops
- Paleo-liquefaction structures
 - Endeavour Primary School



Osborne & Kay Rds

- Outcrops of Puketoka Formation
- Gully formation
- Displacement of Hinuera Surface
- Seismites in lakes
- Lateral spreading



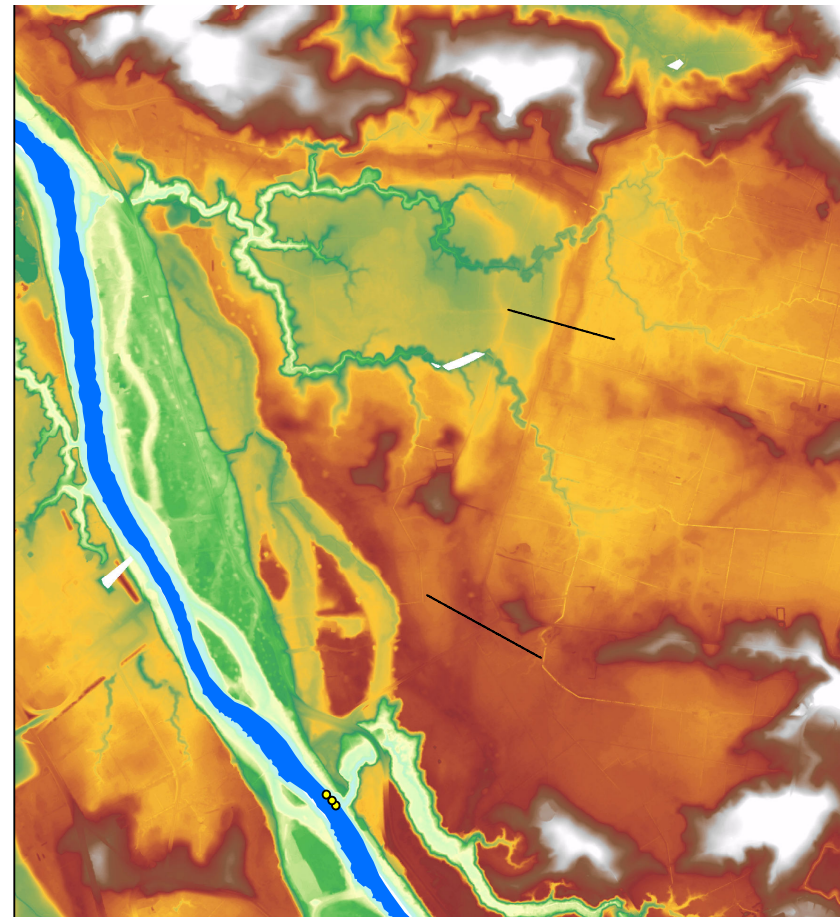
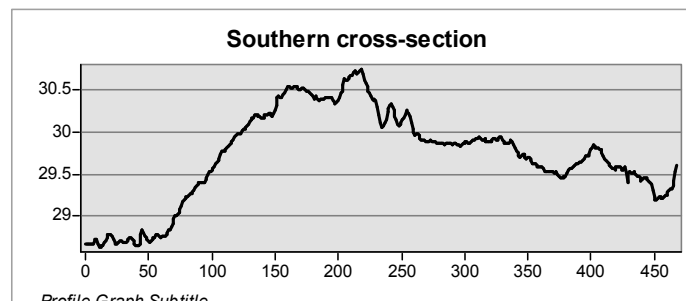
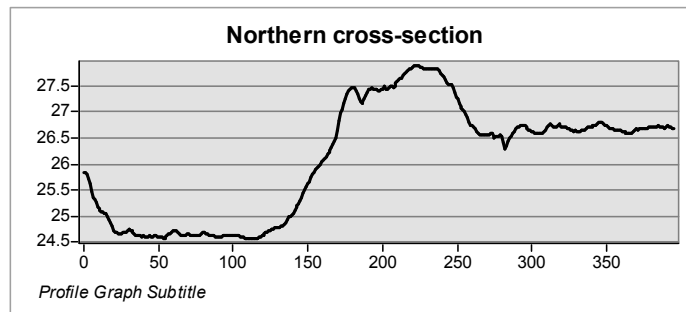
Osborne & Kay Rds



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Legend

- Fault traces
- High : 64.7908
- Low : 9.12676

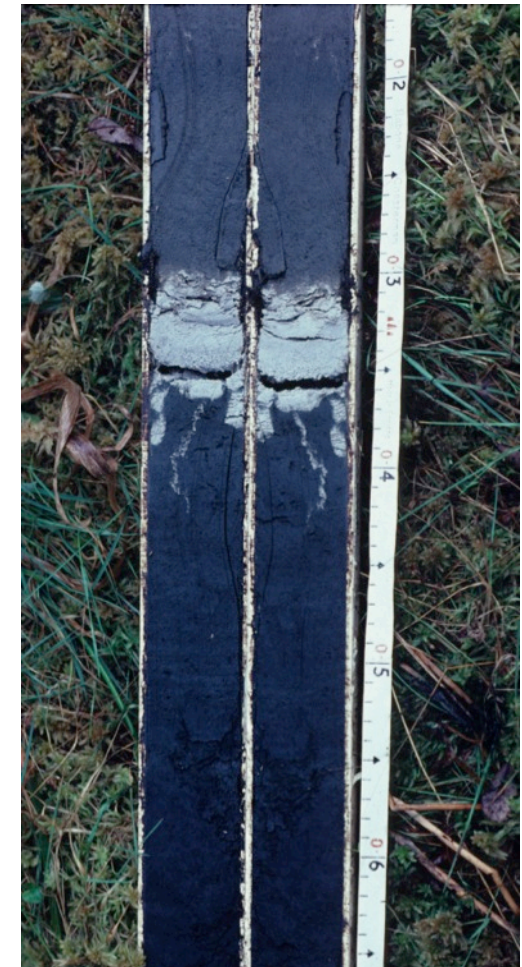


Lake sediments

- Extensive coring of Waikato peat lakes in the late 1970s-1980s as part of tephrochronology study.
- Re-examination of core logs and photos shows unusual features immediately below several tephra layers in many lakes.



Rotorua tephra in two cores in Lake Kainui. Photo D.J. Lowe

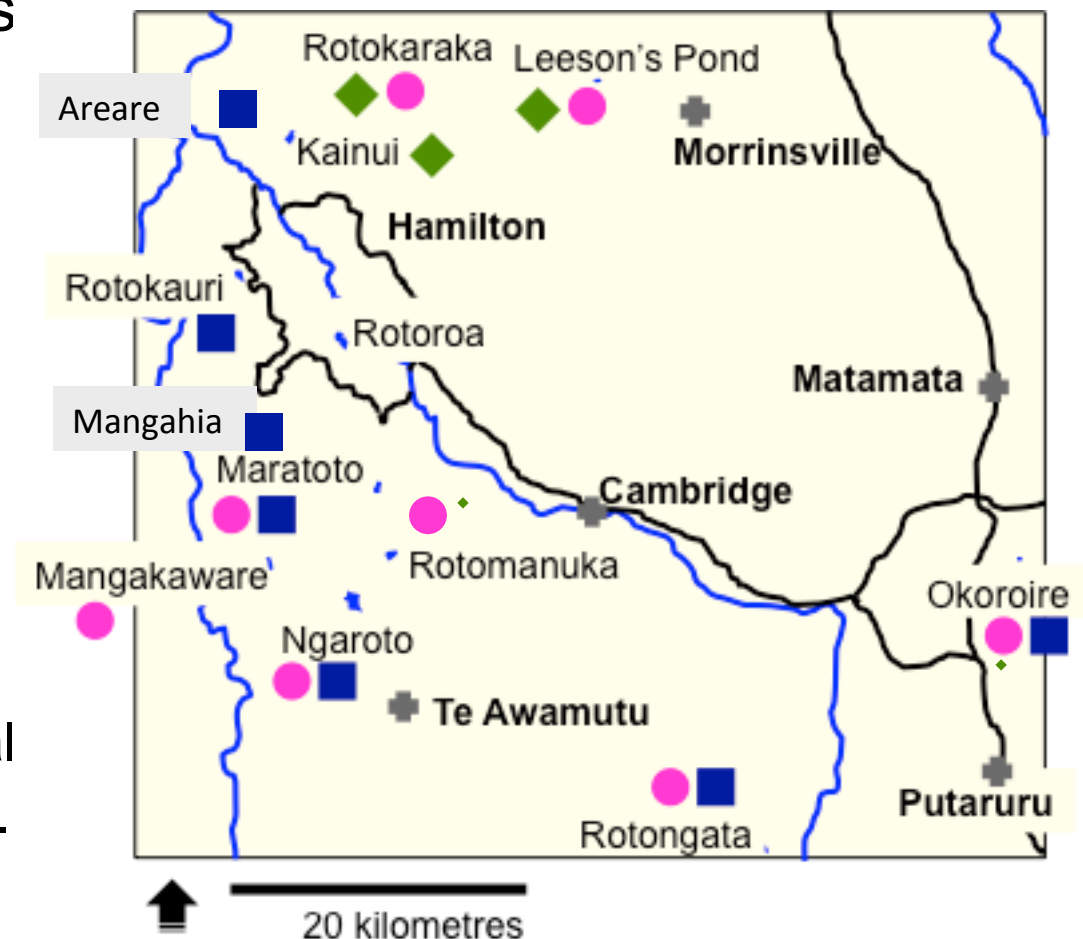


Rotorua tephra, Lake Rotokaraka.
Photo D.J. Lowe

Timing

Tephra	Age (cal ka)	Lakes
Rotorua ◆	15.6	Leeson's Pond, Rotokaraka, Kainui
Waiohau ●	14.0	Leeson's Pond, Rotokaraka, Okoroire, Rotongata, Ngaroto, Maratoto, Mangakaware
Mamaku ■	8.0	Okoroire, Rotongata, Ngaroto, Maratoto, Rotokauri, Mangahia, Areare

- 3 specific disrupted tephras identified in Waikato lakes.
- Implies 3 seismic events in last ~ 15,600 years:
 - Waiohau and Mamaku widespread – cannot distinguish distant (Kerepehi) or local source
 - Rotorua more limited distribution – likely from local source (Osborne Rd Fault?).



Immediate future work



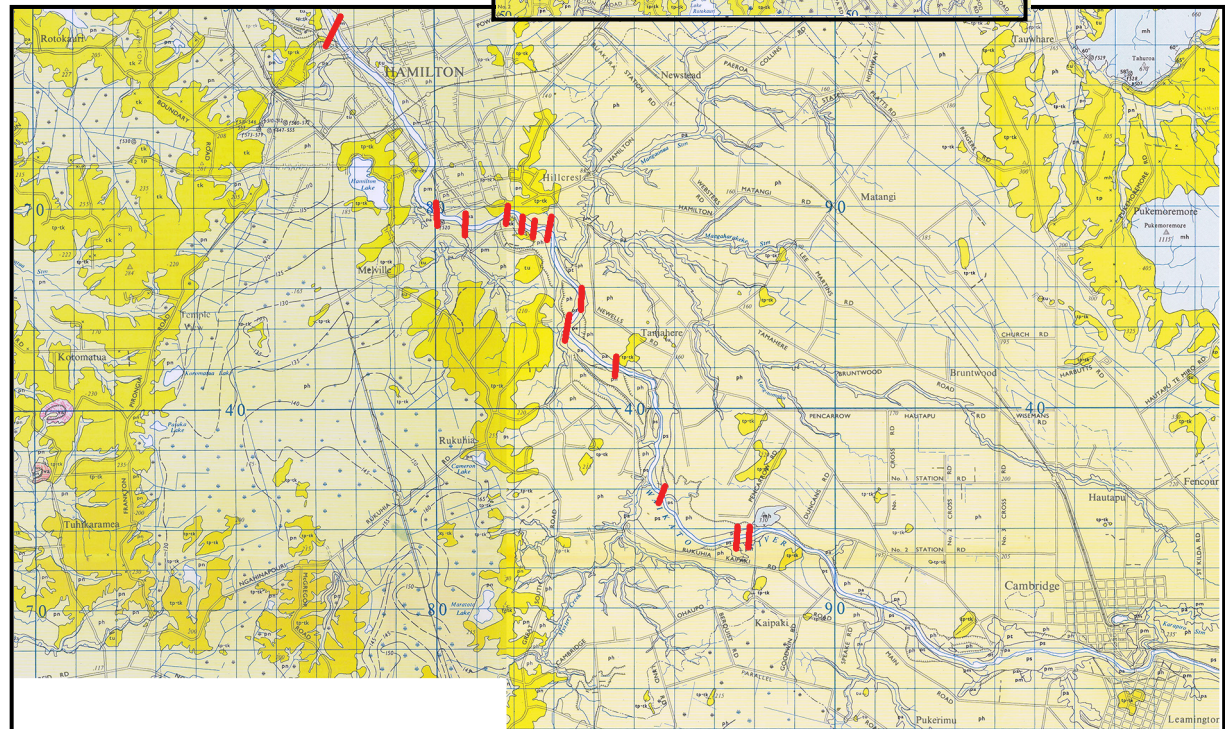
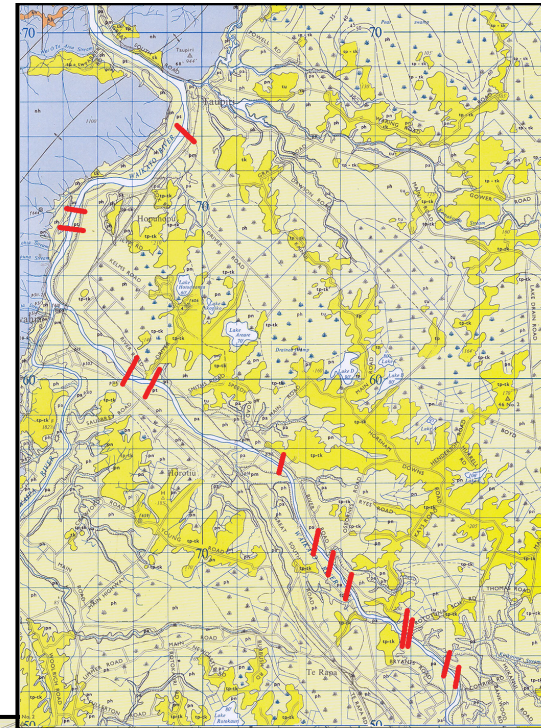
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- EQC
 - Resistivity at Osborne Rd & Stubbs Rd
- Students:
 - Francesca Spinardi
 - Geological mapping
 - Ben Campbell
 - Trenching at Newstead
 - Aleesha McKay
 - Liquefaction assessment
 - Mike Cummins
 - Geomorphology Stubbs Rd area?
- Need:
 - Trench at Osborne Rd / Kay Rd



Concluding comments

- We have identified quite a few potential faults along Waikato River from multiple lines of evidence
 - Still need ground truthing
- Occur in zones that correlate with geomorphology, surface geology & major basement features
- There is growing evidence that many of these are active features
- We think trenching at least one of these zones is a priority for next phase of research
 - Osborne Rd is presently boundary of NW city development



Acknowledgements



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 - EQC
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