

**Before the Hearings Panel  
at Porirua City Council**

**Under** Schedule 1 of the Resource Management Act 1991

**In the matter of** the Proposed Porirua District Plan

**Between** **Various**

**Submitters**

**And** **Porirua City Council**

**Respondent**

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**Statement of evidence of David Allen Sullivan on behalf of Kenepuru  
Limited Partnership**

**Date: 19 November 2021**

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## INTRODUCTION

- 1 My full name is David Allen Sullivan. I am employed as a Principal Geotechnical Engineer at Tetra Tech Coffey (NZ) Limited (Tetra Tech Coffey), Tauranga, New Zealand. I am a Chartered Geotechnical Engineer in New Zealand and am registered as a licensed Civil Engineer in the seismically active states of California and Nevada. I am a Tetra Tech Coffey Authorised Reviewer having been vetted by Senior Principals to perform technical reviews. I am a member of the following organisations: New Zealand Geotechnical Society (NZGS); Engineering New Zealand; Association of Environmental and Engineering Geologists (AEG); and institute of Public Works Engineering Australasia.
- 2 I have prepared this statement of evidence on behalf of Kenepuru Limited Partnership (**KLP**) in respect of technical related matters included in KLP's submission (**submitter 59**) on the Proposed District Plan (**PDP**).
- 3 Specifically, this statement of evidence relates to the matters in Chapter NH - Natural Hazards and specifically addresses the evidence of Dr Nicola Jane Litchfield on behalf of Porirua City Council (**Council**).
- 4 I am authorised to provide this evidence on behalf of KLP.

## QUALIFICATIONS AND EXPERIENCE

- 5 I have a Bachelor of Science in Geological Engineering from Mackay School of Mines (University of Nevada) and a Master of Business Administration from University of Phoenix.
- 6 I have significant fault investigation training from several post graduation programmes including: AEG Seismic Hazard Analysis seminar; Field Methods in Neotectonics and Paleoseismology workshop by Geo-Haz Consulting; AEG Paleoseismology in Seismic Hazard Assessment; Soil Stratigraphy for Fault Trenching workshop by Soil Tectonics.

7 I have over 25 years of experience in the geotechnical and geological consulting industry. My has experience has been in Nevada, California, and New Zealand. I practice as a geotechnical engineer with specialty in geologic hazards, including (but not limited to) liquefaction, slope stability, fault studies, and subsidence. I have numerous years in fault investigation experience. A list of some of the projects in which I conducted fault studies include: Edgecumbe College project; Kenepuru Landing; multiple investigations in the Taupo Volcanic Zone; Nukuhou (Whakatane) project; Hazen, Nevada 3,000 lot subdivision having 14 fault investigation trenches; Hells Bells Road subdivision, Carson City, Nevada; Lakeview subdivision, Carson City, Nevada; Bryan Canyon Road Subdivision, Washoe County, Nevada; South Curry Street project, Carson City, Nevada; assisted with the Green Valley Fault slip rate investigation, Fairfield, California.

**Code of conduct**

8 I have read the Code of Conduct for Expert Witnesses set out in the Environment Court's Practice Note 2014. I have complied with the Code of Conduct in preparing my evidence and will continue to comply with it while giving oral evidence before the Hearings Panel. My qualifications as an expert are set out above. Except where I state I rely on the evidence of another person, I confirm that the issues addressed in this statement of evidence are within my area of expertise, and I have not omitted to consider material facts known to me that might alter or detract from my expressed opinions.

## SUMMARY

9 My name is David Allen Sullivan.

10 I have been asked by KLP to provide active fault line evidence in relation to its submission on the provisions of Chapter NH – Natural Hazards and the related District Plan Maps.

11 My statement of evidence addresses the evidence of Dr Litchfield in relation to the KLP submission, specifically, the assessment of the Fault Avoidance Zone (FAZ).

12 In Dr Litchfield's evidence summary, she notes:

*(13) Regarding submission 59 I agree that the Ohariu Fault Hazard Zone through the Kenepuru Landing Site should be amended using some of the new data provided, but I do not agree with the zone mapped by the submitter. As requested by Council, I present for consideration a revised FAZ using the methodology of Litchfield and Van Dissen (2014) and taking into account some of the new data referred to in submission 59.*

13 The 2014 work by Litchfield and Van Dissen relies heavily on a single aerial image from which several fault points are observed. Although some of the data has been incorporated in the revised assessment, key aspects still need to be address by Dr Litchfield, these are:

- 13.1 No site visit appear to have been undertaken. Site visits are critical for geological assessments.
- 13.2 Dr Litchfield seems unaware of the substantial earthworks undertaken across the site. This is most notable in comments regarding the depth of trenches 11a and 11b.
- 13.3 Its relatively simple to confirm the stream location relative to the 1940's aerial photos using geo-reference documents.
- 13.4 No contact appears to have been made to either the Author of the Coffey reports, including Dick Beetham (now deceased) or to John Begg (both former GNS colleagues). The works completed by Coffey were also reviewed and assessed by Doug Mason from WSP on behalf of Porirua City Council.

- 13.5 Numerous efforts were made to both inform GNS Science of the works and to involve them in the review process and Dr Litchfield was copied into this communication.
  - 13.6 There's a conflict between the return period of the main/western branch and what appears to be less frequent events occurring on the eastern branch, resulting in less evidence of faulting, but maintaining the same recurrence interval class.
  - 13.7 Dr Litchfield indicates that the trenches are considered too shallow to capture surface rupture from the most recent event on the Ohariu Fault (1050 to 1000 years ago; Litchfield et al. 2004, 2006, 2010). However, Dr. John Begg in his review (19 July 2020) states that *"Two trench logs record the presence of zones of micro-fracturing within Pleistocene to Holocene sediments that may relate to distributed fault deformation."* This indicates that the soils in the trench are older than 1000 years.
  - 13.8 Light-weight timber frame residential structures are capable of tolerating substantial differential movement as identified in the Kaikoura Earthquake (2016) and the Canterbury Earthquake Sequence (2010 to 2011). It appears the recommended FBZ is sufficiently conservative to mitigate the risk of any deformation. However, this is not required, and some deformation should be considered acceptable if managed appropriately through engineering solutions.
  - 13.9 Lastly, it is unclear how the author of the Section 42 report Torrey McDonnell accepted the expert evidence of Dr Litchfield's if a site visit has not been undertaken.
- 14 The fault zone terminology used in this rebuttal of evidence is explained below for clarity:
- 14.1 Fault Avoidance Zone (FAZ) – The fault avoidance zone defined in the Litchfield & Van Dissen 2014 report.
  - 14.2 Revised Litchfield Fault Avoidance Zone (Revised Litchfield FAZ) – The fault avoidance zone proposed by Dr Litchfield in her Statement of Evidence.
  - 14.3 Fault Buffer Zone (FBZ) – as defined the Coffey 2021 report. What Tetra Tech Coffey propose be adopted as the Fault Avoidance Zone in the PDP.

#### **INVOLVEMENT WITH THE KENEPURU LANDING SITE**

- 16 Coffey (now Tetra Tech Coffey) have been involved with the earthworks development, testing, inspection, quality assurance and compliance work for the Kenepuru Landing Development. My role in the site has

been aspects directly relating to the study of the eastern branch of the Ohariu Fault. The cumulation of several years of investigation and assessment resulted in the development of the peer review report: Coffey Services NZ Ltd, 'Kenepuru Subdivision – Fault Trench Investigation – Assessment Report', dated 26 May 2021. The findings of that work concluded the following:

*“A FAZ 170m wide has formerly been identified across the currently mapped eastern splinter of the Ohariu Fault. Based on the risk planning approach outlined in the MfE Guidelines (2003) building within this zone would be limited; likely to timber framed single storey dwellings (Building Importance Category (BIC) 2a), temporary buildings (BIC 1) or potentially no buildings may be allowed at all. The width of the existing FAZ is largely a function of the fault complexity being classified as “Uncertain Constrained” (Litchfield & Van Dissen, 2014) This relates to the uncertainty associated with the location of the fault due to the highly modified nature of the site and surrounding areas. No evidence of surface rupture was encountered at the site. Based on our site investigations, including trenching and geophysical profiles, the 170m wide FAZ is considered unnecessarily wide to mitigate against surface fault rupture at this site. A narrower Fault Buffer Zone (FBZ) of 40-54m encompassing the potential fault related deformation has been proposed, with an additional ‘Zone of Distributed Deformation’. The site development will need to take into account potential future faulting through either avoidance, specific engineering design of dwellings, or a combination of both.”*

#### **RESPONSE TO EVIDENCE OF DR LITCHFIELD**

- 17           The KLP submission requested that *“the Ohariu Fault Hazard Zone through the Kenepuru Landing Site needs to be amended to reflect the amended Fault Avoidance Zone shown on the Coffey reports submitted as part of the Kenepuru Landing Project work and agreed with PCC”*.

18 In response, Dr Litchfield states that *“in my opinion that the Ohariu Fault Rupture Zone overlay may be revised using the Coffey data, but not as proposed by Coffey. This is based on the following analysis of the currently available data:*

18.1 *The east branch of the Ohariu Fault passes through the Kenepuru Landing Site, and the Fault Rupture Zone in the PDP is based upon the FAZ developed by Litchfield and Van Dissen (2014) and is 170 m wide (Figure 1)<sup>2</sup>.*

18.2 *I have reviewed the data used by Litchfield and Van Dissen (2014) to define the FAZ in the vicinity of the Kenepuru Landing Site. These data are shown in Figure 1 and are stream alignments on 1940s aerial photographs in the southwest part of the site (Mitchell Stream) and ~650 m northeast of the site. The location across the remainder of the Kenepuru Landing Site was considered uncertain in large part because of extensive ground surface modifications associated with the former Kenepuru Hospital.*

18.3 *Coffey Geotechnics (NZ) Ltd (Coffey) have undertaken several studies in an attempt to better constrain the location and complexity of the Ohariu Fault through the Kenepuru Landing Site. GNS Science was commissioned to review the methodology proposed by Coffey (Van Dissen, 2016), and concluded the proposed methodology was fit-for-purpose but made some recommendations including the trench depth be deepened to 2-3 m and the trench walls be meticulously cleaned. GNS Science has had no subsequent involvement in the work at the Kenepuru Landings Site.*

19 Response to 18.1: Noted, and referenced in Coffey report.

20 Response to 18.2: No intrusive investigations were undertaken by GNS within the vicinity of the Kenepuru Landing Site. The data noted in Figure 1 was utilized as the basis for the detailed fault study.

21 Response to 18.3: GNS recommendations regarding the methodology were incorporated. This can be seen in the depth of trenches and trench photos. GNS were contacted on numerous occasions both during the trenching and GNS were requested to undertake the peer review. Refer to attached emails. No one from GNS visited site during trenching. Russel Van Dissen was contacted and request to undertake the peer review but noted at the time they did not have the availability due to heavy work load on the NSHM.

18.4 *In preparing this statement of evidence I have reviewed four Coffey reports (2016, 2020a, 2020b, 2021) and a review*

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<sup>2</sup> *Figures are contained in Appendix 1.*

*report by J Begg Geo (2020) supplied by Council. Coffey propose a Fault Buffer Zone that is 40 m wide in the south (Mitchell Stream) and 54 m wide in the centre and north (Figure 2). They have also proposed a Distributed Deformation Zone adjacent to the northern Buffer Zone.*

22 Dr Litchfield then identifies a number of key matters associated with each of the Fault Buffer Zone. For completeness, I respond to each of the points in the following sections.

### ***Southern Fault Buffer Zone***

19.1 *The Coffey southern Fault Buffer Zone is defined by the current centreline of Mitchell Stream and a 20 m buffer either side. I consider this zone to be too narrow for several reasons:*

*1) Mitchell Stream in this area appears to have been modified (moved northwest) from the presumed natural location on the 1940s aerial photographs;*

*2) The centreline doesn't take into account the sinuosity of the stream and therefore the related uncertainty of the fault location;*

*3) The use of a centreline (rather than an uncertainty zone) implies that the Ohariu Fault is of 0 m width, contrary to the northern Fault Buffer Zone; and*

*4) it is my opinion that trenches FT09 and FT11b were too*

*shallow, with a base in alluvium (FT09) and silt (FT11b) that could be younger than the most recent metre-scale surface rupturing earthquake on the Ohariu Fault (1050-1000 years ago; Litchfield et al. 2004, 2006, 2010). Therefore, I consider the presence of the Ohariu Fault below the base of these trenches cannot be ruled out.*

- 23 Response to 19.1-1: We agree the stream has been modified, however, it is located at the base of the hill slope, and most likely has been pushed south-east as fill has been placed. It is not possible for the stream to have been located further to the south east due to the presence of the adjacent hill. The fault line (Litchfield & Van Dissen, 2014) located through the hill is not possible based on the geology and observations (Coffey report reference 773-WLGGE198865-AG-Rev2 dated 2 July 2019) after subsequent removal of the adjacent hill top.
- 24 However, it is a relatively simple exercise to check the relative stream location as the aerial images are geo-referenced. A brief site visit would be sufficient to confirm the streams relative position
- 25 Response to 19.1-2 and 19.1-3: The centre line is an indicative line for drawing and presentation purposes (it is also dashed to imply uncertainty). It is not intended to represent the sinuosity of the stream or the width of the fault. It should be noted GNS active fault database utilizes a standard width line to represent all faults, regardless of fault width, location, depth of soil cover or structure. We acknowledge this as a requirement of drawing / web mapping.
- 26 The fault location in the southern section is well constrained to the southeast due to the large excavation works on the adjacent hill – See item 28 below.
- 27 Response to 19.1-3: As noted above, there is no suggestion that the fault is 0m width. the width of the fault is unknown as it has not been identified
- 28 Response to 19.1-4: For trench location 11b this was undertaken after the top of the hill was removed with excavation up to 8m in height. Following excavation trenches 11a and 11b were excavated to provide a clean surface for inspection. 11a is in the order of 8m+ in depth from the original surface. The soils in 11b are old residual soils and is meters in depth below the original surface. Noted it reduces to 0m at the slope edge. The soils predate the Holocene period. The trenches were also inspected by Doug Mason from WSP, and the interpretations are in agreement. The geology of the hilltop adjacent Mitchell Stream should be considered ‘greywacke’. FT09 – the depth in the trench was limited by ground water, gas pipelines and property boundary.
- 29 Note some trenches such as FT02 had historic cuts, so the top of the trench is already some depth below ground surface.

### ***Northern Fault Buffer Zone***

- 19.2 *The Coffey northern Fault Buffer Zone is defined by a 14 m wide zone of concentrated micro-fractures found in several trenches and a 20 m buffer either side. It also incorporates*

*two of three geophysical anomalies (A and B) identified in a separate study.*

19.3 *While I concur that the micro-fractures could represent distributed deformation of the Ohariu Fault at depth, in my opinion, like the trenches in the south, the northern trenches were too shallow, and the base of FT03 and FT10 in particular were within alluvium that could be younger than the most recent surface rupturing earthquake on the Ohariu Fault. Therefore, I consider the presence of the Ohariu Fault below the base of these trenches and beyond the proposed Fault Buffer Zone cannot be ruled out.*

30 Response to 19.3: The trench depth of both FT03 and FT10 was limited by the presence of water and maintaining a safe working space for inspection. However, the trenches are up to 2.5m in depth and have been assessed to contain soils in excess of 1,000yr, and most likely from the early Holocene to Pleistocene. The Ohakea Loess is not anticipated to be apparent within the local depositional environment.

31 Response to 19.3: The age of the soils has been reviewed by both Dr John Begg (Former GNS employee and Author of QMAP – Geology of Wellington) and Dick Beetham (Also former GNS employee).

32 Response to 19.3: Based on both the fault study and the extensive earthworks across the site, only minor amounts of recent Holocene age alluvial material are present. The majority of the material is early Holocene or older.

33 It is possible that faulting has occurred, but the return period would be greater than the 3,500yr already identified. Which would be more consistent with the limited site observations being more consistent with a longer return period. As noted in Litchfield and Van Dissen (2014) *'The western trace appears to be more active and is defined by a greater number of fault features. Consequently, the Fault Avoidance Zone is narrower*

*along the western trace than the eastern trace’.*

- 34 Lastly the first 21m of FT10 has rock exposed through the side of the trench. Faulting has not been identified. It is unclear why this area is included in the revised Litchfield FAZ, as there is good evidence (including rock outcrops northwest of FT10) which preclude this area as being subject to fault rupture.

#### ***Centre of the Kenepuru Landing Site***

- 19.4 *In the centre of the Kenepuru Landing Site, the Fault Buffer Zone is not constrained by trench evidence. The northern Fault Buffer Zone has been extended southward at the same width (54 m) to a point where Mitchell Stream deflects to the northeast, where the Fault Buffer Zones abruptly narrows to 40 m width. This implies that the Ohariu Fault undergoes a step and an abrupt change in width but no evidence is presented for either.*
- 19.5 *I consider it unlikely that the Ohariu Fault undergoes these changes because they are too abrupt and there is no evidence for them, therefore a tapering zone between the northern and southern areas is equally as likely.*

- 35 Response to 19.4: The fault has not been identified so  
therefore the width is unknown. North of the point where the  
Mitchell Stream deflects northeast, there is evidence of  
faulting due to the micro-fractures, which provides the basis  
for the 14m central portion. This is extended back to the fault  
trenches as the last confirmed location that the micro-  
fractures are not identified. This is considered conservative by  
taking the greater width from the earliest potential location.
- 36 Response to 19.5: Yes, the change could be gradual, but this  
has an arbitrary impact on the FBZ and adjacent development.
- 37 We note Figure 3a has a gap between the southern and  
northern rupture zone. This could be interpreted as  
suggesting the fault is not continuous.
- 38 Note the only documented observation of the eastern fault by  
William (1975) does not mention the width of the fault  
identified.
- 39 Response to 19.5: A tapering zone could be incorporated.

#### ***Distributed Zone***

- 19.6 *The Distributed Zone is based upon there being a “risk of distributed ground deformation, due to a ‘kink’ in the buffer zone/fault” (Coffey 2021 page 2). This zone also includes a set of micro-fractures in FT10 and geophysical anomaly C.*
- 19.7 *While the presence of this zone is possible, it is unclear to me why such a kink would produce a Distributed Zone only on one side of a strike-slip fault. That is, if the Distributed Zone is the result of compression on the northwest side of the northern Fault Buffer Zone, why is there no equivalent Distributed Zone adjacent to the southeast side of the southern Fault Buffer Zone?*
- 40 Response to 19.6: There are no micro-fractures identified

within FT10, prior to chainage of 40m, and within the Zone of Distributed Deformation. It is located within the Fault Buffer Zone.

41 Response to 19.6: Anomaly C was investigated with FT02. Anomalies are common in geophysics and typically investigated through intrusive works. No off set, or evidence of fault was identified. This most likely suggest that anomaly C represents the western side of Mitchell Stream bank.

42 Note William (1975) notes the south east is up thrown, while the anomaly C, shows a step down to the east.

43 Response to 19.7: We agree the zone of distributed deformation is unlikely, however, simple engineering measures can be applied to mitigate consequences of fault related deformation. We consider it a very conservative approach to take.

44 Dr Litchfield concludes that *"..based upon the above analysis of the Coffey reports, I do not agree with the location and definition of the Fault Buffer/Distributed Zone sincluded in the Coffey reports and referred to in Submission 59"*.

45 Dr Litchfield then recommends that *"the eastern Ohariu Fault FAZ through the Kenepuru Landing Site could be revised as identified in Figure 3. The revision uses the methodology and some data from Litchfield and Van Dissen (2014) and the Coffey data that I consider to be robust enough to use to define a FAZ."*

46 Dr Litchfield's reasoning is set out as follows:

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*In the south a likely fault rupture zone (red) is constructed from a buffer either side of the Mitchell Stream trace mapped by Litchfield and Van Dissen (2014) from the 1940s aerial photographs (green line). The buffer is 22.25 m wide (noting that this may change slightly if the Coffey survey/GIS data could be obtained) constrained by the western end of FT11a (Figure 3a), which was entirely in bedrock and did not show any clear evidence of recent faulting. In the absence of any other information the same width is used on the west side of the fault. A 20 m buffer setback zone (pink) is then added either side, but this is modified on the east side to again meet the western end of FT11a. Thus, the total revised FAZ width would be 64.5–84.5 m, which is wider than, but does encompass, the Coffey Fault Buffer Zone (Figure 3b). It is narrower than the 170 m wide zone in the PDP.*

*In the north, a likely fault rupture zone (red) is constructed that is bound by the outer edges of (from top right to top left): geophysical anomaly A, geophysical anomaly B, the outer edge of the total zone of microfractures in FT03, geophysical anomaly C, and a step in bedrock in FT10. This step has not been identified as a fault, and could be a terrace riser, but the trench was not deep enough to rule it out as a fault scarp. The final (northernmost) point is projected along the same orientation. A 20 m buffer setback zone (pink) is then added either side. The total width of this revised FAZ is 101–119 m, similar to, but slightly wider than, the combined Coffey Fault Buffer and Distributed Zones (Figure 3b), but narrower than the 170 m wide zone in the PDP.*

*Between the two areas, the revised FAZ is joined with straight lines, and is also tapered to the existing FAZ*

*northeast and southwest of the Kenepuru Landing Site. In my opinion this is an appropriate method to identify the FAZ for this area.*

*The FAZ fault complexity classification of uncertain – constrained assigned by Litchfield and Van Dissen (2014) is in my opinion still appropriate.*

- 47 The above assessment is based on several assumptions, which have a significant impact on the interpretation of the available data. A critical one being the age of the soils, and the assumption they are of recent Holocene (<1000yrs). Visual inspection of the soils, and in some locations excavations upwards of 8m, provide substantial evidence regarding the age of the soils. Several parts of the interpretation also contain errors, such as micro-fractures being located in the Zone of Distributed Deformation. Several minor aspects of Dr Litchfield's observations could be address through a site visit and geo-referenced mapping.
- 48 Field observations by scientists are important and Coffey (including myself) are the only people who have observed and mapped the trench evidence. Field observations should not be dismissed. Doug Mason (WSP) also undertook select site inspections.
- 49 Significant experience was bought to the fault assessment which included two former GNS employees (Dr John Begg and Dick Beetham), with substantial experience in both the Wellington geology and fault mapping. This experience and contribution appears to have been over looked.
- 50 However, we are in general agreement with the northwest side of the proposed southern rupture zone, but believe the 20m setback buffer should be moved to the area of the 0m end of FT08 and FT11a. It is noted that FT11b did not observe rupture.

## RECOMMENDATIONS

- 51 I recommended that the maps remain as detailed in the May 2021 Coffey Report. We recommended the Fault Buffer Zone illustrated in this report is adopted as the Fault Avoidance Zone within the PDP.

**Date:** [19/11/2021]

A handwritten signature in blue ink, appearing to read 'D. J. E.', is located below the date.

## APPENDICES

### 1. FIGURES

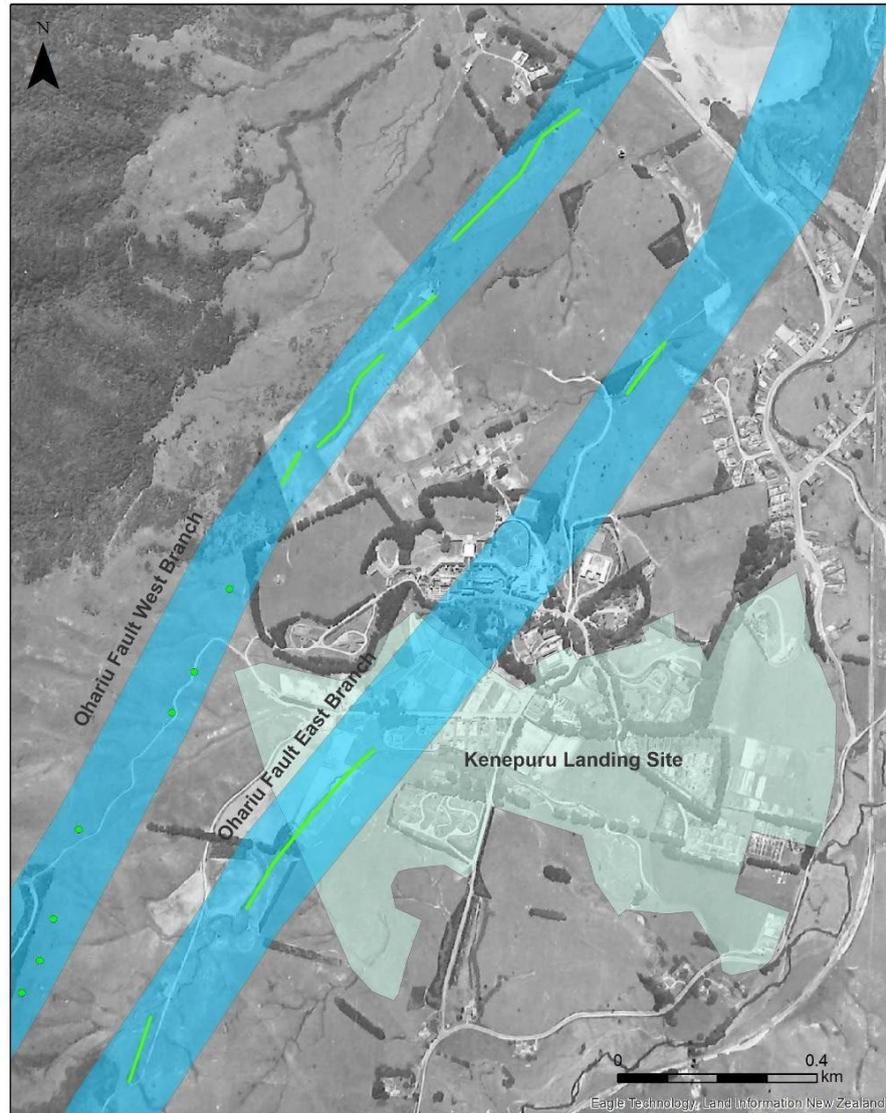
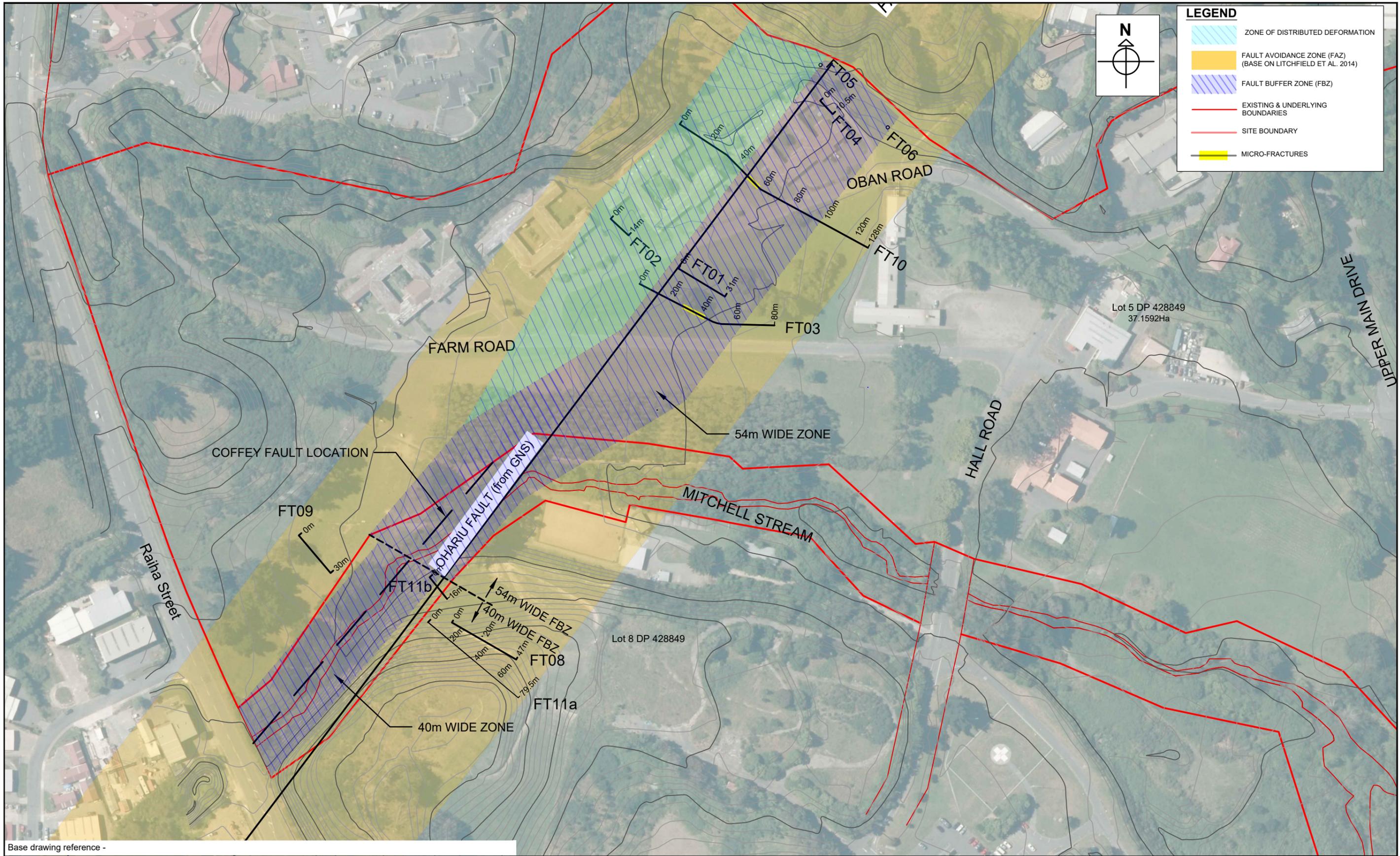
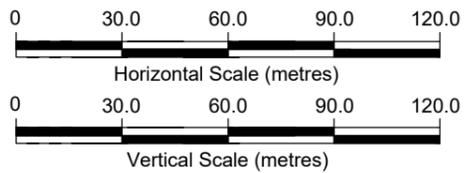


Figure 1. 1940s aerial photograph showing the topographic features (green lines and dots) used by Litchfield and Van Dissen (2014) to define the location of the Ohariu Fault FAZ (blue) in the vicinity of, and crossing, the Kenepuru Landing Site. The Fault Hazard Zone in the PDP is based upon this FAZ.



Base drawing reference -

revision	rev	description	drawn	approved	date
	D	Revision 4	RZ	SM	25/05/2021
	C	Revision 3	NM	SM	28/05/2019
	B	Revision 2	LM	SM	08/02/2019
	A	DRAFT - Revised FBZ after all trenching	SM		26/04/2017



drawn	NM
approved	SM
date	25/05/2021
scale	1:2000
original size	A3



client:	KENEPURU LP		
project:	KENEPURU SUBDIVISION PORIRUA		
title:	FAULT TRENCH SUMMARY		
project no:	773-WLGGE198865AE	figure no:	01
rev:	D		

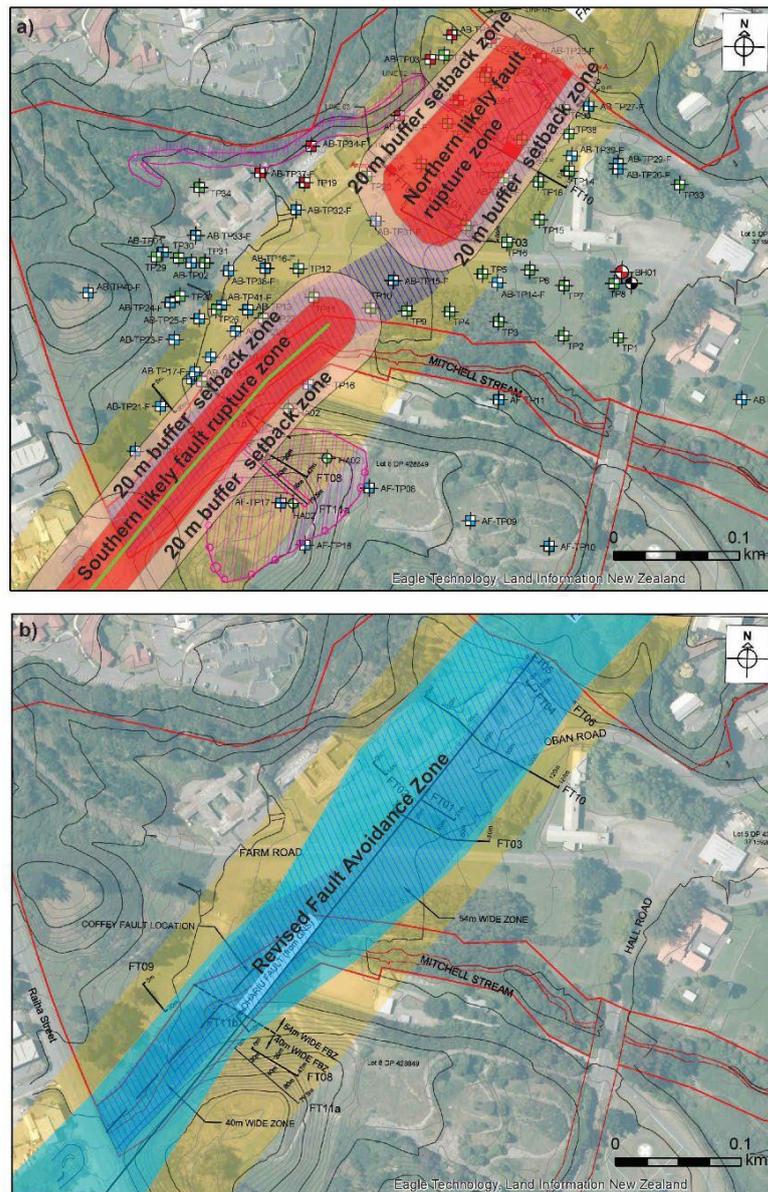


Figure 3. Revised FAZ for the eastern branch of the Ohariu Fault through the Kenepuru Landing Site for consideration. The background map is the Coffey (2020b) map, which shows the Litchfield and Van Dissen (2014) FAZ in light orange and the Coffey Fault Buffer Zone and Distributed Zones in the hatch pattern (also shown in Figure 2). a) Components of the revised FAZ - Likely fault rupture zones (red) and 20 m buffer setback zones (pink) for the southern and northern areas using the Coffey data and the Litchfield and Van Dissen (2014) Mitchell Stream centreline (green line). b) Revised FAZ joining the zones in (a) and tapering (widening) to the previous FAZ outside of the Kenepuru Landing Site.



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**From:** [Martin, Sarah](#)  
**To:** [Clendon, Nick](#)  
**Subject:** FW: 16233AC Kenepuru Subdivision - Fault trenches  
**Date:** Wednesday, 17 November 2021 2:06:59 pm  
**Attachments:** [image001.jpg](#)  
[image002.jpg](#)  
[image003.jpg](#)  
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[image005.png](#)  
[image006.png](#)  
[image007.png](#)  
[image008.png](#)

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My normal days in the office are Tuesday, Wednesday and Friday

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**Sent:** Wednesday, 22 June 2016 3:58 pm  
**To:** Russ Van Dissen <[R.VanDissen@gns.cri.nz](mailto:R.VanDissen@gns.cri.nz)>  
**Cc:** Nicola Litchfield <[N.Litchfield@gns.cri.nz](mailto:N.Litchfield@gns.cri.nz)>; Schumacher, Nathan  
**Subject:** RE: 16233AC Kenepuru Subdivision - Fault trenches

Hi Russ,

Thanks for this. In your experience, are you typically engaged by the council or consultant to do the independent review?

Kind Regards,

Sarah Martin  
Project Engineering Geologist

t: +64 4 385 9885  
m: +64 21 934 182  
w: [coffey.com](http://coffey.com)

**From:** Russ Van Dissen [<mailto:R.VanDissen@gns.cri.nz>]  
**Sent:** Wednesday, 22 June 2016 2:34 p.m.  
**To:** Sarah Martin  
**Cc:** Nicola Litchfield  
**Subject:** Re: 16233AC Kenepuru Subdivision - Fault trenches

Sarah,

My initial response is that an independent review would be more appropriate.

GNS were not involved, nor were we commissioned to review the field work. Accordingly, a collaboratively developed report does not sit comfortably with me.

These are only my initial impressions, and will run them past my manager and get back to you next week with a more definitive response.

Kind regards,  
Russ

From: Sarah Martin <[Sarah.Martin@coffey.com](mailto:Sarah.Martin@coffey.com)>  
To: "[R.VanDissen@gns.cri.nz](mailto:R.VanDissen@gns.cri.nz)" <[R.VanDissen@gns.cri.nz](mailto:R.VanDissen@gns.cri.nz)>  
Cc: Nathan Schumacher <[Nathan.Schumacher@coffey.com](mailto:Nathan.Schumacher@coffey.com)>  
Date: 22/06/2016 13:41  
Subject: 16233AC Kenepuru Subdivision - Fault trenches

---

Hi Russ,

Thanks again for reviewing the fault trench methodology for the Kenepuru Subdivision. We have now completed the fault trenching work and preliminarily feel that we did not encounter the fault but some fractures related to it. Subsequently we will likely be recommending that residential building can occur within at least some of the currently defined Fault Avoidance Zone.

The report for this will be submitted to Porirua City Council. We are wondering at this stage what business relationship GNS would be happy with to give our clients and the council some reassurance (we are also following this up with the council). In your experience, would we be best to submit our report to council and they would likely request an independent review; or work more in collaboration with you during the development of our report and have a review or letter similar to what we did with the methodology?

Kind Regards,

Sarah Martin  
Project Engineering Geologist

Level 5, 150 Willis Street, Wellington 6011  
PO Box 11472, Manners Street, Wellington 6142

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m: +64 21 934 182



---

>>> [Ingenuity@coffey](mailto:Ingenuity@coffey) – it's the ideas that count

---

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**From:** [Martin, Sarah](#)  
**To:** [Clendon, Nick](#)  
**Subject:** FW: Ohariu Fault Investigation - GNS review of fault trenching methodology is attached  
**Date:** Wednesday, 17 November 2021 2:29:06 pm  
**Attachments:** [image001.jpg](#)  
[image002.jpg](#)  
[image003.jpg](#)  
[image004.jpg](#)  
[image005.png](#)  
[image006.png](#)  
[image007.png](#)  
[image008.png](#)

---

Here's another – I thought I had forwarded already

**Sarah Martin, MSc** | Project Engineering Geologist  
Mobile +64 21 934 182 | [sarah.martin@coffey.com](mailto:sarah.martin@coffey.com)  
My normal days in the office are Tuesday, Wednesday and Friday

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---

**From:** Schumacher, Nathan  
**Sent:** Thursday, 16 June 2016 7:41 am  
**To:** 'Russ Van Dissen' <[R.VanDissen@gns.cri.nz](mailto:R.VanDissen@gns.cri.nz)>  
**Subject:** RE: Ohariu Fault Investigation - GNS review of fault trenching methodology is attached

Hi Russ,

We have completed some trenches yesterday; and are continuing today. The trenches are still open. However it is likely they will be backfilled this afternoon/ tomorrow morning at the latest.

If you are interested, I would recommend you go to site this morning to take a look.

Kind Regards

Nathan Schumacher BEng (Hons)  
**Geotechnics Leader – Wellington**  
**Senior Geotechnical Engineer**

t: +64 4 385 9885  
d: +64 4 894 1627  
f: +64 4 385 3066  
m: +64 27 700 7708

**From:** Russ Van Dissen [<mailto:R.VanDissen@gns.cri.nz>]  
**Sent:** Wednesday, 8 June 2016 5:09 p.m.  
**To:** Nathan Schumacher  
**Cc:** Nicola Litchfield; Kirsten Brown  
**Subject:** Ohariu Fault Investigation - GNS review of fault trenching methodology is attached

Nathan,

Attached is my review of Coffey's Ohariu Fault trenching methodology and outcomes.

Thank you for the opportunity to review this report, and I wish you all the best with your upcoming investigations.

I would be grateful if you would let me know when the trenches are opened and cleaned. If I have time, I would like to have a look.

Kind regards,  
Russ

---

From: Nathan Schumacher <[Nathan.Schumacher@coffey.com](mailto:Nathan.Schumacher@coffey.com)>  
To: Russ Van Dissen <[R.VanDissen@gns.cri.nz](mailto:R.VanDissen@gns.cri.nz)>  
Date: 08/06/2016 11:44  
Subject: RE: Ohariu Fault Investigation

---

Fantastic Russ. Really appreciate your time and efforts on this one.

Kind Regards

Nathan Schumacher BEng (Hons)  
Geotechnics Leader – Wellington  
Senior Geotechnical Engineer

t: +64 4 385 9885  
d: +64 4 894 1627  
f: +64 4 385 3066  
m: +64 27 700 7708

**From:** Russ Van Dissen [<mailto:R.VanDissen@gns.cri.nz>]  
**Sent:** Wednesday, 8 June 2016 11:37 a.m.  
**To:** Nathan Schumacher  
**Subject:** RE: Ohariu Fault Investigation

Hello Nathan,

I am in the process of finalising my review, and you will have it by close of play today.

In general I am quite satisfied with your approach, though the review highlights a few issues you may wish to consider further. Budget and time constraints on my end do not allow me to be more iterative than that.

Like I said, you'll have my review and comments by close of play today - which I think is a day before the contracted delivery date.

Kind regards,

Russ

From: Nathan Schumacher <[Nathan.Schumacher@coffey.com](mailto:Nathan.Schumacher@coffey.com)>  
To: Russ Van Dissen <[R.VanDissen@gns.cri.nz](mailto:R.VanDissen@gns.cri.nz)>  
Cc: Sarah Martin <[Sarah.Martin@coffey.com](mailto:Sarah.Martin@coffey.com)>  
Date: 08/06/2016 11:17  
Subject: RE: Ohariu Fault Investigation

---

Morning Russ,

Thanks for completing our review at such short notice. Just dropping you a line to see how it is progressing and if we'll get confirmation from you today that you are satisfied with our approach.

Kind Regards

Nathan Schumacher BEng (Hons)  
Geotechnics Leader – Wellington  
Senior Geotechnical Engineer

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m: +64 27 700 7708

**From:** Russ Van Dissen [<mailto:R.VanDissen@gns.cri.nz>]  
**Sent:** Tuesday, 7 June 2016 10:45 a.m.  
**To:** Nathan Schumacher  
**Cc:** Nicola Litchfield  
**Subject:** RE: Ohariu Fault Investigation

Nathan,

Thanks for sending this through.

Have had a very quick look through, and will start my review in earnest shortly.

Will give you a ring if I have any questions

From: Nathan Schumacher <[Nathan.Schumacher@coffey.com](mailto:Nathan.Schumacher@coffey.com)>  
To: "Russ Van Dissen ([R.VanDissen@gns.cri.nz](mailto:R.VanDissen@gns.cri.nz))" <[R.VanDissen@gns.cri.nz](mailto:R.VanDissen@gns.cri.nz)>  
Cc: "Kirsten Brown ([K.Brown@gns.cri.nz](mailto:K.Brown@gns.cri.nz))" <[K.Brown@gns.cri.nz](mailto:K.Brown@gns.cri.nz)>, "Nicola Litchfield ([N.Litchfield@gns.cri.nz](mailto:N.Litchfield@gns.cri.nz))" <[N.Litchfield@gns.cri.nz](mailto:N.Litchfield@gns.cri.nz)>  
Date: 03/06/2016 19:07  
Subject: RE: Ohariu Fault Investigation

---

Good Evening Russ,

Please see attached our fault trench methodology.

As per the scope of works agreed in the SFA, please can you commence review of the methodology on Tuesday 7 June, noting that timing is critical on this one.

Any questions, please do not hesitate to contact me.

Kind Regards

Nathan Schumacher BEng (Hons)  
Geotechnics Leader – Wellington  
Senior Geotechnical Engineer

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**From:** Kirsten Brown [<mailto:K.Brown@gns.cri.nz>]  
**Sent:** Friday, 3 June 2016 3:40 p.m.  
**To:** Nathan Schumacher  
**Cc:** Russ Van Dissen  
**Subject:** RE: Ohariu Fault Investigation

Hello Nathan,

Many thanks. Please find attached the countersigned copy for your records.

Kind Regards,  
Kirsten

---

From: Nathan Schumacher <[Nathan.Schumacher@coffey.com](mailto:Nathan.Schumacher@coffey.com)>  
To: Kirsten Brown <[K.Brown@gns.cri.nz](mailto:K.Brown@gns.cri.nz)>  
Cc: Nicola Litchfield <[N.Litchfield@gns.cri.nz](mailto:N.Litchfield@gns.cri.nz)>, Russ Van Dissen <[R.VanDissen@gns.cri.nz](mailto:R.VanDissen@gns.cri.nz)>  
Date: 03/06/2016 15:09  
Subject: RE: Ohariu Fault Investigation

---

Hi Kirsten,

The changes you have proposed are adequate. Happy to move forward with this, therefore please find signed copy attached.

Kind Regards

Nathan Schumacher BEng (Hons)  
Geotechnics Leader – Wellington

## Senior Geotechnical Engineer

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m: +64 27 700 7708

**From:** Kirsten Brown [<mailto:K.Brown@gns.cri.nz>]  
**Sent:** Friday, 3 June 2016 11:40 a.m.  
**To:** Nathan Schumacher  
**Cc:** Nicola Litchfield; Russ Van Dissen  
**Subject:** RE: Ohariu Fault Investigation

Hello Nathan,

Our legal counsel has requested two variations to the terms and conditions, as inserted into this contract above the signature block. These are standard variations that we request when we sign all ACENZ format contracts. If these are suitable, we are ready to sign off. Please let me know if you have any questions.

Kind Regards,  
Kirsten

### Kirsten Brown

*Business Development Manager*

*Natural Hazards Division*

**E** [K.Brown@gns.cri.nz](mailto:K.Brown@gns.cri.nz) **D** +64 4 570 4821 **M** +64 21 034 5272

### GNS Science - TE PU AO

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**F** +64 4 570 4600  
[www.gns.cri.nz](http://www.gns.cri.nz)

---

From: Nathan Schumacher <[Nathan.Schumacher@coffey.com](mailto:Nathan.Schumacher@coffey.com)>  
To: Russ Van Dissen <[R.VanDissen@gns.cri.nz](mailto:R.VanDissen@gns.cri.nz)>  
Cc: Kirsten Brown <[K.Brown@gns.cri.nz](mailto:K.Brown@gns.cri.nz)>, Nicola Litchfield <[N.Litchfield@gns.cri.nz](mailto:N.Litchfield@gns.cri.nz)>  
Date: 02/06/2016 11:43  
Subject: RE: Ohariu Fault Investigation

Hi Russ,

Please see .doc copy attached.

Kind Regards

Nathan Schumacher BEng (Hons)

Geotechnics Leader – Wellington  
Senior Geotechnical Engineer

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m: +64 27 700 7708

**From:** Russ Van Dissen [<mailto:R.VanDissen@gns.cri.nz>]  
**Sent:** Thursday, 2 June 2016 11:40 a.m.  
**To:** Nathan Schumacher  
**Cc:** Kirsten Brown; Nicola Litchfield  
**Subject:** RE: Ohariu Fault Investigation

Nathan,

Thanks for this.

Pages 1 and 2 look good to me. However, I do know that GNS will want to make a couple changes to page 3 (the terms and conditions part).

Do you have a Word copy of page 3? Could I request that you send it to Kirsten Brown (email listed above). She can then forward you the proposed changes. If those are agreeable to you, then my boss, Nicola Litchfield, can sign for GNS.

I will not be in the office on Friday, but will be more than ready to review your methodology document on Tuesday 7 June. Should not be a problem to get our finalised letter report to you by your suggested due date of 8 June.

Kind regards.  
Russ Van Dissen

---

From: Nathan Schumacher <[Nathan.Schumacher@coffey.com](mailto:Nathan.Schumacher@coffey.com)>  
To: Russ Van Dissen <[R.VanDissen@gns.cri.nz](mailto:R.VanDissen@gns.cri.nz)>  
Cc: Kirsten Brown <[K.Brown@gns.cri.nz](mailto:K.Brown@gns.cri.nz)>, Nicola Litchfield <[N.Litchfield@gns.cri.nz](mailto:N.Litchfield@gns.cri.nz)>  
Date: 01/06/2016 12:48  
Subject: RE: Ohariu Fault Investigation

---

Hi Russ,

Please see attached SFA for GNS to be sub-consultant to Coffey for the above. Please have a read through, and if you wish to amend; please let me know. Otherwise please sign and return at your earliest.

We're aiming on getting our methodology to you tomorrow or Friday this week.

Kind Regards

Nathan Schumacher BEng (Hons)

Geotechnics Leader – Wellington  
Senior Geotechnical Engineer

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**From:** Russ Van Dissen [<mailto:R.VanDissen@gns.cri.nz>]  
**Sent:** Monday, 30 May 2016 1:02 p.m.  
**To:** Nathan Schumacher  
**Cc:** Kirsten Brown; Nicola Litchfield  
**Subject:** Fw: Ohariu Fault Investigation

Nathan,

Good to speak with you earlier today.

Look forward to receiving in a few day's time the IPENZ short form proposal for this methodology review.

I got the impression from our conversation that your proposed methodology document might be a few to several pages in length, and I gave the indication that GNS could provide review of that document (methodology) for about a day's effort. I also understand that you are not looking for an in-field review of the trench investigations (but on our own time, we would be welcome to look at the trenches). I also understand the GNS is being asked to only review your methodology, not to review your final fault avoidance zone report.

Kind Regards,  
Russ Van Dissen

----- Forwarded by Russ Van Dissen/GNS on 30/05/2016 11:38 -----

From: Nicola Litchfield/GNS  
To: Russ Van Dissen/GNS@GNS  
Cc: Kirsten Brown/GNS@GNS, Pilar Villamor/GNS@GNS  
Date: 30/05/2016 08:58  
Subject: Fw: Ohariu Fault Investigation

---

----- Forwarded by Nick Perrin/GNS on 30/05/2016 08:25 -----

From: Nathan Schumacher <[Nathan.Schumacher@coffey.com](mailto:Nathan.Schumacher@coffey.com)>  
To: "[n.perrin@gns.cri.nz](mailto:n.perrin@gns.cri.nz)" <[n.perrin@gns.cri.nz](mailto:n.perrin@gns.cri.nz)>,  
Date: 27/05/2016 16:50  
Subject: FW: Ohariu Fault Investigation

---

Good Evening Nick,

Terribly sorry to bother you so late on a Friday. I was hoping you may be able to assist me or direct the below email to the right person (see detail below).

We are in a bit of a rush and we need to firm up some fees and timing from GNS for a peer review of a fault trench methodology to support the potential reducing of a fault avoidance zone at site in Porirua. This request for GNS to peer review it has come from PCC.

Are you able to make sure the below email gets to the right person? I really need a response as soon as possible.

Kind Regards

Nathan Schumacher BEng (Hons)  
Geotechnics Leader – Wellington  
Senior Geotechnical Engineer

t: +64 4 385 9885  
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**From:** Nathan Schumacher  
**Sent:** Thursday, 26 May 2016 1:55 p.m.  
**To:** 'r.langridge@gns.cri.nz'  
**Subject:** Ohariu Fault Investigation  
**Importance:** High

Good Afternoon Rob,

In September last year, my former colleague Eleni Gkeli contacted you to discuss the location of the Ohariu Fault in Porirua, particularly around the old Kenepuru Hospital (email attached to perhaps jog your memory).

We are now at a stage where we have met with our client (the Developer – Kenepuru Developments Ltd), and Porirua City Council (PCC) to discuss the options of completing a fault trench investigation with the particular aim to confine its presence to potentially reduce the Fault Avoidance Zone.

PCC are happy for us to go down this path, however they have specifically requested for us to develop a trenching methodology and outline our intended use for the information discovered (i.e. how we will confine the Fault Avoidance Zone). Noting this, PCC wish for GNS, as authors of the Porirua District Fault Trace Study (Report 2014/213) to peer review our methodology and provide comment/overview on the acceptability of such.

Please can you let me know how much this will cost to complete this peer review? Are you the right person to be speaking with? If not, who should I contact?

Timing is becoming critical, and we aim to develop our methodology early to mid-next week; with the intention to have it peer reviewed by GNS w/c 6 June 2016, then with the intent (if all things are okay after the peer review) to commence site investigation works 14 to 16 June.

I look forward to your response.

Cheers

Nathan Schumacher BEng (Hons)  
Geotechnics Leader – Wellington

Senior Geotechnical Engineer

Level 5, 150 Willis Street, Wellington 6011  
PO Box 11-472, Manners Street, Wellington 6142

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**From:** [Martin, Sarah](#)  
**To:** [Clendon, Nick](#)  
**Subject:** FW: Ohariu Fault Investigation - GNS review of fault trenching methodology is attached  
**Date:** Wednesday, 17 November 2021 2:06:33 pm  
**Attachments:** [image001.jpg](#)  
[image002.jpg](#)  
[image003.jpg](#)  
[image004.jpg](#)  
[image005.png](#)  
[image006.png](#)  
[image007.png](#)  
[image008.png](#)

---

**Sarah Martin, MSc** | Project Engineering Geologist  
Mobile +64 21 934 182 | [sarah.martin@coffey.com](mailto:sarah.martin@coffey.com)  
My normal days in the office are Tuesday, Wednesday and Friday

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---

**From:** Schumacher, Nathan  
**Sent:** Thursday, 9 June 2016 6:50 am  
**To:** Russ Van Dissen <[R.VanDissen@gns.cri.nz](mailto:R.VanDissen@gns.cri.nz)>  
**Cc:** Nicola Litchfield <[N.Litchfield@gns.cri.nz](mailto:N.Litchfield@gns.cri.nz)>; Kirsten Brown <[K.Brown@gns.cri.nz](mailto:K.Brown@gns.cri.nz)>  
**Subject:** RE: Ohariu Fault Investigation - GNS review of fault trenching methodology is attached

Good Morning Russ,

Brilliant, thank you very much. We have had a read through and appreciate your time and effort on this, and the advice/ recommendations provided. We will endeavour to achieve these where we can.

Currently we are looking at having the trenches excavated next Wednesday 15<sup>th</sup> and Thursday 16<sup>th</sup>. You are more than welcome to take a look.

Please send your invoice through at a time convenient to you and we will make payment.

Kind Regards

Nathan Schumacher BEng (Hons)  
Geotechnics Leader – Wellington  
Senior Geotechnical Engineer

t: +64 4 385 9885  
d: +64 4 894 1627  
f: +64 4 385 3066  
m: +64 27 700 7708

**From:** Russ Van Dissen [<mailto:R.VanDissen@gns.cri.nz>]  
**Sent:** Wednesday, 8 June 2016 5:09 p.m.  
**To:** Nathan Schumacher  
**Cc:** Nicola Litchfield; Kirsten Brown  
**Subject:** Ohariu Fault Investigation - GNS review of fault trenching methodology is attached

Nathan,

Attached is my review of Coffey's Ohariu Fault trenching methodology and outcomes.

Thank you for the opportunity to review this report, and I wish you all the best with your upcoming investigations.

I would be grateful if you would let me know when the trenches are opened and cleaned. If I have time, I would like to have a look.

Kind regards,  
Russ

---

From: Nathan Schumacher <[Nathan.Schumacher@coffey.com](mailto:Nathan.Schumacher@coffey.com)>  
To: Russ Van Dissen <[R.VanDissen@gns.cri.nz](mailto:R.VanDissen@gns.cri.nz)>  
Date: 08/06/2016 11:44  
Subject: RE: Ohariu Fault Investigation

---

Fantastic Russ. Really appreciate your time and efforts on this one.

Kind Regards

Nathan Schumacher BEng (Hons)  
Geotechnics Leader – Wellington  
Senior Geotechnical Engineer

t: +64 4 385 9885  
d: +64 4 894 1627  
f: +64 4 385 3066  
m: +64 27 700 7708

**From:** Russ Van Dissen [<mailto:R.VanDissen@gns.cri.nz>]  
**Sent:** Wednesday, 8 June 2016 11:37 a.m.  
**To:** Nathan Schumacher  
**Subject:** RE: Ohariu Fault Investigation

Hello Nathan,

I am in the process of finalising my review, and you will have it by close of play today.

In general I am quite satisfied with your approach, though the review highlights a few issues you may wish to consider further. Budget and time constraints on my end do not allow me to be more iterative than that.

Like I said, you'll have my review and comments by close of play today - which I think is a day before the contracted delivery date.

Kind regards,  
Russ

From: Nathan Schumacher <[Nathan.Schumacher@coffey.com](mailto:Nathan.Schumacher@coffey.com)>  
To: Russ Van Dissen <[R.VanDissen@gns.cri.nz](mailto:R.VanDissen@gns.cri.nz)>  
Cc: Sarah Martin <[Sarah.Martin@coffey.com](mailto:Sarah.Martin@coffey.com)>  
Date: 08/06/2016 11:17  
Subject: RE: Ohariu Fault Investigation

---

Morning Russ,

Thanks for completing our review at such short notice. Just dropping you a line to see how it is progressing and if we'll get confirmation from you today that you are satisfied with our approach.

Kind Regards

Nathan Schumacher BEng (Hons)  
Geotechnics Leader – Wellington  
Senior Geotechnical Engineer

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d: +64 4 894 1627  
f: +64 4 385 3066  
m: +64 27 700 7708

**From:** Russ Van Dissen [<mailto:R.VanDissen@gns.cri.nz>]  
**Sent:** Tuesday, 7 June 2016 10:45 a.m.  
**To:** Nathan Schumacher  
**Cc:** Nicola Litchfield  
**Subject:** RE: Ohariu Fault Investigation

Nathan,

Thanks for sending this through.

Have had a very quick look through, and will start my review in earnest shortly.

Will give you a ring if I have any questions

From: Nathan Schumacher <[Nathan.Schumacher@coffey.com](mailto:Nathan.Schumacher@coffey.com)>  
To: "Russ Van Dissen ([R.VanDissen@gns.cri.nz](mailto:R.VanDissen@gns.cri.nz))" <[R.VanDissen@gns.cri.nz](mailto:R.VanDissen@gns.cri.nz)>  
Cc: "Kirsten Brown ([K.Brown@gns.cri.nz](mailto:K.Brown@gns.cri.nz))" <[K.Brown@gns.cri.nz](mailto:K.Brown@gns.cri.nz)>, "Nicola Litchfield ([N.Litchfield@gns.cri.nz](mailto:N.Litchfield@gns.cri.nz))" <[N.Litchfield@gns.cri.nz](mailto:N.Litchfield@gns.cri.nz)>  
Date: 03/06/2016 19:07  
Subject: RE: Ohariu Fault Investigation

---

Good Evening Russ,

Please see attached our fault trench methodology.

As per the scope of works agreed in the SFA, please can you commence review of the methodology on Tuesday 7 June, noting that timing is critical on this one.

Any questions, please do not hesitate to contact me.

Kind Regards

Nathan Schumacher BEng (Hons)  
Geotechnics Leader – Wellington  
Senior Geotechnical Engineer

t: +64 4 385 9885  
d: +64 4 894 1627  
f: +64 4 385 3066  
m: +64 27 700 7708

**From:** Kirsten Brown [<mailto:K.Brown@gns.cri.nz>]  
**Sent:** Friday, 3 June 2016 3:40 p.m.  
**To:** Nathan Schumacher  
**Cc:** Russ Van Dissen  
**Subject:** RE: Ohariu Fault Investigation

Hello Nathan,

Many thanks. Please find attached the countersigned copy for your records.

Kind Regards,  
Kirsten

---

From: Nathan Schumacher <[Nathan.Schumacher@coffey.com](mailto:Nathan.Schumacher@coffey.com)>  
To: Kirsten Brown <[K.Brown@gns.cri.nz](mailto:K.Brown@gns.cri.nz)>  
Cc: Nicola Litchfield <[N.Litchfield@gns.cri.nz](mailto:N.Litchfield@gns.cri.nz)>, Russ Van Dissen <[R.VanDissen@gns.cri.nz](mailto:R.VanDissen@gns.cri.nz)>  
Date: 03/06/2016 15:09  
Subject: RE: Ohariu Fault Investigation

---

Hi Kirsten,

The changes you have proposed are adequate. Happy to move forward with this, therefore please find signed copy attached.

Kind Regards

Nathan Schumacher BEng (Hons)  
Geotechnics Leader – Wellington  
Senior Geotechnical Engineer

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f: +64 4 385 3066  
m: +64 27 700 7708

**From:** Kirsten Brown [<mailto:K.Brown@gns.cri.nz>]  
**Sent:** Friday, 3 June 2016 11:40 a.m.  
**To:** Nathan Schumacher  
**Cc:** Nicola Litchfield; Russ Van Dissen  
**Subject:** RE: Ohariu Fault Investigation

Hello Nathan,

Our legal counsel has requested two variations to the terms and conditions, as inserted into this contract above the signature block. These are standard variations that we request when we sign all ACENZ format contracts. If these are suitable, we are ready to sign off. Please let me know if you have any questions.

Kind Regards,  
Kirsten

**Kirsten Brown**

*Business Development Manager*

*Natural Hazards Division*

**E** [K.Brown@gns.cri.nz](mailto:K.Brown@gns.cri.nz) **D** +64 4 570 4821 **M** +64 21 034 5272

**GNS Science - TE PU AO**

1 Fairway Drive, Avalon, Lower Hutt 5011

PO Box 30368, Lower Hutt 5040, New Zealand

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[www.gns.cri.nz](http://www.gns.cri.nz)

From: Nathan Schumacher <[Nathan.Schumacher@coffey.com](mailto:Nathan.Schumacher@coffey.com)>  
To: Russ Van Dissen <[R.VanDissen@gns.cri.nz](mailto:R.VanDissen@gns.cri.nz)>  
Cc: Kirsten Brown <[K.Brown@gns.cri.nz](mailto:K.Brown@gns.cri.nz)>, Nicola Litchfield <[N.Litchfield@gns.cri.nz](mailto:N.Litchfield@gns.cri.nz)>  
Date: 02/06/2016 11:43  
Subject: RE: Ohariu Fault Investigation

---

Hi Russ,

Please see .doc copy attached.

Kind Regards

Nathan Schumacher BEng (Hons)  
Geotechnics Leader – Wellington  
Senior Geotechnical Engineer

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d: +64 4 894 1627  
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m: +64 27 700 7708

**From:** Russ Van Dissen [<mailto:R.VanDissen@gns.cri.nz>]  
**Sent:** Thursday, 2 June 2016 11:40 a.m.  
**To:** Nathan Schumacher  
**Cc:** Kirsten Brown; Nicola Litchfield  
**Subject:** RE: Ohariu Fault Investigation

Nathan,

Thanks for this.

Pages 1 and 2 look good to me. However, I do know that GNS will want to make a couple changes to page 3 (the terms and conditions part).

Do you have a Word copy of page 3? Could I request that you send it to Kirsten Brown (email listed above). She can then forward you the proposed changes. If those are agreeable to you, then my boss, Nicola Litchfield, can sign for GNS.

I will not be in the office on Friday, but will be more than ready to review your methodology document on Tuesday 7 June. Should not be a problem to get our finalised letter report to you by your suggested due date of 8 June.

Kind regards.  
Russ Van Dissen

---

From: Nathan Schumacher <[Nathan.Schumacher@coffey.com](mailto:Nathan.Schumacher@coffey.com)>  
To: Russ Van Dissen <[R.VanDissen@gns.cri.nz](mailto:R.VanDissen@gns.cri.nz)>  
Cc: Kirsten Brown <[K.Brown@gns.cri.nz](mailto:K.Brown@gns.cri.nz)>, Nicola Litchfield <[N.Litchfield@gns.cri.nz](mailto:N.Litchfield@gns.cri.nz)>  
Date: 01/06/2016 12:48  
Subject: RE: Ohariu Fault Investigation

---

Hi Russ,

Please see attached SFA for GNS to be sub-consultant to Coffey for the above. Please have a read through, and if you wish to amend; please let me know. Otherwise please sign and return at your earliest.

We're aiming on getting our methodology to you tomorrow or Friday this week.

Kind Regards

Nathan Schumacher BEng (Hons)  
Geotechnics Leader – Wellington  
Senior Geotechnical Engineer

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m: +64 27 700 7708

**From:** Russ Van Dissen [<mailto:R.VanDissen@gns.cri.nz>]  
**Sent:** Monday, 30 May 2016 1:02 p.m.  
**To:** Nathan Schumacher  
**Cc:** Kirsten Brown; Nicola Litchfield  
**Subject:** Fw: Ohariu Fault Investigation

Nathan,

Good to speak with you earlier today.

Look forward to receiving in a few day's time the IPENZ short form proposal for this methodology review.

I got the impression from our conversation that your proposed methodology document might be a few to several pages in length, and I gave the indication that GNS could provide review of that document (methodology) for about a day's effort. I also understand that you are not looking for an in-field review of the trench investigations (but on our own time, we would be welcome to look at the trenches). I also understand the GNS is being asked to only review your methodology, not to review your final fault avoidance zone report.

Kind Regards,  
Russ Van Dissen

----- Forwarded by Russ Van Dissen/GNS on 30/05/2016 11:38 -----

From: Nicola Litchfield/GNS  
To: Russ Van Dissen/GNS@GNS  
Cc: Kirsten Brown/GNS@GNS, Pilar Villamor/GNS@GNS  
Date: 30/05/2016 08:58  
Subject: Fw: Ohariu Fault Investigation

---

----- Forwarded by Nick Perrin/GNS on 30/05/2016 08:25 -----

From: Nathan Schumacher <[Nathan.Schumacher@coffey.com](mailto:Nathan.Schumacher@coffey.com)>  
To: "[n.perrin@gns.cri.nz](mailto:n.perrin@gns.cri.nz)" <[n.perrin@gns.cri.nz](mailto:n.perrin@gns.cri.nz)>,  
Date: 27/05/2016 16:50  
Subject: FW: Ohariu Fault Investigation

---

Good Evening Nick,

Terrribly sorry to bother you so late on a Friday. I was hoping you may be able to assist me or direct the below email to the right person (see detail below).

We are in a bit of a rush and we need to firm up some fees and timing from GNS for a peer review of a fault trench methodology to support the potential reducing of a fault avoidance zone at site in Porirua. This request for GNS to peer review it has come from PCC.

Are you able to make sure the below email gets to the right person? I really need a response as soon as possible.

Kind Regards

Nathan Schumacher BEng (Hons)  
Geotechnics Leader – Wellington  
Senior Geotechnical Engineer

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m: +64 27 700 7708

**From:** Nathan Schumacher  
**Sent:** Thursday, 26 May 2016 1:55 p.m.  
**To:** 'r.langridge@gns.cri.nz'  
**Subject:** Ohariu Fault Investigation  
**Importance:** High

Good Afternoon Rob,

In September last year, my former colleague Eleni Gkeli contacted you to discuss the location of the Ohariu Fault in Porirua, particularly around the old Kenepuru Hospital (email attached to perhaps jog your memory).

We are now at a stage where we have met with our client (the Developer – Kenepuru Developments Ltd), and Porirua City Council (PCC) to discuss the options of completing a fault trench investigation with the particular aim to confine its presence to potentially reduce the Fault Avoidance Zone.

PCC are happy for us to go down this path, however they have specifically requested for us to develop a trenching methodology and outline our intended use fo the information discovered (i.e. how we will confine the Fault Avoidance Zone). Noting this, PCC wish for GNS, as authors of the Porirua District Fault Trace Study (Report 2014/213) to peer review our methodology and provide comment/overview on the acceptability of such.

Please can you let me know how much this will cost to complete this peer review? Are you the right person to be speaking with? If not, who should I contact?

Timing is becoming critical, and we aim to develop our methodology early to mid-next week; with the intention to have it peer reviewed by GNS w/c 6 June 2016, then with the intent (if all things are okay after the peer review) to commence site investigation works 14 to 16 June.

I look forward to your response.

Cheers

Nathan Schumacher BEng (Hons)  
Geotechnics Leader – Wellington  
Senior Geotechnical Engineer

Level 5, 150 Willis Street, Wellington 6011  
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---

>>> [Ingenuity@coffey](mailto:Ingenuity@coffey) – it's the ideas that count

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Notice: This email and any attachments are confidential. If received in error please destroy and immediately notify us. Do not copy or disclose the contents.[attachment "GENZWELL16233AC-AC Kenepuru - Fault Trenching Methodology.pdf" deleted by Russ Van Dissen/GNS]

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**From:** [Mason, Dougal](#)  
**To:** [Clendon, Nick](#); [Brett Gawn](#)  
**Cc:** [Mike.Scott@porirua.govt.nz](#); [gina.s@sweetmanplanning.co.nz](#); [Martin, Sarah](#); [Beetham, Richmond](#); [Brabhakaran, Pathmanathan](#)  
**Subject:** RE: Fault Study  
**Date:** Monday, 9 March 2020 4:15:52 pm  
**Attachments:** [image001.png](#)  
[image002.png](#)  
[image003.png](#)  
[image004.png](#)  
[image005.png](#)  
[image006.png](#)  
[image007.png](#)

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Thanks for clearing that up Nick; if John is available and can make it work doing it from Greece then I would have no concerns with him doing the review. It sounds like it would not be straightforward getting someone from GNS involved at this stage.

Cheers  
Doug

---

**From:** Clendon, Nick <[Nicholas.Clendon@coffey.com](mailto:Nicholas.Clendon@coffey.com)>

**Sent:** Monday, 9 March 2020 11:03 AM

**To:** Brett Gawn <[Brett.Gawn@calibregroup.com](mailto:Brett.Gawn@calibregroup.com)>

**Cc:** [Mike.Scott@porirua.govt.nz](mailto:Mike.Scott@porirua.govt.nz); [Mason, Dougal <doug.mason@wsp.com>](mailto:Mason, Dougal <doug.mason@wsp.com>); [gina.s@sweetmanplanning.co.nz](mailto:gina.s@sweetmanplanning.co.nz); [Martin, Sarah <Sarah.Martin@coffey.com>](mailto:Martin, Sarah <Sarah.Martin@coffey.com>); [Beetham, Richmond <Richmond.Beetham@coffey.com>](mailto:Beetham, Richmond <Richmond.Beetham@coffey.com>)

**Subject:** RE: Fault Study

Morning all,

I have made a few calls this morning and have summarised them below in response to your email Doug.

Let me know if you need anything else.

Otherwise, we would like to get John Begg on with the review.

Thanks,

Nick Clendon

Principal Engineering Geologist  
CMEngNZ (PEngGeol)

m: +64 21 607 200

w: [coffey.com](http://coffey.com)

---

**From:** Brett Gawn <[Brett.Gawn@calibregroup.com](mailto:Brett.Gawn@calibregroup.com)>

**Sent:** Tuesday, 3 March, 2020 1:58 PM

**To:** Clendon, Nick <[Nicholas.Clendon@coffey.com](mailto:Nicholas.Clendon@coffey.com)>

**Subject:** FW: Fault Study

**CAUTION:** This email originated from an external sender. Verify the source before opening links or attachments.

Hi Nick

Are you able to respond to the queries from Doug Mason below. I think they are quite easily answered so hope this gets it over the line with PCC.

Thanks

**Brett Gawn | Sector Leader - Urban Development & Survey**

**P** +64 4 384 2029 | **D** +64 4 894 7870 | **M** +64 21 727 052 | **E** [Brett.Gawn@calibregroup.com](mailto:Brett.Gawn@calibregroup.com)

Level 13, Kordia House, 109-125 Willis Street, Wellington 6011

---

**From:** Mike Scott <[Mike.Scott@porirua.govt.nz](mailto:Mike.Scott@porirua.govt.nz)>

**Sent:** Tuesday, March 3, 2020 1:53 PM

**To:** Brett Gawn <[Brett.Gawn@calibregroup.com](mailto:Brett.Gawn@calibregroup.com)>

**Subject:** Fwd: Fault Study

Hey Brett

Are you able to have a look at Doug's comments and come back to me... we may need to organise a Tele conference with you, me, Gina, Doug and coffee if we can't sort this now

Mike

Sent from my iPhone

Begin forwarded message:

**From:** "Mason, Dougal" <[doug.mason@wsp.com](mailto:doug.mason@wsp.com)>

**Date:** 3 March 2020 at 1:46:23 PM NZDT

**To:** Mike Scott <[Mike.Scott@porirua.govt.nz](mailto:Mike.Scott@porirua.govt.nz)>

**Cc:** Gina Sweetman <[gina.s@sweetmanplanning.co.nz](mailto:gina.s@sweetmanplanning.co.nz)>

**Subject:** RE: Fault Study

Hi Mike

Sorry for not replying sooner, I'm currently in the South Island and have been in and out of civilisation.

It's a shame Mark Yetton is unavailable; in terms of possible replacements it would be good to know what the reservations there were about John Begg initially – he's certainly got a lot of local experience with the geology and the faults in the Wellington region, but as he is now retired I don't know what his availability would be?

**He is available. But currently lives in Greece. He's happy to undertake the work, and the meetings with Doug and PCC would just be skype meetings. He has enough knowledge of the area for a site visit not to be required.**

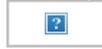
Before validating John Begg as a reviewer, it would be good to know if Coffey have talked to GNS about whether they could review Coffey's report? I know that Nick Clendon got some review and advice from Russ Van Dissen on their fault investigation methodology in the early stages of the project, and as Russ is highly respected and experienced in this subject it would be good to have that input continue. However GNS may also have liability concerns as that has stopped them from doing some fault investigation work in the past, so it would be good to confirm that.

**I have spoken to Russ at GNS. I also tried to contact Dave Heron, but he's out on fieldwork for another month.**

Russ said his team is very busy at present (most are out on field work) and he has been told to prioritize the National Seismic Hazard Model for the next year. He said if we are stuck he could look at it, but would need to check with his bosses about workload/priorities etc.

Russ, in summary said John would be the best option at present if he was available.

Cheers  
Doug  
**Doug Mason**  
Senior Engineering Geologist – Risk & Resilience



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Wellington 6011  
New Zealand

[wsp.com/nz](http://wsp.com/nz)



---

**From:** Mike Scott <[Mike.Scott@porirua.govt.nz](mailto:Mike.Scott@porirua.govt.nz)>  
**Sent:** Friday, 28 February 2020 5:34 PM  
**To:** Mason, Dougal <[doug.mason@wsp.com](mailto:doug.mason@wsp.com)>  
**Cc:** Gina Sweetman <[gina.s@sweetmanplanning.co.nz](mailto:gina.s@sweetmanplanning.co.nz)>  
**Subject:** FW: Fault Study

Hey Doug  
Have you had a chance to look at this please?  
Cheers  
Mike

---

**From:** Mike Scott  
**Sent:** Monday, 24 February 2020 12:37 PM  
**To:** Gina Sweetman <[gina.s@sweetmanplanning.co.nz](mailto:gina.s@sweetmanplanning.co.nz)>; [doug.mason@wsp-opus.co.nz](mailto:doug.mason@wsp-opus.co.nz)  
**Subject:** FW: Fault Study  
Fyi team and thoughts?  
Cheers  
Mike

---

**From:** Brett Gawn <[Brett.Gawn@calibregroup.com](mailto:Brett.Gawn@calibregroup.com)>  
**Sent:** Wednesday, 19 February 2020 11:40 AM  
**To:** Mike Scott <[Mike.Scott@porirua.govt.nz](mailto:Mike.Scott@porirua.govt.nz)>  
**Cc:** Kevin Alkema <[kevin@carrus.co.nz](mailto:kevin@carrus.co.nz)>; Clendon, Nick <[Nicholas.Clendon@coffey.com](mailto:Nicholas.Clendon@coffey.com)>  
**Subject:** FW: Fault Study

Hi Mike  
See below and as discussed, Mark Yetton cannot now do he Kenepuru Fault study.  
Also see below, Nick Clendon has talked with Beca and they have someone who is not very experienced, and Beca will want to limit their liability to 5 times their fee.  
In response to your query about Canterbury University, I believe Nick has talked with people there previously about this, maybe he can talk to you directly about this as a possibility.  
Nick has talked with T&T and they don't have anyone suitable.  
As previously stated – I don't think liability is the issue as that will sit with Coffey and Calibre, so the objective should be to get the individual who can provide the best advice.

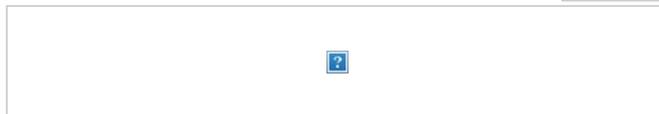
I have re-provided John Begg's cv who was the first person considered that KLP and Coffey believe to be suitable but PCC had reservations about. Perhaps we should reconsider him. At the moment he is the only person qualified that we can find who is available.  
Please let us know PCC's thoughts and please feel free to ring Nick Clendon direct to discuss.

Thanks  
Brett



**Brett Gawn**  
**Sector Leader - Urban Development & Survey**  
P +64 4 384 2029 D +64 4 894 7870 M +64 21 727 052  
E [Brett.Gawn@calibregroup.com](mailto:Brett.Gawn@calibregroup.com)  
Level 13, Kordia House, 109-125 Willis Street, Wellington 6011  
[View the legal disclaimer.](#)

[calibregroup.com](http://calibregroup.com)



---

**From:** Clendon, Nick <[Nicholas.Clendon@coffey.com](mailto:Nicholas.Clendon@coffey.com)>  
**Sent:** Tuesday, February 18, 2020 9:55 AM  
**To:** Brett Gawn <[Brett.Gawn@calibregroup.com](mailto:Brett.Gawn@calibregroup.com)>  
**Cc:** Martin, Sarah <[Sarah.Martin@coffey.com](mailto:Sarah.Martin@coffey.com)>  
**Subject:** Fault Study

Hi Brett,  
Some bad news, Mark Yetton has had to pull out.

Got an eye operation tomorrow and will be out 4-6 weeks. Has all his current work load to deal with.

We are calling around for other, but getting pretty thin.

I have a maybe from Beca, a bit younger, not as experienced as previous but hopefully ok.

However, would want a standard SFA, liability limited to 5xFee. They want something in writing to confirm this ok before wasting their time.

I have attached the conditions, and will send the same to Beca for confirmation.

Nick

Nick Clendon

Principal Engineering Geologist

CMEngNZ (PEngGeol)

m: +64 21 607 200

w: coffey.com

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