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Kapiti Coast District Council
PO Box 601
Paraparaumu

Attn: Kate Dahm

Kate,

1 Fairway Drive
Avalon
PO Box 30 368
Lower Hutt
New Zealand
T +64-4-570 1444
F +64-4-570 4600
www.gns.cri.nz

Following is our report concerning the updating of the 2003 Earthquake Fault Trace Survey of Kapiti Coast (Van Dissen & Heron 2003) as requested by the Council. Also included with this report are 3 shapefiles representing an updated set of fault features and avoidance zones as supplied with the original report. The format of the files has changed since the 2003 report and the interim version provided 2 weeks ago.

REVIEW OF 2003 EARTHQUAKE FAULT TRACE SURVEY FOLLOWING FIELD WORK IN MAUNGAKOTUKUTUKU VALLEY AND TRANSMISSION GULLY AREAS

1.0 Introduction

GNS Science provided to Kapiti Coast District Council (KCDC) a report titled 'Earthquake Fault Trace Survey, Kapiti Coast District' (Institute of Geological & Nuclear Sciences Client Report 2003/77 by Van Dissen & Heron, 2003). The report defined Fault Avoidance Zones for the active faults in the district developed in accordance with the Ministry for the Environment's Active Fault Guidelines (Kerr *et al.* 2003). Following completion of the report, field work undertaken in Maungakotukutuku valley (April 2004) and Transmission gully area (July 2007) has relocated several segments of fault and added a new section. Consequently changes are required to the fault avoidance zones developed in the 2003 study. In addition, trenching of the Ohariu fault has provided additional evidence of fault rupture timing and allowed us to better constrain the Recurrence Interval Class of the fault.

This letter report reviews the fault avoidance zones as a result of the new data collected and reassesses the Recurrence Interval Class of the Ohariu fault.

2.0 Ohariu fault - recurrence interval

Since the release of the 2003 study, trenching and other detailed studies on the Ohariu fault (Litchfield *et al.* 2006) have determined that the fault has an average recurrence interval of surface rupture earthquakes of 2200 years with 68% confidence limits of 1300 to 3800 years (Litchfield *et al.* 2006). Prior to this work the fault was thought to have a recurrence interval of faulting of 1500-5000 years. The fault Recurrence Interval Class as defined in the MfE Interim

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Guidelines (Kerr *et al.* 2003) has not changed, but the new data means that the fault is placed in Recurrence Interval Class II, >2000 years to ≤3500 years (Table 1) with a higher level of confidence.

Table 1 Recurrence Interval Classes of known active faults within Kapiti Coast District. For more detail see Kerr *et al.* (2003), Van Dissen *et al.* (2003), Litchfield *et al.* 2006.

Fault Name	Recurrence Interval Class	Recurrence Interval Range of Respective Recurrence Interval Class	Confidence of Recurrence Interval Classification
Ohariu fault	Class II	>2000 years to ≤3500 years	Moderate
Northern Ohariu fault	Class II	>2000 years to ≤3500 years	Low*
Otaki Forks fault	Class III	>3500 years to ≤5000 years	Low*
Gibbs fault	Class III	>3500 years to ≤5000 years	Low*
SE Reikorangi fault	Class IV	>5000 years to ≤10,000 years	Low*
<p>Note: * As defined in the MfE Interim Guidelines, a Low confidence of recurrence interval classification is assigned to an active fault if there are no fault-specific data available for the fault to enable an estimation of its fault-specific recurrence interval (i.e. Recurrence Interval Class is assigned based only on subjective comparisons with other better studied faults) (e.g. Otaki Forks, Gibbs, and SE Reikorangi faults).</p>			

3.0 Ohariu fault - revision of location

Fieldwork in 2007 necessitates the relocation of several small segments of the Ohariu fault near or just north of the saddle in Transmission gully and the revision of the fault avoidance zones accordingly. The main change is the alteration of part of the fault avoidance zone from *uncertain – constrained* to a broader *uncertain – unconstrained* zone in the hills to the east of the northern end of Transmission gully. This area was noted in the 2003 report as showing evidence of widespread disruption.

These features have been added/amended in the database and fault avoidance zones redefined. The changes are restricted to hilly rural land in or above Transmission gully and will have minimal impact on property owners.

4.0 Gibbs fault – revision of location

Since the release of the 2003 study, mapping in Maungakotukutuku valley revealed a new fault trace (Townsend & Heron 2004). The newly discovered *well defined* trace passes southwest

across Maungakotukutuku Stream and across hill slopes towards Nikau Valley. The good preservation of the feature is similar to that seen on recently active parts of the Ohariu fault and it is possible the scarp formed at the same time as the last movement on the Ohariu fault. No evidence has been found in the hills above Nikau valley to suggest this newly discovered trace joins with the Ohariu fault. There is also no evidence of repeated movement.

This new fault feature has been added to the database and new fault avoidance zones have been defined. The changes are restricted to hilly rural land in or above Maungakotukutuku valley and will have minimal impact on property owners.

The fault is assigned the same Recurrence Interval Class as the Gibbs Fault.

5.0 Southeast Reikorangi fault revision

Since the release of the 2003 study, mapping in Maungakotukutuku valley (Townsend & Heron 2004) has identified a new trace from air photos and relocated two other fault features in the hills to the east in the middle valley where the fault branches from the Gibbs fault.

These faults have been added/ amended in the database and fault avoidance zones have been redefined. The changes are restricted to hilly rural land and will have minimal impact on property owners.

6.0 Other revisions

The mapping in Maungakotukutuku valley (Townsend & Heron 2004) also indicates the presence of numerous small linear features in the south of the valley, south of where the Maungakotukutuku Stream meets Maungakotukutuku Road, and these are thought to be related to faulting.

These features have been added to the database and fault avoidance zones have been developed. These changes are restricted to hilly rural land and will have minimal impact on property owners.

Summary, Conclusions and Recommendations

Mapping subsequent to the release of the 2003 Fault Trace Survey has revealed additional fault traces in and around Maungakotukutuku valley and Transmission gully and required small changes to the location of some features.

The fault feature database has been revised to include the new features and the fault avoidance zones have been updated on the basis of the new information.

All new features and the consequent revised fault avoidance zones are in hilly rural areas and impact on very few properties.

New trenching has helped constrain the recurrence interval of faulting on the Ohariu fault and a revised Recurrence Interval Class table is included. The classification of the Ohariu fault remains as it was in the 2003 report, but the confidence with which it is placed in Recurrence Interval Class II has been improved.

References

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Yours sincerely



Dave Heron, Dougal Townsend, & Russ Van Dissen
(Authors)



Mark Rattenbury
(Reviewer)