IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of Proposed Plan Change 29 to the Nelson Resource Management Plan

SUMMARY STATEMENT OF DAN CHAMBEROSE ON BEHALF OF NELSON CITY COUNCIL

NATURAL HAZARDS - GEOTECHNICAL

1. INTRODUCTION

1.1 My name is Daniel Thomas Chamberose, and I am an Associate Engineering Geologist at Beca Limited.

1.2 I am a geotechnical expert for the Council on Plan Change 29 ("PC29") for the slope instability susceptibility, faults (deformation and awareness overlays) and liquefaction overlays.

1.3 My experience, qualifications, involvement in this project and agreement to comply with the Code of Conduct is set out in my Primary Statement of Evidence dated 24 June 2024 and Rebuttal Statement dated 19 August 2024.

1.4 I attended expert conferencing on the 31 July 2024. Items agreed are outlined in the Geotechnical Natural Hazards Joint Witness Statement of 31 July 2024 (JWS). A summary of matters agreed and my position on key matters raised by submitters addressed through my evidence and rebuttal statement are summarised below:

(a) Liquefaction overlay is fit for purpose as currently presented (section 3.2 of the JWS)

(b) No change is required to Area 1 and debris run out area of the slope instability susceptibility overlays (section 3.4.1 iii of the JWS).

(c) It may be appropriate to combine Area 2 and 3 of the slope instability susceptibility overlays (section 3.4.1 i of the JWS). This is because there could be Area 2 pieces of land within Area 3, which could result in different consenting requirements being applied.

(d) The naming of the overlays should be amended to include susceptibility in their title to accurately reflect their intent to avoid users misunderstanding their purpose (paragraph 5.27 of my evidence).

(e) The viewing scale of the maps and a suggested disclaimer for the overlays should be added to the map Webviewer (refer paragraph 7 of rebuttal evidence for suggested disclaimer and viewing scale, and paragraph 5.28 and 5.29 of my evidence).

(f) The occurrence of slope instability depends on a range of factors including the nature of a triggering event. Therefore, in my opinion I do not believe it is appropriate to remove susceptible areas from the slope overlays just because they were not affected by recent events such as the 2022 storm event (paragraph 5.19 of my evidence).

(g) The fault hazard mapping is in agreement subject to the proposed revisions and with the exception of recurrence intervals (discussed below). Where information has been provided by submitters on fault location as part of PC29 and where appropriate to do so, it is recommended that the fault overlays be amended (refer Figure 4 and 5 of evidence and Figure 1 of rebuttal statement).

(h) Slope overlays and land within 100m downslope of active faults. There are no specific areas of the overlay triggered by this criterion, therefore, no amendments to the overlays are required.

(i) 27 Bay View Road. Following a review of information and a site visit, no amendments are required to the overlay in this area.

1.5 I set out below an overview of my opinion on the key outstanding matters raised in submissions and in submitter evidence.

2. KEY OUTSTANDING ISSUE 1: FAULT DEFORMATION AND FAULT AWARENESS OVERLAYS – RECURRENCE INTERVALS (RIS)

2.1 Updates to the fault overlays in the region followed Step 1 and 2 of the risk-based approach in the MfE guidance[1]. The existing operative overlays were

[1] Kerr, J., Nathan, S., Van Dissen, R., Webb, P., Brunsdon, D and King, A. 2003. Planning for Development of Land on or close to Active Faults. Report for the Ministry for the Environment by the Institute of Geological & Nuclear Sciences. Institute of Geological & Nuclear Sciences Client report 2002/124 440W103301, July 2003.

updated to show i) revised fault offset widths (i.e., revised fault corridor widths), where new information was known on faults, and ii) linking up of existing sections of non-continuous corridors (where appropriate to do so) in the region. These were updated to identify a zone on the ground surface where fault deformation or fault rupture could potentially occur if there is future movement on a fault. The location of where this deformation or rupture would occur within the overlay is dependent on anticipated fault deformation width, dataset accuracy and fault location confidence. Council have addressed the other steps in the MfE guidance risk-based approach by adopting regulatory methods (rules) to address the risks associated with the hazard. The intent of this approach being that if certain activities were proposed within the fault overlays, this could trigger a more detailed assessment of the fault hazard/risk.

2.2 There is disagreement between experts on the inclusion of recurrence intervals and the impact this has on the overlays and provisions associated with them. Mr Lines and Ms Hargraves believe that overlays should not be applied to faults with long recurrence intervals, or that rules should be changed to allow certain buildings to be constructed within the fault overlays.

2.3 The current proposed approach to fault hazard in Nelson would be considered a precautionary approach (as identified in the MfE guidance using Nelson City Council as an example); however, I believe this approach is appropriate to manage the risks related to fault rupture in the region given:

(a) MfE guidance mentions several times that it is best to avoid fault rupture hazard (even for faults with long recurrence intervals) when possible to do so, and that recurrence intervals are a statistical measure only and are not an accurate predictor of future movement on a fault.

(b) I consider allowing construction of certain buildings across active or potentially active faults is a short-term view, and that avoiding the hazard is the safest and most satisfactory long-term solution for current and later landowners.

(c) Currently, there is uncertainty around recurrence intervals on some faults in the region. Some of these faults show evidence of rupture in the last 12,000 years but there is uncertainty within that time period of when they ruptured.

2.4 I consider that the rules proposed for the plan change relating to the fault overlays are appropriate from a geotechnical point of view. The rules trigger

further geotechnical assessment to better define the risks when developing within the fault overlays.

3. KEY OUTSTANDING ISSUE 2: SLOPE INSTABILITY SUSCEPTIBILITY OVERLAYS AND DEBRIS RUN-OUT OVERLAY – STABILISED/MODIFIED LAND AND THE OVERLAYS

3.1 The slope instability susceptibility overlays have been developed to align with the Australian Geomechanics Society Guideline for Landslide Susceptibility, Hazard and Risk Zoning for Land Use Planning (AGS guidelines)[2]. The slope overlays were created through the development of a methodology tree (presented in the Beca reports) that aligned with the AGS guidance to identify land that was potentially susceptible to slope instability. The original susceptibility overlay was split into Area 1, 2 and 3 based on the suggestion by Slope Instability Technical Advisory Group (SI-TAG) to reflect the varying nature of slope susceptibility in the region, which may warrant separate planning considerations to better manage activities that could trigger instability in these areas. These revised overlays with Areas 1, 2 and 3 are the overlays that were presented in PC29. As mentioned above it is agreed amongst experts that Area 2 and 3 could be combined (Area 1 remains unchanged and separate) into a single overlay. The following comments assume the recommendation to combine Area 2 and 3 overlays is accepted.

3.2 It is crucial to clarify the intended purpose of the slope instability susceptibility overlays. These are regional scale (1:5,000) susceptibility overlays that are intended simply as a trigger for further site specific-geotechnical assessment. The overlays do not consider risk, or explicitly consider previously engineered certified/modified land. In my opinion, the combined slope overlay provides an appropriate tool to allow provisions to be put in place to manage potential slope instability risks in the region by triggering further site-specific assessment. I believe the proposed provisions and building consent processes are appropriate to manage the risks associated with potential slope instability within the slope overlays.

3.3 There is still however an outstanding issue that needs to be resolved. Submitters have requested land that has been modified or stabilised be excluded from the slope overlays.

---

[2] Australian Geomechanics Society, 2007a. Guideline for Landslide Susceptibility, Hazard and Risk Zoning for Land Use Planning, Journal and News of the Australian Geomechanics Society, 42 (1): 13- 36.

3.4 One of the datasets used to create the slope overlays was LiDAR information (i.e. hill shade model and slope angles) that captured the contour of the land between 2008-2015. Following the August 2022 storm event in Nelson, new LiDAR was flown which captured more recent information on the contours of the land. The LiDAR was used to inform the 2022 slope overlay updates in areas where new damage was observed, however, a full remap of the whole extent of the slope overlays was not undertaken. If updated data sets were used (such as the 2022 LiDAR) to run through the same methodology for the slope overlays, some areas would be excluded from the slope overlays as a result of modification of slopes that have altered the contour of the land. There are likely to be a number of sites around the region (including parts of submitters land) where land contour has changed which will not be reflected in the current PC29 slope overlays. Figure 1 below shows an example of this at Bayview.

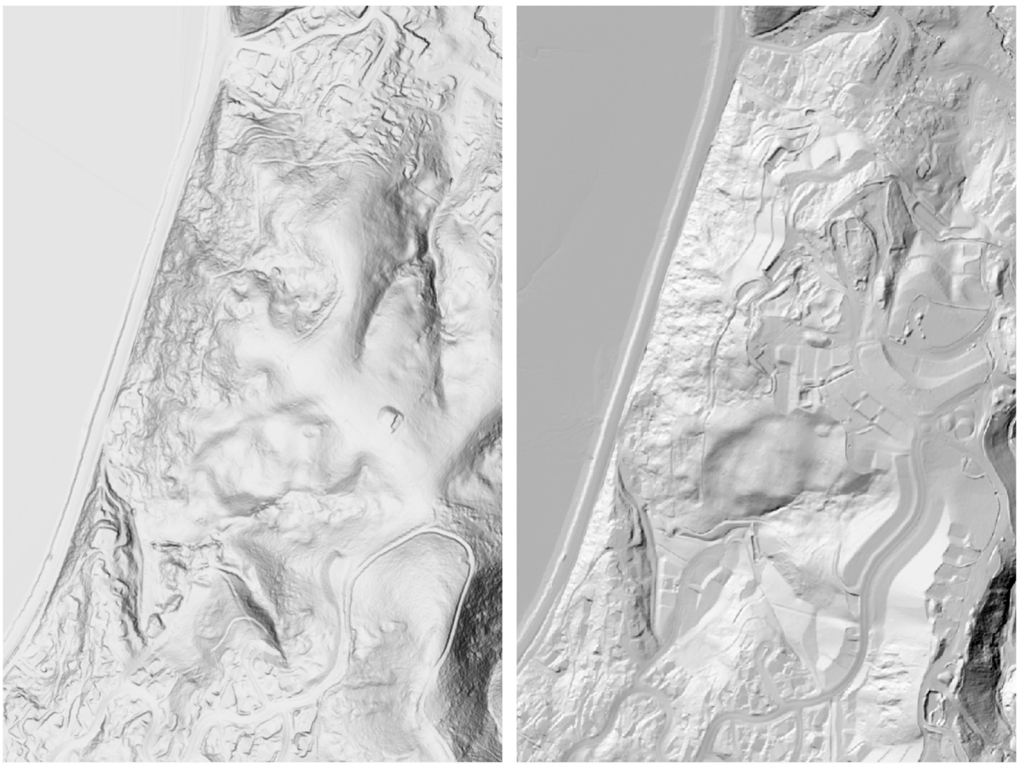


Figure 1: Example of changes in land contour changes between datasets. Left is a hill shade model from LiDAR 2008-2015. Right is a hill shade model from LiDAR 2022.

3.5 The currency of the data is an ongoing consideration for overlays such as this that rely on data which is only accurate at the date it was created. As mentioned in my rebuttal evidence (paragraph 6.3), consideration of the most appropriate time to complete an update (be it only related to submitters land or the wider extent of the region) of the overlays using the latest datasets is required.

3.6 If it is agreed that more recent base datasets be used to update overlays of submitters land or the wider extent of the region, there may still be some areas where modified or stabilised land still triggers the criteria of the methodology tree for inclusion in the slope overlays. For example, large scale earthworks/modified slopes/engineered structures may still be steeper than 35° in slope angle, or replacement of materials within a deep-seated landslide would still be captured as susceptible when using the methodology tree. As set out in my evidence (paragraph 5.19, 5.23 to 5.25) and rebuttal evidence (paragraph 6.8), I do not think it is appropriate or practicable to exclude these areas from a regional slope overlays purely because they have been engineered. This is because they are designed to a certain standard (design life and design criteria such as earthquake loading) and to determine whether they were not susceptible to slope instability would require review of these slopes and standards to which they are designed, along with consideration of the site-specific information on file and at the site.

4. KEY OUTSTANDING ISSUE 3: SLOPE INSTABILITY SUSCEPTIBILITY OVERLAYS AND DEBRIS RUN-OUT OVERLAY – OVERLAY BOUNDARY INTERPRETATION

4.1 There has been discussion around interpretation of the regional overlays when compared to site-specific information (some examples provided by submitters where land has been remapped). The intent of the regional scale overlays is to highlight areas where a more detailed site-specific assessment is required to further detail slope instability considerations at a site. Using site specific information or knowledge to challenge the accuracy of a regional scale assessment where its very intent is to trigger that level of detailed assessment is not appropriate.

5. CLOSING STATEMENTS

5.1 The liquefaction, fault and slope overlays were developed at a regional scale, using appropriate methodologies/guidance, and completed by suitably qualified people, with the intent of triggering further site-specific assessment of the risks associated with these hazards.

5.2 In my opinion the overlays are appropriate to allow provisions to be put in place to manage potential risks associated with these natural hazards.

Dan Chamberose

23 August 2024