

**BEFORE THE HEARINGS PANEL  
FOR THE PROPOSED WAIMAKARIRI DISTRICT PLAN**

**UNDER** the Resource Management Act 1991 (RMA)

**IN THE MATTER** of the Proposed Waimakariri District Plan

**AND**

**IN THE MATTER** of Hearing Stream 3: Natural Hazards Chapter

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**STATEMENT OF EVIDENCE OF NICHOLAS DAVID ROBERT GRIFFITHS  
ON BEHALF OF THE CANTERBURY REGIONAL COUNCIL**

**NATURAL HAZARDS**

**10 July 2023**

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**WYNN WILLIAMS**

## **SUMMARY STATEMENT**

- 1 The Section 42A report recommendations address many of the points raised in the Canterbury Regional Council (**CRC**) submission. In some cases, the recommendations are intended to address the CRC submission points, but require further refinement to do so effectively.
- 2 The main points raised in the CRC submission that I consider to be inadequately addressed by the Section 42A report recommendations relate to how offsite flood effects are managed.

## **INTRODUCTION**

- 3 My full name is Nicholas David Robert Griffiths.
- 4 I hold a Bachelor of Science with Honours degree in Geography and Geology obtained from the University of Canterbury in 2005. I have been employed by the CRC as a natural hazard scientist since September 2011. This role involves assessing and providing advice on natural hazards and associated planning provisions.
- 5 Although this is a Council-level hearing, I can confirm that I have read and am familiar with the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023. I have complied with the Code of Conduct in preparing this evidence and I agree to comply with it while giving any oral evidence during this hearing. Except where I state that I am relying on the evidence of another person, my evidence is within my area of expertise. I have not omitted to consider material facts known to me that might alter or detract from the opinions that I express.
- 6 I was an author of the Joint Witness Statement dated 9 June 2023 and confirm that I complied with the Code in preparing that statement.
- 7 Although I am employed by the Regional Council, I am conscious that in giving evidence in an expert capacity that my overriding duty is to the Hearings Panel.

## **SCOPE OF EVIDENCE**

- 8 I have prepared my evidence on behalf of CRC.
- 9 My evidence primarily relates to how the recommended provisions give effect to the natural hazards policies of the Canterbury Regional Policy Statement (**CRPS**).

- 10 I have reviewed the following documents and evidence in preparing my evidence:
- a. The notified provisions of the Natural Hazards chapter of the proposed Waimakariri District Plan (**pWDP**);
  - b. The Section 32 report prepared and notified by Waimakariri District Council (**WDC**);
  - c. The Section 42A report prepared by WDC, including the evidence of Mr Chris Bacon and Mr Damian Debski on behalf of WDC;
  - d. The CRPS;
  - e. The evidence of Ms Joanne Mitten on behalf of CRC.
  - f. The evidence of Ms Jolene Irvine on behalf of CRC.

### **High Hazard Definition**

- 11 I agree with the Section 42A report recommendation to delete the definition of 'high coastal flood hazard area' and 'high flood hazard area' and replace them with a single 'high hazard area' definition.
- 12 I agree that the CRPS definition of 'high hazard areas' is ambiguous with respect to coastal inundation.
- 13 The definition presented in the Section 42A report is clearer, and I consider that it aligns with the intent of the CRPS. However, I consider that the 'and' between the two clauses should instead read 'or', to make it clearer that an area would meet the high hazard definition if either of the clauses are met.
- 14 Subject to this change, I support the 'high hazard area' definition presented in the Section 42A report.
- 15 I broadly agree with the rationale for supporting the recommended definition presented in the evidence of Mr Damian Debski.

### **Flood Overlays**

- 16 I agree with the Section 42A report recommendation to use revised Urban and Non-Urban Flood Assessment Overlays, as described in the Joint Witness Statement that I prepared in conjunction with Mr Chris Bacon.
- 17 The revised flood assessment overlays broadly address concerns raised about the notified overlays in the CRC submission. I consider that use of the revised

overlays will reduce the likelihood of buildings being constructed with an insufficient standard of flood mitigation.

- 18 I also agree with the Section 42A report recommendation that NH-R2(3) and NH-R3(2)(f) – that outline flood mitigation requirements for areas outside the notified Non-Urban Flood Assessment Overlay – can be deleted, if the more extensive revised overlays are adopted. I consider the likelihood of buildings being proposed in areas subject to flooding outside of the revised overlays to be low, as these areas will generally be obvious (i.e., within well-defined stream channels or localised depressions).
- 19 I agree with the Section 42A report recommendation to delete the Kaiapoi Fixed Minimum Floor Level Overlay (and associated references) and replace it with the Urban Flood Assessment Overlay. This will provide greater flexibility if new flooding information becomes available during the life of the plan, and a more consistent approach to managing flood hazards across the district.

### **Liquefaction Overlays**

- 20 I agree with the Section 42A report recommendation to amend the Liquefaction Hazard Overlay so that it only captures 'liquefaction damage is possible' areas within the Waimakariri District. The broad extent of the notified overlay appears to have been due to a GIS error, and the recommended amendment would be consistent with the extent that was originally intended.

### **Natural Hazard Sensitive Activity Definition**

- 21 I agree with the Section 42A report recommendation to amend the definition of 'Natural hazard sensitive activity' to be based on the physical characteristics of buildings, rather than their use. I consider that the amended definition will more appropriately capture buildings that should be afforded an adequate level of flood mitigation. The recommended amendments to the definition will make it more difficult for the associated rule requirements to be circumvented when new buildings are constructed, or existing buildings are converted.
- 22 I also agree with the recommendation to expand the definition of 'Natural hazard sensitive activity' to capture the conversion of existing buildings, in addition to the construction of new buildings.
- 23 The changes recommended in the Section 42A report address most of the concerns raised in the CRC submission.

- 24 However, I do not agree that 'attached garages' should be excluded from the definition (as recommended in the notified plan and Section 42A report).
- 25 Garages attached to modern residential units often have the same potential for flood damage as the rest of the building, are integral to the structure and use of the building, and contain items of value that could be damaged or destroyed during a flood.
- 26 I consider that attached garages should be captured by the definition (and therefore associated rules), noting there is a resource consent pathway that could enable them to be built with lower floor levels in certain circumstances. This would give the council a mechanism to impose other mitigation measures that help to reduce flood damage.

### **Freeboard**

- 27 I agree with the Section 42A report recommendation to specify freeboard requirements in NH-S1 and NH-S2, as I consider it will provide additional certainty for plan users.
- 28 I also consider that the freeboard amounts will typically be adequate to account for uncertainty in design flood levels, and physical factors that can locally increase water levels during a flood event. The recommended freeboard amounts are reasonably conservative, and generally consistent with those used in other district plans that I am aware of.

### **Diversion and Displacement of Floodwater Policies**

- 29 I support the intent of changes to policies NH-P2, NH-P3, NH-P4, and NH-P7 recommended in the Section 42A report, with respect to offsite flood effects which require that the risk from flooding on surrounding properties is 'no more than minor'. However, the recommended wording does not appear to accurately capture the intent of the change.
- 30 I understand the intent of the recommended re-wording is to state that the **increase** in flood risk on surrounding properties from subdivision, use and development should be 'no more than minor'.
- 31 However, the recommended wording simply states that 'the risk from flooding on surrounding properties is no more than minor'. This wording could be amended to 'the increased risk from flooding on surrounding properties is no more than minor' to better reflect the intent of the policies. This reflects that in some instances

there will already be risk from flooding on surrounding properties, irrespective of the development.

- 32 The evidence of Ms Joanne Mitten addresses other issues related to the wording of these policies.

### **Diversion and Displacement of Floodwater Rules**

- 33 I have two main concerns relating to how diversion and displacement of floodwater is addressed by the recommended rules, as follows:
- a. I consider that it is inappropriate to specify a single magnitude flood event for effects to be assessed against.
  - b. I consider that the rules fail to address all activities that can cause offsite flood effects.

These two concerns are outlined further below.

- 34 I support the intent of changes to NH-R4, NH-R5, NH-R6, NH-R17, and NH-R18 recommended in the Section 42A report to include a requirement that the activity does not exacerbate flooding on any other property by displacing and diverting floodwaters on surrounding land in a 0.5% annual exceedance probability (AEP)<sup>1</sup> event. I support this change as it is based on effects, rather than an arbitrary threshold which may or may not relate to effects.
- 35 I also support the intent of changes with respect to providing greater clarity around how effects should be assessed. However, I consider that the wording recommended in the Section 42A report ('...in a 0.5% AEP event') is not appropriate, as the size of event that produces the worst offsite effects will vary on a case-by-case basis.
- 36 For example, development on a given site may have no offsite flood effects in a small event (e.g., 10% AEP), as there will be no flooding on the site. Offsite flood effects may be more than minor during a moderate event (e.g., 2% AEP), as the development may divert a large proportion of floodwater onto neighbouring properties that would otherwise be unaffected. During a large event (e.g., 0.5% AEP), effects of the development may be less than minor, as the site and

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<sup>1</sup> Annual exceedance probability (AEP) is the probability of a flood of a certain size occurring in a single year.

surrounding properties are subject to severe flooding anyway, and the impact of the development becomes negligible.

- 37 I therefore suggest that this wording could be amended to ‘...in events with an AEP of 0.5% or more’ or similar, so it is clear that a range of flood events need to be considered, but not events that are larger than a 0.5% AEP event.
- 38 Regardless of the wording issues noted above, I do not consider that the natural hazard rules recommended in the Section 42A report and notified earthworks rules adequately implement the relevant policies. The rules only address offsite effects in the following circumstances:
- a. NH-R1, NH-R2, and NH-R3 address offsite effects associated with buildings that meet the ‘natural hazard sensitive activity’ definition, where they are proposed to be in overland flow paths (via a restricted discretionary resource consent pathway).
  - b. NH-R4, NH-R5, NH-R6, NH-R17, and NH-R18 address offsite effects associated with infrastructure, regardless of the whether the activity is within an overland flow path.
  - c. EW-R5 addresses offsite effects associated with earthworks in overland flow paths that are greater than 0.25 m above ground level, where the flood depth is greater than 100 mm in a 0.5% AEP event, and where the fill is not for building platforms (subject to boundary setbacks).
- 39 This means that the rules do not address the potential for offsite flood effects associated with ‘natural hazard sensitive activities’ outside of overland flow paths, earthworks unrelated to infrastructure outside of overland flow paths, or other activities (such as buildings that do not meet the definition of ‘natural hazard sensitive activities’, certain types of earthworks, and structures).
- 40 This leaves gaps in the rule framework where certain activities that could cause offsite effects are not addressed, either due to the type of activity, or the location of the activity (i.e., outside of an overland flow path). More than minor offsite effects can still occur from the displacement or diversion of floodwater in areas that do not meet the overland flow path definition.
- 41 Additionally, the way in which the two sets of recommended natural hazards rules and the proposed earthworks rules deal with offsite flood effects is inconsistent.
- 42 I consider it appropriate to address all activities that could cause offsite flood effects in a consistent fashion.

- 43 I consider that a single permitted activity rule similar to that recently incorporated into the Kaikoura District Plan would provide a simpler, more effective, and risk-based means of addressing offsite flood effects. For example, a rule that permits all above ground earthworks, buildings, and structures in the flood overlays (irrespective of whether they are in an overland flow path or not) if they will not worsen flooding on other properties, defaulting to a restricted discretionary resource consent if they will. A suggested additional rule and consequential amendments in the pWDP are set out in the evidence of Ms Joanne Mitten.

### Standards

- 44 I consider that the flooding scenarios outlined in standards NH-S1(1)(e) and NH-S2(1)(d) in the Section 42A report are unnecessarily prescriptive and may become outdated during the life of the plan. The Section 42A recommended wording is as follows:

#### NH-S1(1)(e)

- i. flooding predicted to occur in a 0.5% AEP (1 in 200-year) Localised Rainfall Event plus up to 500 mm freeboard; or
- ii. flooding predicted to occur in a 0.5% AEP (1 in 200-year) Ashley River/Rakahuri Breakout Event concurrent with a 5% AEP (1 in 20-year) Localised Rainfall Event plus up to 500 mm freeboard; or
- iii. flooding predicted to occur in a 0.5% AEP (1 in 200-year) Storm Surge Event concurrent with a 5% AEP (1 in 20-year) River Flow Event with sea level rise based on an RCP8.5 climate change scenario, plus up to 500 mm freeboard.

#### NH-S2(1)(d)

- i. the flooding level predicted to occur in a 1% AEP (1 in 100-year) Storm Surge Event concurrent with a 5% AEP (1 in 20-year) River Flow Event with sea level rise of 1 m based on an RCP8.5 climate change scenario.

- 45 I consider that the flood scenarios could be described more generally for both standards, consistent with the recommended 'high hazard area' definition. For example, 'flooding predicted to occur in a 0.5% AEP flood event, accounting for the cumulative effects of climate change over the next 100 years (based on latest national guidance) and all sources of flooding (including fluvial, pluvial, and coastal)'.



- 46 I consider this would provide adequate certainty for plan users, whilst maintaining the flexibility needed to incorporate the latest climate change guidance, and flood modelling best practice.
- 47 I support the Section 42A report recommendation that coastal flooding is required to be mitigated to a 0.5% AEP standard, (rather than 1% AEP as originally proposed), but consider the wording could be modified as outlined above in paragraph 45 above.
- 48 However, I note that the Section 42A report does not recommend an equivalent change to NH-S2, which creates an inconsistency in the coastal flood mitigation required by the two standards. I consider that any reference to 1% AEP in NH-S2 should instead reference 0.5% AEP to be consistent with NH-S1, and to give effect to the CRPS.

Dated this 10<sup>th</sup> day of July 2023



Nicholas David Robert Griffiths