

**BEFORE A PANEL OF INDEPENDENT HEARING COMMISSIONERS IN THE  
WAIKATO REGION**

**I MUA NGĀ KAIKŌMIHANA WHAKAWĀ MOTUHEKE WAIKATO**

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

**AND**

**IN THE MATTER** of Proposed Variation 3 to the Waikato Proposed  
District Plan (PDP)

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**SECOND STATEMENT OF REBUTTAL EVIDENCE OF ANDREW BOLDERO FOR  
WAIKATO DISTRICT COUNCIL  
(HOROTIU STORMWATER)**

**Dated 14 NOVEMBER 2023**

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## **INTRODUCTION**

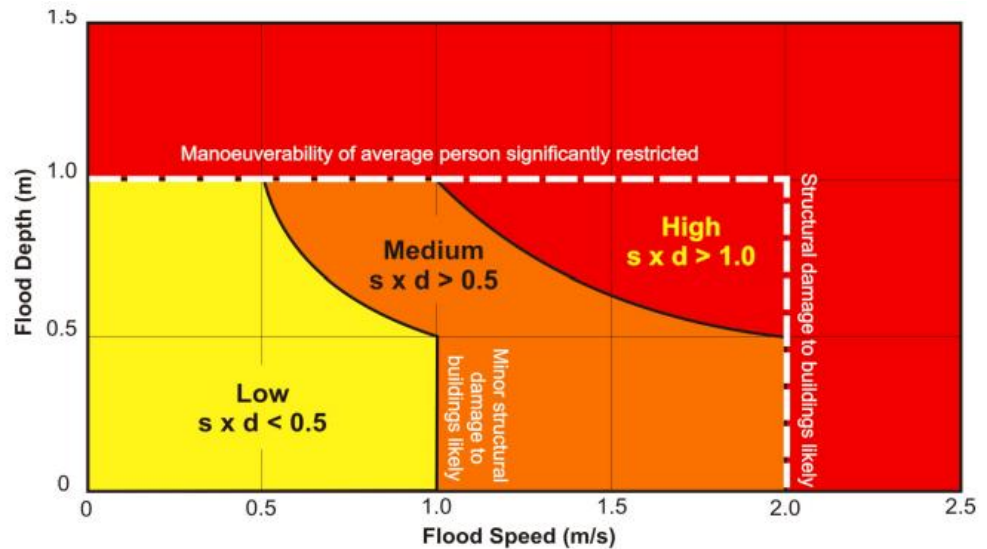
1. My name is Andrew Stanley Boldero and I am a Principal Stormwater Engineer at Te Miro Water.
2. My qualifications and experience are set out in my statement of evidence in chief (EIC) dated 20 June 2023.
3. I reaffirm the commitment in my EIC to adhere to the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023.
4. This statement of rebuttal responds to questions raised during the hearing relating to:
  - (a) Statement of Evidence of Aaron Collier for Horotiu Farms Limited (Submitter 049);
  - (b) Statement of Evidence of Justin William Adamson for Horotiu Farms Limited (Submitter 049); and
  - (c) Statement of Evidence of Tim Lester (Planning) for Korris Limited (Further submitter 201).

## **AARON COLLIER ON BEHALF OF HOROTIU FARMS**

5. In paragraph 6.4, Mr Collier refers to the small pockets of High Risk Flood areas on the Horotiu Farms land and the larger area on the Korris block and states Variation 3 does not define these areas.
6. High Risk Flood areas are defined as per the following graph which is a graphical representation of the following district plan criteria for the 1% AEP rainfall event:
  - (a) Exceeds 2 m/s velocity/speed;
  - (b) Exceeds 1m in depth;

(c) Flood depth multiplied by flood speed exceeds 1.

7. A High Risk Flood area is considered a significant hazard.



<p><b>High risk flood zones</b></p>	<p>Land that is subject to river or surface flooding during an event with an annual exceedance probability of no more than one per cent, and during such an event:</p> <ul style="list-style-type: none"> <li>i. the depth of flood waters exceeds one metre;</li> <li>ii. the speed of flood waters exceeds two metres / second; or</li> <li>iii. the flood depth multiplied by the flood speed exceeds one.</li> </ul>
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8. I refer paragraphs 6.5 and 6.6 which oppose the non-complying activity status for High Risk Flood areas on the site.

9. I understand that the resource consent process to develop land with High Risk Flood areas is more onerous than land without such risks under the provisions of the PDP. I acknowledge that there are instances where High Risk Flood areas (particularly isolated ponding areas) can be removed through filling (earthworks) or other engineering solutions. If flood hazards are mitigated, I am of the view that a less onerous resource consenting pathway should be available to enable development.

10. I have reviewed the recommended exemption to the High Risk Flood rules recommended by Ms Lepoutre in the s42A rebuttal report dated 14 November 2023. The recommended exemption would enable

developers/landowners to submit a detailed hydraulic analysis undertaken by a suitably qualified person, around isolated high risk flood areas that would, within the consenting process, enable a developer with Waikato District Council approval, to remove thi high risk flood category by undertaking a detailed flood hazard analysis of the lot/area which:

- (a) Provides evidence that the isolated area is not a High Risk Flood area, or;
- (b) The isolated high risk hazard can be remove by an engineered solution that does not cause adverse effects.

#### **JUSTIN WILLIAM ADAMSON ON BEHALF OF HOROTIU FARMS**

- 11. At paragraph 7.5 of his evidence, Mr Adamson raises the same concerns regarding the High Risk Flood areas on the site as raised by Mr Collier. I have addressed this is paragraphs to 8 to 10 above. In paragraph7.6 Mr Adamson states the terms 'flood plain' and 'overflow flow paths' should be defined for clarity.
- 12. Both terms are defined in the modelling report as areas greater than 0.1m in depth and covering more than 150 m<sup>2</sup> area (25% of a 600m<sup>2</sup> lot) as shown within the flood maps. As the mapping aligns with the Waikato Regional Council hydraulic modelling guidelines, I consider the above definition reasonable and aligns with other flood mapping undertaken in the region and across New Zealand.
- 13. Any further amendments to the definition of overland flow paths could be considered in the future when further updates of the models are considered.
- 14. At paragraph 7.11 Mr Adamson states reliance of the flood maps need to be exercised with caution as it appears no calibration of the hydraulic model has been undertaken.

15. Calibration is not available for the model as we do not have real time flow or level data to undertake a calibration. Very few large-scale models across NZ are calibrated due to this reason. I further note that calibration is not a requirement under the Waikato Regional Council's Stormwater Modelling Guidelines.
16. In my opinion, the current level of modelling undertaken is fit for purpose and represents a higher level than standard practice for rapid flood modelling in NZ. The recent sensitivity checks have also highlighted confidence in the modelling results given the model's limited sensitivity to various parameters. I acknowledge that this model does not replace the requirement for specific and detailed hydraulic analysis to be undertaken when development is proposed or being consented.
17. At paragraph 7.12 Mr Adamson considers the modelling may be conservative and potentially overestimates the flooding and runoff because it uses an 80% impervious rate compared to 70% permitted in the MRZ.
18. The MRZ impervious area is not proposing to increase the maximum allowable impervious area from 70%. The model must account for the roads within this area which have a higher impervious area. Therefore, for areas that are zoned for future development (and do not have a defined road layout), the hydraulic model increases the maximum impervious area to represent this. The 80% utilised reflects the increase in impervious area average due to roads which are typically higher in impervious cover than a residential lot. 80% coverage is considered representative of this.
19. The 80% impervious cover does not represent individual future development layouts (as this is an urban scale model), which may have various proposed land cover types (i.e. reserves) not represented in the model. I refer to paragraph 16 above outlining the modelling scope and developer requirements for detailed hydraulic analysis.

**TIM LESTER ON BEHALF OF KORRIS LIMITED**

20. The High Risk Flood areas identified within the Korris property is not considered 'isolated' and therefore should not be considered for an engineering solution to remove the High Risk Flood hazard (I understand this is not being proposed). This is due to the site's connection to the main watercourse/stream running north which is currently experiencing significant erosion. No reduction in flood storage volume, increase in flood or nominal flow levels or increases in velocity downstream would be acceptable in this location due to the likely impact (increase) on the severe downstream erosion. Notwithstanding this, I understand that engineering solutions for the development of the Korris land have already been proposed through a resource consent application to the Waikato Regional Council.

Andrew Boldero  
14 November 2023