

**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)

**EVIDENCE IN CHIEF OF ANDREW BOLDERO FOR WAIKATO DISTRICT COUNCIL
(HOROTIU STORMWATER)**

Dated 26 SEPTEMBER 2023

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INTRODUCTION

1. My name is Andrew Stanley Boldero. My qualifications and experience were set out in my statement of evidence in chief for the substantive hearing dated 20 June 2023. In summary I have a New Zealand Certificate in Civil Engineering (NZCE) and a Diploma of Environmental Studies (Open Polytechnic of New Zealand), and I am an affiliate member of Engineering NZ.
2. I have 10 years' experience in the stormwater sector and for the last one and half years have held the position of Principal Stormwater Engineer at Te Miro Water Consultants Ltd.
3. I reaffirm the commitment to adhere to the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023.
4. Te Miro Water (TMW) was originally contracted (March 2023) by Waikato District Council (WDC) to undertake flood modelling in the four towns included in the notified version of Variation 3 – Ngaaruawaahia, Huntly, Pookeno and Tuakau. TMW has since been asked to undertake the same modelling for Horotiu. I have undertaken or supervised the completion of this work.

SCOPE OF MY EVIDENCE

5. My evidence for the Horotiu hearing addresses the following:
 - (a) A description of the flood modelling undertaken and the refinements being completed;
 - (b) An overview of the relevant stormwater catchment;
 - (c) Application of the flood hazard and stormwater provisions proposed for the other four Variation 3 towns; and
 - (d) Site specific considerations for the Horotiu West Land.

HOROTIU FLOOD MODELLING

6. The modelling carried out for Horotiu is the same as was undertaken for the other four towns in Variation 3. I described the accuracy of the modelling in my rebuttal statements of evidence.¹ The flood model maps are included in Appendix D of the 15 September 2023 s42A report.

7. In summary, the following has been included in the Horotiu modelling:
 - (a) Latest (current) available LIDAR;
 - (b) The most up to hydrology data;
 - (c) The latest climate change estimates;
 - (d) The latest hydraulic modelling software; and
 - (e) Compliance with the Waikato Regional Council (WRC) modelling guidelines (2020) where appropriate.

8. TMW are currently undertaking the following additional quality assurance (QA) work for Horotiu, along with the other four Variation 3 towns:
 - (a) Detailed checks of culvert and network relating to connectivity of flood zones;
 - (b) Removal of ponding caused by LIDAR processing (removal of houses in urban areas);
 - (c) Additional sensitivity checking including:
 - (i) Running several pipe/culvert blockage scenarios;

¹ Dated 19 July, 25 August 2023.

- (ii) Varying runoff co-efficient to check criticality;
 - (iii) Running additional rainfall events with varying intensity and duration; and
 - (iv) Comparing results to additional existing models, including previous rapid flood models and WRC flood scheme maps.
9. The intention is that the final Horotiu flood maps are available on 13 October 2023.
10. In my opinion, the flood modelling undertaken is fit for purpose for identifying properties impacting by flooding.

HOROTIU STORMWATER CATCHMENT

11. The Horotiu catchment is characterised by the following:
- (a) Proximity to the Waikato River which runs adjacent to the catchment;
 - (b) Spilt by the Hamilton Expressway dissecting the area into two districts (Hamilton City Council (HCC) and WDC); and
 - (c) Sharing of the catchment/flow path between HCC and WDC.
12. The Horotiu West site contains three main flooding areas, shown on Figure 1 below. These are:
- (a) Area A: Adjacent to the expressway;
 - (b) Area B: Southwest corner (overflow from the water course); and
 - (c) Area C: Central area due to the topography (shallow gully).

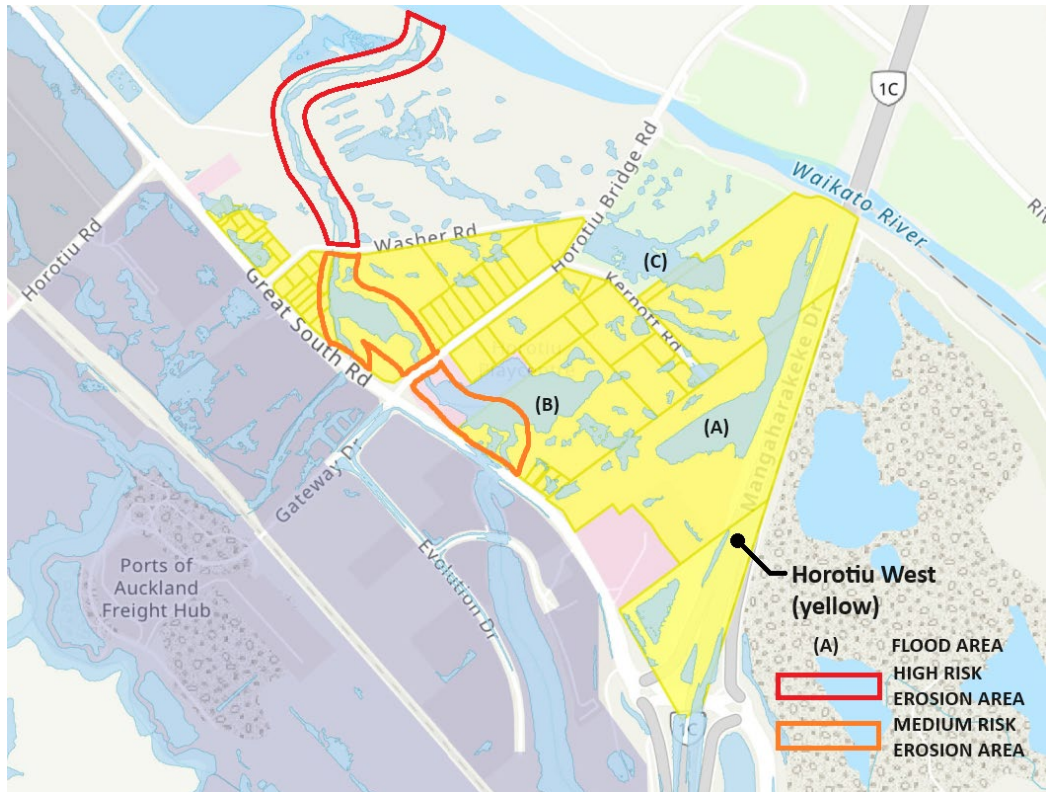


Figure 1: Flooding areas on the Horotiu West site

13. Areas (A) and (C) would be able to be managed by standard stormwater conveyance networks due to their proximity to the Waikato River, provided the outlet(s) are robust (as per standard practice).
14. The southwest area (Area (B) as shown on Figure 1) shows significant flooding that would require mitigation but would potentially be subjected to a higher level of mitigation due to the sensitivity of the downstream area (high level of erosion).
15. It is my opinion that all the flood prone areas of the Horotiu West site could be managed to ensure less than minor effects provided the consenting process is followed requiring a detailed stormwater design review. The mitigation would likely include upgrading of the channel within the site, contributions to the future channel downstream, reducing flow significantly by diverting some of the catchment more directly to the Waikato River, for example.
16. Outside of the Horotiu West site, there are large flat areas on the western side of Great South Road which are difficult to drain due to the lack of

grade. Closer to the Waikato River the topography is steeper and stormwater easily drains to the river.

17. Horotiu has important water courses for both HCC and WDC, as two major commercial areas (Horotiu and Te Rapa) drain to the Waikato River via the main water course that runs through this area. This watercourse is unnamed but identified on Figure 2 below and is partially located within the Horotiu West land
18. HCC and WRC have significant concerns with this area due to the erosion within the above-mentioned water course (near its outlet to the Waikato River). This area shows signs of instability, subsidence, scouring and sediment mobilisation. This water course is constrained by existing ponds near its outlet that limits the ability to re-batter the sides which is a common way to remedy unstable embankments. HCC are in the process of discussing mitigation and funding options with WDC.

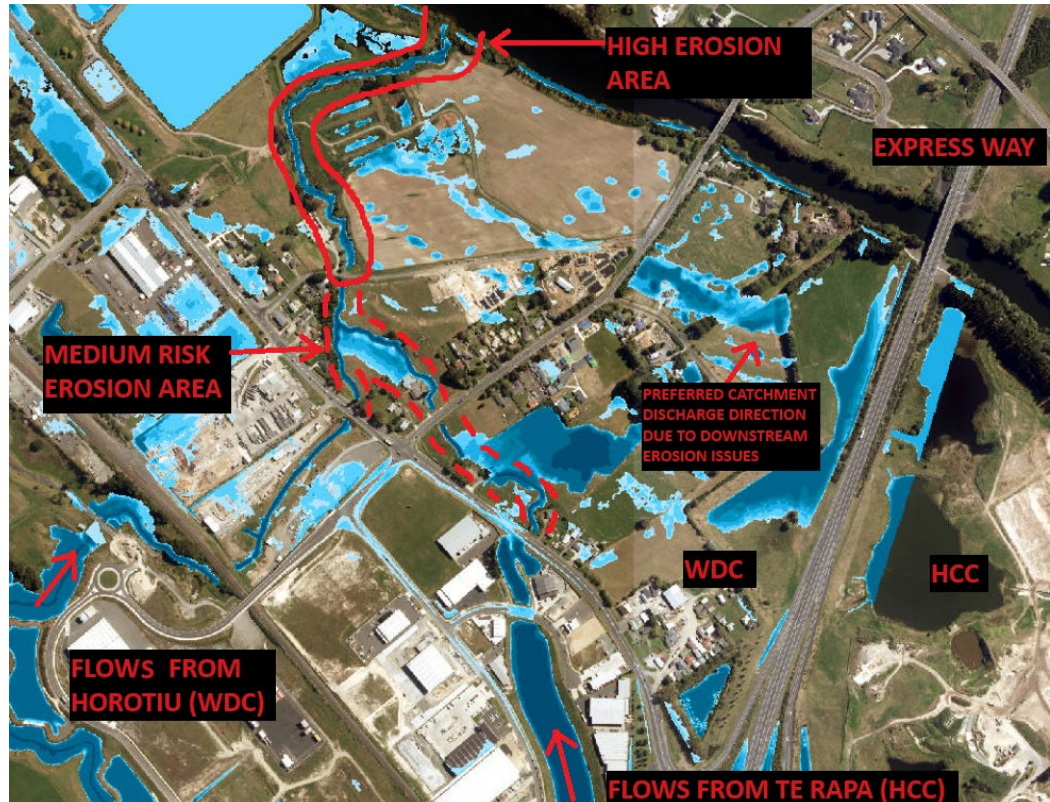


Figure 2: Watercourse features in Horotiu

19. There is some asset information missing from WDC's database which requires survey and investigation. This lack of information is less critical for the Horotiu West land adjacent to the motorway, as the majority of the significant public stormwater network is located closer to the AFFCO site further west of the Horotiu West land.
20. Currently HCC are promoting the need to rectify the erosion in this area due to a desire to release industrial land in Te Rapa. This has the support of WRC and recent discussions with WDC suggests this may occur in the format of a combined catchment management plan for the wider area.
21. My understanding is that HCC are to send a proposal to WDC for review (which includes mitigation works and requires a 20m (minimum) offset from this water course). I understand that all parties (WRC, WDC, HCC) agreed in principle that a combined CMP would be beneficial, however this has not been approved or progressed to a formal agreement.
22. If agreement to undertake a combined CMP is not reached, then separate CMPs would still be required as part of the existing stormwater discharge consent conditions. Given the current knowledge about stormwater in the area, a CMP (either combined or separate) would not be critical in terms of developing the Horotiu West site (provided the consent process is undertaken and includes an acceptable stormwater management strategy). Generally, a development aligned with an up-to-date CMP would be expected to provide better catchment wide outcomes.
23. In relation to the offset discussed above, I am aware Variation 3 includes a watercourse setback standard that would apply to the Horotiu West site requiring a set back from the unnamed watercourse of 21.5m. If development proposes to be closer to the watercourse additional assessment will be required through a resource consent process.

APPLICATION OF FLOOD HAZARD AND STORMWATER PROVISIONS

24. Through the substantive Variation 3 hearing, I was involved in the development of two sets of provisions:
 - (a) The Flood Density QM area – an overlay identifying properties that are impacted by flooding in the TMW model; and
 - (b) Stormwater provisions that apply to all properties in Medium density residential zone.

25. The purpose of the Flood density QM area is to limit permitted levels of residential intensity on a property that the modelling indicates is impacted by flooding. A resource consent is proposed to be required for more than one primary residential unit in an area within the Flood density QM area.

26. The proposed stormwater provisions, including the new WWS-R1A and additional assessment criteria, are proposed to ensure that stormwater is appropriately managed on both a site-specific basis, but also in a comprehensive way for larger greenfield developments.

27. I understand that there is a regional consent application underway for comprehensive stormwater works on part of the Horotiu West land. Notwithstanding this, I understand that the provisions developed through the substantive hearing would still apply to the Horotiu West land. In my view this is appropriate as the provisions will contribute to ensuring that:
 - (a) The flooding hazard on the site can be appropriately avoided or mitigated through a consenting process; and
 - (b) That the stormwater management proposed for the property properly considers that relevant WDC discharge consent, catchment management plan and WRC Stormwater Guidelines.

28. In my view, due to the sensitivity of the receiving environment, any development in on the Horotiu West land (as per the existing application has currently proposed) should either:

- (a) Direct stormwater towards the Waikato River and not to the above-mentioned watercourse significantly reducing watercourse flows.
- (b) Rehabilitate the watercourse and provide a higher level of mitigation to reduce flows into the watercourse than the current standards provide.

While not part of the Variation 3 process, I would recommend that these requirements be included as part of the stormwater management plan for the Horotiu West land, confirmed by conditions of consent at later stages of the development process.

Andrew Boldero
26 September 2023