

Before the Independent Hearing Panel

In the Matter of the Resource Management Act 1991 (**RMA**)

And

In the Matter of an application to the Gore District Council and Environment Southland for resource consents to establish and operate a gold mining activity near 972 Waikaka Road, Chatton North, Southland

Reference APP-20242608 (Environment Southland)
LU 24035 (Gore District Council)

Evidence of Ramon Blair Strong on behalf Waikaka Gold Mines Limited

Stream Diversions (River Engineering and Flood Hazard)

18 November 2025

Introduction

1. My full name is Ramon Blair Strong and I am a Technical Director of Haskoning New Zealand Limited. Haskoning is a global engineering consultancy headquartered in The Netherlands.
2. I hold the qualifications of New Zealand Certificate in Engineering (Civil), Batchelor of Engineering (Civil) and Post Graduate Diploma in Business Administration, qualifications obtained from the Central Institute of Technology (Wellington), Canterbury University and Massey University respectively. I am a member of Engineering New Zealand and Engineers Australia and am a Chartered Professional Engineer (CPEng) in both countries (New Zealand for more than 20 years).
3. I have over 35 years' experience working in the field of civil engineering, specifically river engineering, flood hazard management and geotechnical engineering. I have close to 20 years' experience in regional sector river management leadership roles, including ten years as Engineering Manager for the Otago Regional Council.
4. In September I provided evidence on behalf of Environment Canterbury to an Independent Hearing Panel considering a resource consent application by Amuri Irrigation Limited to take from the Hurunui River (matters related to the proposed upgrade of the fish screen facilities associated with the take).
5. In September 2024 I provided evidence on behalf of Environment Southland to an Independent Hearing Panel considering a resource consent application by Meridian Energy Limited to modify the approach channel to the Mararoa Weir (the structure that regulates the level of Lake Manapōuri).
6. I have been instructed by Waikaka Gold Mines Limited (the "Applicant or WGML") to provide evidence related to the effects associated with the diversion of Waikaka Stream as part of its proposed mining operations, as described in the Resource Consent Application (RCA). I have recently (29 October 2025) viewed the site.

7. In preparing this evidence I have focussed on the following documents:
- a. Waikaka Gold Mines Limited – Resource Consent Application and Assessment of Effects on the Environment (the WGML application), prepared by Town Planning Group (2024). This includes the supporting technical work undertaken by RJ Hall and Associates (RJH) and others that addresses river engineering-related matters.
 - b. Consent Application Technical review documents and correspondence prepared in response and presented to ES.
 - c. The relevant submissions received by ES in relation to the WGML application.
 - d. The ES section 42A report, and
 - e. WGML hearing evidence relating to planning, mine development and operation, and including management and control measures that are proposed to be implemented.
8. Although this is not a hearing before the Environment Court, I record that I have read and agree to abide by the Environment Court’s Code of Conduct for Expert Witnesses as specified in the Environment Court’s Practice Note 2023. This evidence is within my area of expertise, except where I state that I rely upon the evidence of other expert witnesses as presented to this hearing. I have not omitted to consider any material facts known to me that might alter or detract from the opinions expressed.

Scope of Evidence

9. This evidence will address the following:
- a. A brief overview of the nature and characteristics of Waikaka Stream (noting the correct name Waikāhahi Stream but using Waikaka Stream to avoid confusion) and Shepherds Creek.
 - b. Aspects of the proposed mining operation relevant to the temporary and sequential (in regard to the earthworks associated with the proposed mining operation) channel realignment.

- c. The analysis undertaken and the mitigation measures proposed.
 - d. Consideration of potential adverse effects.
 - e. Discussion of proposed conditions of the water permit to undertake temporary diversions of the Waikaka Stream.
 - f. Relevant matters, and where there are any outstanding aspects, arising from ES recommendations as outlined in the staff s42A report.
 - g. Response to river engineering, flood hazard and land drainage issues raised by submitters, and
 - h. The main conclusions of this evidence.
10. For brevity, I do not repeat matters already adequately addressed in the section 42A report. Similarly, I will cross reference the contents of the RJH modelling/ analysis which formed part of the application for consent and/or responses to requests for further information where appropriate, rather than repeating it within this evidence.
11. Note that the figures referred to in my evidence are presented as attachments appended to this report, in the order they are introduced / referred to.

Catchment Characteristics and Site Works Proposed

12. Waikaka Stream forms part of the Mataura River catchment, bounded by Waikoikoi Stream, Leithen Burn and other Pomahaka River tributary catchments to the east and the Waikaia and Mataura River catchments to the west. The proposed mining operation is located on the valley floor at the confluence of the Waikaka Stream (effectively the west branch) and Shepherds Creek, around 3km almost due south of the Waikaka township.
13. Shepherds Creek is a small part of the catchment located between the main branches, encompassing the township. The combined catchment area of both waterways is conservatively assessed at 180km². The 1999 Hudson report that forms part of Attachment N of the application AEE notes the highly modified nature of the stream alignments in this area as illustrated in Figure 9 of the application (the 1946 aerial photograph).

14. The early technical work associated with the proposed mining operation considered extensive and permanent realignments of Waikaka Stream downstream of the Waikaka Road Bridge as outlined in Attachment N of the application AEE. Progressive refinement of the proposed mining approach has seen the application based on a sequence of five short and temporary diversions (Figure 15 of the application) that align with the sequencing of mining operations.
15. Four of the diversions are related to the Waikaka Stream and one related to the lower reach of Shepherds Creek. Each will be in place for approximately one year with the stream / creek then reinstated to its original alignment.
16. RJH have undertaken the analysis (modelling) to determine the longitudinal profile and dimensions of those diversions. The design approach taken is containment (with 300mm freeboard) of the estimated 20-year Return Period flood peak. The modelling employs 2D software and the recent (December 2020 to January 2024) airborne LiDAR point cloud data captured for the Southland region. It uses a 1m by 1m grid with the Waikaka Road Bridge the upstream extent of the model (the point at which the flood hydrograph is routed through the hydraulic model) and a point adjacent to the eastern end of the L&M pond as the downstream extent.
17. The cross-section profile used with the diversion channels is a modified trapezoidal channel incorporating a stepped berm in order to provide for low flow (aquatic habitat) while being able to convey high/ flood flows. The dimensions associated with the Shepherd's Creek diversion are proportionately less than for the Waikaka, reflecting the smaller catchment and consequent smaller design flows.
18. The construction approach and sequencing for each diversion is outlined in the application, along with the enhancement / rehabilitation proposed when the stream is returned to its former course as the diversions are progressively removed. This includes a gravel / cobble lining of the low flow channel to protect against bed scour and the incorporation of pool / riffle

features. The proposed features of the diversion channels are described further in the evidence of Mr Dungey.

19. Sections of temporary bund form part of the flood hazard mitigation work necessary to contain the estimated 20-year Return Period event with 300mm freeboard. They encompass both the diversions and stream in its current, unaltered alignment, limiting the risk of inundation of the work site. Refer to Figure 21 of the application AEE. The average height of the bunds is in the range 1.0 – 1.2m.

Effects Assessment Summary

20. As noted in the application, the proposed site occupies a significant part of the valley floor between the existing L&M pit (southern end) and Waikaka Road (northern end). In my opinion the design standard chosen (20-year Return Period event) is commensurate with the limited and relatively short-term nature of the activity.
21. The correspondence from RJH to Noel Becker dated 17 February 2025 addresses the matter of effects immediately downstream of the site associated with that 20-year Return Period design standard. That is, the potential for the bunds proposed to channelise flows in a manner that has the potential to adversely effect flood depths/ extents south of the L&M pond. Figure 7 presented in that 17 February 2025 letter is definitive in that regard and confirms that any increased flow depth or velocity will be imperceptible.
22. Events larger than a 20-year Return Period event will occupy more of the valley floor but equally existing local controls and influences will also become more apparent with larger (and accordingly lower probability) events.
23. That is attributable to the nature of the terrain, a function of both the natural geomorphic processes but also the modified nature of the environment. The longitudinal grade of the valley floor reduces heading downstream, noting also the confluence with the Waikaka Stream East Branch some 3.5km downstream of the site.

24. Localised examples of the modified nature of the terrain (other than the differences in stream alignment for the reach in the vicinity of the site apparent with the 1946 aerial photograph present in Figure 9 of application AEE) are the presence of the old Waikaka railway embankment; the attenuating effect that the railway embankment (in combination with the Waikaka wastewater treatment pond) is likely to have on Shepherds Creek flood flows.
25. At a larger scale those controls are the backwater effect associated with the ridge across the valley floor immediately south of the L&M pond (visible in Figure 21 of the application). Bank 9 (Figure 21 of the application AEE and Figure 10 of Appendix B, letter report dated 31 May 2024 that forms part of Attachment N of the application AEE) further limits the effective cross-sectional area of the valley floor at this point.
26. The very wide nature of the valley floor at the Waikaka Stream/ Shepherds Creek confluence and the downstream controls noted will mean that larger (greater than a 20-year Return Period) flood events will spread out at relatively low velocities across the valley floor.
27. I note also for completeness the mine dewatering discharge covered in Environmental Management Associates report (Attachment K of the application AEE) and summarised in section 5.6.2 of the application AEE. The maximum discharge shown in Table 11 is 47.3 litres per second.
28. The RJH modelling in regard to the channel capacity required to contain a 20-year Return Period event routes a peak flow of 116 cumecs through this reach of the Waikaka Stream; mine dewatering discharge would constitute 0.04% of that flow. Consequently, the flood hazard-related effects associated with that discharge are negligible.

Proposed Conditions of Resource Consents

29. The conditions proposed by Gore District Council in the Section 42(a) report dated 12 November 2025 related to flood hazard (61 and 62) are reproduced below:

(61) All temporary diversion channels and reconstructed sections of the Waikaka Stream and Shepherd's Creek must have sufficient capacity to contain a 1 in 20 year AEP flood event.

(62) At least 30 working days prior to extraction works commencing; the consent holder must prepare a Flood Management Plan to be submitted to Council for certification outlining the proposed flood management provisions and procedures to be followed in the case of a flood event. These shall include:

- a. The design plan for temporary bunding in accordance with the recommendation of the report titled: RE: Updated Diversion Details, Flood Hazard Analysis, and Flood Mitigation Evaluation Summary Report — Waikaka River (REVISION B), by RJ Hall and Associates Ltd, dated 31/05/2024,*
- b. Monitoring of rainfall and river flows,*
- c. Identification of rainfall and river flow triggers for action,*
- d. Any temporary stabilisation works that need to be completed,*
- e. Access routes for removal of equipment if necessary,*
- f. Site inspections,*
- g. Notification and reporting requirements.*

30. In my view these are sensible suggestions in regard to management plan content. I suggest including an inspection and maintenance regime for both the temporary diversions and the restored sections of channel, specifying who will undertake the inspections, the term, frequency / criteria, method, form of record, required actions and close-out confirmation.

Matters raised by the Officer's report

31. Unless otherwise noted my comments relate to Mr Harry [Hank] Stocker's report in the context of river engineering and flood hazard management considerations.

32. The report notes the 20-year Return Period design standard opted for in the application as “an appropriate risk level” (which I concur with) and comfort with both the design flows used, and the modelling approach taken to assess effects.
33. In regard to the potential for the works proposed to adversely impact flood hazard downstream of the site, Mr Stocker notes that he was “not seriously concerned that any such adverse effects would be likely to arise”. He notes with the conclusion drawn by RJH (negligible effects downstream of the site) that it was “in accordance with my expectations”. That is consistent with my assessment.
34. Mr Stocker notes concerns from ES Catchment Operations staff in regard to willow clearance – the proposed commencement of mining operations overlapping with their maintenance programme for this reach of the Waikaka.
35. Although dependent on context, I largely concur with Mr Stocker’s comments in regard to the undesirability of crack willow. With the Waikaka if left unchecked crack willow will progressively congest, induce channel erosion and avulsion and add to flood debris loads.
36. However, wholesale willow clearance is in my view undesirable - I have seen the results of large scale and poorly planned willow removal. It could also generate effects that could be mistaken for or exacerbate effects related to the diversions proposed with the application, such as erosion. Any willow removal needs to be undertaken in a considered and judicious fashion.

Matters raised by submitters

37. There were no matters raised by submitters related to river engineering and flood hazard aspects of the proposed activities. Matters raised by the Department of Conservation in regard to water quality have been responded to by others.

Conclusions

38. The proposed activity requires the short term, staged alteration of the alignment of both the Waikaka Stream and Shepherds Creek. Technical work undertaken by RJH has definitively demonstrated that this work (primarily the associated bunding to ensure mining operations are not impacted by flood events up to a 20-year Return Period) has no impact on flood extents beyond the site.
 39. Reinstatement of the creek to its original alignment will occur once each diversion is no longer required. The application proposes a comprehensive approach to that reinstatement that looks to restore/ enhance the reach to a state that is, in general, beyond its already altered state.
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Ramon Blair Strong

Dated 18 November 2025

Attachments

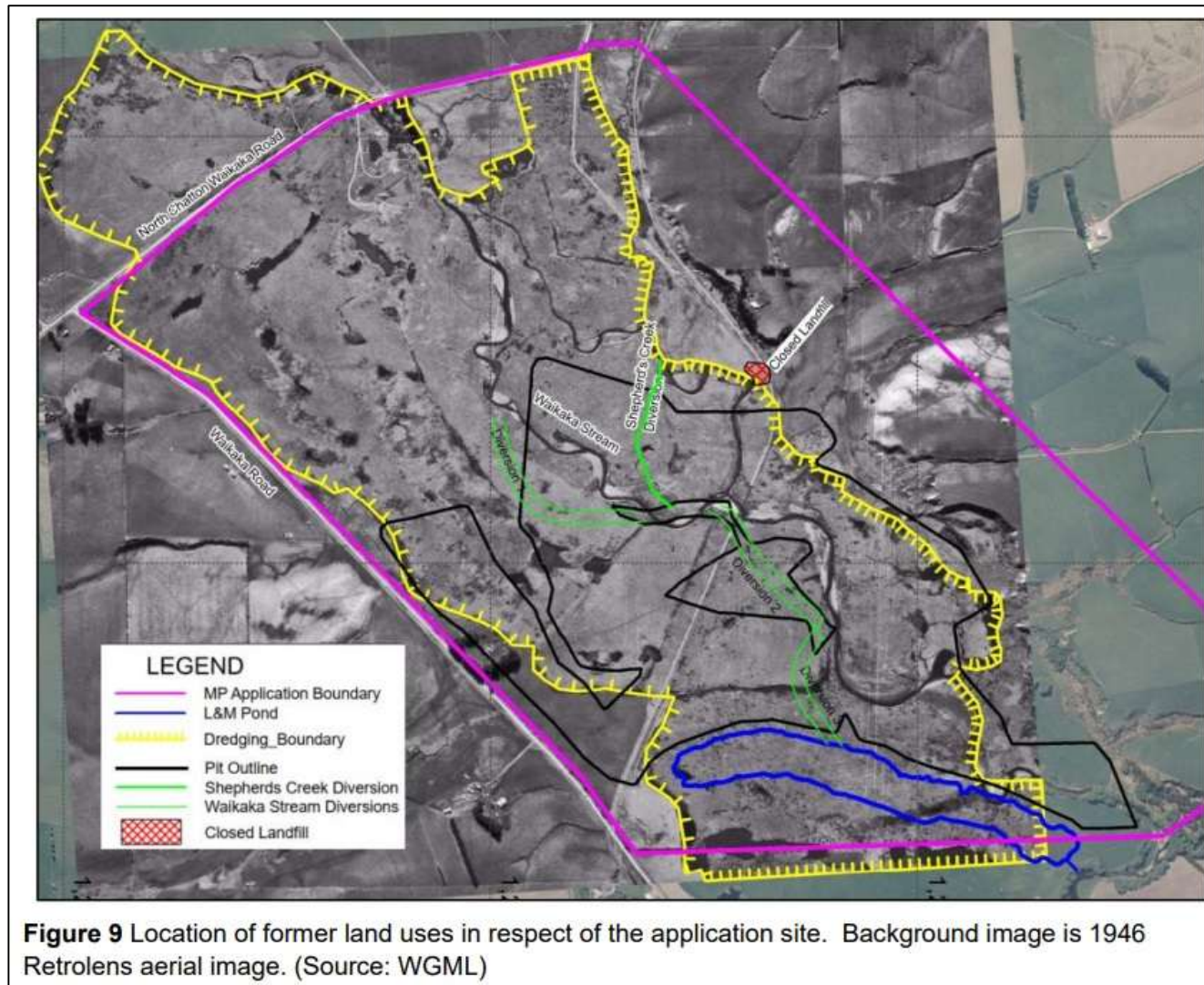


Figure 1 – Figure 9 of the application AEE.

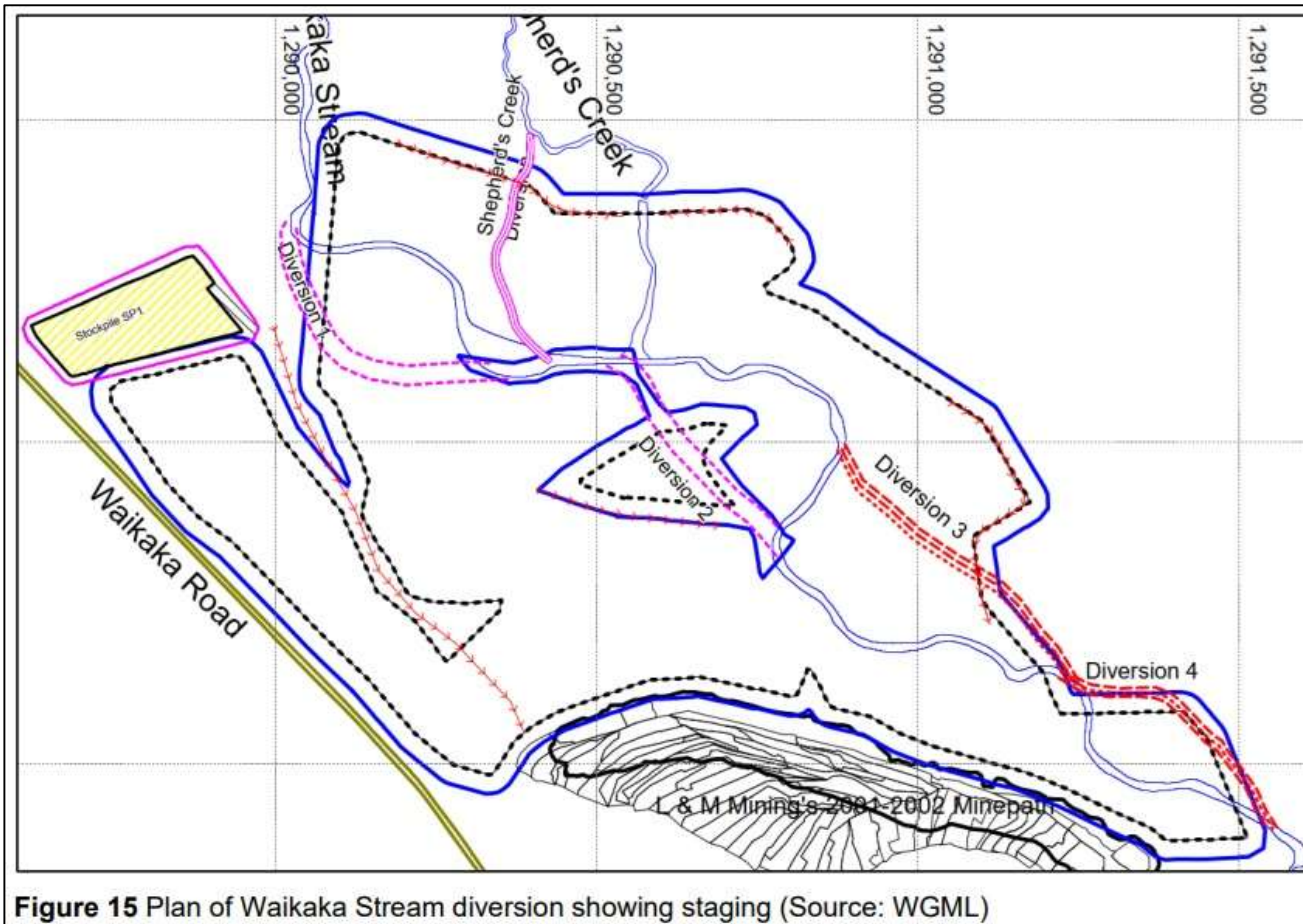


Figure 15 Plan of Waikaka Stream diversion showing staging (Source: WGML)

Figure 2 – Figure 15 of the application AEE.

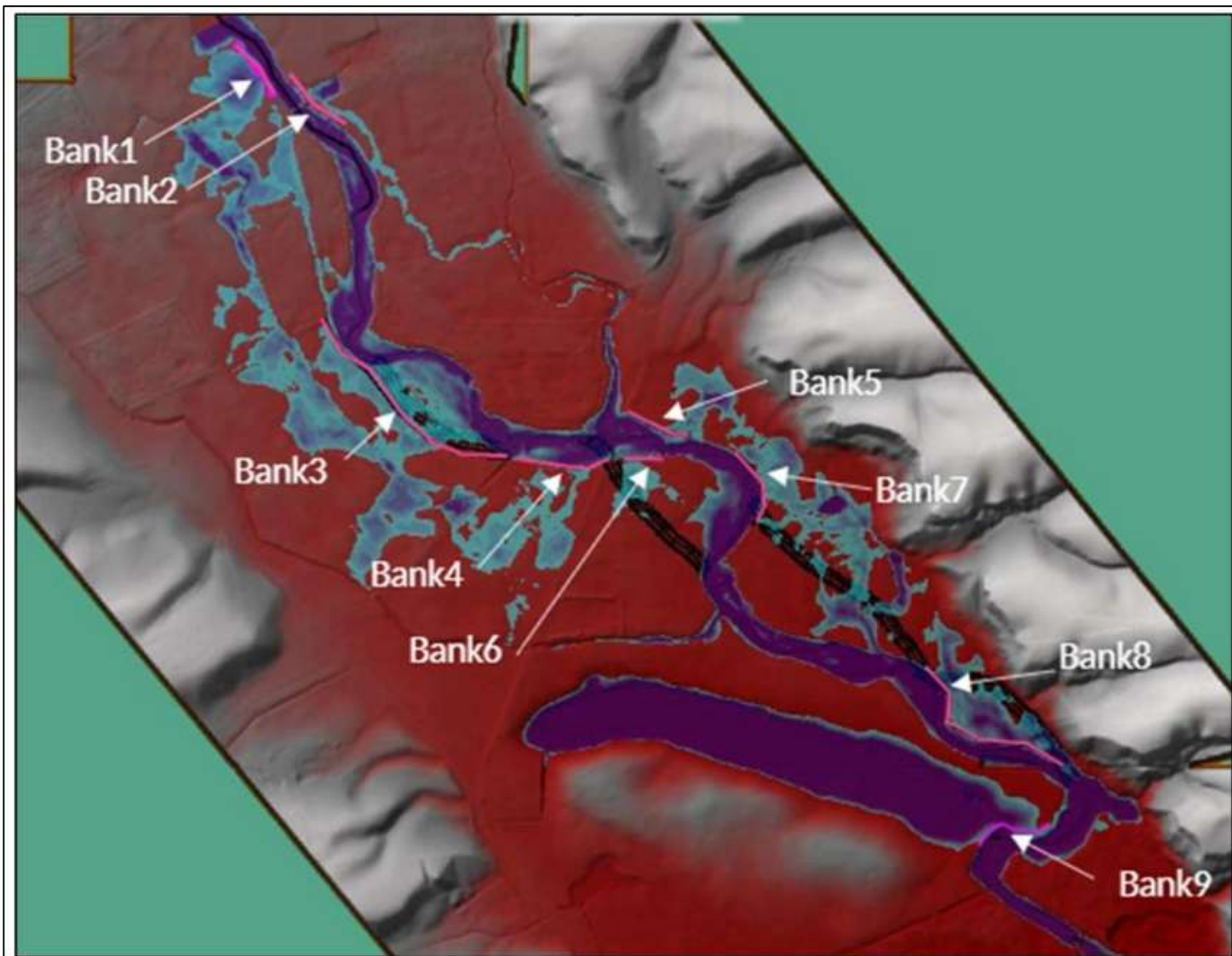


Figure 21 Location of flood protection banks (Source: Attachment [N] Hall Report Figure 4, p5 of the pdf).

Figure 3 - Figure 21 of the application AEE.

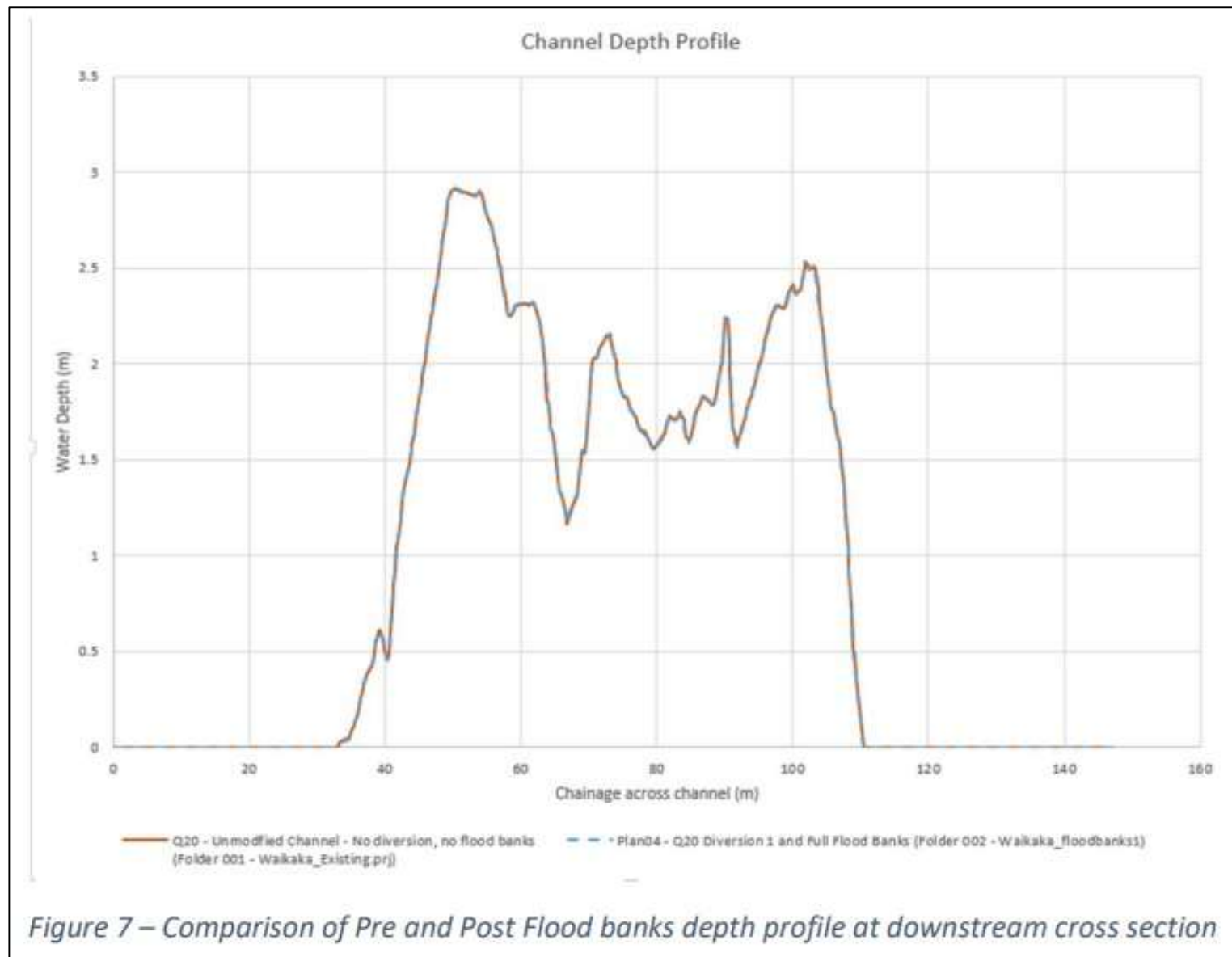


Figure 4 – Figure 7 of the RJH letter to WGML dated 17 February 2025

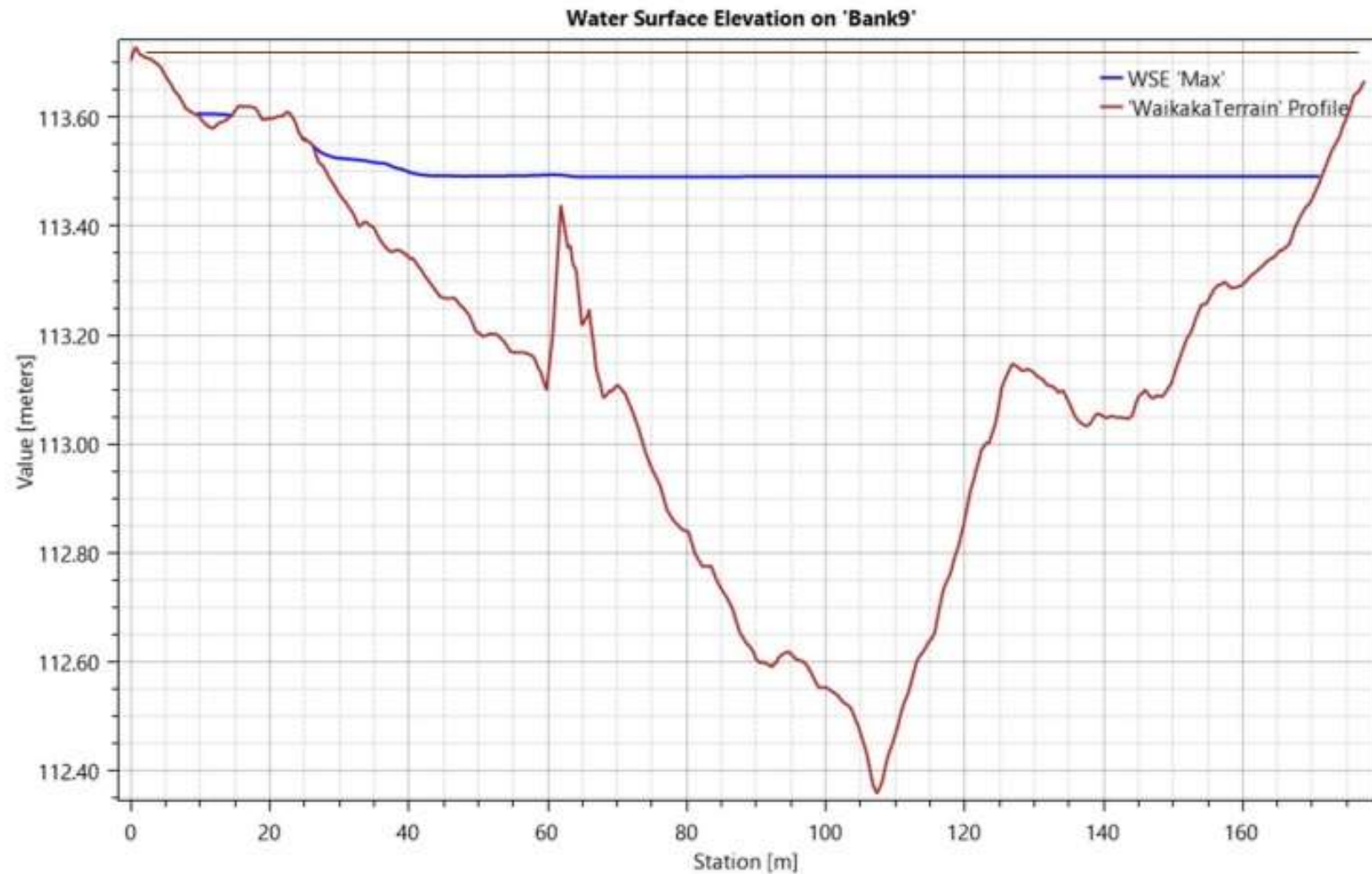


Figure 10: Bank 9 Long Section with estimated flood bank profile – settlement pond outlet (brown line)

Figure 5 – Figure 10, RJH report dated 31 May 2024 (forms part of Attachment N)

