



have relied on the advice of other persons. I have not omitted to consider materials or facts known to me that might alter or detract from the opinions I have expressed.

## Scope

6. This memorandum covers the following:
  - a. Assessment of Natural Hazards and mitigation of these as required under Section 106 of the Resource Management Act, with respect to geological and geotechnical hazards.
  - b. Assessment and discussion of geotechnical reports received and matters arising from them
  - c. Relevant matters raised, and relief sought, in submissions.
  - d. Relevant statutory considerations
  - e. Recommended amendments and/or additions to the Requiring Authority's proposed designation conditions.

## Executive Summary

7. This memorandum provides a technical assessment under section 42A of the Resource Management Act (RMA), focusing on geological and geotechnical aspects related to the Ruakiwi Reservoir Alteration to Designation (the Requirement).
8. Following a review of pertinent documents, an on-site visit, and analysis of specific issues raised in submissions, I conclude that the effects can be managed through conventional good practice and engineering measures.
9. Some aspects of the proposed works can be managed by appropriate designation conditions, including the new or modified conditions that I recommend below or similar conditions, will have adverse effects on technical area that are generally no more than minor.
10. I have reviewed the submissions on topic area matters and recommended responses to them.

## Documents considered

11. The following documents have been considered in the preparation of this assessment:
  - a. *Central City Reservoir - Ruakiwi: Notice of Requirement for an Alteration to an Existing Designation, August 2025, Bloxam Burnett & Olliver Ltd (BBO) for Hamilton City Council (the NoR).*
  - b. *Hamilton City Council – IAF Reservoir, Ruakiwi Road, Hamilton, Geotechnical Design Report, ref HAM2023-0099AI Version B, by CMW Geosciences, dated 17 July 2025.*
  - c. *IAF Reservoir – RFI Comments, Ruakiwi Drive, Hamilton Lake. CMW Geosciences letter report ref HAM2023-0099AM Rev 3, dated 11 November 2025*
  - d. *Discussions held with CMW Geosciences on 7 November 2025 in respect to letter report dated 19 September 2025*

12. None of the submissions provided by Hamilton City Council (HCC) raised geotechnical related issues.

### Site visit

13. I visited the site on 5th November 2025. This involved a walkover of the site to assess gradients and landforms. I can confirm that they are generally as described in the reports reviewed. The one difference being I estimate that some of the slopes on the western margin of the site, next to the lake are locally steeper in part, close to 1 vertical to 1 horizontal (45°) near the crest of the slope.

### Introduction

14. I was commissioned by Hamilton City Council (HCC) to undertake a technical review of the Geotechnical Reporting prepared by CMW Geosciences with respect to the proposed Notice of Requirement. It should be noted that reports prepared by CMW were not prepared solely for the proposed Notice of Requirement (NoR) but also to support application for Building Consent for the proposed reservoir No 1. This review has been carried out with respect to NoR requirements only and should not be considered a review of the report's adequacy for a building consent application.
15. The initial CMW report (document (b) above) is predominantly about Reservoir No1 with little discussion of Reservoir 2 and any issues associated with it.
16. I requested further information with respect to Reservoir 2 as a Section 92 request. The second report by CMW (document (c) above) was submitted in response to that request. Revision 1 of that report contained some ambiguous and contradictory statements for which clarity was sought and received.
17. My analysis of the information supplied in both Geotechnical Reports is presented below.
  - e. In my opinion the two geotechnical reports provided – “Hamilton City Council – IAF Reservoir, Ruakiwi Road , Hamilton, Geotechnical Design Report, ref HAM2023-0099AI Version B, by CMW Geosciences , dated 17 July 2025” (Appendix H of the NoR) and “*IAF Reservoir – RFI Comments, Ruakiwi Drive, Hamiton Lake. CMW Geosciences letter report ref HAM2023-0099AM Rev 3, dated 11 November 2025*” taken together provide a good analysis of the effects of the works with regards to geotechnical and geological matters.
18. I largely agree with and adopt that analysis for the purposes of this memorandum.

### Analysis

#### Overall Assessment of Natural Hazards

19. The assessment of Natural Hazards and mitigation of these is required under Section 106 of the Resource Management Act. Those of a geological and geotechnical nature pertaining to the designation area (the site ) as a whole are listed in Section 7.0 of the CMW report (a).
20. The Natural Hazards listed in the report are comprehensive and cover those typically anticipated for the Hamilton Area, the underlying geology and pertinent to the site's topography, location and intended development.

21. I consider that the Natural Hazards identified are appropriate, that the levels of risk associated them is suitably discussed and that the mitigation measures proposed for managing those risks are also appropriate.

### **Detailed Assessment of Natural Hazards**

22. The reports presented are comprehensive and detailed. However, the boreholes, cone penetrometer tests and hand augers undertaken are heavily concentrated in the area of proposed Valve Chamber and Reservoir No1, with a lesser number of investigation points in the area of Reservoir 2. CMW recognise this and recommend further investigation in the area of Reservoir 2 at the detailed design stage for that reservoir.
23. The seismic hazard for the site has been determined, and associated risks of seismically induced settlement, liquefaction and slope instability assessed using industry standard methodologies, and in accordance with national guidance and practice.
24. Slope stability assessments have been carried out using industry standard software and methodologies, and site-specific soil properties. These demonstrate that the proposed placement of fills and cuts for Reservoir 1, and the works around the valve chamber can be carried out whilst maintaining standard levels of acceptable slope stability with respect to the structures and not affect the natural slopes below the reservoirs.
25. Slope stability assessments carried out with respect to the proposed location of Reservoir 2 show that to achieve standard acceptable level of stability for the soils beneath Reservoir 2, and to protect the natural slopes on the western edge of the designation, a 15m set back from the crest of those slopes is required unless specific engineering measures are undertaken. This offset is more than is currently shown on the designation plans. The geotechnical report provided discusses engineering measures that may be adopted to ensure stability.

### **Construction Hazards and Risks**

26. The construction risks associated with Reservoir 1, settlement and the stability of fill slopes and excavations ) have been identified and appropriate mitigation measures proposed. In Appendix J of the initial CMW report guidance is given on both surcharge application to reduce post construction differential settlements to 100mm, and alternative foundations on CFA rigid inclusions.
27. The primary construction risk associated with the construction of Reservoir 2 after Reservoir 1 is inducing settlement beneath Reservoir 1 by increased loading of the foundation soils. Analyses undertaken by CMW suggests that for a second reservoir of the same design a separation of up to 22m may be needed to limit this risk to a negligible level. This is separation is significantly more than shown on the designation plans. This may not be achievable within the proposed designation and alternative foundation type, such as CFA rigid inclusions may be needed for the second reservoir if constructed close to the first.
28. This combined with the setback recommendations to maintain a suitable level of slope stability indicates that the engineering measures to construct the second reservoir, after the first and within the proposed designation area, may be more complex than those for the first reservoir.
29. The geotechnical reports recommend further detailed ground investigation in the area of Reservoir 2 prior to the detailed design of that structure. These are to confirm the present

stability and settlement assessments, and to assist with any revision to the foundation type and the design of any measures required to ensure appropriate levels of slope stability.

30. I concur with the recommendation for further ground investigation prior to the detailed design of Reservoir 2. I consider that this should be made a condition of the designation.

### **Statutory Considerations**

31. I have reviewed the discussion in Section 13 of the NoR on the provisions in the statutory documents relating to Geotechnical matters that are listed below. I agree with the comments on those provisions. In my opinion, based on that analysis, the Requirement is consistent with those provisions.
  - a. Hamilton District Plan – objectives 25.1.2.2a and 25.2.2.1a
32. At this stage we have not identified any higher order Statutory Planning Conditions relevant to this review.

### **Conclusions**

33. In my opinion, from a geotechnical perspective, the geotechnical risks for the proposed works for which designation is sought:
  - a. Can be managed by appropriate designation conditions, including the new or modified conditions that I recommend below, or similar conditions, and will have adverse effects that are no more than minor and comply with the relevant statutory requirements discussed above.

### **Recommendations**

#### **Designation conditions**

34. I recommend the following amendments and/or additions to the Requiring Authority's proposed designation conditions:

#### **Recommended new NOR Conditions**

- a) That further detailed ground investigation in the area of Reservoir 2 be undertaken prior to the detailed design of that structure.
- b) That further analyses of slope stability and construction induced settlement for the final location of Reservoir 2 be undertaken.