

Memo

To: Laura Galt – Hamilton City Council

From: Simon Edmonds (Beca Limited) **Date:** 27 November 2025

Subject: Ruakiwi Reservoir Requirement – Technical Specialist Report for Section 42A Reporting

Technical Area: Structural Engineering

Version: Final

Purpose

1. This memorandum has been prepared to provide technical assessment under section 42A of the Resource Management Act 1991 (RMA), in respect of structural engineering in relation to the Ruakiwi Reservoir Alteration to Designation (the Requirement).

Introduction

2. My name is Simon Edmonds and am a Technical Director for Beca Limited. I hold a Bachelor of Engineering from the University of Canterbury.
3. I have over 30 years of engineering experience, specialising in the design, assessment, and construction of liquid retaining structures, particularly concrete reservoirs, across New Zealand, Australia and the Pacific. My expertise includes technical leadership for water storage projects, seismic design and retrofit of reservoirs, and the development of design standards for resilient water infrastructure. I have led and contributed to numerous new build and strengthening reservoir projects for local authorities, including Tauranga City Council, Wellington Water, Christchurch City Council, and others, covering aspects from initial scoping and seismic assessment to detailed design and construction monitoring. I was on the committee responsible for the 2009 revision of NZS 3106 – Code of Practice for Concrete Structures for the Storage of Liquid.
4. I confirm I have no conflicts of interest.

Code of Conduct

5. I have read the Environment Court Code of Conduct for expert witnesses contained in the Environment Court Practice Note 2023 and agree to comply with it. I confirm that the opinions expressed in this memorandum are within my area of expertise except where I state that I 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. The environmental effects of the structural engineering aspects of allowing the Requirement and whether any such adverse effects will be acceptable. Construction effects such as noise, vibration, dust and traffic are understood to be addressed separately by others.
 - b. Relevant matters raised, and relief sought, in submissions.
 - c. Relevant statutory considerations.
 - d. Recommended amendments and/or additions to the Requiring Authority's proposed designation conditions.
7. The scope of this memorandum does not include review of the consideration of alternative sites.

Executive Summary

8. This memorandum provides a technical assessment under section 42A of the Resource Management Act (RMA), focusing on structural engineering aspects related to the Ruakiwi Reservoir Alteration to Designation (the Requirement).
9. Following a review of pertinent documents and an analysis of specific issues raised in submissions related to structural engineering, I conclude that effects are no more than minor and comply with the relevant statutory requirements discussed below. No new or modified conditions are recommended.
10. One submission (001 – Ernest Ross Needham) raised concerns regarding vibrations from construction having an adverse effect on the structural integrity of their residence. I understand that the technical assessment of construction effects such as vibrations are being addressed separately by others.

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).*
 - *Appendix B – Structural Design Drawings Rev C - 22/07/2025 (Holmes)*
 - *Appendix H – Geotechnical Design Report Rev B – 17/07/2025 (CMW Geosciences)*
 - *Appendix I2 – Heritage Structural Memo – 18/08/2025 (Archifact – Architecture & Conservation)*
 - *Appendix J – Construction Methodology Statement – 26/06/2025 (Traction Room)*
 - *Appendix K – Civil Design Drawings Rev C - 22/07/2025 (Holmes)*

- *Appendix M – Ruakiwi Reservoir Detailed Seismic Assessment – 22/08/2025 (WSP)*
 - *IAF Reservoir – RFI Comments, Ruakiwi Drive, Hamiton Lake. CMW Geosciences letter report ref HAM2023-0099AM Rev 2A, dated 11 November 2025*
- b. The Submission is listed in Table 1.

Table 1 Submissions that raise structural engineering matters

Number	Submitter
001	Ernest Ross Needham

Site visit

12. A site visit was not deemed necessary in order to make the conclusions as outlined in this memorandum. I have discussed relevant site matters with the author of the Beca geotechnical technical memorandum.

Introduction

13. I was commissioned by Hamilton City Council (HCC) to undertake a technical assessment with respect to the proposed Notice of Requirement. It should be noted that some of the documents included in the information provided by HCC 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 technical assessment has been carried out with respect to NoR requirements only and should not be considered a review of the adequacy of the supplied documentation for a building consent application.
14. This memorandum shall be read in conjunction with the Beca geotechnical technical assessment for the proposed NoR.
15. My analysis of the information supplied in relation to the relevant structural engineering matters is presented below.

Analysis

16. Drinking water storage reservoirs and associated valve chamber structures are routinely designed and constructed within urban area of New Zealand that are similar to this proposal for the new Central City Reservoir(s).
17. Concrete as a material of construction for reservoirs, as proposed for the Central City Reservoirs, allows for portions of the reservoir structure to be buried (below ground) to suit the reticulation pipework and site constraints and landscaping by providing both structural capacity and durability. Other reservoir material options (such as steel) would not be considered suitable materials for below ground configurations.
18. New Zealand structural design code requirements for concrete reservoirs that are referenced in the NoR are considered in my opinion to be satisfactory to address the requirements for seismically resilient performance of these proposed Central City reservoirs.
19. The specified seismic design standards for the proposed reservoir and valve chamber structures as Importance Level 4 (IL4) with a 100-year design life is considered appropriate for this critical infrastructure for Hamilton City.

20. The adequacy of the geotechnical investigations and assessment and recommendations appears to be satisfactory for the Stage 1 reservoir to be used as an input to the structural design. Consideration of potential ground settlement interaction effects of the Stage 2 reservoir with the Stage 1 reservoir where they would be in close proximity to each other is recommended. This issue is further discussed in the specific geotechnical evidence by others.
21. The design proposals for the reservoir are evidently being developed from the Preliminary Design stage. An observation separate to the NoR for the reservoir project, is that consideration be given to incorporating geosynthetic membranes between the outside of the reservoir concrete wall and any backfill placed against it to enhance the security of the stored water contained in the reservoir. This would address potential risks of external ground water leaking into the reservoir as a source of potential contamination of the drinking water contained.
22. Consideration of adequate clearance between the reservoir structure and any subsequent planted replacement trees as part of landscaping is recommended. Mature trees can become a hazard for reservoir structures from instability and impact damage. The root structure of trees and vegetation can also affect subsoil drainage provisions around and below the reservoirs.
23. Consideration of the adequacy of the proposed design of the roof slope (or fall) for the reservoirs against any longer term predicted geotechnical ground settlement as documented in the geotechnical information reviewed is recommended. Ground settlement below the reservoirs could influence the roof support columns and hence the profile of the reservoir roof supported on the columns. Positive roof slope to shed rainwater and avoid ponding is a structural consideration that can enhance the security of the stored water in the reservoirs by mitigating the risk of infiltration.
24. One submission (001 – Ernest Ross Needham) raised concerns regarding vibrations from construction having an adverse effect on the structural integrity of their residence. I understand that the technical assessment of construction effects such as vibrations are being addressed separately by others.

Statutory Considerations

25. I have reviewed the discussion in Section 13 of the NoR on the provisions in the statutory documents relating to structural engineering 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.
 - Hamilton District Plan – objectives 25.1, 25.2, 25.7 and 25.13
26. At this stage I have not identified any higher order Statutory Planning Conditions relevant to this review.

Conclusions

27. In my opinion, from a structural engineering perspective, the proposed works for which designation is sought can be managed by appropriate designation conditions, and will have adverse effects that are no more than minor and comply with the relevant statutory requirements discussed above. No new or modified conditions are recommended.

Recommendations

28. No new or modified conditions are recommended.