Appendix B4: Technical Memorandum for Stormwater and Flooding – Alternative to the Brynderwyn Hills

TECHNICAL MEMORANDUM

To:	Stacey Sharp & Blair Masefield, Beca (consultant planners)
From:	Dale Paice, Technical Director – Civil Engineering, Beca
Subject:	Stormwater and Flooding Technical Memorandum - Alternative to the Brynderwyn Hills (FTAA-2603-1178)
Date:	16 June 2026

EXECUTIVE SUMMARY

1. This memo is prepared on behalf of the Whangarei District Council and contains specialist stormwater and flooding input on the Alternative to the Brynderwyn Hills fast-track consent application (FTAA-2603-1178) (the Project) as lodged under the Fast-track Approvals Act 2024.
2. This assessment focuses on potential stormwater quality, stream erosion and flooding effects associated with the Project, including effects on receiving environments, Council infrastructure, the Ahuroa Water Treatment Plant (WTP), and flood-sensitive areas within the wider catchment.
3. I have reviewed the Applicant's stormwater and flooding assessment and consider it to be prepared in accordance with current good practice and sufficient to demonstrate that stormwater quality and flood risk effects can be managed to a suitable level within the designation.
4. The principal matters identified during my review relate to the management of stream erosion effects, flood management outcomes and the extent to which the proposed designation conditions will achieve the outcomes relied upon by the assessment.
5. While I support the application in principle from a stormwater and flooding perspective, I do not consider the proposed stormwater and flooding designation conditions will achieve the intended outcomes for the full range of potential designs authorised by the designation. In particular, I recommend refinements relating to the use of extended detention, consideration of more frequent flood events, allowable flood level increases at the designation boundary, and protection of vulnerable activities and infrastructure, this are complied in Table 1 of this technical memorandum.
6. Subject to these refinements, I consider the potential stormwater and flooding effects of the Project can be appropriately managed.

Section 1: Author Credentials

1.1. Statement of Qualifications and Experience

7. My name is Dale Paice and I am a Technical Director - Civil Engineering at Beca and a Chartered Professional Engineer (CPEng), Chartered Member of Engineering New Zealand (CMEngNZ), and International Professional Engineer (IntPE(NZ)). I have more than 20 years' experience in civil engineering, with particular expertise in stormwater management, drainage, flood risk assessment, hydraulic modelling and infrastructure planning. My experience includes the assessment, design and delivery of major infrastructure, land development and transportation projects throughout New Zealand, together with providing technical evidence and specialist advice for resource consenting, designation approval processes.

1.2. Code of Conduct

8. I confirm that I have read the Environment Court Practice Note 2023 – Code of Conduct for Expert Witnesses and agree to comply with it in the preparation of my assessment and participation in any subsequent expert or hearing processes. I confirm that the opinions expressed are within my area of expertise and are my own, except where I have expressly relied on the work of others.

Section 2: Approvals and Application Material Reviewed

2.1 Approvals

9. From a stormwater and flooding perspective, Council's interests relate to the following statutory approvals sought by the Applicant:

    a. The Notice of Requirement (designation) to construct, operate, maintain, and improve a state highway and associated infrastructure; and

    b. The regional resource consent applications, particularly relating to flood hazard management, stream works, and discharges to water and land (where it may enter water).

2.2 Reference Documents

10. The following application documents have been reviewed and inform this technical memorandum:

    a. Substantive Application entitled: Substantive Application under the Fast-track Approvals Act 2024 – Volume A – Main Application, Alternative to the Brynderwyn Hills – Brynderwyn Hills section, prepared by NZTA Waka Kotahi, dated 2 April 2026, Revision A;

    b. Substantive Application entitled: Substantive Application under the Fast-track Approvals Act 2024 – Volume B – RMA Approvals, Alternative to the Brynderwyn Hills – Brynderwin Hills Section, prepared by NZTA Waka Kotahi, dated 2 April 2026, Revision A;

    c. Design Drawings Vol A – Appendix D4A entitled: Brynderwyn Hills Section – Indicative Stormwater and Hydrology Plan, prepared by NZTA Waka Kotahi, sheets SW-1401 – SW-1414, plan set dated 27th March 2026;

    d. Design Drawings Vol A – Appendix D4B entitled: Brynderwyn Hills Section Typical Stormwater Details Channels and Drains, prepared by NZTA Waka Kotahi, sheets SW-1413 – SW-1434, plan set dated 27th March 2026;

    e. Design Drawings Vol B – Appendix D11 (A1) entitled: Brynderwyn Hills Section Indicative Stormwater and Hydrology Plan, prepared by NZTA Waka Kotahi, sheets SW-1401 – SW-1414, plan set dated 27th March 2026;

f. Design Drawings Vol B – Appendix D11 (A2) entitled: Brynderwyn Hills Section Typical Stormwater Details Channels and Drains, prepared by NZTA Waka Kotahi, sheets SW-1413 – SW-1434, plan set dated 27th March 2026; and

g. Assessment of Environmental Effects entitled: Assessment of Operational Stormwater and Flooding effects, Alternative to the Brynderwyn Hills – Brynderwyn Hils section, prepared by NZTA Waka Kotahi, dated 2 April 2026 (henceforth referred to as AEE), Revision A.

Section 3: Technical Assessment

3.1 Scope

11. In considering this application from the perspective of Whangārei District Council, I considered the following matters:

    a. Whether **stormwater quality** (that is, contaminant loads) discharging from the road to receiving environments being streams and eventually the sea follow good current practice approaches and support objectives to protect and enhance waterways;

    b. Whether **stream erosion** in receiving environments would start to occur or be exacerbated by changes to hydrological patterns;

    c. Whether **flood hazard** to assets (such as local roads, water supply infrastructure as well as private and public) might be exacerbated to a degree that would materially impact ongoing use; and

    d. Whether any increase in food levels or hazard to vulnerable activities (such as habitable buildings, road crossings subject to overtopping, water treatment plants) would unreasonably increase **risk to life**.

12. Where mitigations are proposed for any of the above, I considered whether they are appropriate and flexible enough to accommodate the full wide range alternative road arrangements that might be accommodated within the proposed designation. In my review, I considered both short term (during and immediately post-construction) as well as long term (including allowing for long term climate change effects) impacts.

3.2 Effects Assessment Review

13. I have reviewed the "Assessment of Operational Stormwater and Flooding Effects – Alternative to the Brynderwyn Hills – Brynderwyn Hills Section" prepared for the Project and found it is fit-for-purpose, prepared to good practice standards and comfortably demonstrates that stormwater quality and flood risk effects can be managed to a suitable level within the designation. As such, from a stormwater and flooding perspective, I support the application in principle.

3.3 Conditions Review

14. I do not consider that the proposed flood risk and stormwater designation conditions will achieve the intended outcomes (as per the effects assessment) for the full range of possible designs. I identified three technical matters for focus in refining conditions. These are:

    a. Extended detention;

    b. Near term effects; and

    c. Scale of flood impact.

15. These matters are discussed further below.

Extended Detention

16. The Applicant has proposed extended detention as a mitigation throughout for potential stream erosion effects. This method captures runoff from the road carriageway and allows it to pond in swales or wetlands for slow release over a matter of days. In certain soils and conditions, ponded water causes or exacerbate land instability and increase landslide risk. We know that the designation includes areas highly vulnerable to such risks.

17. I recommend that the conditions therefore recognise that risk and allow for alternative approaches for managing stream erosion effects (e.g. offset riparian planting) in some cases.

Near Term Effects

18. The proposed conditions and the assessment focus on two very large rainfall events, being 10% and 1% AEP rainfall events allowing for the most pessimistic long term climate change impacts. While this provides a suitable upper bound for considering effects, it does not consider the near-term future or nuisance as occurred events similar to those experienced over the summer of 2022 / 2023.

19. I recommend that a smaller / nearer term flood risk event be considered to make sure that there is no unintentional exacerbation of serviceability / nuisance flooding in more frequent events.

Scale of Flood Impact

20. The proposed allowable flood level increase of up to 100mm at the extent of designation throughout is greater that current good practice. Recent designations for NZTA have used 50mm at the extent of future road corridor for example with tighter requirements at high-risk locations. Given the variation across the area, I consider that level increases of 100mm may be problematic in some locations.

21. I recommend that tighter and / or more targeted limits be applied through the conditions.

Section 4: Mitigation and Conditions

22. Two of the designation conditions set the stormwater and flood risk outcomes. With reference to the 2 April 2026 draft, these are:

    a. RC50 which gives bullet points of stormwater management requirements to be achieved, and

    b. RC56 which gives bullet points relating to flood levels at the site boundaries.

23. I recommend the outcomes / bullet points included in those two conditions be re-drafted to align with intended outcomes. To facilitate this, **Table 1** below sets out my understanding of and feedback on the stormwater mitigation measures and outcomes relied on for the effects assessment. This can be used to discuss and agree the matters to be conditioned with the Applicant's technical team.

__Table 1__ - Stormwater and flood risk mitigation measures and intended outcomes

Measure	Effect mitigated	Proposed approach	Feedback
Retention	• Stream health impacts • Bank erosion	Not applied	Agree. Impractical for road runoff and has potential adverse land stability effects.
Detention	• Stream health impacts • Bank erosion	Applied	Agree – but not suitable in all locations. Can have adverse effects on land stability in some soils. Recommend conditions allow for alternative mitigation measures (eg.

			riparian planting and fencing) and discourage detention in high-risk areas.
Riparian protection	• Stream health impacts • Bank erosion	Not applied.	See above
Water quality	• Contaminant discharge to receiving streams	Applied to all runoff. Treatment by wetlands and wetland swales.	Agree with treatment outcome but not with limiting methods to wetlands and wetland swales. Both detain water and therefore can have adverse effects on land stability. Recommend that all current good practice type of devices are allowed subject to achieving a target contaminant reduction outcome.
Secondary (1%AEP / 100-year ARI) management / peak flow attenuation	Serviceability / nuisance flooding	Flood level increase of up to 100mm vertically allowed at designation boundary	Recommend a limit applied to the primary (10%AEP / 10-year ARI) event as well to cover near-term and nuisance effects. Recommend limit is reduced and / or refined for higher risk locations.
Secondary (1%AEP / 100-year ARI) management / peak flow attenuation	Vulnerable activity flooding	Flood level increase not allowed at existing habitable floors.	Recommend a greater range of vulnerable activities are covered (e.g. water treatment plant) and freeboard is provided for.