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MEMO

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TO Brandon Ballie

RE Waikare Gorge Realignment APP- 128957 Review Memo

I have been engaged by Hawkes Bay Regional Council (HBRC) to review the design as well as the flooding and erosion effects of the proposed Waikare Gorge realignment on SH2 near Putorino. I have reviewed the Application and Assessment of Environmental Effects prepared by Stantec NZ Limited (Stantec) on behalf of the Applicant – Waka Kotahi NZ Transport Agency (Waka Kotahi). I have reviewed Appendix C – Stormwater Preliminary Design Report along with the drawings (General Arrangement, Stormwater Drainage Preliminary Plans and Structures). Following this initial review, a S92 request was made requiring further information on three matters relating to flooding and erosion. On 18 August 2023 the Applicant provided a response to the S92 matters which I have reviewed and provide comment on below.

S92 Responses

S92 Request 1 – Please check the capacity of proposed culverts 2/C12815 and 9/C15830 and if they are to remain at their currently proposed sizes (DN450 mm and DN375 mm) then provide an assessment of the effects of upstream flooding due to headwater requirements to pass design flows. Alternatively, if the diameters are increased so headwater depths are less than 1 m then the upstream flooding assessment is not considered necessary.

Applicants Response – The Applicant has increased the size of both of these culverts to DN750 mm. I have checked the capacity of these upgraded culverts and I am satisfied that they now have sufficient capacity to pass the design flows without excessive headwater requirements and that the upstream flooding effects are likely to be less than minor.

S92 Request 2 – If culverts 2/C12815 and 9/C15830 are to remain the same size then further details are required around outlet energy dissipation, particularly for culvert 2/C12815. If these culverts are increased as per above S92 request then standard energy dissipation at the outlets would be considered acceptable.

Applicants Response – The Applicant has increased both of the culvert diameters to DN750 mm and has also provided details for standard rock rip-rap aprons at the outlets. The rock rip-rap aprons are 4 m long x 1.5 m wide and formed from 600 – 700 mm D_{50} rock. I am satisfied that this is an appropriate arrangement for dissipating energy at the outlets and reducing the risk of downstream erosion.

S92 Request 3 – It would appear that outlet erosion protection is likely to be required at culvert 4/C14200 and possibly at some of the other fish passage culverts. The Applicant to consider providing for this within the Application.

Applicants Response – The Applicant has proposed in the detailed design phase that roughness elements will be provided in the base of the culvert 4/C14200 combined with possible widening as well energy dissipation downstream. The energy dissipation downstream would be either a concrete apron with rock rip-rap or a rock ramp and energy dissipation pool formed using a small rock weir. I am satisfied that this is feasible at this location and propose the following consent condition to confirm the requirements for this culvert.

Proposed Consent Condition – The detailed design of culvert 4/C14200 shall demonstrate that adequate provision for fish passage and energy dissipation is achieved to the satisfaction of HBRC prior to construction. The detailed design is expected to include widening and or roughness elements within the culvert barrel as well as specific energy dissipation at the outlet and shall be in accordance with an accepted industry guideline (e.g. HEC 14).

Summary

Overall, I am satisfied that the design of the structures proposed in this Application, as amended through the S92 process and subject to meeting the proposed consent condition above, are in accordance with standard industry practice and the effects on flooding and erosion are likely to be less than minor.

Prepared by

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