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Request for technical comment

To: Ryan Hodgson

From: Katie Blakemore, Senior Scientist – Surface Water Quality; Lexmy Gopalakrishnan, Environmental Scientist – Groundwater and Contaminated Land, & Ewen Rodway, Team Leader – Science Strategy and Integration.

Date: April 2025

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Subject: **Request for technical comment**

The Aparima River Catchment (catchment context)

The following paragraph provides some context regarding the environmental condition of the Aparima River catchment. This has relevance for the proposed activity and related discharges of nitrogen, phosphorus, sediment and microbial contaminants.

Monitoring indicates that freshwater ecosystem health is poor in many parts of the Aparima catchment. A summary of available monitoring results indicates that seven of the 11 measured attributes are currently graded as poor or very poor in one or more river classes (across the Aparima and Pourakino catchments)(Rodway et al., 2023). The Jacobs River Estuary is in poor ecological condition and classed as eutrophic. Ecosystem health is particularly poor in the upper portions of the estuary. This is a result of excessive sediment and nutrient supply and accumulation. Pathogens, sediment, and nutrients are the main drivers of declining ecosystem health and increased risks to human health throughout the Aparima Catchment (Rodway et al., 2023).

Water quality context of the activity in relation to adverse effects on aquatic life

- The proposed activity is situated within a degraded catchment as defined by Schedule X for TN, suspended sediment, *E. coli,* MCI (Ton Snelder – Evidence in Chief for SRC, 2022).
- Modelling indicates that, at this location, TN and TP load reductions required to achieve whole of catchment national bottom lines and minimum standards in the SWLP are greater than 40% (Snelder & Plew, 2024).
- Modelling indicates that sediment load reductions required to achieve river national bottom lines and minimum standards in the SWLP are estimated to be 16% (Neverman et al., 2021)
- Modelling indicates that *E. coli* load reductions required to achieve river national bottom lines and minimum standards in the SWLP are estimated to be 63% (Snelder & Fraser, 2021).

- LAWA indicates that for the Aparima River at Thornbury, *E. coli* is in the D band. The dissolved inorganic nitrogen 5-year median is 0.775 mg/L and in the worst 25% of sites.
- Monitoring of Jacobs River Estuary indicates that the estuary is eutrophic and generally in poor condition. TN load reductions are required to meet current draft Macroalgae targets (C Band) (Rodway et al., 2023; Snelder & Plew, 2024; and Plew, D., 2023).
- The above points provide evidence that the application is for discharge into a catchment where there are 'significant adverse effects on aquatic life'. This is based on the assumption that classification as 'degraded' meets the criteria for 'significant adverse effects on aquatic life'.[1]
- Predicted farm nitrogen load reductions of 23% are estimated to result in a net reduction in in nitrogen load delivered to the catchment. However, the predicted load of 7620 kg N/year would be discharged to a catchment where there are already 'significant adverse effects on aquatic life' and thus this discharge would contribute to those effects.
- Similarly, whilst there may be marginally reduced discharges of phosphorus, sediment and *E. coli* (estimate of 4% for phosphorus, no estimates for sediment or *E. coli*), these discharges will be contributing to existing 'significant adverse effects on aquatic life' as a result of cumulative phosphorus, sediment and *E. coli* contamination.

[1] See Paras 264-265 of Fifth Interim Decision on the Southland Water and Land Plan - Aratiatia Llivestock Limited v Southland Regional Council

Surface Water Quality

The existing environment assessment on pages 31-36 of the PDF requires further detail or review to address the following points:

- The applicant has identified that the proposal is located within a degraded catchment under schedule X. It would be appropriate to also identify that the relevant river segments within the proposal area are degraded for MCI, *E. coli* and suspended sediment. This information is publicly available on beacon.
- LAWA has been used to assess the state of the receiving environment based upon the Aparima River at Thornbury monitoring site. This is a significant distance downstream of the proposed activity. It would strengthen the application to make use of the modelled water quality information which is publicly available on beacon.
- Median clarity is stated as 1.92m, however this information has not been used to assess the Suspended Fine Sediment NOF attribute which is based on median visual clarity.
- It has been identified that the Aparima River at Thornbury is a popular bathing site as per Appendix G of the pSWLP. Therefore the *E. coli* attribute relating to specified recreational sites should also be assessed.
- The application states that there are no toxic algae alerts in the Aparima River catchment. This is currently incorrect. Given the temporally and spatially variable nature of algal communities it is inappropriate to assess swimmability based on the presence or absence of toxic algae alerts at a single unspecified point in time. It would be more appropriate to assess this over a longer time period of at least one recreational monitoring season, and up to five seasons as is used to grade a site for recreational suitability as per the microbial guidelines for recreational water quality. I would recommend the applicant uses the assessed current state from the baseline state report (Rodway et al., 2023) which covers a five-year period using the Southland benthic cyanobacteria attribute.

No surface water monitoring is proposed for this activity. It is unlikely that surface water monitoring would detect effects that could be attributed specifically to the proposed activity. However, the SOE monitoring network will detect cumulative impacts of land use across the entire catchment of that monitoring site.

There is currently insufficient detail to assess the likely effects of the proposed activity on the Opio Stream and Aparima River. There is currently insufficient information provided to assess the uncertainty associated with the stated nutrient reductions. Using only one year for comparison with the proposed contaminant losses does not provide confidence that the existing activity is well represented by the modelled year. Robust demonstration of the difference between the existing and proposed activities requires evidence from multiple previous years. It is therefore unclear whether the stated reductions are greater than the model uncertainty. Contaminant loss reductions of this magnitude as modelled by Overseer are best interpreted as indicative of the direction.

In addition, relating specifically to the losses of sediment and microbial contaminants, the use of the modelled P loss is insufficient to assess the change in sediment and microbial contaminant losses. The modelled change in P losses includes changes to P fertiliser use, thereby increasing the likelihood that reductions in sediment and microbial contaminant loss would not be proportional to the reductions in P losses. I acknowledge that these contaminants are difficult to model, however the applicant should at the minimum supply further explanation of the mechanisms by which the proposed changes in land use activity and proposed mitigations are likely to alter the losses of

sediment and microbial contaminants. Stating that the losses of sediment and microbial contaminants follow similar pathways as phosphorus losses provides insufficient evidence to assess the likely change in the discharge of these contaminants, particularly when the modelled change in P loss is small.

The proposed riparian planting mitigation lacks detail and cannot be adequately assessed based on the information supplied. A riparian planting plan should be provided with the application. There are many factors that influence the effectiveness of riparian planting, such as the plant species chosen, the buffer width and the aspect that will be planted. This can also have some influence on the instream habitat quality and hence the suitability for aquatic life.

I note that a map of tile drainage is supplied, but there is no mention of farm/effluent management to mitigate or manage risk to surface water via these pathways. Noting that dominant drainage is likely to be overland, there is still a risk that needs to be managed from the subsurface drainage. Management of effluent application in relation to the tile drainage present on the property is not adequately addressed in the AEE.

The application identifies that the proposed activity is in a degraded catchment under schedule X for MCI, sediment, *E. coli* and nitrogen. There is no specific assessment of the impact of the proposal on either MCI, sediment or *E. coli* in the receiving environment. Based on Schedule X, the cumulative impact of activities in the catchment is causing adverse effects on aquatic life, specifically macroinvertebrates. The applicant has not provided any information regarding mechanisms by which the activity and associated mitigations might improve conditions for aquatic life. Based on the information available, a measurable improvement in MCI score would be unlikely to result from the proposal. Additional mitigations that reduce sediment inputs should ultimately reduce sediment deposition on the streambed which is likely to improve instream habitat for macroinvertebrates. The applicant should consider whether they can offer any further mitigations that will reduce sediment inputs.

Groundwater

The assessment of environmental effects on groundwater within 5 km of the applicant's property indicates an elevation in nitrate levels; however, these values do not necessarily justify the need for site-specific groundwater monitoring. A review of the 1985–2017 groundwater chemical data from Environment Southland's database shows that two nearby wells (D45/0038 and D45/0185) have nitrate concentrations below 1 mg/L (median 0.26mg/l), indicating low nitrate levels. These wells are closer to the applicant's property than the bores referenced in Table 7 of the AEE, making them more representative of groundwater conditions near the proposed activity.

The dairy platform is situated within the Gleyed and Central Plains Physiographic Zones. The physiographic setting at this location indicates that nitrogen losses are likely to primarily occur via overland flow or artificial drainage, rather than leaching into groundwater. In the Central Plains zone, nitrogen loss to groundwater occurs only under dry conditions when soil cracking allows infiltration. However, this portion of the property is small, and nitrogen losses in this area predominantly affect surface water rather than groundwater. Given these physiographic characteristics, the risk of nitrate contamination to groundwater is considered low based on this regional scale assessment.

While the groundwater quality data used in the assessment is not recent, updating water quality results would provide a more current understanding of conditions near the applicant's property. However, because of historical data, and the physiographic setting, imposing groundwater monitoring to characterise nitrate contamination is not recommended.

Given the low nitrate concentrations in nearby wells, the physiographic constraints on nitrogen leaching to groundwater, the requirement for groundwater quality monitoring is not justified in this case. The primary concern remains the impact on surface water rather than groundwater.

References

Joint Witness Statement October 2019. https://www.es.govt.nz/repository/libraries/id:26gi9ayo517q9stt81sd/hierarchy/about-us/plans-and-strategies/regional-plans/proposed-southland-water-and-land-plan/documents/background-documents/appeals/court-minutes-and-directions/2019%2010%2017%20Joint%20Witness%20Statement%20Water%20Quality%20and%20Ecology.pdf

Neverman, A., Smith, H., Herzig, A., Basher, L. 2021. Modelling baseline suspended sediment loads and load reductions required to achieve Draft Freshwater Objectives for Southland. Manaaki Whenua – Landcare Research Contract Report LC3749. 76p.

Plew, D., 2023. Updated Total Nitrogen Load Limits for Southland Estuaries. NIWA Client Report, NIWA, Christchurch, New Zealand.

Rodway E., Blakemore K., De Silva N., Rabel, A. 2023. Identification of freshwater and estuarine attributes, baseline state, and current state in Murihiku Southland. Environment Southland technical report. Publication number 2023-07. ISBN 978-0-909043-94-0.

Snelder, T., & Plew, D., 2024. Nutrient Load Reductions to Achieve Target Attribute States in the Rivers, Lakes and Estuaries of Southland. LWP Client Report 2024-03. March 2024.

Snelder, T., & Fraser, C., 2021. Assessment of Escherichia coli Load Reductions to Achieve Draft Freshwater Objectives in the Rivers of Southland Murihiku. LWP Client Report Number 2020-21. August 2021.

Snelder T., 2022. Evidence in Chief for Southland Regional Council https://www.es.govt.nz/repository/libraries/id:26gi9ayo517q9stt81sd/hierarchy/about-us/plans-and-strategies/regional-plans/proposed-southland-water-and-land-plan/documents/background-documents/Topic%20B%20evidence/Southland%20Regional%20Council%20-%20Evidence%20in%20chief%20-%20Ton%20Snelder