Recommendation and decision on notification of resource consent application(s) under sections 95-95G of the Resource Management Act 1991 (RMA)

Summary

I recommend the application is processed on a publicly notified basis. This is because:

- The application is to expand an existing dairy farm to include 84.2ha of land historically sheep farmed.
- The mitigations proposed do not adequately avoid, remedy or mitigate all the adverse effects on freshwater.
- The adverse effects on the environment, and in particular on the 84.2ha sheep block, are more than minor.

The application

Particulars

Applicant:	Titipua Limited Partnership
Application reference:	APP-20211092
Site address or location:	354 Hedgehope Block Road (Dairy platform) 306 Hedgehope Block Road (Schrama block)
New consent(s) for new activity(ies) (s88)	☒
New consent(s) for existing activity(ies) (s88)	☒
Change to conditions of existing consent(s) (s127)	☐

The proposal

The applicant is proposing to renew their discharge and water permits (AUTH-301081-V1 and AUTH-301082-V1) as well as expand their dairy platform to include a recently purchased 84.2ha block of land. They also require a land use consent for a feed pad. The proposal is for:

- Discharge of dairy shed effluent from milking up to 600 cows from 5 August to 30 May (inclusive);
- Discharge of feed pad effluent from up to 120 cows during the months of August to October (inclusive);
- The discharge of liquid effluent via low rate cobra rain gun, slurry tanker or umbilical system onto 88ha;
- Take 72m^3/day of groundwater at a rate of <2L/sec;
- New land use consent for a feed pad; and
- New land use consent for an expanded dairy farm.

Water permit	
Relevant rule(s)	Rule 23(d) RWP – discretionary Rule 54(a) pSWLP – permitted
Source of water (bore or watercourse)	Bore E46/1068
Groundwater zone/name of watercourse	Makarewa

Aquifer type (for groundwater takes)	Lowland
Rate of take	<2L/sec
Daily volume	72m^3/day
Consistent with 120 L/cow/day?	Yes
Yearly volume	26,280m^3/year
Discretionary allocation (m^3/year)	49,065,000
Amount currently allocated (m^3/year and % of discretionary allocation)	3,987,124 and 8%

FDE discharge permit	
Relevant rule(s)	Rule 50(e) RWP – discretionary Rule 35(b) pSWLP – restricted discretionary
Cow numbers	Increase from 500 to consented 600
Stocking rate (cows/ha)	3.3
Winter milking proposed?	No
Other sources of effluent?	Feed pad
Effluent disposal area	88ha
Application rate and depth	Low rate cobra travelling irrigator - 10mm depth, 10mm/hour rate Slurry and umbilical – 5mm
Storage available	2,320m^3
Massey pond calculator 90% storage requirement	2,279m^3

Land use consent – feed pad	
Relevant rule(s)	Regulation 11 NES-F – non-complying
Size?	1,300m^2
Cows?	120
Effluent collected in system?	☒ Yes ☐ No
Base material	Wood based material

Land use consent – expanded dairy farm	
Relevant rule(s)	Rule 20(e) pSWLP - discretionary Regulation 19 NES-F - discretionary
Dairy platform increasing in size?	Yes, adding 84.2ha of neighbouring sheep farm.
Peak milking cow number increasing?	Yes, from 500 to consented threshold of 600
Cows remain on farm during winter?	Yes, all 600 cows will be on farm on crop, baleage and grass
Intensive Winter Grazing?	12ha of crop (permitted)

Overall, the application is a **non-complying** activity.

Public notification consideration

1. Is notification mandatory?

1.1	**Has the applicant requested that the application be publicly notified? (s95(3)(a))**	☐ Yes	Application must be publicly notified. Go to 10.2
		☒ No	Go to 1.2
1.2	**Was further information, or commissioning of a report, requested under s92?**	☒ Yes	Go to 1.3
		☐ No	Go to step 2.1

1.3	**If yes, was the request refused, or did the applicant fail to respond or fail to provide the information by the deadline?**	☐ Yes	Public notification is required by s95C. Go to 10.2
		☒ No	Go to step 2.1

2. Is notification precluded?

2.1	**Is each activity subject to a rule or NES that precludes public notification?**	☐ Yes	Rule(s): enter rule Go to 4.1
		☒ No	Go to step 2.2
2.2	**Is each activity a controlled activity?**	☐ Yes	Application must not be publicly notified unless special circumstances exist. Go to 4.1
		☒ No	Go to 3.1

3. Is notification required?

3.1	**Are any of the activities subject to a rule or NES that requires notification?**	☐ Yes	Application must be publicly notified. Go to 10.2
		☒ No	Go to 3.2
3.2	**Will the activity have, or is it likely to have, adverse effects on the environment that are more than minor?**	☒ Yes	Application must be publicly notified. Complete 3.3 and go to 10.2
		☐ No	Complete 3.3 and go to 4.1.

3.3 Reasons adverse effects on the environment are less than minor / minor / more than minor

The existing environment

The existing site is an operational dairy farm located approximately 23km north east of Invercargill. Currently the applicant holds discharge permit AUTH-301081-V1 and water permit AUTH-301082-V1. The discharge permit authorises the discharge of dairy shed effluent from 600 cows onto 88ha via low rate rain gun. The water permit authorises the abstraction of 72,000L/day of groundwater.

The applicant recently purchased 84.2ha of neighbouring property known as the Schrama block. This parcel of land has been historically sheep farmed and has never been included in a dairy platform. Since the purchase the applicant has been using this block of land for growing winter crop which was undertaken by the previous owner in the reference period stipulated in the National Environmental Standards for Freshwater 2020 (NES-F). I undertook a pre-application site visit on the 24th February 2021 before the application was lodged on 11 May 2021. At that time the Schrama block did have 5.8ha of crop growing on it and a new dairy lane had been constructed but not fenced and there were no cows present on the block.

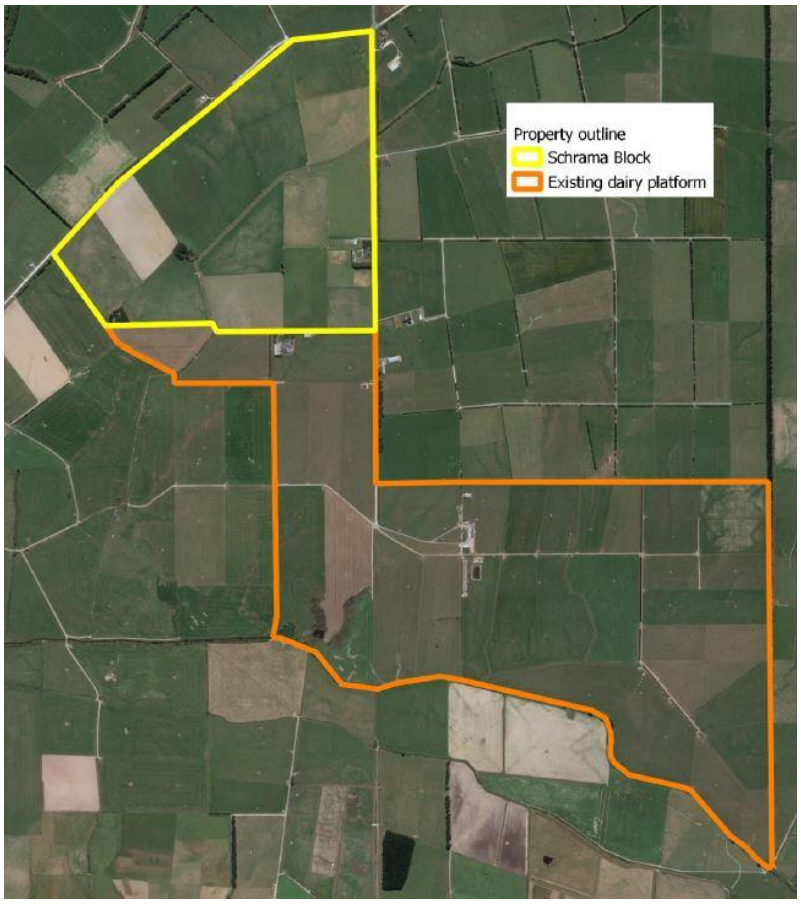

Figure 1: *Taken from the application showing the existing dairy platform in orange and the newly purchased sheep farm (Schrama block) in yellow.*

Soils and Physiographic Zones

	Soil Type	Vulnerability Factors		
		Structural Compaction	**Nutrient Leaching**	**Waterlogging**
Soils	Pukemutu	Severe	Slight	Severe
	Makarewa	Moderate	Slight	Severe
	Arthurton	Minimal	Slight	Severe
Physiographic Zones	Lignite/Marine Terraces (72%) Peat Wetlands (27%) Gleyed (1%)			

Soils in the Lignite/Marine Terraces Physiographic zone have high denitrifying potential in areas close to organic carbon sediments. The main risk in this zone is to the surface water due to contaminant movement via overland and/or artificial drainage during heavy rainfall events. Some water will drain to underlying aquifers however they tend to have long 'residence times' (slow movement of groundwater through the aquifer).

Much of the Peat Wetlands physiographic zone was wetland before being developed and has extremely acidic soils which are prone to waterlogging. A key feature of this zone is the highly fluctuating water table, which can extend up to the land surface during wet winter months. When the water table is high, streams are at risk of receiving high levels of contaminants via overland flow. When the water table is lower, streams receive contaminants via the extensive artificial drainage system. The soils also have a high denitrification potential and so nitrogen build-up is not an issue for aquifers in this zone. However, a lack

of silt and clay and the highly acidic property of peat soils mean that phosphorus is poorly retained and easily leached to water.

Soils in the Gleyed physiographic zone are poorly drained and prone to water logging. The soils may accumulate and store nitrogen during summer and early autumn months when soil moisture levels are low. This accumulated nitrogen starts moving with water when soils become wet in late autumn and winter and may be lost via artificial drains or overland flow. However, some nitrogen will be removed from the soil and aquifers via denitrification, resulting in relatively low groundwater nitrate concentrations.

Groundwater quality
There is one groundwater monitoring bore on the property, E46/1068, which showed Minor to Moderate land use impacts (1.0 – 3.5mg/L) when it was tested once only in January 2011. There are seven monitoring bores located between 5.5km - 8km down gradient which show a range of results from Pristine, pre-European (0.01 – 0.4mg/L) to Exceeding NZDWS (>11.3mg/L). Four of these bores have been tested three times or less and have not been tested within the last five years. Bore E46/0994 (18m deep) located 6.6km down gradient was tested 14 times between 2010 and 2016 with groundwater nitrate levels ranging between 4.4mg/L and 1.21mg/L. Bore E46/0888 (51m deep) located 5.5km down gradient was tested 15 times between 2009 and 2018 with groundwater nitrate levels ranging between 7.3mg/L and 10mg/L. Bore E46/0895 (8.5m deep) located 7km down gradient was tested 19 times between 2009 and 2017 with results ranging between 12.3mg/L and 34mg/L which is more than triple the New Zealand Drinking Water standards. The two latter bores are both located in the Oxidising physiographic zone which could be contributing to the elevated nitrate levels.

Council's Environmental Scientist has been asked to assess whether Groundwater quality monitoring would be appropriate in this scenario. If it is deemed to be appropriate, this will be included in consent conditions.

Adverse effects of the proposed activities on the environment

Consideration of the following effects is required:
- effects on water quality;
- effects on water quantity;
- soil health; and
- odour.

Water Quality

Discharge
Potential adverse effects of discharging effluent onto land include contamination of groundwater and contamination of surface waterways. The applicant has proposed good management practices that will be adopted to minimise adverse effects arising from the activity:

- Storage of effluent in the effluent pond when conditions are not suitable for discharge;
- Adhering to buffer distances from surface waterways and bores;
- Application of effluent at low rates and depths; and
- Use of a slurry tanker and umbilical system as required.

However, the applicant has not provided a tile drain map, therefore it is not known if the applicant avoids discharging over known tile drains within the discharge area.

Land Use – Expanded dairy farm

The applicant has provided nutrient budgets of the current scenarios and proposed amalgamated scenario as required by Part B section 4 of Appendix N in the proposed Southland Water and Land plan. These budgets have been created by Mo Topham, who is a Certified Nutrient Management Advisor, using the Overseer Software. Council commissioned Nicky Watt, who is a Certified Nutrient Management Advisor, to review the nutrient budgets for a 'sensibility check'. She has confirmed that the figures that have been used in the budgets are appropriate and that the Overseer Best Practice Data Input Standards have been followed.

The table below shows the nutrient losses from the dairy platform and the Schrama block as individual current scenarios. It is noted in the application that the inputs used for the Schrama block have been based off information available from Beef and Lamb NZ Economic survey[1] and are not actual farm specific inputs due to a lack of detailed information and records from the previous owner. Losses from both the dairy platform and the Schrama block were then added together to provide a relative comparison to the proposed scenario (Schrama block included as dairy platform).

	Dairy platform current	**Schrama block current**	**Dairy + Schrama current**	**Proposed scenario**	**Difference (%)**
N Loss to water (kg/ha/yr)	56	20	45	44	-2.2%
N Loss to water (kg/yr)	10,196	1,685	11,881	11,656	-1.9%
P Loss to water (kg/ha/yr)	2.5	2.3	2.4	2.3	-4.2%
P Loss to water (kg/yr)	456	191	647	617	-4.6%

The table below outlines the good management practices (GMPs) and mitigation measures which have either occurred or are proposed to be undertaken on farm. Each GMP/mitigation has a varying degree of effectiveness in terms of nitrogen, phosphorus, microbes (e.g. E. coli) and sediment loss. The mitigation measures and GMPs for the landholding have been selected based on specific characteristics of the physiographic zones and key contaminant pathways present.

Mitigation/GMP	**Implementation timeframe**	**Mitigation measure or GMP?**
Fence off all waterways	Done	Good management practice
Plant all riparian margins	Ongoing – riparian margin between new land and waterway to be planted	Good management practice
Provide sufficient effluent storage to enable deferred application	Done	Good management practice
Defer effluent application when soil conditions are unsuitable	Currently happens	Good management practice
Minimising run-off from tracks, gateways, and crossings by ensuring they are designed and maintained adequately	From first exercise of new consent for Schrama block	Good management practice
Plant/enhance wetland	From first exercise of new consent	Mitigation measure

[1] https://beeflambnz.com/sites/default/files/data/files/2019%20SSI.pdf

Ecotain plantain seeds used in re-grassing programme	Has been occurring for the past four years	Mitigation measure
Apply effluent at low rates and depths	Low rate rain gun used	Good management practice
Re-sow bare soils as soon as possible	Currently happens	Good management practice
Back fence stock off land that has already been grazed	Currently happens	Good management practice
Use portable water troughs and portable feeders when baleage is fed on crop paddocks.	Currently happens	Good management practice
Mob sizes less than 120 cattle when intensively winter grazing	Currently happens	Good management practice
CSAs are identified and protected	Currently happens	Good management practice
Avoid applying fertiliser to excessively dry, saturated or when soil temp is less than 7 degrees	Currently happens	Good management practice
Reducing Olsen P levels from 34/35 to 30	From first exercise of new consent	Good management practice

The table above shows which measures are identified as mitigations and which are GMPs. Overseer assumes that GMPs are being used, which means some of the GMPs are already accounted for in Overseer. Others are not accounted for in Overseer and are therefore not taken into account by the budget, and so they can be considered a mitigation as they represent something additional that the applicant is putting in place to mitigate the effects.

In light of the Government's Science Advisory Panel's review of the effectiveness of Overseer in assessing and predicting farm-scale nitrogen losses, and the conclusion that the current Overseer model is not fully fit for purpose in the way it is being currently used in the consenting process, mitigation measures are of the utmost importance when assessing this application. This is because they represent additional steps that can be taken to offset or compensate for the effects of the change or intensification of land use. Those crucial mitigations are:

- Wetland enhancement;
- Ecotain plantain used.

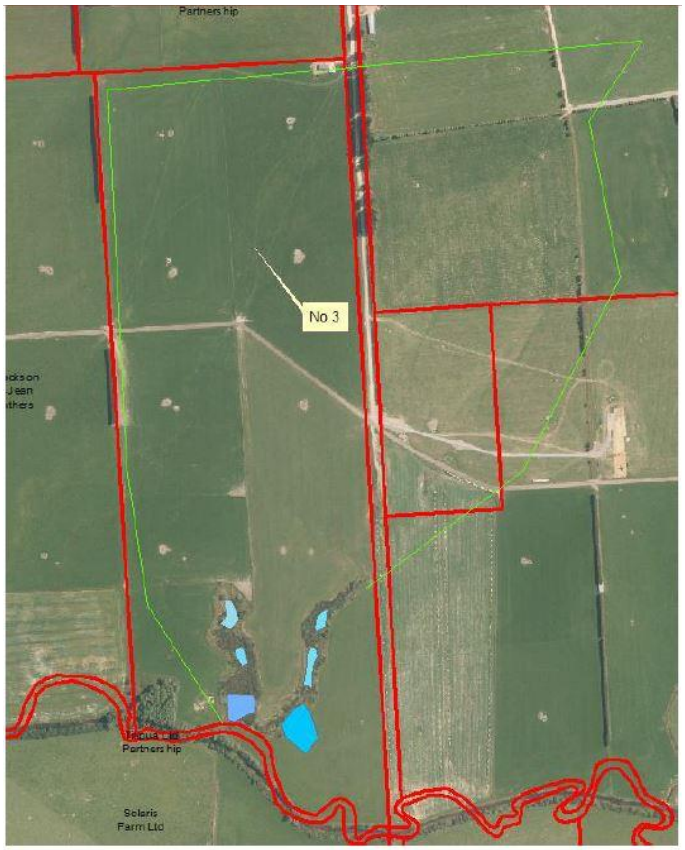

Figure 2: *Taken from the application showing the proposed wetland enhancement and the contributing catchment outlined in green.*

Nitrogen

The budgets show that the N losses on the landholding are expected to decrease by 225kg/year or -1.9% when the Schrama block is amalgamated into the platform in comparison with the current scenarios combined. However, the application includes calculations done outside of Overseer to account for wintering on grass and baleage and the enhancement of the duck pond into a constructed wetland. These calculations were undertaken by Mo Topham as Overseer cannot model them and they detail why N losses are expected to be lower than those modelled.

Overseer has estimated that the loss of nitrogen from the grass baleage wintering system is 433kgN (or 43kgN/ha). Ms Topham notes in her OverseerFM Nutrient Budget Modelling Report (Appendix B of the application) that Overseer has most likely underestimated the nitrogen losses from the grass and baleage wintering system as it is not able to adequately reflect what is actually happening on-farm. Overseer assumes that the pasture plants will regrow post grazing and take up urinary N from the winter grazing activity. However, due to the soil type and climate on the applicant's property, the plants are not viable following the winter grazing (also known as a sacrifice paddock) and will be cultivated/re-grassed in spring. Wintering cows in paddocks can cause compaction of soil which reduces soil porosity and hydraulic conductivity and increases bulk density, particularly on fine textured soils which have become water-saturated (Luo & Ledgard, 2021)[2]. Fallow soil can run off into surface waterbodies carrying with it phosphorus and microbial contaminants. As a result of the calculation done outside of Overseer, the application predicts that the losses from the grass and baleage wintering system will be **444kgN higher** than estimated in the Overseer proposed scenario.

[2] Luo, J. and Ledgard, S. (2021) New Zealand Dairy Farm Systems and Key Environmental Effects. *Frontiers of Agricultural Science and Engineering*, Vol 8, issue 1, pages 148–158

The existing duck pond in the south western section of the landholding is proposed to be upgraded to a 2.216ha wetland and will have a contributing catchment of 50ha. NIWA's Constructed Wetland Guidelines[3] state to function effectively the constructed wetland needs to comprise between 1%-5% of its contributing catchment. The applicant's proposed wetland will equate to 4.4% of the contributing catchment. A constructed wetland of that size in a region with median annual air temperature of 8-12 degrees can remove between 30% – 44% of long term total nitrogen inputs (Tanner et al., 2020)[4]. The application includes calculations based on the constructed wetland removing 50% of long term total nitrogen inputs, however 50% is the median for a location considered a 'warm zone' (median annual air temperature >12 degrees) which Titipua is not according to NIWA's median annual average temperatures across NZ (1981 – 2010)[5]. This can be seen in Figure 3 below.

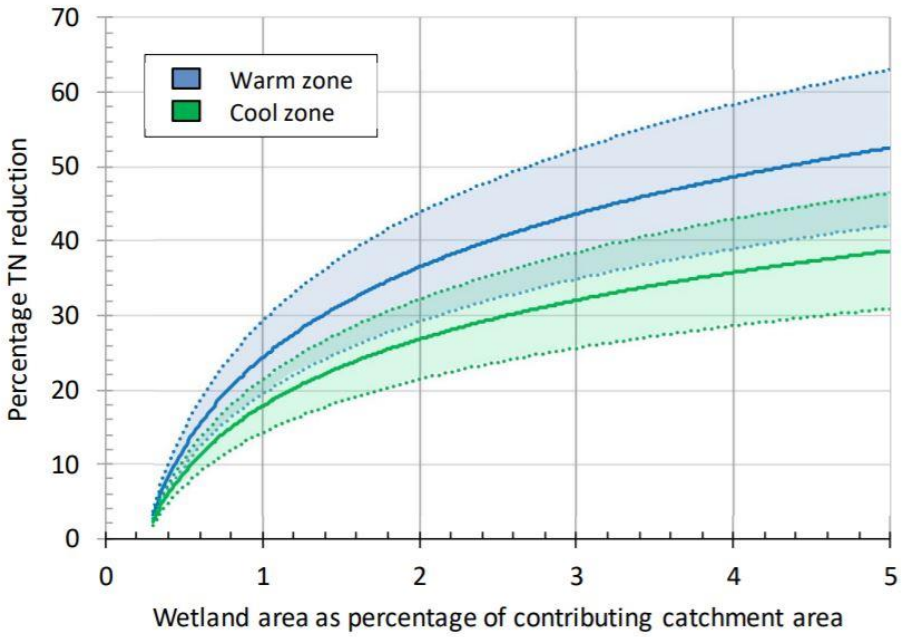

Figure 3: *Long-term median annual Total Nitrogen (TN) reduction performance expectations for warm (median annual temperature >12°C) and cool (median annual temperature 8-12°C) climatic zones. The solid lines show expected medians for each zone; shaded areas show inter-annual and inter-site range of performance expected.*

As a result, I consider that the calculations of N reduction within the application in Figure 4 below are incorrect. Using the same total reduction equation (ha x kgN/ha x %) the constructed wetland could remove an additional **399 - 586kg/year** of total nitrogen from the 38ha of the contributing catchment within the landholding at a 30% – 44% reduction rate. I note since the completion of the nutrient budgeting report, there has been a version change of Overseer to v6.4.0. This has resulted in changes in the estimated losses of N which are shown in red in Figure 4 below.

[3] https://niwa.co.nz/sites/niwa.co.nz/files/Summary%20of%20Constructed%20Wetland%20Guidelines%202020%20v2.pdf
[4] Tanner, C.C., Sukias, J.P.S. and Woodward, B. (2020) Provisional guidelines for constructed wetland treatment of pastoral farm run-off. NIWA Client Report to DairyNZ, January 2020.
[5] https://niwa.co.nz/climate/national-and-regional-climate-maps/national

Overseer block name	Area (ha)	OverseerFM estimated nitrogen leaching loss (kgN/ha) (updated in red)	Reduction in N leaching due to wetland (from David Moate's report) (%)	Total reduction (kgN) (Ha x kgN/ha x %) (updated in red)	30%	44%
Non-Eff, Rolling – Puke, Apar	32.2	40.6 36.2	50	653.66 582.82	349.7	512.8
Eff, Rolling – Puke, Apar	2.1	43.0 38.6	50	45.15 40.53	24.3	35.7
Non effective area (laneways and tracks) – the losses from this area are accounted for in "other sources" below.	3.7					
Total block Nitrogen loss mitigated	**38.0**			**698.81** **623.35**	**374**	**548.5**
Plus reduction in other sources losses	38/265.7	589 593	50	42.12 42.40	25.4	37.3
Total farm Nitrogen loss mitigated				**740.93** **665.75**	**399.4**	**585.8**

Figure 4: *Taken from the application showing Total Nitrogen removed by the constructed wetland at the 50% reduction rate. A version change within Overseer occurred resulting in changes shown in red. Two additional columns have been added to the right hand side showing the TN reductions at 30% and 44%.*

Phosphorus

The budgets show that the P losses on the landholding are expected to decrease by 30kg/year or -4.6% when the Schrama block is amalgamated into the platform in comparison with the current scenarios combined. However, the application includes calculations done outside of Overseer to account for the enhancement of the wetland. These calculations were undertaken by Mo Topham as Overseer cannot model them and they detail why P losses are expected to be lower than those modelled. A constructed wetland of 2.216ha which constitutes 4.4% of the contributing catchment can remove between 32% – 60% of long term total phosphorus inputs, with a median reduction rate of 48% (Tanner et al., 2020)[6]. This can be seen in Figure 5 below. These performance predictions do not apply for constructed wetlands whose main source is sub-surface drainage containing predominantly dissolved forms of phosphorus.

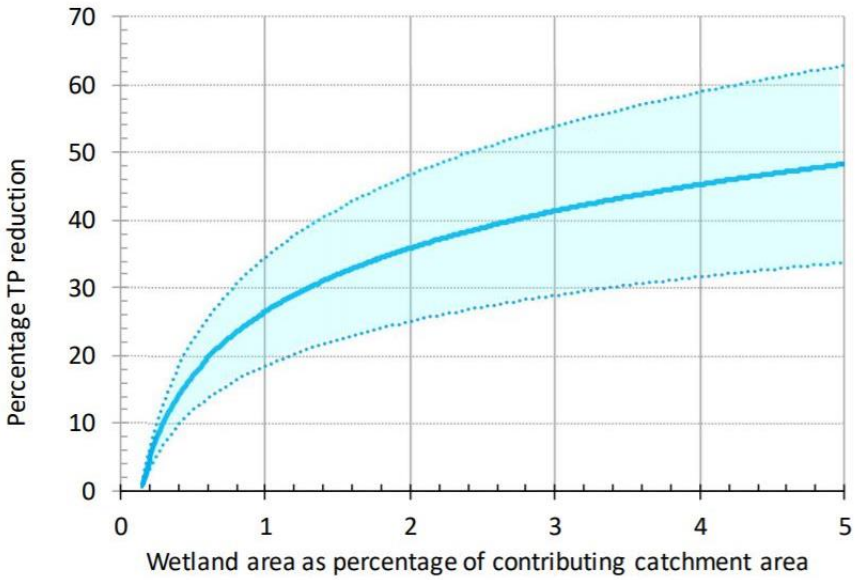

Figure 5: *Long-term median annual Total Phosphorus (TP) reduction performance expectations. The solid line shows expected median; shaded area shows inter-annual and inter-site range of performance expected.*

[6] Tanner, C.C., Sukias, J.P.S. and Woodward, B. (2020) Provisional guidelines for constructed wetland treatment of pastoral farm run-off. NIWA Client Report to DairyNZ, January 2020.

As a result, the calculations of P reduction within the application in Figure 6 below are mostly accurate and the constructed wetland could remove an additional **17 - 54kg/year** of total phosphorus from the 38ha of the contributing catchment within the landholding at a 32% – 60% reduction rate.

Overseer block name	Area (ha)	OverseerFM estimated P loss (kgP/ha)	Reduction in P loss due to wetland (from David Moate's report) (%)	Total reduction (kgP) (Ha x kgP/ha x %)
Non-Eff, Rolling – Puke, Apar	32.2	2.14	48	33.08
Eff, Rolling – Puke, Apar	2.1	2.20	48	2.22
Non effective area (laneways and tracks) – the losses from this area are accounted for in "other sources" below.	3.7			
Total block Phosphorus loss mitigated	**38.0**			**35.3**
Plus reduction in other sources losses	38/265.7	114	48	7.83
Total farm Phosphorus loss mitigated				**43.13**

Figure 6: *Taken from the application showing Total Phosphorus removed by the constructed wetland at a 48% reduction rate.*

Overall, the application has identified an additional **444kgN/year** will be lost by the grass baleage wintering system and an average of **493kgN/year** and **43kgP/year** can be mitigated by the constructed wetland. As a result of the additional calculations, the overall N losses are predicted to decrease by **274kg/year or -2.3%** and the overall P losses are predicted to decrease by **73kg/year or -11.3%**. This brings the proposed dairy platform P losses down to 2.2kgP/ha, but does not change the kgN/ha. The decrease in nitrogen is negligible and, given the uncertainty associated with Overseer modelling, does not demonstrate that water quality will be improved with regard to nitrogen.

It has been identified that loss of N and P via overland flow is of much greater concern than leaching of N to groundwater. If consent was granted, any GMPs and mitigations detailed in the application that have not been implemented yet should be imposed as consent conditions. This is to ensure that the potential effects from overland flow will be mitigated by the proposed GMPs and mitigations, provided that they are implemented.

Water Quantity

The applicant is proposing to abstract 72m^3/day and 26,280m^3/year. The daily take is the equivalent to 120L/cow/day which is the industry standard of efficient use for shed and stock water use. The rate of abstraction is less than 2L/sec from bore E46/1068. The groundwater zone from which the water would be taken (Makarewa in both the RWP and pSWLP) is not over-allocated, and the proposed abstraction will not result in over-allocation. The closest waterway to the abstraction bore (E46/1068) is the Titipu Stream located 540m south and with the proposed maximum rate of abstraction of <2L per second, I consider the effects on water quantity are less than minor.

Soil Health

The liquid effluent disposal field is proposed to remain at 100ha, no effluent is proposed to be discharged onto the new Schrama block. The proposed discharge area is more than the area needed to meet the minimum requirement of 4 hectares per 100 cows, which is calculated to achieve a maximum loading of

150 kg of nitrogen/hectare/year from effluent irrigation and more than the 8 hectares per 100 cows as recommended in the Best Practice Guidelines Booklet[7].

Odour

As long as the effluent is applied in accordance with the specified application rates and depths, and the buffers specified by recommended consent conditions are maintained, then there should little risk of adverse effects from odour and spray drift on surrounding land owners and occupiers. Effluent storage facilities can cause problems with odour, however, the closest dwelling on another property is located over 870m from the effluent storage pond and all facilities are more than 270m from the property boundary. A recommended condition of consent requires that the stored or discharged agricultural effluent shall not cause any odour beyond the boundary of the site that is offensive or objectionable.

Adverse effects that have been disregarded

Policy 39 of the proposed Southland Water and Land Plan states:

"*When considering any application for resource consent for the use of land for a farming activity, the Southland Regional Council should consider all adverse effects of the proposed activity on water quality, whether or not this Plan permits an activity with that effect*".

As such, **all effects** related to the use of land for farming and the associated activities undertaken as part of the entire farming operation have been considered, and **no effects have been disregarded**.

Planning provisions (policies and objectives) relevant to adverse effects

A policy assessment has been included in the consent application. I have reviewed this assessment and also examined the relevant planning documents. The following are the most relevant provisions:

- National Policy Statement for Freshwater Management 2020 (NPS-FM)
  - Objective 1 seeks to ensure that natural and physical resources are managed in a way that prioritises first, the health and well-being of water bodies and freshwater ecosystems, second, the health needs of people, third, the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future.
  - Policy 1 seeks to manage freshwater in a way that gives effect to Te Mana o te Wai.
  - Policy 2 seeks to actively involve Tangata Whenua in freshwater management and Māori freshwater values are identified and provided for.
  - Policy 3 seeks to manage freshwater in an integrated way that considers the effects of the use and development of land, including the effects on receiving environments.
  - Policy 9 seeks to protect the habitats of indigenous freshwater species.
  - Policy 11 seeks to ensure freshwater is allocated and used efficiently, all existing over-allocation is phased out and future over-allocation avoided.
  - Policy 15 seeks to enable communities to provide for their social, economic, and cultural well-being in a way that is consistent with the NPS.

- Proposed Water and Land Plan 2018 (pSWLP)
  - Objective 1 - Land and water and associated ecosystems are sustainably managed as integrated natural resources, recognising the connectivity between surface water and groundwater, and between freshwater, land and the coast

[7] Farm Dairy Effluent, Best Practice Guidelines (2007), Environment Southland

- Objective 2 - The mauri of water provides for te hauora o te taiao (health and mauri of the environment), te hauora o te wai (health and mauri of the waterbody) and te hauora o te tangata (health and mauri of the people).
- Objective 3 - Water and land are recognised as enablers of the economic, social and cultural wellbeing of the region.
- Objective 4 - Tangata whenua values and interests are identified and reflected in the management of freshwater and associated ecosystems
- Objective 6 - Water quality in each freshwater body, coastal lagoon and estuary will be maintained where the water quality is not degraded and improved where the water quality is degraded by human activities.
- Objective 8 - The quality of groundwater that meets both the Drinking Water Standards for New Zealand 2005 (revised 2008) and any freshwater objectives, including for connected surface water bodies, established under Freshwater Management Unit processes is maintained. The quality of groundwater that does not meet those standards and objectives because of the effects of land use or discharge activities is progressively improved so that groundwater meets the Drinking Water Standards for New Zealand 2005 (revised 2008) and any freshwater objectives and freshwater quality limits established under Freshwater Management Unit processes.
- Objective 11 - The amount of water abstracted is shown to be reasonable for its intended use and water is allocated and used efficiently.
- Objective 12 - Groundwater quantity is sustainably managed, including safeguarding the life-supporting capacity, ecosystem processes and indigenous species of surface water bodies where their flow is, at least in part, derived from groundwater.
- Objective 13 - Provided that the quantity, quality and structure of soil resources are not irreversibly degraded through land use activities or discharges to land; and the health of people and communities is safeguarded from the adverse effects of discharges of contaminants to land and water; and ecosystems (including indigenous biological diversity and integrity of habitats), are safeguarded, then land and soils may be used and developed to enable the economic, social and cultural wellbeing of the region.
- Objective 18 - All persons implement environmental practices that optimise efficient resource use, safeguard the life supporting capacity of the region's land and soils, and maintain or improve the quality and quantity of the region's water resources.
- Policy 6 seeks to avoid, remedy, or mitigate adverse effects on water quality from contaminants in the Gleyed and Lignite/Marine Terraces Physiographic zones by requiring implementation of GMPs to manage contaminants transported via artificial drainage, and overland flow where relevant and having particular regard to adverse effects from these contaminant pathways when assessing resource consent applications and Farm Environmental Management Plans;
- Policy 11 seeks to avoid, remedy, or mitigate adverse effects on water quality in the Peat Wetlands Physiographic zone by requiring implementation of GMP's to manage contaminants transported via artificial drainage, deep drainage and lateral drainage and having particular regard to adverse effects from these contaminant pathways when assessing resource consent applications and Farm Environmental Management Plans and decision makers generally not granting consents for additional dairy farming of cows where contaminant losses will increase;
- Policy 13 seeks to manage land use activities to enable the achievement of Policies 15A, B and C;
- Policy 15A-C seek to main water quality where standards are met and improve water quality where standards are not met;
- Policy 16 seeks to minimise the adverse environmental effects, including cumulatively, on groundwater and surface water quality from farming activities and require all farming activities to implement a Farm Environmental Management Plan.

➢ Te Tangi a Tauira (2008)
- Policy 3.5.1.3 seeks to ensure all discharges of dairy farm effluent to land must have a resource consent.

- Policy 3.5.1.8 requires best practice for land application to manage farm effluent in order to minimise adverse effects on the environment.
- Policy 3.5.1.11 seeks to avoid any surface run off/overland flow, ponding or contamination of water resulting from the application of dairy shed effluent to pasture.
- Policy 3.5.1.14 requires a buffer of at least 100m be established between discharge activities and bores.
- Policy 3.5.1.15 seeks that all spray drift be managed and contained within the boundaries of the consent area.
- Policy 3.5.10.3 seeks to protect and enhance the mauri, or life supporting capacity, of freshwater resources throughout Murihiku.
- Policy 3.10.5.5 seeks to promote the management of freshwater according to the principle of ki uta ki tai, and thus the flow of water from source to sea.
- Policy 3.5.11.14 seeks to use riparian enhancement, buffer zones, fencing, and related streamside management tools as conditions of consent to ensure that human use of rivers and their water does not compromise river health.
- Policy 3.5.13.1 seeks to ensure the role of Ngāi Tahu ki Murihiku as tangata whenua and kaitiaki of water must be recognised and provided for in all water quality management.
- Policy 3.5.13.7 ensures when assessing the effects of an activity on water quality, where the water source is in a degraded state, the effects should be measured against the condition that the water source should be, and not the existing condition of the water source.
- Policy 3.5.13.8 promote the restoration of wetlands and riparian areas as part of maintaining and improving water quality, due to the natural pollution abatement functions of such ecosystems.
- Policy 3.5.14.4 prefers, in the Southland Plains region, water takes are from bores, as opposed to surface water abstractions.
- Policy 3.5.14.11 seeks to avoid excessive drawdown of aquifer levels as a result of groundwater abstractions.
- Policy 3.5.18.3 seeks to advocate for the restoration and enhancement of wetland areas, as part of any consent application where it is deemed feasible to include such conditions.
- Policy 3.5.19.3 seeks to promote riparian zone establishment and management as a tool to improve water quality in the waterways of Murihiku.

There is clear policy direction in the pSWLP that water quality should be maintained or improved where water quality is degraded by human activities. The water quality in the receiving environment is degraded, in particular the Hedgehope Stream 20m upstream of the Makarewa River confluence sits in the worst 25% of all sites for E.coli and in the worst 50% of all sites for Total Nitrogen and Total Phosphorus[8]. The applicant has offered mitigations in an attempt to mitigate the adverse effects, however the wetland enhancement mitigation targets contaminant losses to surface water from a 50ha contributing catchment of which only 38ha is within the landholding. This contributing catchment does not include any part of the new Schrama block and therefore does not avoid or mitigate the significant increase in contaminant losses from the Schrama block (N increase from 1,653kg/year to 2,729kg/year). I also note that within the constructed wetland advice the applicant received from one of Council's Land Sustainability Officers was two more smaller wetlands within the Schrama block but the applicant has chosen not to proceed with these and has not included them in the proposal. Another mitigation which is currently utilised within the farming system is using plantain in the re-grassing programme. Plantain causes cows to urinate more often which reduces nitrate leaching by spreading any surplus nitrogen in the urine across a paddock, rather than saturating one spot. However, this mitigation has been in place on the dairy platform for the last four years, therefore the benefits of its use have already been occurring and thus the effectiveness of this measure as a mitigation for increased nutrient losses is reduced. Also, the application does not include a management plan for when, or if, the plantain will be sown on the Schrama block. The only

[8] https://www.lawa.org.nz/explore-data/southland-region/river-quality/oreti-river/hedgehope-stream-20m-us-makarewa-confl/

other mitigation that offers reassurance that there will be a reduction in nitrogen losses to groundwater is incorporating a limit of N loss per hectare into consent conditions along with ongoing modelling and subsequent reporting of N losses for the duration of the consent term. This type of mitigation is of less value than it once was due to the Science Advisory Panel's peer review report on Overseer which was released on 11 August 2021.

The NPS-FM has a hierarchy of obligations in Te Mana o te Wai that prioritises:

(a) first, the health and well-being of water bodies and freshwater ecosystems
(b) second, the health needs of people (such as drinking water)
(c) third, the ability of people and communities to provide for their social, economic, and cultural well-being, now and in the future.

Giving effect to Te Mana o te Wai means the first priority is to protect the life supporting capacity and wellbeing of water. The applicant's proposed mitigations will not fully mitigate all of the potential or actual adverse effects on freshwater and as a result I consider that the proposal is inconsistent with the hierarchy of obligations above. Notably the application is lacking mitigations that prioritise and protect the health and well-being of the water body and freshwater ecosystems in the new Schrama block, in particular contaminant loss to groundwater under and the surface water body within the Schrama block. As mentioned above additional mitigations could be offered to protect the life supporting capacity of the freshwater within the Schrama block by proceeding with the two smaller constructed wetlands within the Schrama block.

Conclusion: significance of adverse effects on the environment

The above objectives and policies have been used to inform and determine the level of adverse effects associated with the proposed activity, as the direction of the policies help establish what effects are acceptable and therefore whether the adverse effects of the proposed activities are less than minor, minor or more than minor.

The applicant has demonstrated that there will be sufficient storage available in the pond when the land is not suitable to discharge effluent to. The existing pond is synthetically lined, was authorised by land use consent AUTH-301083-V1 and has a leak detection system. Also effluent can be discharged at low rates and depths which is consistent with the key policies in avoiding and mitigating effects on water quality. The water abstraction volume is considered efficient and reasonable for its end use which is consistent with key water quantity policies. The calving pad allows the applicant to stand cows off pasture during adverse weather and the effluent generated on the pad is collected in the effluent system which ensures it can be managed and will not flow beyond the perimeter of the pad.

The application proposes to redesign and enlarge a duck pond located in the south west boarder of the property in order to create a wetland. However, the duck pond is already existing therefore it will already be playing a role in catching sediment run-off from the dairy operation. So in reality the effectiveness of the mitigation is likely to be less than predicted. Additionally, according to NIWA's Constructed Wetland Guidelines there are very specific parameters the constructed wetland must include in order to be fully effective and remove the amount of contaminants the application is predicting. Theses parameters include:

1. overall length to width ratio of the wetland channel should be between 5:1 and 10:1 (minimum 3:1);
2. a sedimentation pond should be included as the first stage of the wetland complex;
3. 70% of the wetland should be shallow water (0.2-0.4 m deep); and
4. there should be deep open water areas (0.5 - 0.75 m) at the inlets and at intermediate stages within the wetland (~30% total coverage).

The application does not include a wetland construction/redesign/enhancement plan of any type and therefore it is unclear when the mitigation is going to be completed and if it will meet the specific parameters listed above. The application is relying heavily on this mitigation due to the very small reductions in losses modelled and the Science Advisory Panel's review of Overseer, but without a plan detailing the steps that will be taken and whom the construction/redesign/enhancement will be undertaken and overseen by, there is not certainty that this proposed mitigation will reduce contaminants losses and improve water quality to the full extent that the application predicts. The wetland/pond area has also been modelled in the proposed nutrient budget as being 1.9ha in size as opposed to 2.2ha (referred to in the application). A wetland reduced down to 1.9ha equates to 3.8% of the contributing catchment and would decrease the amount contaminants removed by the constructed wetland even further than predicted by the outside of Overseer calculations.

The use of information for the current Schrama block nutrient budget based off the Beef and Lamb NZ Economic survey, as opposed to actual farm specific inputs, further reduces the reliance that can be placed on the Overseer outputs.

While the nutrient losses over the landholding as a whole could decrease under the proposal, localised losses will increase as a result of the intensification of land use on the Schrama block. There will be an increase in losses from the Schrama block into the Makarewa Groundwater zone and Titipu Stream catchment which will, especially considered cumulatively, result in addition nutrients and contaminants entering the localised receiving environment. Increased losses result in increased contaminant loadings in groundwater and waterways which can cause a number of issues, including nuisance algal growth, over sedimentation and eutrophication. The localised effects of the change of land use have not been adequately assessed for the proposal and therefore I do not have enough information to determine that the effects of the proposal on the localised receiving environment (relative to the Schrama block) will be less than minor.

The applicant is proposing to winter on 10ha of grass and baleage along with 12ha of crop. The application states that after wintering on grass and baleage the plants are no longer viable and will require cultivating and re-grassing, this is also known as a sacrifice paddock. Sacrifice paddocks can have adverse effects on the environment similar to intensive winter grazing if not managed well. The applicant has done a calculation outside of Overseer with regard to nitrogen, however no such calculation has been done for phosphorus. Therefore, phosphorus losses from the grass and baleage winter activity could also be higher than predicted. The use of a sacrifice paddock also falls under the definition of Feedpad/lot in the pSWLP which as per rule 35A (pSWLP) must service no more than 120 adult cattle at one time, cattle must not remain there for more than three continuous months, it must not be located within 50 metres of any surface waterways, natural wetlands or another feedpad/lot or within 200 metres of a neighbouring dwelling or 20 metres of the landholding boundary or within a CSA. The rule also stipulates the base must either be sealed and impermeable and the effluent collected in a sealed effluent storage system authorised under Rule 32B or 32D or the base must be a minimum depth of 500mm of wood based material. If these conditions cannot be met, then the use of a sacrifice paddock for grass and baleage wintering is not a permitted activity.

Lastly, no consultation has been undertaken with iwi who hold mana whenua of the area. This is inconsistent with Policy 2 of the NPS-FM and multiple policies within the Te Tangi a Tauira plan. In the absence of detail in the application and AEE of the potential cultural effects of the proposal I am unable to conclude on the scale of potential effects on cultural values. However, in light of my conclusions above, I consider that there is risk of more than minor adverse effects on cultural values.

I consider the adverse effects from the discharge of agricultural effluent to land, the daily abstraction of groundwater and the use of land for a calving pad will be less than minor. However, as a result of the

above, I consider that the adverse effects from the proposed expansion of a dairy farm will be more than minor.

Recommendation and decision

10. Officer's recommendation

10.1	**The application be processed non-notified**	☐
10.2	**Public notification is recommended**	☒
10.3	**The application be placed on hold while the applicant tries to obtain written approvals from the affected persons**	☐
10.4	**Limited notification is required. Persons to be served notice are those listed in 8.2**	☐

Jade McRae
Senior Consents Officer

Date: 9 September 2021

Decision under Delegated Authority

11.1	**I agree with the recommendation**	☒
11.2	**The application will be processed non-notified**	☐
11.3	**The application will be publicly notified**	☒
11.4	**The application shall be placed on hold while the applicant tries to obtain written approvals from the affected persons**	☐
11.5	**The application will be limited notified. The parties to be served notice are those listed in section 8.2**	☐

This decision is made under delegated authority by:

Bruce Halligan
Acting Consents Manager

Date: 15 September 2021