

2. Consultant/ Agent details (if applicable)

Contact
person Nicole Mesman

Company Lumen Environmental Ltd

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Email nicole@lumen.co.nz

Phone 020 4193 1441

Note: All correspondence during the consent process will be directed to this contact person, unless instructed otherwise. Final decision documents will be sent to the applicant.

Are you the owner or occupier at the site?

 Yes

If not, please complete the following information

Name of owner or occupier at the site
(if different from 1.1.) _____

Address of the owner or occupier at the
site (if different from 1.2.) _____

2 Site Details

Location of activity (including
street/road name, number, and locality) 171 Ruahine Road West, Orepuki

Map Co-ordinates (NZTM 2000)

_____ 1196129 _____ E 4854040 _____ N(NZTM 2000)

Legal description of property at site of activity (refer to land title
or rates

ce) : Lot 2 DP 10746, Section 11 and 12 Block V Longwood Survey District, Lot DP401670
Part Section 14 Block V Longwood SD____

Please attach a map or a coloured aerial photograph, showing at a minimum, the location of the proposed activities.

3. Consents required in relation to this proposal:

Please tick the box for the consent(s) you are applying for and complete the relevant Part B form(s) where available

Water

<input type="checkbox"/>	Take and use surface water
<input type="checkbox"/>	Take and use groundwater

<input type="checkbox"/>	Divert water
<input type="checkbox"/>	Dam water

Land Use

<input type="checkbox"/>	Bore/ Well
<input checked="" type="checkbox"/>	New or expanded dairy farming
<input checked="" type="checkbox"/>	Intensive winter grazing
<input type="checkbox"/>	Feed-pad, wintering pad, calving pad or silage pad
<input type="checkbox"/>	Bridges and culverts

<input type="checkbox"/>	Effluent storage
<input type="checkbox"/>	Cultivation
<input type="checkbox"/>	Gravel extraction
<input type="checkbox"/>	Riverbed activity
<input type="checkbox"/>	Tree planting

Discharge

<input type="checkbox"/>	To air
<input type="checkbox"/>	To Land
<input type="checkbox"/>	To water
<input type="checkbox"/>	

Coastal

<input type="checkbox"/>	Whitebait stand
<input type="checkbox"/>	Removal of natural materials
<input type="checkbox"/>	Discharge/deposit substances
<input type="checkbox"/>	Reclaim/drain foreshore/seabed
<input type="checkbox"/>	Other coastal activities
<input type="checkbox"/>	Structures/occupation of space
<input type="checkbox"/>	Disturb foreshore/seabed
<input type="checkbox"/>	Commercial surface water activity
<input type="checkbox"/>	Marine farming

What is the purpose of this application?

New resource consent

Renew resource consent

Variation of conditions according to S 127 RMA

Certificate of compliance

Y

Are there any **current** or **expired** consents relating to this proposal?

Yes

If yes, please provide consent number(s) and description:

AUTH-301713-V1 – To discharge dairy shed effluent to land

Are any other consents required from Environment Southland or **other authorities**?

N

No

If yes, please state the relevant authority and the type of consent(s) required :

For what **purpose** is this consent(s) required: (e.g. discharge of effluent, gravel extraction etc.)

New consent sought to use land for dairy farming that was not used for that purpose as of June 2016 (Rule 20 PSWLP).

To convert land to dairy farmland that was not used as dairy farmland prior to 2 September 2020 (Regulation 19 NES-F 2020).

To carry out winter grazing in excess of 10% or 50 ha whichever is the greater and on land where the mean slope may exceed 10 degrees over any 20 m distance of land

Pre application advise- Have you discussed this proposal with a council staff member?

Yes

If yes, please provide name of staff member if known: Jade McRae (pre-app meeting 25/11/22)

Any further comments you would like to advise us about this application?

5 Assessment of effects on the environment (AEE)

Please complete the applicable Part B form(s) for the proposed activities. For those activities where no Part B form is available, please attach a written statement that assesses the effects that your activities may have on the environment. An assessment of effects **must** include the following information:

- (a) *if it likely that the activity will result in any significant adverse effect on the environment, a description of any possible alternative locations or methods for undertaking the activity;*
- (b) *an assessment of the actual or potential effect on the environment of the activity;*
- (c) *if the activity includes the use of hazardous substances and installations, an assessment of any risks to the environment that are likely to arise from such use;*
- (d) *if the activity includes the discharge of any contaminant, a description of—*
 - (i) *the nature of the discharge and the sensitivity of the receiving environment to adverse effects; and*
 - (ii) *any possible alternative methods of discharge, including discharge into any other receiving environment;*
- (e) *a description of the mitigation measures (safeguards and contingency plans where relevant) to be undertaken to help or prevent or reduce the actual or potential effect;*
- (f) *identification of the persons affected by the activity, any consultation undertaken, and any response to the views of any persons consulted;*
- (g) *if the scale and significance of the activity's effects are such that monitoring is required, a description of how and by whom the effects will be monitored if the activity is approved;*
- (h) *if the activity will, or is likely to, have adverse effects that are more than minor on the exercise of a protected customary right, a description of possible alternative locations or methods for the exercise of the activity (unless written approval for the activity is given by the protected customary rights group).*

You should also include:

- (a) *an assessment of the activity against any relevant provisions of any relevant objectives, policies, or rules;*
- (b) *any information specified to be included in the application in accordance with the relevant regional plan;*
- (c) *for an application to replace an existing consent, an assessment of the value of the investment of the existing consent holder:*

An assessment of effects **must** address the following matters:

- (a) *any effect on those in the neighbourhood and, where relevant, the wider community, including any social, economic, or cultural effects;*
- (b) *any physical effect on the locality, including any landscape and visual effects;*
- (c) *any effect on ecosystems, including effects on plants or animals and any physical disturbance of habitats in the vicinity;*
- (d) *any effect on natural and physical resources having aesthetic, recreational, scientific, historical, spiritual, or cultural value, or other special value, for present or future generations;*
- (e) *any discharge of contaminants into the environment, including any unreasonable emission of noise, and options for the treatment and disposal of contaminants;*
- (f) *any risk to the neighbourhood, the wider community, or the environment through natural hazards or the use of hazardous substances or hazardous installations.*

6 Affected Parties

Please attach written approval from parties who may be affected by your activity. *Written Approval of an Affected Party* forms are available on the Environment Southland website. During the processing of your application, Council may determine that additional approvals are required.

7 Site visit from the Consents Team

Consents staff are able to meet with you, visit your site and see what you are proposing to do. We find that this is beneficial to everyone involved. The cost of the visit will be included in the total cost of processing your consent. We find that applications that have an on-site visit are processed with less congestion and at a similar or lesser overall cost. We will contact you if we consider a site visit to be advantageous in processing your application.

8 How much will it cost to process my application?

Environment Southland’s User Charges and Fees document is available at:

www.es.govt.nz/fees-and-charges

When the consent has been processed you will receive an invoice for an additional fee, or for a refund.

User Charges

Please note that additional Annual User Charges will apply to all consents.

How to pay

Environment Southland accepts payment in the forms of cash, Eftpos, or electronic transfer. All electronic transfers must include the applicant’s name and “consent application” as a reference. Please make electronic payments to: Environment Southland, 01-0961-0018998-00 or online at www.es.govt.nz/online-services/online-payments.

9 Checklist: Have you included the following?

Y	Payment of the required deposit (<i>see fee schedule</i>)
NA	Written approval from all potentially affected parties (<i>forms available from the Environment Southland website</i>)
Y	Site plan/location map/sketch of the proposed activity
Y	A copy of the Certificate of Incorporation (<i>where applicant is a company</i>)
	Part B form(s) specific to your activity and/or a separate assessment of environmental effects (AEE)

Notes:

- (a) *If your application does not contain the necessary information and the appropriate fee, Environment Southland may return the application.*
- (b) *Under S35 of the Resource Management Act 1991 your application will be publicly available information and subject to the relevant provisions of the Local Government Official Information and Meetings Act 1987.*

Signature of applicant

I hereby certify that to the best of my knowledge and belief, the information given in this application is true and correct.

I undertake to pay all actual and reasonable application processing costs incurred by Environment Southland.

Name (block capitals) SIMON ANDERSON

Signed 

Date 21/10/22

(Signature of applicant or person authorised to sign on behalf of applicant)

Certificate of Incorporation

PAHIA DAIRIES LIMITED
1963595
NZBN: 9429033259420

This is to certify that PAHIA DAIRIES LIMITED was incorporated under the Companies Act 1993 on the 13th day of July 2007.



Registrar of Companies
19th day of October 2022



Certificate generated 19 October 2022 10:28 AM NZDT

Pahia Dairies Ltd

Dairying land use application form

Version 3

December 2022

Prepared by: Lumen Environmental Limited

Quality Assurance Statement	
Project Manager	Mark Everest
Prepared by:	Nicole Mesman, <i>CNMA</i> nicole@lumen.co.nz 020 4193 1441
Supported by:	Jenna Sutton, Reuben Edkins & Victoria Bishop, <i>CNMA</i>

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1. Executive Summary

Pahia Dairies Ltd is a Dairy operation in Pahia, Southland, milking 980 cows on the 350 ha effective dairy farm and carrying young stock and wintering dry stock across part of this block but mainly on the 95 ha effective Browns block in the NE corner of the property. The combined farm area including areas of fenced shrub and trees is 511 ha.

Pahia Dairies has an existing dairy effluent consent for 1,000 Cows (AUTH-20222602), expiry 31st May 2032.

The applicant does not wish to increase any stock numbers on the property, however they do wish to consent the expansion of their existing dairy farm area onto the neighbouring Browns block which was purchased in the spring of 2017. The 95 ha effective Browns block and has historically been used for winter grazing of dairy cows and year-round grazing of replacement dairy stock. However, as indicated by the physiographic maps of the property, some of the land on the Browns block is peaty and not well suited to winter cropping. By consenting the Browns block for dairy farming Pahia Dairies will increase the area over which they can rotate their winter feed crops, therefore reducing the area of winter grazing that takes place on peat soils and enabling them to use fodder beet in their rotation. Due to the tight rotation of winter forage cropping on Browns block and the susceptibility of fodder beet to disease, this crop was not previously an option and kale was grown instead. Fodder beet will allow Pahia to reduce their total area of winter grazing by up to 12 ha from 63 ha to 51 ha (unless poor conditions in early establishment requires planting of a maximum of 55 ha through additional area planted later in the season). This will also reduce their N loss because of the lower protein content of the crop. Overall this reduces the N and P lost from the farm and enables the farm to be more resilient, reducing the need to import large amounts of feed in poor seasons. Pahia has historically and will continue to winter all cows and graze nearly all replacement dairy stock at home.

This application is for consent to:

- Use land for dairy farming (that did not exist as of May 2016, PSWLP)
- Convert land on farm to dairy farmland (NES-F 2020)
- Carry out intensive winter grazing (NES-F 2020)

This application has been prepared following guidance from Environment Southland and with reference to relevant regional and national legislation. The potential environmental effects of the proposal are assessed on the receiving environment (water, air, soil and plants, habitat, air and amenity). The cumulative effects are considered to be less than minor due to management practices which ensure that overall, there is a reduction in environmental effects.

The proposed activity includes implementation of a range of good management practices and mitigations to avoid and mitigate adverse effects on the environment. Overall, modelling using Overseer shows that there is a reduction in nutrient loading on the receiving environment and research surrounding the proposed mitigation practices demonstrates that these reduce loading of sediment and microbial contaminants. This proposal includes the recommendation that discussed mitigation measures around 5 m grazing setback distances from waterbodies (10 m setback for slope) during intensive winter grazing, establishment of riparian zones and continued use of intensive winter grazing plans become consent conditions.

The proposed activity is able to meet the requirements of the Proposed Southland Water and Land Plan and NES-F 2020 as a discretionary activity.

From discussion with Environment Southland around the sensitive nature of such consent applications the applicant concludes that the consent application must be processed as a publicly notified consent.

2. Introduction

2.1. The Applicant

Applicant Address: Pahia Dairies Limited
171 Ruahine Road West
Orepuki

Address for Service: c/- Lumen Environmental
189 Alford Forest Road
Ashburton 7700

2.2. Purpose of Documentation

Under Section 88 of the Resource Management Act 1991 (the RMA), this report provides an assessment of the activities effects on the environment as required by Schedule 4 of the RMA.

2.3. Property Details:

Location	171 Ruahine Road West, Orepuki
Map reference	D46: 060-157
Receiving environment	Land
Catchment	Rurikaka Creek
Legal Description	Lot 2 DP 10746, Section 11 and 12 Block V Longwood Survey District, Lot DP401670 (existing dairy farm) Part Section 14 Block V Longwood SD (Browns block)
Total Farm Area (ha)	511 ha (current Dairy Platform and Browns block)
Effective Farm Area (ha)	350 ha current effective Dairy Platform 95 ha Browns block, currently dairy support, subject of this application is to also dairy across it (40ha of fenced tree/scrub)
Size of effluent disposal area (ha)	250 ha
Stocking Rate	2.8 cows per hectare (stocking rate is for the platform)
Physiographic Zones	Oxidising Lignite/marine terraces Bedrock/hill country Peat wetlands
Freshwater Management Unit (FMU)	Lake George subunit of the Aparima FMU

2.4. Location

Pahia Dairies is located at 171 Ruahine Road West, located 46km West of Invercargill and bounds the south coast of the South Island. The farm location is depicted below.



Figure 1: Pahia Dairies and Browns support block locations

2.5. Climate

The Orepuke climate station (7km northwest of the property) indicates annual rainfall of 1314mm over a 20 year time period from 2002 to 2022.

There is no localised Evapotranspiration data, however, the Invercargill Aero weather station (46km southeast of the property) data suggests annual Potential Evapotranspiration of 571 mm. The wind, as measured at the Invercargill Aero weather station shows that the predominant and strongest winds come from the southwest.

2.6. Topography Soils and Drainage

The existing dairy farm area is a combination of rolling to flat and steeper rolling land with a range of soil types. Browns block is entirely flat but is majority organic peat soils with small areas of silt. The purpose of obtaining this consent to expand dairy platform area is to ensure that winter grazing can take place on the best suited parts of both the current dairy farm area and Browns block. Winter grazing that takes place on slopes over 10 degrees will maintain a 10 m vegetated buffer between the winter grazing and any surface water body or critical source area and winter grazing will be break fenced from the top to the bottom of the slope. Where grazing from top to bottom of the slope is not practical then there will be a 20 m last bite strip at the bottom of the slope. Effluent application takes place on flat – rolling land as per the area denoted by the effluent discharge consent.

Flat to lightly rolling land

By combing the two blocks the farm can make better use of the flat – rolling Waikiwi soils across the entire area as well as the parts of the Otway and Kaipaki soils which lend themselves to winter grazing.

The areas of these soils present on the flat – rolling areas of the farm are defined in S-Maps as follows:

1. Organic (peat) soils, comprising:
 - a. Otway soils (66ha total), 17 ha in Browns block and 49 ha across the current dairy farm area
 - b. Kaipaki soils (119ha total), 59 ha in Browns block and 60 across the current dairy farm area
2. Typic Firm Brown (silt) soils, comprising:
 - a. Waikiwi soils (235ha total), 37 ha in Browns block and 198 ha across the current dairy farm area

Waikiwi soils are characterised as being well-drained, with high P retention and low N leaching potential. The characteristics of high preferential flow risk require appropriate grazing management such as the use of portable troughs and back fences to ensure that cows do not pace during wet periods and cause damage to larger areas. Strategic placement of cows during wet periods to avoid sub surface drains which conduct contaminants to waterways.

Otway and Kaipaki soils are characterised by their organic, peaty texture as being poorly drained with low N leaching potential. These soils have high waterlogging risk potential and high bypass flow risk. As a result they are highly susceptible when wet to pugging damage from winter grazing and to bypass flow occurring during winter. For this reason there are only some areas of these soils that the farm has identified as being suited to winter grazing going forward.

Moderately rolling land

The steeper rolling part of the property nearer the coast is part of the existing dairy farm area. Parts of this block are only used for young dairy stock and others are fenced off for regenerating scrub and bush and will not be used for winter grazing however there are a number of paddocks which are around or over 10 degrees which will still be included in the winter cropping rotation. This area is described by S-Map as being dominated by one main soil classification:

1. Acidic Orthic Brown (silt loam) soils, comprising:
 - a. Orepuki soils (91ha)

Below is a summary of the soils on the property, including a breakdown of the total area present in the current dairy farm area and Browns block.

Table 1: Pahia Soils Breakdown

Soil Sibling	Otway (Otway_3a.1)	Kaipaki (Kai_9a.1)	Waikiwi (Waiki_16a.1)	Orepuki (Orepuk_2a.1)
Soil Classification	Sphagmic Fibric Organic	Mellow Mesic Organic	Typic Firm Brown	Acidic Orthic Brown
Texture	Peat	Peat	Silt	Silt over Loam
Drainage Class	Very poor	Very poor	Well	Moderately well
P Retention	Low (26%)	Medium (37%)	Medium (43%)	Medium (36%)
N Leaching Vulnerability	Very low	Very low	Low	Medium
Total farm area	66ha	119ha	235ha	91ha

Current dairy farm area	49 ha	60 ha	198 ha	91 ha
Browns block area	17 ha	59 ha	37 ha	nil

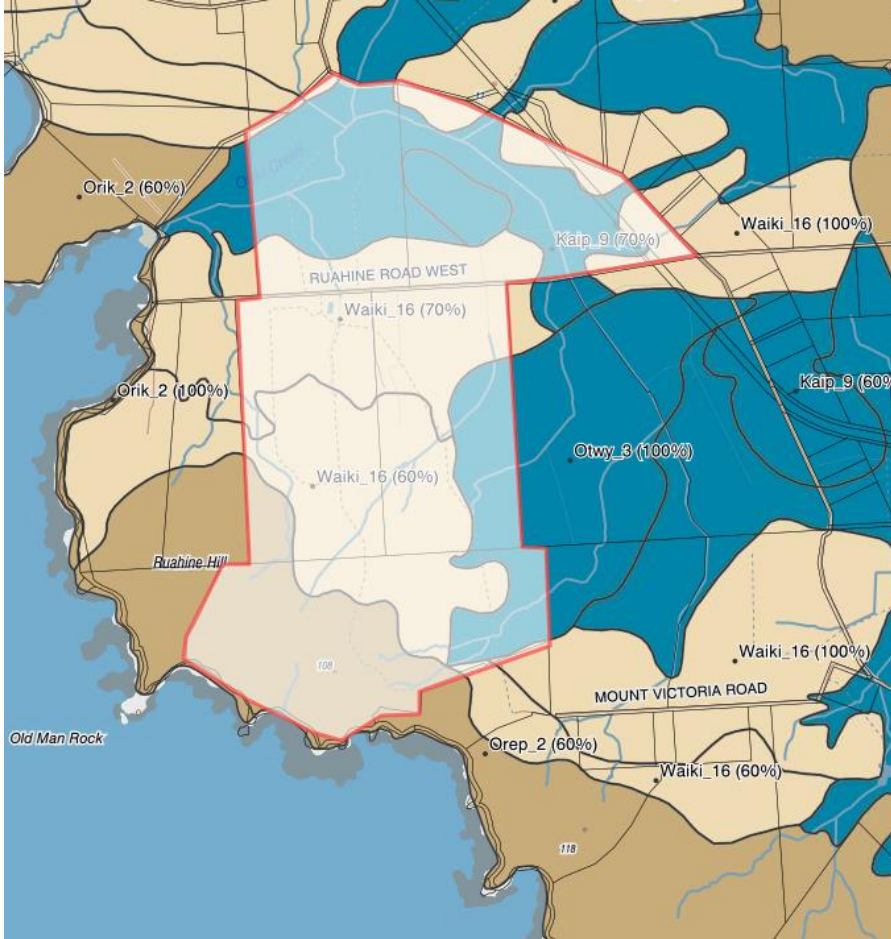


Figure 2: Soil Types at Pahia Dairies Ltd, S-Map (dairy platform and Browns support block)

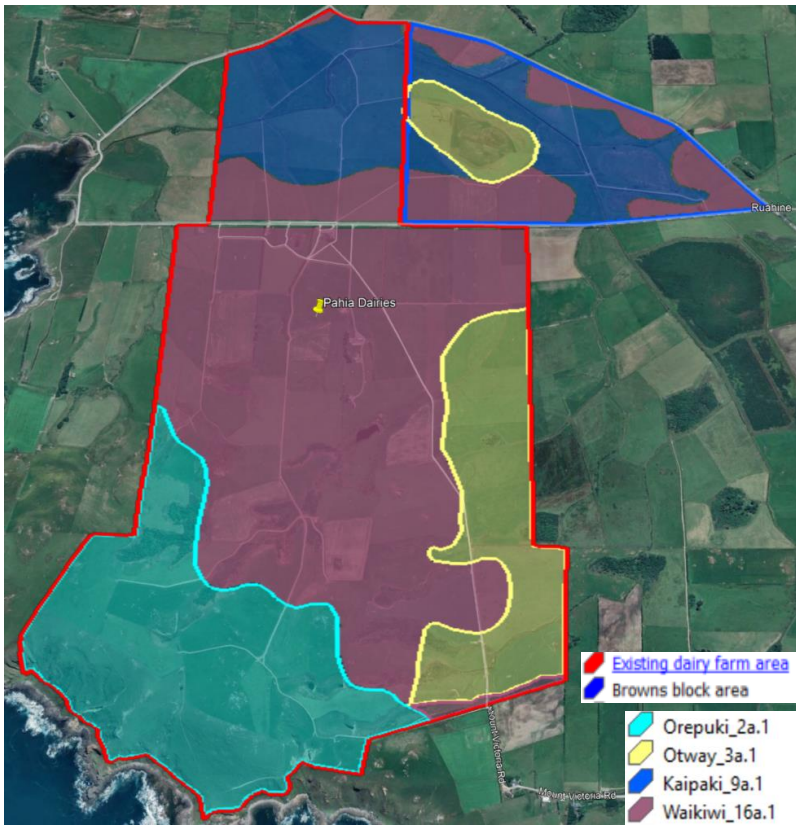


Figure 3: Soil Type Overlay at Pahia Daries Ltd

2.7. Physiographic Zones

The Browns block is mostly comprised of peat wetlands, as shown by the soil types present on the block. There are some areas of lignite marine terraces, roughly following the Waikiwi silt soils area and small areas of oxidising. On the existing the dairy farm area the four main physiographic zones are:

1. Bedrock/Hill Country
 - a. Artificial Drainage Variant
 - b. Overland Flow Variant
2. Lignite/Marine Terraces – Artificial Drainage
3. Peat Wetlands
4. Oxidising
 - a. Artificial Drainage Variant
 - b. Overland Flow Variant

Oxidising – Artificial Drainage

Oxidising soils have a propensity to accumulate nitrogen if there is excess applied or available. During heavy or prolonged rain events any free nitrogen can be leached through the lower soil horizons (with typically low nitrate denitrification or attenuation capabilities) into groundwater. Where sub surface drainage is present, the nitrogen losses percolate to terminal drains or streams.

Peat Wetlands

Peat soils typically have very high-water tables and drain to nearby streams or aquifers. These unique features mean that over high-water table times of the year (winter), contaminants are at risk of entering streams via overland flow, and during wet but not waterlogged times of the year, contaminants enter waterways via sub surface drainage.

Due to the very high carbon content and low clay content of these soils, they have an ability to denitrify nitrogen build-up, therefore ensuring nitrogen build up in these zones is not a risk, however poor management of phosphorus can lead to phosphorus leaching.

Bedrock/Hill Country - Artificial Drainage

The Bedrock/Hill Country – Artificial Drainage physiographic zone is characterised by water quickly flowing down-slope through wet soils and as overland flow to nearby streams following high or prolonged rainfall. Nitrogen, phosphorus, sediment and microbes are all carried with water, particularly during late autumn and winter. Groundwater contaminants are typically not a concern for this zone.

Lignite/Marine Terraces – Artificial Drainage

In the Lignite physiographic zone, the nitrogen in surface and groundwater is moderated by soil and aquifer denitrification during moderate rainfall intensity. Typically, shallow depths to groundwater mean that during high rainfall events, both overland flow of contaminants (on sloping land) and sub surface drainage draining contaminants to water ways are pathway risks. Surface water is the typical concern for this physiographic zone.

Table 2: Physiographic Zones in existing dairy area and Browns block

Physiographic Zone	Oxidising (Artificial Drainage)	Peat Wetlands	Lignite/Marine Terraces (Artificial Drainage)	Bedrock/Hill Country (Artificial Drainage)	Bedrock/Hill Country (Overland flow)
Existing dairy area	10.2 ha	111 ha	170 ha	46 ha	81 ha
Browns block	3.7 ha	74 ha	22 ha	Nil	Nil

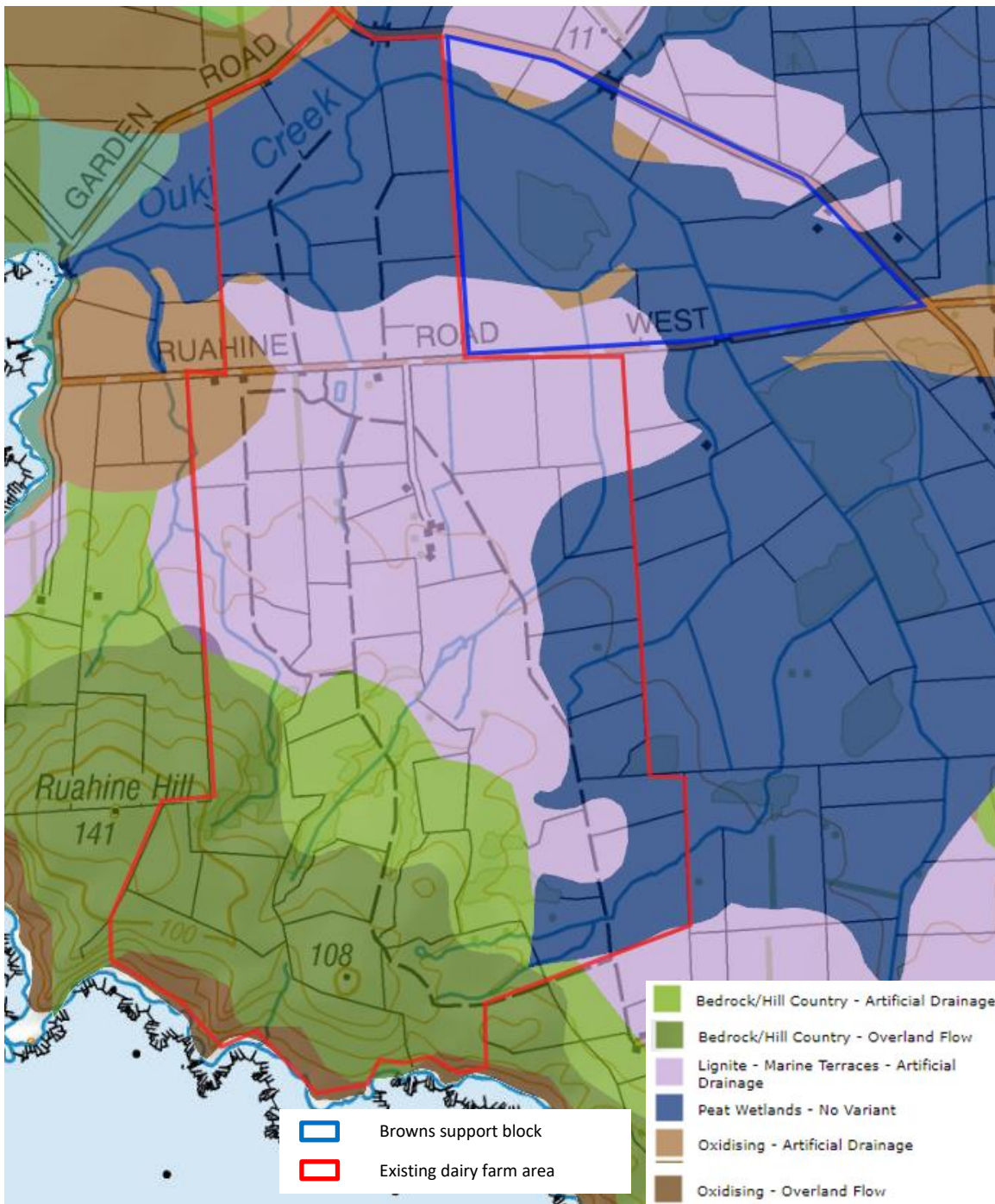


Figure 4: Physiographic Zones within existing dairy farm area (Red) and Browns support block area (Blue)

2.8. Community

Pahia Dairies has employee residences on the property, the nearest properties neighbouring Pahia dairies are:

1. 260m south of the south-eastern boundary of the existing dairy farm on Mount Victoria Road.
2. 1350 metres east of the property boundary from the existing dairy farm on Pahia Wakapatu Road.
3. 400 metres east of the property boundary from Browns block on Ruahine Road East.
4. 200 metres north of the property boundary from the existing dairy farm on Pahia Wakapatu Road.

5. 500 metres west of the property boundary from the existing dairy farm on Garden Road.

As the proposed activity to increase the current dairy farm area is consistent with the farming activities already occurring in the area and the farm is not proposing any change to farming techniques (other than a broader area of rotation for intensive winter grazing) or intensity the proposal is expected to have a less than minor impact on the amenity value of the area.

The following are relevant to the proposal:

- The bore on farm D46/0079 is located at the dairy shed, away from any dairy grazing, intensive winter grazing and over 100 m away from where effluent is applied and the wellhead is protected.
- The existing dairy farm and browns block are 5 km away from the closest regionally significant wetland/sensitive water body, lake George.
- There are no registered community supply bores within 500 metres of the existing dairy farm or Browns block
- There are no known areas of historic importance withing 500 metres of the existing dairy farm or Browns block.
- There are no known cultural or archaeological sites. No traditional communal activities take place on or near the property that could be in any way affected by the proposed activity. No heritage buildings are recorded on or near the site.

2.9. Groundwater

There are no registered wells withing 100 metres of the proposed effluent storage or discharge area. The nearest bore is on the property (D46/0079), which is used for Dairy purposes, drawing water from a depth of 92 metres. The farm has submitted an application for resource consent to replace the previous groundwater consent and is currently working with council on this application.

The farm is located in the Orepuki groundwater management zone (7,300 ha) with a low allocation status. Groundwater is generally 3-5 metres below the surface and recharge of the Orepuki is predominantly from rainwater infiltration (estimated to be 415 mm/year), although some may originate from surface water adjacent to the Longwood Range. Discharges predominantly occur along the coastal margin, some may occur to small streams along and some groundwater discharge may occur to Lake George. Groundwater generally flows perpendicular to the coastline.

Environment Southland have characterised the Orepuki groundwater quality as containing low levels of dissolved ions except for Iron, Sodium and Chloride (originating from marine aerosol deposits). Nitrate concentrations are generally low, due to the reducing nature of the soils and groundwater as indicated by the physiographic zones. Microbial contamination of the groundwater is low due to slow movement of groundwater however it could become elevated close to the source of contamination.

The subsurface drains at Pahia present a potential source of contamination, particularly of microbes to the groundwater. This risk is also highlighted by the physiographic zones present at Pahia. The proposal to extend the existing dairy area over Browns block addresses this risk as winter grazing could then occur over larger parts of the farm in the areas best suited to winter grazing and mean that back-to-back winter cropping was not required and instead pasture could be resown as soon as practical after grazing.

Due to the vicinity of the property to the coastline it is expected that groundwater will flow to off the coast rather than to surface water bodies.

2.10. Surfacewater

Pahia have submitted a consent to take surface water and are in the process of working with council on this application. Pahia Dairies is located in the Lake George Freshwater Sub Unit (FSU) of the Aparima Freshwater Management Unit (FMU) and the associated inventory notes for the zone state that between Otautau and Riverton, water quality is varied:

1. E.coli as a proxy for in-stream bacterium registers on average at >130 colony forming units (cfu)/100 ml water.
2. Dissolved Inorganic Nitrogen ranges between 0.24mg/litre and more than 1.0mg/litre. This is a good test result.
3. Deposited Fine sediments are very low with very low cover of hard beds in sediment.
4. Clarity is variable in surfacewater. The range in visibility is from less than 1.3 metres to greater than 3.0 metres.

The catchment has aspirations of improving all aspects of water quality through implementation of buffer setbacks and through implementing additional grazing management techniques to reduce the risk of overland flow and sediment entering water courses.

Due to the vicinity of the farm to the coast there are no water quality monitoring sites in the ES data base which are downstream of the farm. The nearest surface water quality monitoring site is at Waimeamea River at Young Road. While this surface water is in a different catchment to that at Pahia it is within the Lake George FSU and Aparima FMU and has similar physiographic zones present surrounding it. The site is monitored for macroinvertebrates only. The results from the past 5 years are given in Table 3 below. The river is above all national bottom line indicators as per the NPS-FW (2020). For macroinvertebrate community index (MCI) and quantitative macroinvertebrate community index (QMCI) scores the river is in band C meaning that moderate organic pollution or nutrient enrichment is present as shown by a mix of taxa present which are insensitive to pollution/ enrichment.

Measurement of macroinvertebrate average score per metric (APSM) indicate that the river is in band A (>0.6) indicating macroinvertebrate communities have high ecological integrity. No trends have been established in these data sets yet.

These results indicate that the river body is degraded as a result of pollution/ enrichment but that the communities present have high integrity. The proposal to expand the area of dairy platform results in a decrease in nutrient loss from the farming system which will assist in reducing the pollution/ enrichment of the river bodies in the area.

Given the high water quality status of the FMU and FSU and the modelling of the proposed activity suggesting reductions in environmental impacts are likely alongside the proposed additional mitigations with regards to buffer areas and setbacks to retain nutrient, we conclude that the proposed activity will promote water quality enhancement in the catchment.

Table 3: 5 year median results and national bottom line for macroinvertebrate monitoring for Waimeamea River at Young Road.

Macroinvertebrate measurement	Waimeamea River at Young Road (5 yr median)	National bottom line
Macroinvertebrate Community Index	116.2	90 – at or below 90 is considered indicative of moderate organic pollution or nutrient enrichment

Quantitative Macroinvertebrate Community Index	5.4	4.5 – at or below 4.5 MCI is indicative of severe organic pollution or nutrient enrichment
Macroinvertebrate Average Score Per Metric (APSM)	0.611	<0.3 – below 0.3 APSM indicates that macroinvertebrate communities have had severe loss of ecological integrity

2.11. Cultural values

Ngāi Tahu has a strong relationship to the land, water and resources of the district and the maintains kaitiakitanga to ensure the mauri of these resources is maintained and enhanced for future generations.

The takiwa of Te Rūnanga o Ōraka Aparima centres on Ōraka (Colac Bay) and extends from Waimatuku to Tawhititarere sharing an interest in the lakes and mountains from Whakatipu-Waitai to Tawhititarere with other Murihiku Runanga and those located from Waihemo southwards.

Te Tangi a Tauria is the Iwi Management Plan developed by Ngāi Tahu ki Murihiku as an expression of kaitiakitanga and the document acknowledges tribal knowledge and perspectives on resource management and environmental issues. The document (in addition to the District Plan) lists sites and areas of significance to tangata whenua. It is acknowledged that there will be additional sites of wāhi tapu and wāhi taonga that have yet to be discovered and the role of kaitiaki of Ngāi Tahu ki Murihiku over these sites is recognised in the assessment of the iwi management plan.

2.12. Existing Consents

Table 4: Existing/expired Consents

Consent No	301714	AUTH-20222602
Activity	Water Take and Use	Effluent Storage and Discharge
Date Granted	11/11/2012	3/11/2022
Date of Expiration	10/11/2022	31/05/2032

3. Proposed activity

3.1. Introduction

The application proposes to increase the existing dairy farm area (346 ha effective) to include the current Browns support block (95 ha effective). No stock numbers will increase from what has been done historically.

The current dairy farm area has been operated as a dairy farm since the 1990s with the current owners taking over the management of the farm from FarmRight in 2020. Browns block has been operated as a dairy support block for many years, the previous owner winter grazed MA cows and young stock throughout the rest of the season, both under contract. The block continued to be operated for dairy winter grazing and support upon purchase by the current owners in spring of 2017. The current effluent discharge consent allows for the discharge of effluent from a maximum of 1000 cows (as per the previous discharge consent) over 250 ha (as per Appendix 1) including an area of Lignite physiographic zone in the Browns block suitable for effluent application.

The application for an increase in dairy area is to enable the rotation of a decreased area of winter grazing over a larger part of the farm. This will allow winter grazing to take place on parts of the farm that are better suited to wintering as well as creating a more sustainable agronomic rotation rather than continuously cropping areas. The

3.2. Proposed Activity Summary

The table below summarises the proposed changes on the farm. The areas requiring consent are the expansion of the dairy area and the area of intensive winter grazing.

Table 5: Summary of comparison in land use and stockholding between current and proposed systems

Factor	Current dairy farm operation	Current Browns block	Proposed farm operation
Land titles	Lot 2 DP 10746, Section 11 and 12 Block V Longwood Survey District, Lot DP401670	Part Section 14 Block V Longwood SD	Lot 2 DP 10746, Section 11 and 12 Block V Longwood Survey District, Lot DP401670, Part Section 14 Block V Longwood SD
Total farm area	411 ha including 40ha of fenced tree/scrub	100 ha	511 ha
Effective area	350 ha	95 ha	480 ha
Area of dairy platform	350 ha	0	480 ha
Area of dairy support	0	95 ha	0 ha
Area of intensive winter grazing	19	44	51
Peak cows milked	Maximum 1000	0	Maximum 1000
Stocking rate, milking cows/ha	2.8	0	2.3

Nitrogen loss to water total kg	17,128 kg N	6,162 kg N	22,220 kg N
Phosphorus loss to water total kg	685 kg P	260 kg P	764 kg P

3.2.1. Consent to expand area of dairy platform

Under Rule 20a (ii)(6) of the PSWLP the use of land for a farming activity is a permitted activity provided the land area of the dairy platform is no greater than at 3rd June 2016.

While Pahia Dairies will not be increasing dairy cow or any stock numbers, because they wish to rotate the area of winter grazing around a larger area of the current dairy platform, by definition there will be an increase in dairy platform area as there will be more area which will at some point have dairy cows grazing it than there was at 3rd June 2016.

Therefore under Rule 20(d) this expansion of dairy farm area under PSWLP is a restricted discretionary activity.

The farming operation meets all other conditions of Rule 20.

Under Rule 18 of the NES-F (2020) the conversion of land on a farm to dairy farm land is a permitted activity if it complies with the applicable conditions 3 and 4. Under these conditions the area of the farm that is dairy farm land must be no greater than (a) the area of dairy farm land at the close of 2 September 2020; plus (b) 10 ha.

As the applicant is proposing that the area of dairy farm land will increase by 95 ha from the close of 2 September 2020 under Rule 19 the increase in dairy farm land is a discretionary activity under the NES-F (2020).

The application to expand dairy farm land is therefore an application for a discretionary activity.

Rule 24 of the NES-F (2020) lists conditions on consent authorities for the granting of a consent for a discretionary activity. These conditions are that the consent authority is satisfied that the granting of the consent will not result in an increase in (a) contaminant loads in the catchment, compared with the loads as at the close of 2 September 2020; or (b) concentrations of contaminants in freshwater or other receiving environments (including the coastal marine area and geothermal water), compared with the concentrations as at the close of 2 September 2020. (2) a resource consent granted for the discretionary activity must be for a term that ends before 1 January 2031.

The Overseer nutrient budgets representing the current operation of the existing dairy farm area and Browns block and a nutrient budget demonstrating the loss of contaminants given the expansion of the dairy farm area over Browns block have been prepared to accompany this application and to meet the requirements of Rule 24 (1)(a).

3.2.2. Consent to carry out intensive winter grazing

Under Rule 26(4) of the NES-F (2020) intensive winter grazing is a permitted activity if at all times, the area of the farm that is used for intensive winter grazing is no greater than 50 ha or 10% of the area of the farm, whichever is greater. The area of winter grazing at Pahia will be 51 ha therefore exceeding the greater of 50 ha or 10% of the farm. However if there are any issues with establishment, or weather events early in the season which effect yield the farm may increase their area to 55 ha through planting additional area to make up for this reduction in yield. This additional area would be planted around the start of January. Intensive winter grazing at Pahia will sometimes exceed condition 26(4)a where the proposal includes winter grazing on parts of the farm where the slope can exceed 10 degrees over a 20 m distance of land.

Otherwise meet the conditions of Rule 26(4) around setback distances, and grazing of critical source areas will be met.

Under Rule 27 of the NES-F (2020) the use of land on the farm for intensive winter grazing is a restricted discretionary activity given that it meets the conditions of Rule 29(3). The proposed winter grazing at Pahia meets Rule 29(3) as the land on the farm used for winter grazing will be no more than what was used for winter grazing during the reference period.

The act of intensive winter grazing at Pahia is therefore a restricted discretionary activity.

Matters to which the discretion of the consent authority is restricted to are:

- (a) The adverse effects of the activity on ecosystems, freshwater, and water bodies:
- (b) The adverse effects of the activity on the water that affect the ability of people to come into contact with the water safely:
- (c) The adverse effects of the activity on Māori cultural values:
- (d) The susceptibility of the land to erosion, and the extent to which the activity may exacerbate or accelerate losses of sediment and other contaminants to water:
- (e) The timing and appropriateness of the methods (if any) proposed to avoid, remedy, or mitigate the loss of contaminants to water.

The applicants demonstrate their ability to mitigate any adverse effects associated with winter grazing through appropriate paddock selection, enabled by the increase in dairy platform area, the mitigation measures described in this application and the implementation of winter grazing plans.

3.3. Consent Duration Sought

9 years

3.4. Consents required

Table 6: Consents required and applicable rules

Consent required	Plan and rule triggered
Land use consent and associated discharge permit to use land for dairy farming	NES-F (2020), regulation 19 – discretionary activity PSWLP, regulation 20D – restricted discretionary activity
Land use consent and associated discharge permit to carry out intensive winter grazing	NES-F (2020), regulation 27 – restricted discretionary activity

3.5. Joint application

The joint application for winter grazing and dairy expansion is to be treated as a discretionary activity.

3.6. Proposed consent conditions

In addition to standard conditions the applicant proposes:

Not more than 55 ha of forage crops sown for IWG will be planted in any one season in total.

Not more than 30 ha of the forage crops sown for IWG will be planted on the “Browns block” (area outlined in red on Figure 5).

Forage crops planted for IWG will not be planted in the exclusion zones in Figure 5.

The number of dairy milking cows will not exceed 1000.

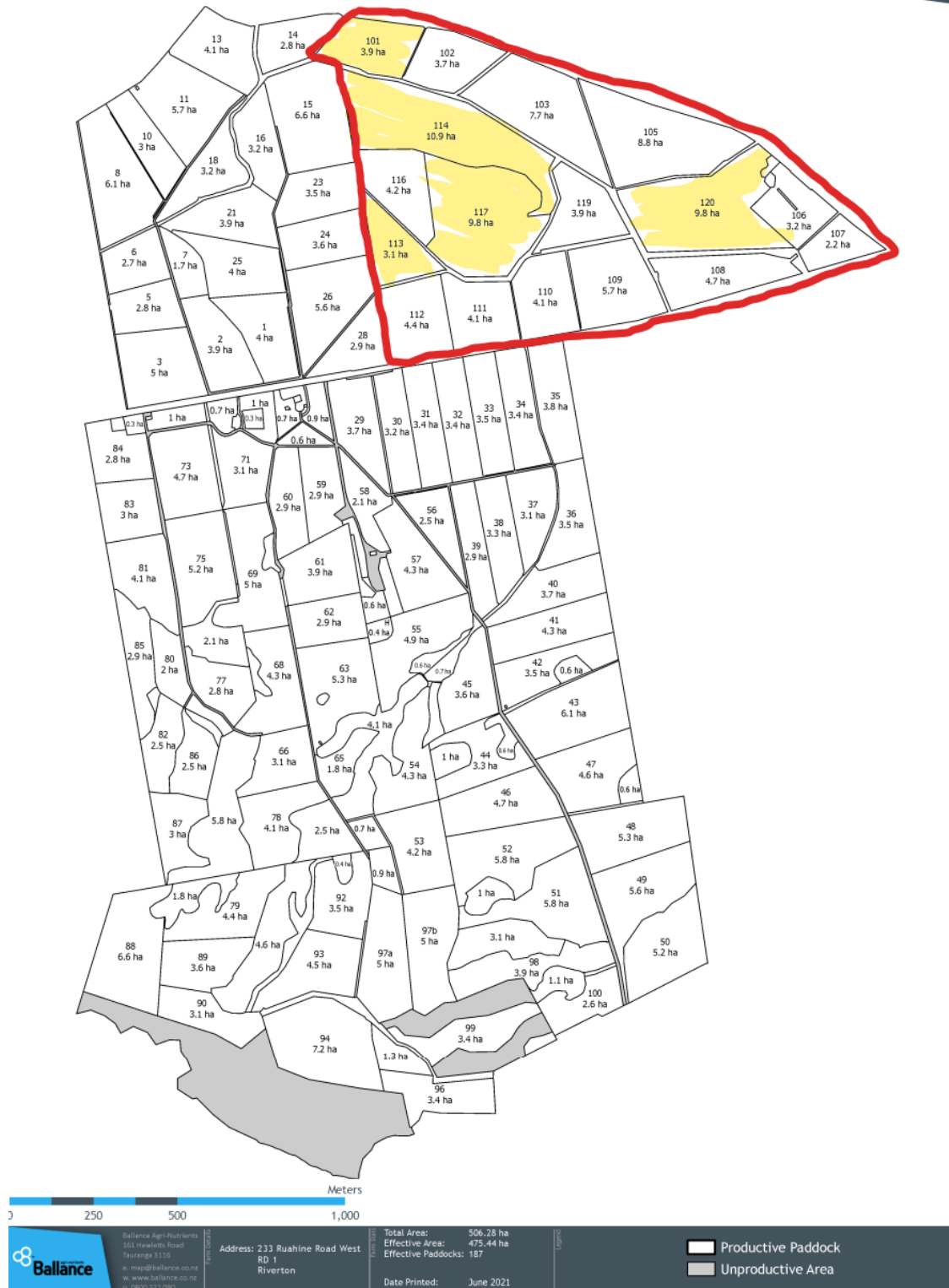


Figure 5: Browns block marked in red and paddocks in Browns block not suited for cropping and therefore proposed not to be cropped anymore, highlighted yellow

3.7. Notification & Consultation

The AEE in Section 4 this reports demonstrates that the effects on the environment from the proposed expansion of dairy farm land will be less than minor. However the consent authority, unless expressly precluded by a rule in a NES, has discretion on whether to publicly notify and application or not.

The effects on the environment from the assessment of this activity are considered less than minor and therefore limited notification to Ngāi Tahu and Te Rūnanga o Ōraka Aparima would be sufficient. However it is acknowledged that while this consent is not for an increase in dairy cow numbers it is for an increase in dairy platform area and due to the public interests in consents of this nature Environment Southland have recommended that the applicants ask for this application to be publicly notified from the start. This will assist Environment Southland with processing the application efficiently and as a result the applicant requests for this application to be publicly notified from the start.

Prior to submitting this application, the applicant was advised by Environment Southland to submit the complete application to Te Ao Mārama for any consultation they would like to or have time to give prior to the submission to ES. As informed by ES Te Ao Mārama are extremely busy and do not typically respond to consultation prior to public notification however we have submitted our application to them already.

The mitigations proposed in the application are to:

- Reduce the area of intensive winter grazing through growing fodder beet instead of kale
- Reduce the area of intensive winter grazing occurring on Browns block so that winter grazing on peat soils is avoided
- Increase the vegetated buffer strip distance to 10 m when grazing paddocks where the slope exceeds 10 degrees over any 20 m piece of land and ensure good management practices around grazing top to bottom or otherwise a 20 m last bite strip are implemented.
- Continuing implementing the Riparian Management Plan (Appendix 2) to plant along water ways and drains and enable regeneration of fenced native bush and scrub
- Ensure good management practices for winter grazing continue to take place around implementation of paddock specific winter grazing plans, grazing direction, back fencing, setback distances to streams on flat paddock, use of portable troughs and feeders and restricted mob sizes.
- As per the current and proposed farm system models nitrogen loss reductions of 1,892 kg N or 9% and phosphorus loss reductions of 172 kg P or 18%.

The proposed mitigations aim to address concerns poised in the Te Tangi a Tauira iwi management plan and to remedy and mitigate any potential effects.

4. Assessment of Environmental Effects

Under the RMA an assessment of environmental effects is required as set out in Schedule 4. This section will address the effects arising from both the expansion of dairy platform and carrying out intensive winter grazing. The effects of the expansion of dairy platform and intensive winter grazing will be considered separately when needed.

4.1. Effect of the activity on groundwater

The inclusion of Browns block into the Pahia dairy farm platform area will not change the stock numbers for the farm. This is because the same operation will be carried out but the winter grazing rotation will occur over a larger

area. This is shown by there being no change between the current and proposed RSU/ha according to Overseer from the current system at 20.65 RSU/ ha to the proposed system at 20.51 RSU/ha. The slight decrease in RSU between current and proposed is due to the 12 ha decrease in winter forage crop area meaning more pastoral area is available for grazing. This area may supply extra baleage for the farm however, due to the unpredictable nature of the weather on the farm, in some seasons it may not result in much extra baleage being produced.

The area of intensive winter grazing will decrease by around 12 ha from that carried out during the reference period. This is because with the ability to graze milking cows on Browns block the winter grazing which typically occurred on this block as a Kale-pasture-Kale-pasture (repeat) rotation can now become a fodder beet crop used as part of pasture renovation every 7 years on the flat areas of the wider dairy platform. The farm will require 51 ha of winter grazing (in an average season) to rotate around roughly 350 ha of the farm. While Kale has been used previously, in this intensive back-to-back winter cropping regime, in the proposed farm system winter forage rotations can take place over a larger area and fodder beet can be grown without risk of disease. Fodder beet is susceptible to disease when grown in short rotation programmes, (Ministry for Primary Industries, 2022). Due to the lower protein content of fodder beet and despite the higher stocking rate on the crop due to higher yields the nitrogen lost to water has been found to be considerably lower than the losses from kale.

Research results from southern Southland have shown that winter grazed fodder beet leached 42-50% less than winter grazed kale (Smith & Monaghan, 2020). Overseer modelling of the current system at Pahia and the proposed system show a decrease in N loss and P loss to water as per Table 5 and Table 13.

4.1.1. Loss of microbial pathogens to groundwater

Microbial pathogens of primary concern for discharges to groundwater as larger micro-organisms are likely to be filtered out as they pass through the soil and substrata. The New Zealand Drinking Water Standards (Ministry of Health, 2018) specify *Escherichia coli* (*E.coli*) as the indicator organism for faecal contamination of drinking water. The standards require that the *E.coli* levels in drinking water be less than 1 Colony Forming Unit (cfu) in 100 ml of sample.

Soil is normally a very good protector of groundwater against the entry of pathogens, providing that it is in an unsaturated state and is not classified by bypass flow. The bacteria and viruses are attenuated very effectively through desiccation, irradiation filtration, adsorption, and natural attrition.

Currently more than 50% of the winter grazing on Browns block takes place on Peat soils. These soils are characterised by their high organic matter content and as a result are prone to waterlogging with a high seasonal water table that sits close to the ground surface. Because these soils on Browns block are artificially drained there is more risk of contaminant loss to surface water. However, when the water table is high there is also risk of contaminant loss to groundwater. In comparison the expansion of the dairy platform will enable winter grazing to take place on more of the Lignite/ Marine terraces present at Pahia. This physiographic zone has few connections between ground and surface water and most contaminant movement is via overland flow on slopes or to artificial drainage on flatter areas.

In addition, the proposed farm system will result in a decrease in winter grazing area by 12 ha due to fodder beet being grown instead of kale. This area will instead be in pasture and there will be limited grazing of pasture over the winter. Pasture has lower losses of microbial contaminants than winter forage crops (Landscape DNA, 2022).

In the case of Pahia the effect on groundwater from dairying and intensive winter grazing is thought to decrease as a result of the proposed farm system because more winter grazing will be able to take place on Lignite/Marine terraces and there will be a decrease in total winter grazing area.

4.1.2. Nutrient loss to groundwater

Nitrogen and phosphorus are the primary nutrients of concern due to their effect on nitrate levels and microbial levels when groundwater enters surface water and aerobic conditions are present to enable microbial growth. Elevated nitrate concentrations in groundwater are a concern due to the harmful effects if ingested by humans. The main health concern is methemoglobinemia, commonly known as blue baby syndrome. Nitrates have also been cited as a risk factor in developing gastric and intestinal cancer and childhood diabetes, although there is no conclusive evidence to support this. The New Zealand Drinking Water Standard (Ministry of Health, 2018) for nitrate is 50 mg/L (which is equivalent to 11.3 g/m³ of nitrate-nitrogen (LAWA, 2022)). Phosphorus is mostly present in ground water as dissolved reactive phosphorus (DRP) this form of phosphorus is also an indicator of the waterbodies ability to support algae and plant growth so when groundwater enters surface water the DRP of the groundwater will influence the algal levels and weed growth of the surface water (LAWA, 2022).

The Overseer nutrient budgets carried out for the current and proposed farm systems at Pahia demonstrate that as a result of the larger area of winter grazing rotation, decreased area of winter grazing and grazing of fodder beet instead of kale there will be a reduction in both nitrogen and phosphorus lost to groundwater. Although the Peat zone has a higher ability to denitrify nitrogen in the soil before it enters groundwater than the Lignite/Marine terraces zone the reduction in total nitrogen as shown by Overseer modelling is expected to still result in a reduction of N in groundwater.

4.2. Effects on surface water

The effect of an expanded dairy platform and intensive winter grazing on surface water is thought to be particularly influenced by the presence of artificial drainage and when grazing events occur in relation to soil saturation.

The grazing of dairy cows on Browns block is considered to have a lesser effect than winter grazing on Browns block. This is because a large portion of the effective area on Browns block is zoned Peat, 74 ha of 95 ha, and in this zone nitrogen is lost to surface water when the water table is high via overland flow and via the artificial drainage present on the block when the water table is low. These conditions typically occur over the winter when historically there has been winter grazing taking place on this block. Although the block is mostly flat there are micro contours present which would still result in some overland flow occurring. The grazing of dairy cows on Browns block would occur over the milking season from August-May and, as there is a large rotational area for the platform, grazing can be managed to ensure paddocks are not grazed on Browns block when they are susceptible to waterlogging and therefore pugging and pasture damage. The best parts of the farm can be chosen for winter grazing to mitigate effects on surface water.

Mitigation measures proposed by Pahia to mitigate nutrient loss to surface water from intensive winter grazing are listed in the farms FEMP and are:

- Implementation of 10 m vegetated buffer strips when grazing paddocks with a slope of more than 10 degrees over any 20 m area of land. Grazing of these paddocks would take place in accordance with good management practices around grazing from top to bottom or leaving a 20 m last bite strip.
- Intensive winter grazing plans are carried out for each paddock identifying risks from the activity and management practices to reduce them.
- Stock are back fenced to reduce treading damage
- Portable water troughs and baleage feeders are used again to reduce treading
- Mobs of 120 cattle are maintained

- Vegetation is maintained and not grazed, harvested or cultivated from the 1st May till 30th September in critical source areas that are within or adjacent to paddocks of intensive winter grazing
- For flat paddocks a 5 m buffer strip of pasture will be maintained between the crop and any surface water body despite the setback distance of the fence. All waterways are already fenced.

4.3. Summary of mitigation measures

The mitigation measures proposed can be summarised as strategic winter grazing. In a study looking at grazing strategies to reduce contaminant losses from forage crops grazed during the winter Monaghan, R. M and Laurenson, S (2017) analysed the effect of delaying grazing of critical source areas, grazing towards critical source areas, back fencing and grazing down the slope. They found that there was a reduction in loss of nitrogen, phosphorus and sediment from implementing these practices. There was no change in loss of the microbial contaminant *E.coli* found. However, due to the reduction in total area of winter grazing in the proposed farm system a reduction in microbial contaminants is expected at Pahia.

4.4. Effects of the activity on other matters

The main effect of the proposed activity on public health is thought to be that of aerosols and spray drift originating from the re-arrangement of land use on the two blocks. A key part of this is associated with dairy effluent. A replacement dairy effluent consent has recently been obtained for Pahia dairies and the application included a proposal to apply liquid effluent over the part of Browns block most suited to effluent application, due to the presence of a Lignite/Marine terraces zone. The application outlined that effluent would be managed in accordance with the effluent management plan to ensure that aerosols, spray drift and odour did not travel past the property boundary. This may mean delaying application in strong easterly conditions. This application for the expanded effluent area over part of Browns block was granted with the condition that the permit be exercised in accordance with the farm's effluent management plan. The expanded effluent area is shown in Appendix 1. As a result of the consent being granted it is concluded that there are no effects on public health from the proposed activity.

4.5. Effects on soil structure

Damage to soil structure does occur during winter grazing of fodder crops, decreasing total soil porosity and macroporosity (Monaghan, Laurenson, Dalley, & Orchiston, 2017). Implementation of strategic grazing practices has not been found to significantly reduce the effect of winter grazing on soil structure. However the effect of winter grazing on soil structure is not cumulative and soil recovers upon return to pasture so that subsequent forage cropping does not further degrade structure. The reduction in total area of winter forage cropping proposed by Pahia and the increase in the length of time between forage cropping events on the same paddock is thought to improve soil structure on the farm overall.

4.6. Tangata Whenua values

The Southland Regional Policy Statement describes resource management issues important to Ngai Tahu and ensures tangata whenua are considered in decision making, iwi management plans are considered, food gathering sites are protected and sites of special significance and taonga are protected.

The property resides within the Aparima river catchment which is presided over by the Oraka-Aparima Runaka. The application has been assessed as consistent with relevant tangata whenua values as outlined in the iwi management plan for Te Ra a Takitimu (Southland Plains), which contains a generalising preference for consenting activities for a period for less than 25 years.

This proposal includes activities that are contained within the applicant's property boundary. The proposed activity will be carried out in accordance with Good Management Practices outlined in the Farm Environment Plan in conjunction with mitigations included in this application. Therefore the proposed activity should not directly impact on tangata whenua values or compromise the integrity of sites of significance or those for the gathering of kai.

The described management practices promote the improvement of water, land and air quality, which supports the primary objective of Te Ra a Takitimu which is to protect the ability of freshwater and soil resources of the Southland Plains to meet current and future demands

As the proposed activity meets all of the objectives of the Iwi Management Plan and promotes improved water and air quality, any cultural effects of this activity are considered less than minor. However due to the sensitive nature of applications to expand dairy platform area the applicant informed Te Ao Marama in advance of submitting this application to ES so they could be aware of what was being proposed and ask for additional information if they had time to read it in advance of Council receiving it.

4.7. Positive effects of the activity

As explained by the ensuing sections of this AEE a reduction in winter grazing area and implementation of strategic grazing practices has been shown to decrease losses of nutrients, sediment and microbial contaminants thereby having a positive effect. The reduction in winter grazing area also allows for an increased area of pasture to be grown, as there are no increases in stock numbers the extra pasture grown will be in excess of requirements and therefore more silage can be made on farm, reducing the amount of supplement the farm needs to import.

4.8. Alternatives Considered

The alternative to allowing the area of winter grazing to rotate over a larger area thereby increasing the area of dairy farm land is to keep the majority of the winter grazing and dairy support on Browns block (thereby not classing it as dairy farm land). The issue with this option is that this means a very short cropping rotation is required, Kale-Pasture-Kale (repeating) due to the size of the block. This means that the farm can only grown Kale, as fodder beet and swedes are more prone to disease with continually tight rotations. Kale has a higher protein content and results in more nitrogen leaching or prone to runoff to surface water than fodder beet. By increasing the area of the dairy platform the farm will be able to grow fodder beet and rotate it around the platform which is considered to result in reduced environmental risks.

4.9. Conclusions

The applicant determines based on this assessment of environmental effects, that the proposed activity of increasing the dairy platform over the additional 95 ha effective of Browns block will result in the maintenance or improvement of the water, air and land quality in the receiving environment

- Ground and surface water
- Public health
- Amenity values
- Air quality
- Tangata Whenua values
- Soil health
- Nutrient management (other effects).

5. Policy Assessment and Statutory Considerations

5.1. Introduction

As stated in Schedule 4 of the RMA when applying for a resource consent the activity must be assessed against any relevant provisions of any relevant policy document. In this section the activity is assessed against relevant legislation.

An assessment of the activities against the relevant rules of The RMA Regional Water Plan for Southland, The Proposed Southland Water and Land Plan, The National Environmental Standards for Freshwater 2020, National Policy Statement for Freshwater Management 2020, and IWI Management Plan are discussed in this section.

5.2. Resource Management Act 1991

5.2.1. RMA Part 2

The Resource Management Act defines how we should manage our environment and establishes values for councils to recognise when setting rules and requirements to manage activities.

Part 2 of The Act must be addressed when applying for a resource consent. Schedule 4 of the RMA specifically states that resource consent applications are assessed against the matters set out in Part 2 of the act.

Section 5 – purpose

The purpose of the Act is to promote the sustainable management of natural and physical resources.

This application complies with the purpose of The Act as the proposed activity is to create a more sustainable rotation of winter grazing around the ground to better look after soil structure, enable growing fodder beet which reduces N losses and increase pastoral area to help reduce the farm's imported feed requirements. Making the operation long term more sustainable. The assessment of environmental effects and proposed mitigations in Section 4 alongside the farm's farm environment plan specifically highlight how the application meets Section 5 of the Act.

Section 6 – matters of national importance

Matters of national importance that consent authorities must recognise and provide for when managing natural and physical resources such as through evaluating consent applications include: preservation of natural character of the coastal environment, wetlands, lakes, rivers and margins; protection of outstanding natural features and landscapes or significant habitats of indigenous fauna; relationship of Maori with their ancestral lands, water and sites.

The assessment of effects of the proposed activity on matters of national importance are detailed in Sections 5.2 and 5.3 of this report, combined with proposed mitigations and potential impacts on the Te Rūnanga O Ōraka/ Aparima as described in the Te Tangi a Taura Iwi Management Plan section within this report indicating no adverse impacts on environment, the proposed activity is deemed to be consistent with section 6 of The Act.

Section 7 – other matters

In addition to Section 6 of the Act, when evaluating consent applications consent authorities must give particular regard to the following:

- a) Kaitiakitanga:
- b) The efficient use and development of natural and physical resources:
- c) The maintenance and enhancement of amenity values:
- d) Intrinsic values of ecosystems:
- f) Maintenance and enhancement of the quality of the environment:
- g) Any finite characteristics of natural and physical resources.

The activity is consistent with these matters as addressed in Section 4 of this report. In particular the rotation of winter grazing around a larger area of the farm to utilise better soil types and ensure that fodder beet, which results in lower N losses, can be used for winter grazing. Increasing the rotation area for winter grazing means that the soil resource can be managed into the future and the use of fodder beet means a smaller area is required resulting in increased pastoral area and some reduction in imported supplements which will depend on the season.

Section 8 – Treaty of Waitangi

The principles of the Treaty of Waitangi must be taken into account when evaluating consent applications.

Consideration of principles of the Treaty of Waitangi are addressed in the following sections. In particular, consideration is given in the assessment of the relevant iwi management plans and consultation with rūnanga in relation to Te Mana o Te Wai.

While this application is not directly impacted by the Treaty of Waitangi and does not impact Treaty of Waitangi, there are no likely material impacts to cultural values resulting from the proposed activity.

5.2.2. RMA Part 3

Part 3 of the RMA defines the duties and restrictions under the Act. Where the Act or a regional plan requires authorisation for an activity, that authorisation can only be derived from a rule in a regional plan or resource consent.

Section 9 – Restrictions on use of Land states:

1. No person may use land in a manner that contravenes a national environmental standard unless the use—
 - a. is expressly allowed by a resource consent; or
 - b. is allowed by section 10; or
 - c. is an activity allowed by section 10A; or
 - d. is an activity allowed by section 20A.
2. No person may use land in a manner that contravenes a regional rule unless the use—
 - a. is expressly allowed by a resource consent; or
 - b. is an activity allowed by section 20A.
3. No person may use land in a manner that contravenes a district rule unless the use—
 - a. is expressly allowed by a resource consent; or
 - b. is allowed by section 10; or
 - c. is an activity allowed by section 10A.
4. No person may contravene section 176, 178, 193, or 194 unless the person obtains the prior written consent of the requiring authority or the heritage protection authority.

Pahia dairies is applying for a resource consent to expand dairy platform and to carry out winter grazing as required under the NES-F (2020) and the PSWLP.

Specific sections of Part 3 of the RMA that this application gives consideration to are:

Section 17 – Duty or avoid, remedy or mitigate adverse effects

The proposed activity complies with sub-clauses 1(a) and (b) which require persons to avoid, remedy or mitigate any adverse effects on the environment resulting from an activity.

The proposed activity proposes to have a less than minor effect on the environment as outlined in the Assessment of Environmental Effects (Section 4).

Under Part 6 of the RMA the following applies:

Section 104 – Consideration of applications

Under 104 (2A) the consent authority must have regard to the value of the investment of the existing consent holder.

Pahia dairies has invested significant amounts of money into the farm with a capital value, if the land is unable to be milked off, then the property could see a reduction in land value of up to \$10,000 per hectare (total loss of \$950,000).

5.2.3. Resource Management (Stock Exclusion) Regulations 2020

The Stock Exclusion Regulations 2020 state that dairy cattle, pigs and dairy support cattle on any terrain must be excluded from lakes and wide rivers and must not be closer than 3 meters to the edge of the bed of a lake or wide river by the 1st of July 2023. A wide river is defined as a river with a bed that is wider than 1 meter anywhere in a land parcel.

The Ouki creek is present on the property as are a number of unnamed tributaries. The applicant has all water ways fenced off and has stock crossings installed to ensure stock exclusion can be achieved.

All stock must be excluded from any natural wetland that is identified in a regional or district plan or regional policy statement that is operative on the commencement date.

There are no known wetlands on the applicants property identified by the owners or any regional planning databases.

5.2.4. Resource Management (Measurement and Reporting of Water Takes) Amendment Regulations 2020

The regulations require water takes to be measured at 15 minute periods and reported daily to council. The time when these requirements commence depends on the flow rate of the water take:

- 3 September 2022 for a water permit for ≥ 20 litres/ second
- 3 September 2024 for a water permit for ≥ 10 but < 20 litres/ second
- 3 September 2026 for a water permit for ≥ 5 but < 10 litres/ second.

With the resource consents held or in application the water takes at Pahia will be monitored and reported at the required intervals.

5.3. Policy Statements

5.3.1. National Policy Statement for Freshwater management 2020

The National Policy Statement for Freshwater Management 2020 (NPS-FM 2020) sets out how the concept of Te Mana o Te Wai should be given effect to when managing freshwater. It establishes a hierarchy of obligations to be applied, they are prioritised as follows:

1. *The health and wellbeing of water bodies and freshwater ecosystems*
2. *The health needs of people using the water for purposes such as drinking water*
3. *The ability of people and communities to provide for their social, economic and cultural wellbeing now and in the future.*

The NPS-FM 2020 has not yet been completely incorporated into Regional Policy Statements, Regional or District Plans therefore until this time the NPS-FM 2020 will have a high level of importance in resource consents. As stated in Section 104 (2) of the Act, a consent authority may disregard the adverse effects of an activity on the environment if a national environmental standard or the plan permits an activity with that effect. Therefore, until the time when Regional or District plans are operative or proposed the national environmental standard must be regarded. The NES-FW 2020 has been written to give effect to the NPS-FM 2020 with the focus being on high-risk farming activities. There is currently no requirement for existing activities to immediately reduce their effect on freshwater. Reductions to effects on freshwater has been tasked to territorial authorities to develop plans which give effect to the NPS-FM 2020, Te Mana o te Wai and set limits on contaminants entering freshwater which reflect community values for freshwater bodies and ecosystems.

The proposed activity seeks to alter land use by definition however does not propose any increase in stock numbers, proposes a decrease in intensive winter grazing area and a decrease in nutrient loss. The continued implementation of good management practices around nutrient use and maintaining setback distances from water bodies and critical source areas will result in the proposed activity having no adverse impact on the cultural values of the Ouki creek and coastal areas.

Due to the importance of the area to Te Rūnanga O Ōraka/Aparima, the concept of Te Mana o te Wai requires that this resource consent application give regard to the effect of the proposed activity on the health and well-being of the freshwater ecosystem. This is done through assessing the activity against the policies outlined in the NPS-FM 2020 through the Hierarchy of Obligations.

Policy 1 – Freshwater is managed in a way that gives effect to Te Mana o te Wai

The proposed mitigations outlined in Section 4 and practices detailed in the farm's farm environment plan are to ensure that the health and well-being of surface and groundwater ecosystems are managed. The practices detailed within the Overseer nutrient budgets, proposed mitigations and FEP will result in improved water quality outcomes compared to the current status.

Policy 2 – Tangata whenua are actively involved in freshwater management (including decision making processes), and Māori freshwater values are identified and provided for.

Consultation was undertaken with Te Rūnanga O Ōraka/Aparima through the iwi consultancy Te Ao Mārama in relation to this application as the proposed activity is in relation to expansion of dairy area. Environment Southland advised the applicant consider applying for this consent to be publicly notified and therefore notifying Te Ao Mārama prior, even though they may be too busy to reply in advance, would at least give

them a heads up. The activities proposed within the application and further mitigations and management techniques outlined in the Overseer nutrient budgets, AEE and the FEP promote healthier water quality of the groundwater which may percolate to surface water.

Policy 3 – Freshwater is managed in an integrated way that considers the effects of the use and development of land on a whole-of-catchment basis, including the effects on receiving environments.

The effects of the use and development of land over the whole catchment are difficult to address in relation to a single farm. However, the mitigations in the Overseer nutrient budgets, AEE and FEP ensure that the effects on receiving environments are no more than what they are currently and that nutrient losses will reduce.

Policy 4 – Freshwater is managed as part of New Zealand’s integrated response to climate change.

This is difficult to assess in relation to a single farm. However, the rotation of winter grazing over a larger area means that fodder beet can be grown instead of kale. Fodder beet has been shown to reduce the methane produced by livestock due to the higher sugar content of the crop promoting digestion by enzymes which do not produce as much methane.

Policy 5 – Freshwater is managed through a National Objectives Framework to ensure that the health and well-being of degraded water bodies and freshwater ecosystems is improved, and the health and well-being of all other water bodies and freshwater ecosystems is maintained and (if communities choose) improved.

Regional policy will need to be updated to give effect to the National Objectives Framework as the standards set out in it are, in some cases, higher than required in the PSWLP. Proposed mitigations and practices laid out in the farm’s FEP address both the standards in the NES-F (2020) and the PSWLP.

Policy 6 – There is no further loss of extent of natural inland wetlands, their values are protected, and their restoration is promoted.

There are wetland-type areas on the property, these areas will be protected from grazing or drainage to preserve their naturalness.

Policy 7 – The loss of river extent and values is avoided to the extent practicable.

The practices carried out on the farm previously and those proposed will not result in any decrease in river extent or values and will aim to improve these by continuing to exclude stock from water courses.

The proposed activity seeks to reduce environmental impacts and improve water quality in the catchment. A reduction in nutrient loss from the property, as demonstrated by the Overseer nutrient budgets, will likely have a positive downstream impact on river and stream water quality.

Policy 8 – The significant values of outstanding water bodies are protected.

No outstanding water bodies are present on the farm, no wetlands, sites of wildlife or national significance are present.

Policy 9 – The habitats of indigenous freshwater species are protected.

The proposed activity seeks to reduce diffuse nutrient loss from the property which will likely have a positive downstream impact on river and stream water quality where shallow groundwater merges with surface water. As a result of the likely improved catchment water quality, the habitats of indigenous freshwater species will at minimum be protected to their current status.

Policy 10 – The habitat of trout and salmon is protected, insofar as this is consistent with Policy 9.

As there are no known water bodies on the property that provide habitat for salmon and trout, the proposed activity of this application will have no impact on salmon and trout other than possible positive impacts similar to those outlined in the discussion under Policy 9.

Policy 11 – Freshwater is allocated and used efficiently, all existing over-allocation is phased out, and future over-allocation is avoided.

Not applicable as this consent relates to land use rather than a water take consent. The applicant is currently working with council on water take consents for both ground and surface water.

Policy 12 – The national target (as set out in Appendix 3) for water quality improvement is achieved.

The modelled nutrient loss reductions in Overseer and the mitigations proposed help to achieve this target.

Policy 13 – The condition of water bodies and freshwater ecosystems is systematically monitored over time, and action is taken where freshwater is degraded, and to reverse deteriorating trends.

Regional Council is undertaking systematic water quality testing on water bodies in the area including the Waiau River and Pourakino River and is developing catchment groups focused on reducing nutrient and sediment loss to streams. This application complies with the regulations and rules as set out in the PSWLP. As a result, the proposed activities' reduction in nutrient loss to water in comparison to current will aid the catchment in reversing any freshwater degradation trends.

Policy 14 – Information (including monitoring data) about the state of water bodies and freshwater ecosystems, and the challenges to their health and well-being, is regularly reported on and published.

Assessments of groundwater quality would not be directly representative of this activity or the farm due to numerous interactions between groundwater and surface water that are difficult to define. Monitoring is best carried out at a catchment level by the Regional council.

As discussed above in Policy 13, Regional Council is systematically testing surface water quality within the catchment and reporting findings on an annual basis (sometimes more frequently).

Policy 15 – Communities are enabled to provide for their social, economic, and cultural wellbeing in a way that is consistent with this National Policy Statement.

The land operators contribute to GDP and provide jobs for staff and the agricultural industry. This application enables the farming practices of the land occupier to become more efficient and to increase the long-term sustainability of the operation, resulting in positive outcomes for the local community and wider catchments.

The absence of a resource consent for the expansion of the dairy platform area and winter grazing would result in the farm continuing their current land use practices. While this is feasible the farm has identified that this is also not the most efficient way to use their land resources and their operation will be more sustainable in the long term if they can expand their winter grazing and dairy rotation over a larger area, while not increasing stock numbers. This ensures the long-term viability of the business which contributes

to the rural community through employment and regional spending, with each \$1 spent on employee wages having a regional economic value of \$2.50.

5.3.2. Southland Regional Policy Statement

The Southland Regional Policy Statement (SRPS) became operative in October 2017. The RPS provides a framework for the manner in which Southland’s natural and physical resources will be managed. It directs regional and district plans to address the cumulative effects of resource use and development. It considers the community objectives, while encouraging people to work collaboratively and recognising connections to our environment by encompassing the Ngāi Tahu philosophy of “ki uta ki tai” – from the mountains to the sea.

The vision and principles of the SRPS are embodied in the Regional Water Plan, Land Application Plan and Iwi Management Plan, where they are specific to the management in those areas.

The chapters and objectives in the SRPS that are considered to most relevant to this application for the expansion of dairy platform area and to carry out intensive winter grazing are outlined below.

Chapter 3: Tangata Whenua Provisions

Objective	Assessment
Objective TW.1	The principles of the Treaty of Waitangi/Te Tiriti o Waitangi are taken into account in a systematic way through effective partnerships between tangata whenua and local authorities, which provide the capacity for tangata whenua to be fully involved in council decision-making processes.
Objective TW.2	All local authority resource management processes and decisions take into account iwi management plans.
Objective TW.3	Mauri and wairua are sustained or improved where degraded, and mahinga kai and customary resources are healthy, abundant and accessible to tangata whenua.
Objective TW.4	Wāhi tapu, wāhi taonga and sites of significance are appropriately managed and protected.
Objective TW.5	Māori are able to develop and use their land and resources and provide for their social, economic and cultural wellbeing, in a manner that is sustainable.

Tangata Whenua have been considered in Policy 1 and 2 of the PSWLP which requires that Ngāi Tahu interests in freshwater are identified and reflected alongside their values in the management and decision making on freshwater. Iwi management plans must be taken into account and water quality and quantity assessed in relation to Ngāi Tahu health indicators.

The reflection of iwi values and health indicators is specifically addressed in the assessment of Te Tangi a Tauira in Section 5.5 below. Ngai Tahu interests in freshwater and values are recognized through buffer

zones from waterways and critical source areas along with other proposed mitigations and good farm management practices to ensure that this proposal will not negatively impact the environment, allowing for the continued sustainment of mahinga kai and customary resources used by the tangata whenua.

Chapter 4: Water Quality: Part A

Objective	Assessment
Objective WQUAL.1	Overall management of water quality to ensure that the effect of discharges are managed in order to maintain water quality.
Policy WQUAL.1	
Objective WQUAL.2	Halt the decline and improve water quality in lowland water bodies and coastal lakes, lagoons, tidal estuaries, salt marshes and coastal wetlands in accordance with freshwater objectives formulated in accordance with the National Policy Statement for Freshwater Management.
Objective WQUAL.3	Maintain the quality of water where it is in its natural state.

As set out in Section 4 of this application, the potential adverse effects of the proposal on surface water quality has been assessed as less than minor. The modelling carried out suggests that this proposal will have result in an improvement in water quality. In addition mitigation and management measures have been suggested to prevent runoff and leaching from adversely affecting water quality and ecosystem health have been proposed. As a result, water quality will be improved and will not exceed the limits set out in the Southland Regional Policy Statement, Chapter 4 Water Plan.

Chapter 5: Rural Land and Soils

Objective	Assessment
Objective RURAL.1	Achieve sustainable use of Southland’s rural land resource, in respect of: (a) agriculture and primary sector activities; (b) subdivision, use and development activities; (c) earthworks and vegetation clearance activities; (d) the use of soil resources; (e) mineral extraction activities; and (f) on-site wastewater systems.
Objective RURAL.2	Safeguard the life-supporting capacity, mauri and health of soils in rural areas, and prevent or minimise soil erosion and sedimentation from land use soil disturbance.

This proposal will contribute to protect the health of the Region’s soils, through ensuring that damage to soil structure and any resulting loss of sediment due to pugging from winter grazing is minimized. Winter grazing will be carried out as much as practicable on soils which are best suited to it, those without high water tables and that are less than 10 degrees in slope. Winter grazing management plans are prepared for the farm to ensure soils are appropriately managed, particularly in wetter conditions. Overall, the application seeks to use land in a sustainable way that safeguards the life supporting capacity and health of soils.

5.4. Rule Assessment and Consents Required

5.4.1. Operative Regional Water Plan for Southland 2010

The Regional Water Plan applies to all discharges of effluent and sludge onto or into land in the region. It became operative in 2010. The relevant rule that relates to this proposal is Rule 50.

Policy Assessment

Policy	Assessment
<p>Policy 1A – Take into account Iwi Management Plans Any assessment of an activity covered by this plan must take into account any relevant Iwi Management Plan</p>	<p>Yes: The proposal has considered the relevant Iwi Management Plan</p>
<p>Policy 1 – Surface water body classes (a) Recognise the different characteristics of the following surface water body classes when managing discharges: (i) Natural State Waters (ii) Lowland (hard bed) (iii) Lowland (soft bed) (iv) Hill (v) Mountain (vi) Lake-fed (vii) Spring-fed (viii) Maitara 1 (ix) Maitara 2 (x) Maitara 3 (xi) Lowland/coastal lakes and wetlands (xii) Hill lakes and wetlands (xiii) Mountain lakes and wetlands (b) Apply water quality standards established under any Water Conservation Order.</p>	<p>Yes: The proposal is not for the discharges directly into any of the listed surface waterbodies. Water quality standards for all water body classes will continue to be met.</p>
<p>Policy 2 – Natural State Waters Provide for discharges to Natural State Waters only where there will be no measurable adverse effects on existing water quality beyond the zone of reasonable mixing, unless it is consistent with the sustainable management of natural and physical resources as set out in Part 2 of the Resource Management Act 19</p>	<p>Not Applicable: The proposal will not discharge into Natural State Waters and as it is not a discharge to water there will be no zone of reasonable mixing.</p>
<p>Policy 3 – No reduction in water quality Notwithstanding any other policy or objective in this plan, allow no discharges to surface water bodies that will result in a reduction of water quality beyond the zone of reasonable mixing, unless it is consistent with the promotion of the sustainable management of natural and physical resources,</p>	<p>Not Applicable: The proposal will not discharge into surface water bodies and therefore there will be no zone of reasonable mixing. Management as outlined in the FEP details practices such as maintaining buffer strips, vegetation around CSAs, not grazing on slopes and choosing paddocks with soils best suited to</p>

	IWG where practical.
<p>Policy 4 – Surface water bodies outside Natural State Waters</p> <p>For surface water bodies outside Natural State Waters, manage point source and non-point source discharges to meet or exceed the water quality standards referred to in Rule 1 and specified in Appendix G “Water Quality Standards”, unless it is consistent with the promotion of the sustainable management of natural and physical resources, as set out in Part 2 of the Resource Management Act 1991, to do so and so avoid levels of contaminants in water and sediments that could harm the health of humans, domestic animals including stock and/or aquatic life.</p>	<p>Yes:</p> <p>The proposal will not directly discharge into any surface water body outside of Natural State Waters and the water quality standards referred to in Rule 1 and specified in Appendix G “Water Quality Standards” will continue to be met.</p> <p>The application is consistent with the promotion of natural and physical resources through the improved management of the soil resource and reduction of winter grazing area. This will increase productivity of paddocks following winter grazing and ensure pasture production on the farm is more resilient during difficult seasons.</p>
<p>Policy 5 – Discharges to water in artificial watercourses</p>	Not Applicable
<p>Policy 6 – Non-regulatory methods</p> <p>(a) Use non-regulatory methods, in addition to rules, to maintain and enhance surface water and groundwater quality, and to avoid, remedy or mitigate adverse effects on soil quality.</p> <p>(b) Assess on an ongoing basis whether the adoption of non-regulatory methods has resulted in improvements to water or soil quality, and consider the introduction of other interventions if improvements have not resulted.</p>	Not Applicable
<p>Policy 7 Prefer discharges to land</p> <p>Prefer discharges to land over discharges to water where this is practicable, and the effects are less adverse.</p>	<p>Yes:</p> <p>Use of buffer strips and maintaining vegetation in critical source areas to capture and utilize nutrients rather than have them enter waterbodies.</p>
<p>Policy 8 – Discharges to water</p>	<p>Not Applicable:</p> <p>Proposal is not for the discharge to water.</p>

<p>Policy 9 – Zone of reasonable mixing</p>	<p>Not Applicable: Proposal is not for the discharge into waterways where there would be a zone of mixing.</p>
<p>Policy 10 - Use of diffusers</p>	<p>Not Applicable</p>
<p>Policy 11 – Stormwater discharges Apply consent conditions requiring consented discharges of stormwater to meet both the ANZECC sediment guidelines (as shown in Appendix E of this Plan) and the relevant water quality standards specified in Appendix G “Water Quality Standards” following reasonable mixing to: (a) all resource consents for new stormwater discharges; and (b) all new resource consents for existing stormwater discharges. Unless it is consistent with the purpose of the Act to allow further time, existing discharges will be required to meet the standards and guidelines by 2010 or the date the resource consent commences, whichever is the latter.</p>	<p>Not Applicable</p>
<p>Policy 12 – Application of agrichemicals and vertebrate pest control poisons</p>	<p>Not Applicable</p>
<p>Policy 13 – Discharge of untreated effluent Avoid the point source discharge of raw sewage, foul water and untreated agricultural effluent to water.</p>	<p>Not Applicable</p>
<p>Policy 13A – Transitional policy relating to the establishment of new dairy farms Recognise that the establishment of new dairy farms poses risks to water quality. For this risk to be managed through the requirement for farms to obtain a resource consent for this activity.</p>	<p>Yes: As indicated in the plan the word transitional in the heading is due to the council developing long-term policy framework around the establishment of new dairy farms as seen in the PSWLP. Water quality has been shown to improve under this proposal due to the decrease in winter grazing, change in forage crop type and better selection of paddocks for winter grazing. As stated under Policy 13A the application for increased dairy farm land is a discretionary activity.</p>

<p>Policy 25 - Adverse effects arising from point source and non-point source discharges To avoid, remedy or mitigate the adverse effects arising from point source and non-point source discharges so that there is no deterioration in groundwater quality after reasonable mixing, unless it is consistent with the promotion of the sustainable management of natural and physical resources, as set out in Part 2 of the Resource Management Act 1991, to do so.</p>	<p>Yes: The proposed mitigations and GMP as per the AEE and the FEP in relation to the increase in area of dairy farm land and carrying out winter grazing ensure that effects on water quality and soil are either avoided, remedied or mitigated.</p>
<p>Policy 26 - Adverse effects of bores and wells To avoid the adverse effects on groundwater quality and quantity arising from bores and wells by ensuring that bores and wells are appropriately designed, constructed and maintained in a way that adverse effects are avoided to the extent practicable.</p>	<p>Not Applicable</p>
<p>Policy 27 – Groundwater research and investigation</p>	<p>Not Applicable</p>
<p>Policy 31A – Matching discharges onto or into land to risk Match the level of management that is required for discharges of contaminants onto or into land to the level of environmental risk posed by the following risk factors: (a) Nature and quantity of contaminants in the discharge (b) Sloping land (c) Soils with artificial drainage or coarse structures (d) Soils with impeded drainage or low infiltration rates (e) Well drained soils (f) Climate (g) Proximity to groundwater (h) Proximity to surface water (i) Soil’s current physical, chemical and biological characteristics and its potential to leach nutrients (j) Natural hazards (for example, flooding and erosion)</p>	<p>Yes: The risk from the listed factors in this policy have been considered when proposing mitigations for this application, in the choosing of paddocks for intensive winter grazing and when preparing winter grazing management plans.</p>
<p>Policy 31B – Natural State Catchments Recognise that discharges onto or into land in the catchments of Natural State Waters can have adverse effects on water quality, and manage such discharges in accordance with Policy 2 and Policy 31A of this Plan</p>	<p>Yes: The proposed activity is managed in accordance with Policy 2 and Policy 31A.</p>

<p>Policy 31C - Manage discharges of contaminants onto or into land Manage discharges of contaminants onto or into land to avoid, remedy or mitigate adverse effects, including on:</p> <ul style="list-style-type: none"> (a) soil quality; (b) amenity values; (c) habitats, ecosystems and indigenous biological diversity; (d) historic heritage, cultural and traditional values; (e) natural character; (f) outstanding natural features. 	<p>Yes: Cumulative effects have been considered and the proposed continuation of activity will be managed in a way that ensures adverse effects on any of the features listed in Policy 31C are avoided. The level of management of the discharge is in line with the level of risk to the environment. Details are outlined in the FEP and the AEE of this document.</p>
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The proposal recognises Ngāi Tahu as a guardian of the natural resource. The proposal is only for activities to actively farmed land and modelling shows a decrease in loss of nutrients to the receiving environment which alongside proposed best management practices ensures that there is no change in effects to culturally sensitive sites. The proposed mitigations are considered sufficient to avoid adverse effects on cultural values.

A consent duration of 9 years is requested. Rule 24 (2) NES-F (2020) states the consent for a discretionary activity can be granted for a term ending before the 1st January 2031. 9 years is considered appropriate for this application given the low environmental risk, the near equivalent practices to those which are permitted activities and that compliance reports will be provided annually.

The proposal will not result in any increase in stock numbers, will result in a decrease in intensive winter grazing area and better utilization of the already farmed area to reduce the requirement to import supplement.

As the proposal will improve the current status of soil and water quality, there will be a less than minor effect on any cultural values. As discussed above, the proposed activities are considered to achieve the policies and objectives set out in the Iwi Management Plan.

The proposed activity of the application is consistent with the Policies of the Regional Water Plan for Southland.

Rule Assessment

Rule	Assessment
<p>Rule 17 A – Transitional rule relating to the establishment of new dairy farms</p> <ul style="list-style-type: none"> (a) The establishment of a new dairy farm is a discretionary activity. (a) Notwithstanding (b) notice of an application under this 	<p>As discussed in relation to Policy 13A the inclusion of the word transitional is due to Council establishing rules around new dairy farms as indicated in the PSWLP.</p> <p>This consent application for the</p>

<p>rule shall be served on the following: (i) Te Runanga o Ngai Tahu and the appropriate runanga. (ii) The Department of Conservation for an application that adjoins a national park or conservation area administered by that department. (iii) The Gore District Council for an application within that area of the Knapdale Groundwater Zone identified on the Knapdale Groundwater Map.</p>	<p>expansion of dairy farm area is a discretionary activity however it is not required to apply under the Regional Water Plan for Southland as this Rule is covered by Rule 20 in the PSWLP (2018) which became operative in 2021.</p> <p>Te Ao Marama as representatives for Te Runanga o Oraka/Aparima have been notified of this consent application. The area does not adjoin a national park or conservation area. The area is not within the Knapdale Groundwater Zone therefore neither DOC nor Gore DC need to be notified.</p>
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5.4.2. Proposed Southland Water and Land Plan

The proposed Southland Water and Land Plan (PSWLP) has been made part operative on 1 March 2021, as the 2018 decisions version. Although the PSWLP is partially operative, an assessment of the rules applicable to the application have been made as the intention of the PSWLP is to incorporate the principles and objectives of the currently operative Regional Water Plan and Regional Effluent Land Application Plan.

Objectives Assessment

Objective	Assessment of Alignment
<p>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.</p>	<p>Yes: Proposal will be carried out in a sustainable way, using good management practices and will not degrade the regions water (both groundwater and freshwater), land or coast.</p>
<p>Objective 2: Water and land is recognised as an enabler of primary production and the economic, social and cultural wellbeing of the region.</p>	<p>Yes: In this proposal both land and water are enabling primary production and promoting the economic, social and cultural wellbeing of the region.</p>
<p>Objective 3: The mauri of waterbodies provide for te hauora o te tangata (health and mauri of the people), te hauora o te taiao (health and mauri of the environment) and te hauora o te wai (health and</p>	<p>Yes: The proposed activity will result in improvements to water quality and the proposed mitigations will likely result in improvements to the environment and</p>

mauri of the waterbody).	therefore health and mauri of the people. The life supporting capacity of the regions land and water resources will be maintained or improved.
<p>Objective 4: Tangata whenua values and interests are identified and reflected in the management of freshwater and associated ecosystems.</p>	<p>Yes: The proposal demonstrates a decrease in nutrient losses to land and the proposed mitigations are suggested to result in a decrease in microbial contaminants and sediment. This will have a positive effect on Tangata whenua values in relation to the management of freshwater and associated ecosystems, thus preserving any culturally significant areas such as mahinga kai collection sites.</p>
<p>Objective 5: Ngāi Tahu have access to and sustainable customary use of, both commercial and non-commercial, mahinga kai resources, nohoanga, mātaítai and taiāpure.</p>	<p>Yes: The proposal will not in any way impact on the access to, or sustainable use by Ngai Tahu of mahinga kai resources, nohoanga, mātaítai and taiāpure.</p>
<p>Objective 6: There is no reduction in the overall quality of freshwater, and water in estuaries and coastal lagoons, by: (a) maintaining the quality of water in waterbodies, estuaries and coastal lagoons, where the water quality is not degraded; (b) improving the quality of water in waterbodies, estuaries and coastal lagoons, that have been degraded by human activities.</p>	<p>Yes: The proposed activity will result in a decrease in nutrient loss to water and the mitigations proposed are expected to result in a decrease in microbial contaminants and sediment lost. Therefore maintaining or improving the quality of waterbodies.</p>
<p>Objective 7: Any further over-allocation of freshwater (water quality and quantity) is avoided and any existing over-allocation is phased out in accordance with freshwater objectives, freshwater quality limits and timeframes established under Freshwater Management Unit processes.</p>	<p>NA: There is no water take as part of this application</p>

<p>Objective 8:</p> <p>(a) 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 waterbodies, established under Freshwater Management Unit processes is maintained; and</p> <p>(b) The quality of groundwater that does not meet Objective 8(a) because of the effects of land use or discharge activities is progressively improved so that:</p> <p>(1) groundwater (excluding aquifers where the ambient water quality is naturally less than the Drinking Water Standards for New Zealand 2005 (revised 2008)) meets the Drinking Water Standards for New Zealand 2005 (revised 2008); and</p> <p>(2) groundwater meets any freshwater objectives and freshwater quality limits established under Freshwater Management Unit processes</p>	<p>Yes:</p> <p>As demonstrated in the AEE, soil type selection for winter grazing where practical, buffers from groundwater abstraction points and implementation of intensive winter grazing plans are carried out to ensure that proposal will not result in any adverse effects on groundwater. The modelling demonstrates a reduction in nutrient loss to groundwater from the activity.</p>
<p>Objective 9:</p> <p>The quantity of water in surface waterbodies is managed so that aquatic ecosystem health, life supporting capacity, outstanding natural features and landscapes and natural character are safeguarded.</p>	<p>NA:</p> <p>There is no water take as part of this application</p>
<p>Objective 9A:</p> <p>Surface water is sustainably managed to support the reasonable needs of people and communities to provide for their social, economic and cultural wellbeing.</p>	<p>Yes:</p> <p>Surface water will not be impacted by this proposal. Appropriate buffers to surface water from associated activities will be maintained and vegetation will be maintained in critical source areas.</p>
<p>Objective 9B:</p> <p>The effective development, operation, maintenance and upgrading of Southland's regionally significant, nationally significant and critical infrastructure is enabled.</p>	<p>Yes:</p> <p>This application will enable the continued operations of a dairy farm which contributes to an industry that has regional significance.</p>
<p>Objective 10:</p> <p>The national importance of existing hydro-electric generation schemes, including the Manapōuri hydro-electric generation scheme in the Waiau catchment, is provided for, recognised in any resulting flow and level regime, and their</p>	<p>NA:</p> <p>This proposal will not impact on existing hydroelectric generation schemes.</p>

<p>structures are considered as part of the existing environment.</p>	
<p>Objective 11: The amount of water abstracted is shown to be reasonable for its intended use and water is allocated and used efficiently.</p>	<p>NA: There is no water take as part of this application,</p>
<p>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.</p>	<p>NA: There is no water take as part of this application</p>
<p>Objective 13: Enable the use and development of land and soils to support the economic, social, and cultural wellbeing of the region.</p>	<p>Yes: This application will provide sustained economic benefit to land owners and the district through continued employment of people and continued spending in the regional centres. Increased rotation of intensive winter grazing will improve soil structure, enable a smaller area of winter forage crop and reduce imported supplement requirements, depending on the season.</p>
<p>Objective 13A: The quantity, quality and structure of soil resources are not irreversibly degraded through land use activities or discharges to land.</p>	<p>Yes: Soil quality and structure will be improved by this proposal. The ability to rotate winter grazing over the entire Pahia dairy farm will mean there is more time between winter forage cropping on each paddock (around 8 years in comparison to the current 1 year). This will improve soil structure through continued time in pasture and through the ability to choose paddocks better suited to winter grazing (where practical).</p>
<p>Objective 13B: The discharges of contaminants to land or water that have significant or cumulative adverse effects on human health are avoided.</p>	<p>Yes: The discharges of effluent onto land do not have cumulative adverse effects and fertiliser applications are structured following nutrient loading events such as winter grazing to optimize the recycling of these nutrients.</p>

<p>Objective 14: The range and diversity of indigenous ecosystem types and habitats within rivers, estuaries, wetlands and lakes, including their margins, and their life-supporting capacity are maintained or enhanced.</p>	<p>Yes: Indigenous ecosystems and habitats are maintained as this proposal ensures setback distances from waterbodies, maintenance of vegetation in critical source areas and winter grazing in paddocks under 10 degrees in slope.</p>
<p>Objective 15: Taonga species, as set out in Appendix M, and related habitats, are recognized and provided for.</p>	<p>Yes: The application ensures setback distances are maintained from surface waterbodies therefore no Taonga species or habitats will be affected by this proposal.</p>
<p>Objective 16: Public access to, and along, river (excluding ephemeral rivers) and lake beds is maintained and enhanced, except in circumstances where public health and safety or significant indigenous biodiversity values are at risk.</p>	<p>Yes: This application will not restrict public access to any river or lake bed.</p>
<p>Objective 17: The natural character values of wetlands, rivers and lakes and their margins, including channel and bed form, rapids, seasonably variable flows and natural habitats, are protected from inappropriate use and development.</p>	<p>Yes: The proposal is for activities only be on existing agricultural land. Natural character areas will not be degraded. The application for increased area of dairy platform is to enable winter grazing activities to be rotated around a larger area which will reduce effects on the surrounding area.</p>
<p>Objective 18: All activities operate in accordance with “good management practice” or better to optimize 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.</p>	<p>Yes: Good management practices or better will be carried out to optimise resource use. The application will not result in a degradation of water resources or life supporting capacity of regions land and soils.</p>

Policy Assessment

Policy	Assessment
<p>Policies 1, 2 and 3</p>	<p>Yes: The relevant Iwi Management Plan has been considered and this proposal will not adversely affect Taonga species</p>

<p>Policies 6, 10 and 11 relating to Physiographic zones Bedrock/ Hill country, Lignite-Marine Terraces, Oxidising and Peat Wetland respectively that are present on the property</p>	<p>Yes: The farm will avoid, remedy or mitigate erosion and adverse effects on water quality from contaminants transported by overland flow and artificial drainage pathways by implementing the GMPs relevant to the respective physiographic zones on the property as described in the consent application.</p>
<p>Policy 13 – Management of land use activities and discharges</p> <p>1. Recognise that the use and development of Southland’s land and water resources, including for primary production, enables people and communities to provide for their social, economic and cultural wellbeing.</p> <p>2. Manage land use activities and discharges (point source and non-point source) to enable the achievement of Policies 15A, 15B and 15C.</p>	<p>Yes: Proposed mitigation measures and good management and better practices will ensure the activity is appropriately managed and water quality will be improved in regard to nutrient loading and maintained or improved in regard to sediment and microbial contaminant loading.</p>
<p>Policy 14 – Preference for discharges to land</p> <p>Prefer discharges of contaminants to land over discharges of contaminants to water, unless adverse effects associated with a discharge to land are greater than a discharge to water. Particular regard shall be given to any adverse effects on cultural values associated with a discharge to water.</p>	<p>Yes: This proposal is for the discharge to land rather than a discharge to water.</p>
<p>Policy 15A – Maintain water quality where standards are met</p> <p>Where existing water quality meets the Appendix E Water Quality Standards or bed sediments meet the Appendix C ANZECC sediment guidelines, maintain water quality including by:</p> <p>1. avoiding, remedying or mitigating the adverse effects of new discharges, so that beyond the zone of reasonable mixing, those standards or sediment guidelines will continue to be met; and</p> <p>2. requiring any application for replacement of an expiring discharge permit to demonstrate how the adverse effects of the discharge are avoided, remedied or mitigated, so that beyond the zone of reasonable mixing those standards or sediment guidelines will continue to be met</p>	<p>Yes: Proposed mitigation measures will ensure water quality and sediment in waterbodies will be improved or maintained this proposal will not impact the ability of a waterbody to continue to meet guidelines.</p>

Policy 15B – Improve water quality where standards are not met

Where existing water quality does not meet the Appendix E Water Quality Standards or bed sediments do not meet the Appendix C ANZECC sediment guidelines, improve water quality including by:

1. avoiding where practicable and otherwise remedying or mitigating any adverse effects of new discharges on water quality or sediment quality that would exacerbate the exceedance of those standards or sediment guidelines beyond the zone of reasonable mixing; and
2. requiring any application for replacement of an expiring discharge permit to demonstrate how and by when adverse effects will be avoided where practicable and otherwise remedied or mitigated, so that beyond the zone of reasonable mixing water quality will be improved to assist with meeting those standards or sediment guidelines

Yes:

As the discharge to water is avoided by the proposed management as set out in the AEE, water quality measures in Appendix E do not apply. There are no adverse effects from this proposal that would exacerbate the exceedance of water quality targets.

Policy 15C – Maintaining and improving water quality after FMU processes

Following the establishment of freshwater objectives and limits under Freshwater Management Unit processes, and including through implementation of non-regulatory methods, improve water quality where it is degraded to the point where freshwater objectives are not being met and otherwise maintain water quality where freshwater objectives are being met

Yes:

This application proposes a reduction in nutrient losses to water and proposed mitigations will also assist in improvements or maintenance in water quality in areas which are not meeting objectives after the establishment of the Freshwater Management Unit processes.

<p>Policy 16 – Farming activities that affect water quality</p> <p>1. Minimising the adverse environmental effects (including on the quality of water in lakes, rivers, artificial watercourses, modified watercourses, wetlands, tidal estuaries and salt marshes, and groundwater) from farming activities by:</p> <p>(a) discouraging the establishment of new dairy farming of cows or new intensive winter grazing activities in close proximity to Regionally Significant Wetlands and Sensitive Waterbodies identified in Appendix A; and</p> <p>(b) ensuring that, in the interim period prior to the development of freshwater objectives under Freshwater Management Unit processes, applications to establish new, or further intensify existing, dairy farming of cows or intensive winter grazing activities will generally not be granted where:</p> <p>(i) the adverse effects, including cumulatively, on the quality of groundwater, or water in lakes, rivers, artificial watercourses, modified watercourses, wetlands, tidal estuaries and salt marshes cannot be avoided or mitigated; or</p> <p>(ii) existing water quality is already degraded to the point of being overallocated; or</p> <p>(iii) water quality does not meet the Appendix E Water Quality Standards or bed sediments do not meet the Appendix C ANZECC sediment guidelines; and</p> <p>(c) ensuring that, after the development of freshwater objectives under Freshwater Management Unit processes, applications to establish new, or further intensify existing, dairy farming of cows or intensive winter grazing activities:</p> <p>(i) will generally not be granted where freshwater objectives are not being met; and</p> <p>(ii) where freshwater objectives are being met, will generally not be granted unless the proposed activity (allowing for any offsetting effects) will maintain the overall quality of groundwater and water in lakes, rivers, artificial watercourses,</p>	<p>Yes:</p> <p>Adverse effects on environment from this proposal are avoided when the proposed activities are performed in accordance with the proposed conditions.</p> <p>This application is for the increase in dairy platform area by definition however there is no increase in any stock numbers and is a decrease in winter grazing area which ensures risks of catchment degradation are further mitigated.</p> <p>The mitigations and discussion in the AEE demonstrate that the risk of any effects resulting from this application, including buffer areas around water bodies and managing cover on critical source areas will mitigate contaminants entering water bodies via overland flow. No water quality degradation risk exists with this application as the application seeks to carry out a more sustainable rotation of winter forage crops over the entire dairy platform instead of over the small area that is Browns block.</p> <p>A farm environment plan will be maintained.</p> <p>The activity is not in close proximity to any Regionally significant wetland or sensitive areas.</p> <p>Intensive winter grazing plans are in place to identify best management practices for specific paddocks and to avoid runoff to surface water bodies.</p>
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modified watercourses, wetlands, tidal estuaries and salt marshes.

2. Requiring all farming activities, including existing activities, to:

- (a) implement a Farm Environmental Management Plan, as set out in Appendix N; and
- (b) actively manage sediment run-off risk from farming and hill country development by identifying critical source areas and implementing practices including setbacks from waterbodies, sediment traps, riparian planting, limits on areas or duration of exposed soils and the prevention of stock entering the beds of surface waterbodies; and
- (c) manage collected and diffuse run-off and leaching of nutrients, microbial contaminants and sediment through the identification and management of critical source areas within individual properties.

3. When considering a resource consent application for farming activities, consideration should be given to the following matters:

- (a) whether multiple farming activities (such as cultivation, riparian setbacks, and winter grazing) can be addressed in a single resource consent; and granting a consent duration of at least 5 years.

Policy 17 – Agricultural effluent management

- 1. Avoid significant adverse effects on water quality, and avoid, remedy, or mitigate other adverse effects of the operation of, and discharges from, agricultural effluent management systems.
- 2. Manage agricultural effluent systems and discharges from them by:
 - (a) designing, constructing and locating systems appropriately and in accordance with best practice; and
 - (b) maintaining and operating effluent systems in accordance with best practice guidelines; and
 - (c) avoiding any surface run-off or overland flow, ponding or contamination of water, including via sub-surface drainage, resulting from the application of agricultural effluent to pasture; and
 - (d) avoiding the discharge of untreated agricultural effluent to water.

Note: Examples of best practice referred to in Policy 17(2)(a) for agricultural effluent include IPENZ Practice Note 21: Farm Dairy Effluent Pond Design and Construction and IPENZ Practice Note 27: Dairy Farm Infrastructure.

Note: Examples of best practice guidelines referred to in Policy 17(2)(b) for agricultural effluent include DairyNZ’s guidelines A Farmer’s Guide to Managing Farm Dairy Effluent – A Good Practice Guide for Land Application Systems, 2015 and A Staff Guide to Operating Your Effluent Irrigation System, 2013.

Yes:

A new effluent discharge permit has been obtained recently therefore the proposed mitigation practices associated with the discharge to land have been assessed by the council as maintaining or improving water quality.

Policy 18 – Stock exclusion from waterbodies

- Reduce sedimentation and microbial contamination of water bodies and improve river (excluding ephemeral rivers) and riparian ecosystems and habitats by:
- 1. requiring progressive exclusion of all stock, except sheep, from lakes, rivers (excluding ephemeral rivers), natural wetlands, artificial watercourses, and modified watercourses on land with a slope of less than 15 degrees by 2030; and
 - 2a. requiring the management of sheep in critical

Yes:

Stock are excluded from waterways. The farm has a riparian planting strategy (Appendix 2) and farm environmental plan (attached separately).

<p>source areas and in those catchments where E.coli levels could preclude contact recreation; and</p> <p>3. encouraging the establishment and enhancement of healthy vegetative cover in riparian areas, particularly through use of indigenous vegetation; and</p> <p>4. ensuring that stock access to lakes, rivers (excluding ephemeral rivers), natural wetlands, artificial watercourses and modified watercourses is managed in a manner that avoids significant adverse effects on water quality, bed and bank integrity and stability, mahinga kai, and river and riparian ecosystems and habitats.</p>	
<p>Policy 39 – Application of the permitted baseline</p> <p>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.</p>	<p>Yes:</p> <p>Consideration of all adverse effects has been carried out, including cumulative effects and have been assessed as less than minor.</p>
<p>Policy 39A – Integrated management</p> <p>When considering the cumulative effects of land use and discharge activities within whole catchments, consider:</p> <p>1. the integrated management of freshwater and the use and development of land including the interactions between freshwater, land and associated ecosystems (including estuaries); and</p> <p>2. through the Freshwater Management Unit process, facilitating the collective management of nutrient losses, including through initiatives such as nutrient user groups and catchment management groups</p>	<p>Yes:</p> <p>The cumulative effects have been considered and effects on surface water and groundwater have been assessed as less than minor.</p>

<p>Policy 40 – Determining the term of resource consents</p> <p>When determining the term of a resource consent consideration will be given, but not limited, to:</p> <ol style="list-style-type: none"> 1. granting a shorter duration than that sought by the applicant when there is uncertainty regarding the nature, scale, duration and frequency of adverse effects from the activity or the capacity of the resource; 2. relevant tangata whenua values and Ngāi Tahu indicators of health; 3. the duration sought by the applicant and reasons for the duration sought; 4. the permanence and economic life of any capital investment; 5. the desirability of applying a common expiry date for water permits that allocate water from the same resource or land use and discharges that may affect the quality of the same resource; 6. the applicant’s compliance with the conditions of any previous resource consent, and the applicant’s adoption, particularly voluntarily, of good management practices; and 7. the timing of development of FMU sections of this Plan, and whether granting a shorter or longer duration will better enable implementation of the revised frameworks established in those sections 	<p>Yes:</p> <p>The applicant has considered the Iwi Management Plan and a consent duration of 9 years is requested. 9 years is considered appropriate for this application given the low environmental risk, the investment in effluent storage facilities. Good management practices will be carried out including monitoring.</p>
<p>Policy 41 – Matching monitoring to risk</p> <p>Consider the risk of adverse environmental effects occurring and their likely magnitude when determining requirements for auditing and supply of monitoring information on resource consents.</p>	<p>Yes:</p> <p>With an improvement in the rotation of intensive winter grazing, resulting ability to apply discretion in relation to the timing grazing on peat soils and reduction in total area of winter fodder crop grown there is a less than minor risk of adverse environmental effects.</p> <p>The applicant seeks to comply with all auditing and reporting requirements of council supplying intensive winter grazing plans and the farm environment plan upon request.</p>

This proposal will contribute to protecting the health water bodies through the ability to rotate intensive

winter grazing around a larger area of the Pahia dairy platform enabling fodder beet to be grown instead of kale which has lower nutrient losses and higher yields. Subsequently there can be a reduction in winter feed area and an increase in pastoral area which will help ensure resilience during times of poor pasture growth and enable the farm to produce/ store baleage when conditions are favorable. This is possible because there will be no increase in stock numbers. Winter grazing management plans are in place to ensure soils are appropriately managed, particularly in wetter conditions.

This application is consistent with the applicable objectives and policies of the relevant Regional Plans, it is considered that the proposal is consistent with the PSWLP.

Rules Assessment

Rule	Assessment
<p>Applicable conditions of Rule 20 - Farming</p> <p>(a) The use of land for a farming activity is a permitted activity provided the following conditions are met.</p> <p>(ii) where the farming activity includes a dairy platform on the landholding, the following conditions are met: (6) the land area of the dairy platform is no greater than at 3 June 2016.</p> <p>1. The use of land for a farming activity that meets all conditions of Rule 20(a) other than (ii), (iii)(1),(iii)(4) or (iii)(5) or does not meet condition (i) of Rule 20(b) is a restricted discretionary activity, provided the following conditions are met: a Farm Environmental Management Plan is prepared and implemented in accordance with Appendix N; and (ii) the application includes the following material, prepared by a suitably qualified person: (1) an assessment that shows that the annual amount of nitrogen, phosphorus, sediment and microbiological contaminants discharged from the landholding will be no greater than that which was lawfully discharged annually on average for the five years prior to the application being made; and (2) for any mitigation proposed, a detailed mitigation plan (taking into account contaminant loss</p>	<p>The definition of dairy platform is the area of a landholding where dairy cows being milked on a daily basis are kept during the milking season. Because currently Browns block is only used for dairy support stock with the proposal to rotate the winter grazing area currently on Browns block over the rest of the Pahia dairies platform there would likely be dairy cows grazing on the paddocks that would then be going into winter feed. So during the milking season the area that could have milking cows on it would increase.</p> <p>The increase in dairy platform under the PSWLP is therefore a restricted discretionary activity.</p> <p>Modelling shows that there will be a decrease in nutrient loss to water and while it is difficult to demonstrate that there is no increase in loss of sediment or microbial contaminants relevant references detailed in the AEE suggest that increasing the area of rotation, implementation of strategic grazing practices and total decrease in winter feed area due to change to growing fodder beet will result in no increase in microbial contaminants from what was discharged in the five years prior to this application. Mitigations proposed are laid out in detail in the per paddock winter grazing</p>

pathways) that identifies the mitigation or actions to be undertaken including any physical works to be completed, their timing, operation and their potential effectiveness.	plans made annually.
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5.4.3. National Environment Standards for Freshwater (NES-F 2020)

In 2020 the government released the new National Environment Standards for Freshwater (NES-F). These National Standard include sections that are relevant to farming activities. The rule relevant to this application is Rule 10.

Standard	Assessment
Feedlots and other stockholding areas:	Not Relevant
Feedlots and other stockholding activities	Not relevant

Feedlots:	Not relevant
Stockholding areas other than feedlots: Permitted activities – stockholding areas for small and young cattle	Not Relevant
Stockholding areas other than feedlots: Permitted activities – stockholding areas for larger and older cattle	Not Relevant
Stockholding areas other than feedlots: Discretionary activities – stockholding areas for larger and older cattle	Not Relevant
Subpart 2 - Agricultural Intensification Application of this subpart (1) Except as provided in subclause (2), this subpart applies to— (a) farms; and (b) for the purposes of regulations 16 and 17, other landholdings in which land used for plantation forestry is being converted to pastoral land use. (2) This subpart does not apply to a farm or other	Relevant

<p>landholding if the relevant regional council has publicly notified the amendments required by section 55(2B) of the Act to give effect to the National Policy Statement for Freshwater Management.</p> <p>(3) In subclause (2), publicly notified the amendments means that the proposed policy statement or plan containing the amendments has been publicly notified in accordance with clause 5 of Schedule 1 of the Act.</p>	
Subpart 3 – Intensive winter grazing	Relevant

<p>Conversions of plantation forestry to pastoral land use: 16 Permitted activities</p>	Not Relevant – Application is not associated with conversion from plantation forestry.
<p>Conversions of plantation forestry to pastoral land use: 17 Discretionary activities</p>	Not Relevant
<p>Conversions of land on farm to dairy farm land: 18 Permitted activities</p> <ol style="list-style-type: none"> 1. The conversion of land on a farm to dairy farm land is a permitted activity if it complies with the applicable condition. Condition 3. If the farm included dairy farm land at the close of 2 September 2020, the condition is that, at all times, the area of the farm that is dairy farm land must be no greater than (a) the area of dairy farm land at the close of 2 September 2020; plus (b) 10 ha. 4. In any other case, the condition is that, at all times, the area of the farm that is dairy farm land must be no greater than 10 ha. 	<p>Relevant</p> <p>The definition of dairy farm land is land on a farm which is used for grazing dairy cattle. Although there is no increase in the number of dairy cattle or dairy support stock on the farm because it is proposed that the winter grazing area rotate around parts of the current Pahia Dairy platform also there will be an increase in the area that dairy cows will rotate through. Therefore the proposal is for an increase in the area of dairy farm land equivalent to the effective area of the Brown’s block which is 95 ha.</p>
<p>Conversions of land on farm to dairy farm land: 19 Discretionary activities</p> <ol style="list-style-type: none"> 1. The conversion of land on a farm to dairy farm land is a discretionary activity if it does not comply with the applicable condition in regulation 18(3) or (4). 	Relevant – the application to increase the area of land on the farm used as dairy farm land is a discretionary activity .
<p>Irrigation of dairy farm land: 20 Permitted activities</p>	Not Relevant – There is no irrigation on this property

<p>Use of land as dairy support land: 22 Permitted Activities</p>	<p>Not Relevant – Not a increase in dairy support area.</p>
<p>Resource Consents for discretionary activities 24 Conditions on granting resource consents</p> <p>(1) A resource consent for an activity that is a discretionary activity under this subpart may be granted only if the consent authority is satisfied that granting the consent will not result in an increase in—</p> <p>(a) contaminant loads in the catchment, compared with the loads as at the close of 2 September 2020; or</p> <p>(b) concentrations of contaminants in freshwater or other receiving environments (including the coastal marine area and geothermal water), compared with the concentrations as at the close of 2 September 2020.</p> <p>Term of resource consent</p> <p>(2) A resource consent granted for the discretionary activity must be for a term that ends before 1 January 2031.</p>	<p>Relevant – Modelling in Table 5 and Table 13 shows that the nitrogen and phosphorus loss to water from the proposed activity will be less than what is currently occurring on the farm. As the wording of this regulation is to demonstrate that the contaminant there is not increase in the contaminant load compared with the load as at the close of 2 September 2020 OR concentrations of contaminants in freshwater or other receiving environments this application is able to meet this condition through demonstrating a decrease in nutrient loading and concentrations.</p> <p>Application is for a 9-year consent that expires January 2031 in line with this regulation.</p>
<p>Intensive winter grazing: 26 Permitted activities</p> <p>(1) The use of land on a farm for intensive winter grazing is a permitted activity if it complies with the applicable condition or conditions.</p> <p>(2) The following discharge of a contaminant is a permitted activity if it complies with the applicable condition or conditions:</p> <p>(a) the discharge is associated with the use of land on a farm for intensive winter grazing; and</p> <p>(b) the discharge is into or onto land, including in circumstances that may result in the contaminant (or any other contaminant emanating as a result of natural processes from the contaminant) entering water.</p> <p><i>Conditions</i></p> <p>(3) The condition is that the intensive winter grazing must be undertaken in accordance with the farm’s certified freshwater farm plan if—</p>	<p>The area of Intensive Winter Grazing proposed in this application is area is 55 ha of 511ha exceeding the 10% threshold for the permitted activity rule. Intensive winter grazing may be carried out on land where the mean slope exceeds 10 degrees over any 20 m distance of land therefore exceeding condition 4(b) of this rule.</p> <p>All other conditions of the rule are met as detailed in the AEE and Farm’s FEP.</p>

(a) the farm has a certified freshwater farm plan that applies to the intensive winter grazing; and
(b) a certifier has certified that the adverse effects (if any) allowed for by the plan in relation to the intensive winter grazing are no greater than those allowed for by the conditions in subclause (4).

(4) In any other case, the conditions are that,—

(a) at all times, the area of the farm that is used for intensive winter grazing must be no greater than 50 ha or 10% of the area of the farm, whichever is greater; and

(b) the mean slope of a paddock that is used for intensive winter grazing must be 10 degrees or less determined by measuring the slope over any 20m distance of the land; and

(i) (Revoked)

(d) livestock must be kept at least 5 m away from the bed of any river, lake, wetland, or drain (regardless of whether there is any water in it at the time); and

(e) on 1 May to 30 September of any year, in relation to any critical source area that is within, or adjacent to, any area of land that is used for intensive winter grazing on a farm

(i) the critical source area must not be grazed; and

(ii) vegetation must be maintained as ground cover over all of the critical source area; and

(iii) maintaining that vegetation must not include any cultivation or harvesting of annual forage crops.

year).

But see regulation 29 (permitted activities and restricted discretionary activities: temporary further conditions)

<p>Intensive Winter Grazing 26A Pugging standard</p> <p>(1) A person using land on a farm for intensive winter grazing in accordance with regulation 26 must take all reasonably practicable steps to minimise adverse effects on freshwater of any pugging that occurs on that land.</p> <p>(2) A person using land under this regulation must provide any information reasonably required by a regional council enforcement officer for the purpose of monitoring compliance with this regulation.</p>	<p>Intensive winter grazing management includes a winter grazing plan prepare for each paddock and wet weather management strategies including dry lying areas and back fencing with portable troughs and feeders to ensure soil pugging damage is minimized.</p>
<p>Intensive Winter Grazing 26B Ground cover standard</p> <p>(1) A person using land on a farm for intensive winter grazing in accordance with regulation 26 must ensure that vegetation is established as ground cover over the whole area of that land as soon as practicable after livestock have finished grazing the land.</p> <p>(2) A person using land under this regulation must provide any information reasonably required by a regional council enforcement officer for the purpose of monitoring compliance with this regulation.</p>	<p>Replanting times includes strategies such as finishing paddocks with stock from two ends where possible to enable re-planting as soon as conditions permit.</p>
<p>Intensive Winter Grazing 27 Restricted Discretionary Activity</p> <p>(1) The use of land on a farm for intensive winter grazing is a restricted discretionary activity if the use does not comply with the applicable condition, or any of the applicable conditions, in regulation 26(3) or (4).</p> <p>(2) The following discharge of a contaminant is a restricted discretionary activity if it does not comply with the applicable condition, or any of the applicable conditions, in regulation 26(3) or (4):</p> <p>(a) the discharge is associated with the use of land on a farm for intensive winter grazing; and</p> <p>(b) the discharge is into or onto land, including in circumstances that may result in the contaminant (or any other contaminant emanating as a result of natural processes from the contaminant) entering water.</p>	<p>The area of Intensive Winter Grazing proposed in this application is area is 55 ha of 511 ha therefore exceeds the 10% threshold in regulation 26(4) and will occasionally exceed the slope threshold occurring on slopes that exceed 10 degrees over any 20 m distance of land. The application to carry out intensive winter grazing is therefore a restricted discretionary activity.</p>

<p>(3) But see regulation 29 (permitted activities and restricted discretionary activities: temporary further conditions).</p> <p><i>Matters to which discretion is restricted</i></p> <p>(4) The discretion of a consent authority is restricted to the following matters:</p> <p>(a) the adverse effects of the activity on ecosystems, freshwater, and water bodies:</p> <p>(b) the adverse effects of the activity on the water that affect the ability of people to come into contact with the water safely:</p> <p>(c) the adverse effects of the activity on Māori cultural values:</p> <p>(d) the susceptibility of the land to erosion, and the extent to which the activity may exacerbate or accelerate losses of sediment and other contaminants to water:</p>	
<p>Intensive Winter Grazing</p> <p>29 Permitted Activities and restricted discretionary activities: temporary further conditions</p> <p>(1) To be a permitted activity, an activity described in regulation 26(1) or (2) must also comply with the conditions in subclause (3) of this regulation (in addition to the applicable condition, or applicable conditions, in regulation 26(3) or (4)).</p> <p>(2) To be a restricted discretionary activity, an activity described in regulation 27(1) or (2) must comply with the conditions in subclause (3) of this regulation.</p> <p><i>Further conditions</i></p> <p>(3) The conditions are that—</p> <p>(a) land on the farm must have been used for intensive winter grazing in the reference period; and</p> <p>(b) at all times, the area of the farm that is used for intensive winter grazing must be no greater than the maximum area of the farm that was used for intensive winter grazing in the reference period.</p> <p>(4) To avoid doubt, the activity must comply with</p>	<p>The application for IWG will not exceed that of the baseline period (63ha), and the application will result in a decrease in catchment load of nutrients as the proposed activity is a reduction in the area of winter grazing carried out during the reference period.</p>

<p>the conditions in subclause (3) of this regulation even if the maximum area used in the reference period was less than the applicable area under regulation 26(4)(a).</p> <p>Enforcement officer may require information</p> <p>(5) A person undertaking a permitted activity under regulation 26 must provide any information reasonably required by a regional council enforcement officer for the purpose of monitoring</p> <p>(4) compliance with the conditions in subclause (3) of this regulation.</p>	
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<p>Intensive Winter Grazing 30 Discretionary Activities</p>	<p>Not relevant</p>
<p>Application of synthetic nitrogen fertilizer to pastoral land: 33 Permitted activities</p> <p>(1) The following discharge of synthetic nitrogen fertiliser is a permitted activity if it complies with the condition:</p> <p>(a) the discharge is for the purpose of applying nitrogen to land in pastoral land use; and</p> <p>(b) the discharge is into the air, or into or onto land, including in circumstances that may result in the synthetic nitrogen fertiliser (or any other contaminant emanating as a result of natural processes from the fertiliser) entering water</p> <p><i>Condition</i></p> <p>(2) The condition is that the application of nitrogen, as a component of the synthetic nitrogen fertiliser, to the land in pastoral land use in a contiguous landholding must not exceed the nitrogen cap.</p>	<p>Permitted</p> <p>The farm will apply synthetic nitrogen fertiliser to land in pastoral land use and will not exceed the nitrogen cap of 190 kg N/ha, averaged across the landholding.</p>
<p>Application of synthetic nitrogen fertilizer to pastoral land: 34 Non-complying activities</p>	<p>Nitrogen fertiliser application on this farm will be a permitted activity under standard 33.</p>

<p>Application of synthetic nitrogen fertilizer to pastoral land: 35 Compliance with regional rules</p>	<p>Not relevant</p>
<p>Application of synthetic nitrogen fertilizer to pastoral land 36 Operating dairy farm: monitoring and information required</p> <p>A person who is responsible for operating a contiguous landholding that includes any dairy farm land must provide to the relevant regional council, no later than 31 July of each year, the following information relating to the previous 12-month period ending on 30 June of that year:</p> <p>(a) the area of land in pastoral land use in the contiguous landholding and, within that land, the areas of the following (all in hectares):</p> <p>(i) the land used to grow annual forage crops:</p> <p>(ii) the other land:</p> <p>(b) the area of land in other uses in the contiguous landholding (in hectares):</p> <p>(c) the receipts for the synthetic nitrogen fertiliser purchased for the contiguous landholding:</p> <p>(d) the types of synthetic nitrogen fertiliser applied to the contiguous landholding and, for each type, the percentage of the nitrogen component by weight:</p> <p>(e) the rate at which each type of synthetic nitrogen fertiliser was applied (in kg/ha/year)—</p> <p>(i) to the land in pastoral land use in the contiguous landholding and, within that land, to—</p> <p>(A) the land used to grow annual forage crops:</p> <p>(B) the other land:</p> <p>(ii) to the land in other uses in the contiguous landholding:</p> <p>(f) the dates on which the synthetic nitrogen fertiliser was applied.</p>	<p>The proposed activities will comply with the monitoring and information required under this rule.</p>

5.4.4. Consents Required

As summarised in Table 7: Activities requiring consent below, the following resource consents are required under the Regional Water Plan for Southland, 2010 (RWPS), The Proposed Southland Water and Land Plan, 2018 (PSWLP) and The National Environmental Standards for Freshwater (NES-F 2020).

Table 7: Activities requiring consent

Consent	Plan	Rule	Activity Status
Land Use Consent and associated Discharge permit – to use land for expanded dairy farming and intensive winter grazing	RWPS	17A	Not applicable
	PSWLP	20(d)	Restricted Discretionary
	NES - F	19, 24, 27	Discretionary

Overall the proposed activity is classed as a **discretionary activity**.

5.4.5. Consents not required

In accordance with Schedule 4 of the RMA, an application must describe and demonstrate compliance with any permitted activity that is part of the proposal to which the application relates. Table 8 below shows which consents are not required for Pahia Dairies.

Table 8: Activities not requiring consent

Activity	Compliance with the relevant permitted rules of the RWPS and PSWLP
Incidental discharges from farming (Rule 24 PSWLP)	The land use associated with discharge will be authorised under Rule 20 PSWLP.
Fertiliser (Rule 10 RWPS, Rule 14 PSWLP & Rule 33 NES-F)	A nitrogen cap of 190 kg N/ha/yr will not be exceeded on pastoral blocks. All practicable measures will be taken to minimise fertiliser drift beyond the target areas. Fertiliser will be applied to selected areas of the farms in accordance with nutrient budget recommendations, and soil tests to avoid excess leaching of nutrients to groundwater. Fertiliser will be applied when a soil water deficit exists, and all waterways will have buffers/riparian margins with stock excluded.
Silage storage and silage leachate (Rule 51 of the RWPS, and Rules 40 & 41 of the PSWLP.)	All silage storage facilities will be located away from sensitive receiving environments, in accordance with permitted rule setbacks and no direct discharge of silage leachate to any waterbody is proposed.

Existing agricultural effluent storage facilities (Rule 32D PSWLP)	The farm has a new effluent discharge permit which was granted under Rule 32D due to the effluent storage facility construction being authorised originally under a resource consent.
Cleanfill, Farm Landfills and Offal Holes (Rules 53, 54 & 55 of the RWPS, and Rules 42 & 43 of the PSWLP)	All permitted activity requirements can be met and sensitive areas can be easily avoided when undertaking these associated activities.
Drainage of Land (Rule 9 RWPS & Rule 13 PSWLP)	It is not anticipated that any discharge from subsurface drains would result in a conspicuous change to the colour and/or clarity of the receiving waters at a distance of 20 m from the point of discharge. The proposed good management practices will significantly reduce the likelihood of any contaminants reaching the subsurface drains.
Stock exclusion from waterbodies (Rule 70 PSWLP)	All waterbodies are fenced, and crossings are bridged over. Creek and river bed disturbance is prevented.

5.5. Iwi Management Plan

The Iwi Management Plan is a natural resource and environmental iwi management plan developed by Ngāi Tahu ki Murihiku. The purpose of the Plan is to provide a document that can assist Ngāi Tahu ki Murihiku to effectively participate in natural resource planning. Many of the policies relate to the way in which Ngāi Tahu ki Murihiku aims to operate. However, it is also designed as a resource for local authorities to ensure Ngāi Tahu ki Murihiku issues and policies are provided for. It helps councils determine the nature and extent of consultation required with respect to specific activities or areas of importance.

The policies within this plan have been outlined in several separate chapters, with Chapter 3.5 Te Rā a Takitimu Southland Plains being the most relevant to this proposal. The application is not for activities in Fiordland, is adjacent to the coastal environment but not explicitly in this area therefore only section 3.5 has been assessed against.

The sections deemed to be relevant within 3.5 are:

- Section 3.5.10 General Water Policy
- Section 3.5.11 Rivers
- Section 3.5.13 Water Quality
- Section 3.5.16 Mahinga Kai
- Section 3.5.17 Biodiversity
- Section 3.5.19 Riparian Zones
- Section 3.5.20 Freshwater Fisheries
- Section 3.5.21 Protection of Significant Sites

Ngāi Tahu ki Murihiku is formally known as Te Ao Mārama Incorporated. Te Rūnanga o Oraka Aparima are one of the four Rūnanga that Te Ao Mārama is authorised to represent.

This proposal recognises Ngāi Tahu ki Murihiku as a guardian of the natural resources. This proposal applies to land already actively farmed which ensures that there is no change in effects to culturally sensitive sites. The proposal aims to always operate at best management practice. The assessment of cumulative effects undertaken concludes that proposed mitigations and implementation of best management practices are considered sufficient to avoid adverse effects on tangata whenua values or compromise sites of special significance or food gathering sites.

The following is recommended by the application in accordance with Te Tangi a Taura:

- Maintenance of buffer strips to extraction bores and water bodies for both stock and effluent application to ensure nutrient filtration
- Maintenance of vegetation in critical source areas when intensive winter grazing is occurring
- Continued riparian planting across Pahia Dairy farm and Browns block in accordance with the Riparian Management Plan supplied in Appendix 2
- Monitoring of species of Mahinga Kai and other invertebrates in surface waterbodies to build up knowledge on farm of this ecosystem as per the Farm's FEP attached separately.

- Nutrient applications and loading are at industry best management or better. The farm has been reducing nitrogen fertiliser use continuously and is now operating well below the 190 kg N/ha cap.
- The farm will implement a freshwater farm plan when the template is available and this will give additional regard to cultural and catchment values to recognise how current management practices give effects to the values of Ngāi Tahu and other stakeholders in the Aparima catchment.
- Grazing of a reduced area of winter forage crop which reduces the nutrient losses from the farm which could enter waterbodies.
- Grazing of fodder beet instead of kale which has a lower protein content and results in less nitrogen excreted by cows which could enter waterbodies.
- There are no areas of cultural significance within the property boundary and the application will not result in cultivation or earthworks on any part of the farm that has not previously had these activities carried out on in previously.

As the proposal will not degrade or negatively impact the current status of soil and water quality, there will be a less than minor effect on any cultural values. As discussed above, the proposed activities are considered to achieve the policies and objectives set out in the Iwi Management Plan.

5.5.1. Ngāi Tahu ki Murihiku – Draft Freshwater Objectives

Environment Southland engaged with the community around values for freshwater in 2019. From there draft environmental outcomes for different types of water bodies were established. Te Ao Marama has since carried out a similar process to establish values and objectives at a catchment level. There are 5 draft freshwater objectives that have been identified through the work carried out by Te Ao Marama for the whole region, within all freshwater management units.

1. Paetae Tuatahi

The way water is managed will:

- Recognise and provide for rangatiratanga, customary rights and development rights
- Enable customary use and protection and restoration of cultural heritage, and
- Utilise and support the intent of Ngāi Tahu Settlement instruments.

The application considers objective 1 through assessment that species involved in the practice of mahinga kai will not be effected by this application.

2. Paetae Tuarua

All waterbodies that have been degraded will be returned to a state of hauora, which will in turn improve provision for cultural use and association

The application considers objective 2 through the assessment that activity will not have an impact on the indicators of health established in Section 3.1. Riparian margins will be maintained and enhanced through the Riparian Management Plan, cultural practices and uses and aquatic life are given regard to in that the application will not affect the life supporting capacity of surface waterways and water quality will be enhanced due to a decrease in nutrient loading from the activity.

3. Paetae Tuatoru

There will be no further deterioration of waterbodies and consistent, progressive measured improvement where waterbodies have been degraded towards a state of hauora.

This application will result in an improvement in water quality through reduction in nutrient losses. The implementation of continued riparian plantings, setback distances and other proposed mitigations will contribute to the wider catchment working towards achieving this objective.

4. Paetae Tuawhā

The goal is to:

- Establish a long term monitoring programme using Ngāi Tahu Indicators of Health that adds to the existing council monitoring programme, and
- Use Ngāi Tahu Indicators of Health to assess the state of waterbodies and the impact of proposed activities on them, including in resource consent decision-making processes.

With regards to long term monitoring (paetae tuawhā), the applicant encourages Environment Southland to continue monitoring water quality at the Mataura River SOE site, and to include monitoring of Ngāi Tahu Indicators of Health.

5. Paetae Tuarima

Communities and catchment groups will be supported to understand Ki Uta Ki Tai, Te Mana o te Wai, Hauora and Mahinga Kai, and will be provided with the means to work effectively towards a state of hauora for each waterbody.

The applicant recognises that the learning in relation to Hauora of waterbodies is an evolving one and is committed to continue to work with the community and the catchment to achieve hauora of waterbodies.

6. Conclusion

A decision to grant the resource consent application(s) under Section 104B is recommended on the basis that:

- a) the adverse effects on the environment are expected to be less than minor;
- b) The proposal is consistent with the requirements of the RMA, relevant regional plan objectives and policies and other relevant matters.

Granting the resource consent application(s) will be consistent with the purpose of the RMA for the reasons explained within this report. The proposed activities are likely to result in positive environmental outcomes. The proposed activity is unlikely to result in further degradation of water quality and potential adverse effects will be avoided or mitigated as far as practicable.

7. References

- Collins, R., Mcleod, M., Heley, M., Donnison, A., Close, M., Hanly, J., . . . Matthews, L. (2007). Best management practices to mitigate faecal contamination by livestock of New Zealand waters. *New Zealand Journal of Agricultural Research*, 267-278.
- Dairy NZ. (2022, 02 24). *Managing and Operating Effluent Systems*. Retrieved from Dairy NZ: <https://www.dairynz.co.nz/environment/on-farm-actions/effluent/managing-and-operating-effluent-systems/>
- Di, H. J., & Cameron, K. C. (2000). Calculating nitrogen leaching losses and critical nitrogen application rates in dairy pasture systems using a semi-empirical model. *Taylor & Francis Online*, 139-147.
- Landscape DNA. (2022, 12 14). *Manage critical source areas*. Retrieved from Landscape DNA: <https://www.landscapedna.org/actions/prevention/manage-critical-source-areas/>
- LAWA. (2022, 08 20). *Factsheet: Nitrate-nitrogen in groundwater*. Retrieved from Land Air Water Aotearoa: <https://www.lawa.org.nz/learn/factsheets/groundwater/nitrate-nitrogen-in-groundwater/>
- LAWA. (2022, 12 12). *Phosphorus*. Retrieved from LAWA: <https://www.lawa.org.nz/learn/factsheets/phosphorus/>
- Ministry for Primary Industries. (2022, 12 12). *Agronomic Solutions for Fodder Beet Defining good management practices*. Retrieved from Funding and programmes: <http://www.mpi.govt.nz/funding-and-programmes/>
- Ministry of Health. (2018). *Drinking-water Standards for New Zealand 2005*. Wellington: Ministry of Health.
- Monaghan, R. M., Laurenson, S., Dalley, D. E., & Orchiston, T. S. (2017). Grazing strategies for reducing contaminant losses to water from forage crop fields grazed by cattle during winter. *New Zealand Journal of Agricultural Research*, 333-348.
- Smith, C. L., & Monaghan, R. M. (2020). Nitrogen leaching losses from fodder beet and kale crops grazed by dairy cows in southern Southland. *Journal of New Zealand Grasslands*, 61-71.

8. Declaration

Section G: Planning Assessment and Declaration

The Resource Management Act 1991 requires you to make your own assessment of your proposal against relevant policies. A separate planning assessment sheet is available to use, or you can do your own assessment. The planning assessment can be found on our website, under the application forms. An assessment must be included with your application.

I hereby certify that to the best of my knowledge and belief, the information given in this application is true and correct.

I undertake to pay all actual and reasonable application processing costs incurred by Environment Southland.

Name (please print)

Simon Anderson

Signed



Date

21/10/22

END OF FORM

9. Overseer Nutrient budget report

This Nutrient Budget has been compiled in accordance with the OverseerFM User Guide produced by Overseer Management Services dated October 2019.

Physical farm input data concerning fertiliser, stock, feeds and management practices were established in consultation with management of Simon Anderson. No liability is held by Lumen Environmental Ltd (Lumen) or its employees in relation to accuracy of data collected.

This report details the information used to prepare two nutrient budgets:

- A farm system of YE2020, which is also representative of 2nd September 2020 and the current farm system, broken down and analysed in this report to show the nutrient losses from the existing dairy farm and the Browns block,
- A proposed farm system demonstrating the nutrient loss proposed across the entire farm when the existing dairy farm and Browns block are operated together.

The modelled nutrient budgets have been published to Environment Southland under the 'Pahia Dairies Ltd 34656' account named 'YE2020 for LUC' and 'Proposed expanded dairy platform for LUC'

10. Explanation of current farm system

The farm system includes dairy milking cows, carry over cows, replacement young stock, wintering of dry cows and a small number of R1 and R2 bulls. It is based on the YE2020 farm system which is the same as the one currently in operation. For viewing in Overseer the account name the file will be submitted under is Pahia Dairies Ltd and the file name will be 'YE2020-Current farm system'.

10.1. Farm area

Table 9: Effective and total area of Pahia and Browns blocks

Block	Total area (ha)	Effective area (ha)
Pahia Dairy platform	371	349.9
Pahia Dairy fenced trees/scrub	40	40
Browns block	100	95.1
Combined	511	485

10.2. Soil type

Table 10: Soil types and area at Pahia and Browns block

Soil type	Description	Pahia Dairy platform area (ha)	Browns block area (ha)
Waiki_16a.1	Deep, well drained, silt	124.9	34.3
Kaip_9a.1	Deep, very poorly drained, peat	72.3	40.3

Orep_2a.1	Moderately deep, moderately well drained, silt over loam	77.3	
Otwy_3a.1	Deep, very poorly drained, peat	52.1	6.5
Orik_2b.1	Deep, moderately well drained silt	23.3	
Piak_5b.1	Deep, very poorly drained, peat		14

10.3. MA milking cows

- Breed = Friesian x Jersey cross
- Breeding replacement rate = 22%
- Lactation length = 266 days
- Milk solids = 338,200 kg MS/yr
- Once a day milking during drying off
- Average mob weight = 450 kg
- Mean calving date = 20th August
- Drying off date = 25st May
- 778 are on farm on the 1st of July having stayed on farm over the winter weighing 440 kg lwt. At start of calving in August these MA cows weight 450 kg lwt.
- 220 heifers enter mob on 15th August at 450 kg lwt.
- Peak numbers of 980
- 11 leave on 15 December
- 10 leave on 15th January
- 84 leave on 1st April
- 97 leave on 1st June
- Remainder are on farm over the winter

10.4. Carry overs

- Average mob weight = 450 kg
- 42 starting on 1st July
- 21 leave the mob 1st August at 450 kg lwt
- 11 enter mob 15th December
- 10 enter mob 15th January

10.5. Replacements

Calves, to weaning from milk

- 150 calves on 15th August
- Another 100 calves by 1st September
- a. Leave mob at 100kg at 1st December

- All female
- Mature weight 450 kg lwt.

R1s

- 250 enter mob from calf mob at 100 kg in December
 - 250 leave mob/farm at 150 kg lwt at 1st February for grazing off farm
 - 100 return on the 1st June at 220 kg lwt for grazing on farm over winter
 - Weight at end of June 230 kg lwt.
 - Mature weight 450 kg lwt.

R2s

- 100 on farm at opening on 1st July at 230 kg lwt and 11 months
- 150 arrive back on farm from grazing on 1st October
- 30 leave on 1st April at 410 kg
- Weight at end of June 440 kg lwt.
- Mature weight 450 kg lwt. Heifers

In Calf Heifers

- 220 on farm at opening on 1st July at 440 kg lwt and 23 months.
- 220 leave to enter dairy mob for calving on 15th August at 450 kg lwt.
- Mature weight 450 kg lwt.

R1 Bulls

- 25 Bought onto farm on 1st January at weaning, 100 kg lwt and 5 months old.
- Liveweight end of June 300 kg.
- Mature weight 680 kg lwt.

R2 Bulls

- 25 on farm at opening on 1st July at 300 kg lwt and 11 months.
- 25 sold to works on 1st March at 550 kg lwt.
- Mature weight 680 kg lwt.

10.6. Blocking and rotations in Overseer

Blocks are mapped in Overseer and are defined by topography, drainage, effluent application, stock type present, relative productivity and cropping blocks.

Pasture blocks:

- Dairy farm, MA cows only, flat, drained, effluent – relative productivity 1
- Dairy farm, MA cows only, flat, drained, no effluent – relative productivity 1
- Dairy farm, MA cows only, rolling, no drainage, no effluent – relative productivity 0.8
- Dairy farm, young stock only, rolling, no drainage, no effluent – relative productivity 0.8
- Dairy farm, all stock classes rolling, drained, no effluent – relative productivity 0.8
- Browns block, support stock only, flat, drained, no effluent and no fert– relative productivity 0.3

Crop blocks (support stock only):

- Dairy farm, Kale-Pasture, no drainage
- Dairy farm, Pasture-Kale, drainage
- Browns block, Kale-Pasture, drainage
- Browns block, Pasture-Kale, drainage

Crop blocks:

- Browns block, Kale-Pasture, drainage. Crop block 5 years in pasture, grazed by dairy support stock (dry MA cows and young stock). Cultivation in October of Year 1, kale sown in December year 1 with conventional cultivation, grazed from May-September yielding 12 T DM/ha. Cultivation event in November of reporting year before sowing back into permanent pasture with conventional cultivation in December of reporting year, grazed by dairy support stock.
 - The equivalent area on Browns block is modelled as Pasture – Kale to demonstrate a continual pasture-kale-pasture-kale rotation where 44 ha of the block is always in kale at one time.
- The dairy farm crop blocks are modelled the same as described above for Browns block except that the rotation of the crop blocks around the dairy farm means that 9 years out of every 10 is in pasture.

Other blocks:

- Trees/scrub

10.7. Fertiliser

10.7.1. Dairy farm, pasture, non-effluent blocks (small amounts of solid effluent applied to flat blocks)

- 100 kg/ha Sulphate of Ammonia in September
- 50 kg/ha Urea in September, March and April
- 55 kg/ha Urea in November, December, January and February
- 300 kg/ha Sulphur gain 15S in February
- 100 kg/ha Potash in February
- 150 kg/ha Lime in February

10.7.2. Dairy farm, pasture, effluent block

- 100 kg/ha Sulphate of Ammonia in September
- 50 kg/ha Urea in September, March and April
- 55 kg/ha Urea in November, December, January and February
- 200 kg/ha Sulphur gain 15S in February
- 150 kg/ha Lime in February

10.7.3. Browns block, pasture dairy support stock only

- 100 kg/ha Sulphate of Ammonia in September
- 50 kg/ha Urea in September, March and April
- 55 kg/ha Urea in November, December, January and February

- 250 kg/ha Sulphur gain 15S in February
- 150 kg/ha Lime in February

10.7.4. Kale fertiliser

- 41-49-0-2 in December at sowing
- 200 kg/ha Urea in January and February

10.7.5. New Pasture (following kale)

- 150 kg/ha DAP in December at sowing
- 50 kg/ha Urea in March and April
- 55 kg/ha Urea in January and February
- 150 kg/ha Lime in February

10.8. Structures

- All milking cows are fed PKE in the milking shed during the season

10.9. Effluent system

10.9.1. Dairy Effluent system

- Holding pond – solids are separated, sprayed regularly
- Applied to Effluent block through the year at <12 mm/application.
- Pond solids are spread on the 'DF, effluent, drainage' and 'DF, drainage, non-eff' blocks every 3 years in November and February.

10.10. Supplements

- 340 Tonnes DM imported PKE fed in milking shed throughout season
- 250 Tonnes DM imported baleage fed to dairy cows throughout the season.
- 290 Tonnes DM imported baleage fed out to dairy support stock on kale equally over June and July.
- 34.5 Tonnes DM harvested baleage from DF, effluent, drainage block in December and exported off farm (for ease of accounting).

11. Explanation of proposed farm system, extended effluent area

The proposed farm system file is 'Proposed expanded dairy platform'. The proposed farm system incorporates Browns block in the dairy platform and then rotates the winter grazing area and dairy support stock equally around the entire farm. Fodder beet is grown instead of kale and therefore the area of winter feed is reduced from 63 ha to 51 ha due to the higher yield of fodder beet. The fodder beet rotates around the flat parts of the farm that are suited to winter grazing and therefore there is roughly 350 ha in the rotation area giving a rotation time of about 7 years. The additional DM produced from the additional area in pasture is a buffer as some seasons when pasture growth is below average

this will be consumed and others they will produce excess which will be taken for baleage to reduce imported feed requirements.

11.1. Farm area

Table 11: Effective and total area of Pahia and Browns blocks

Block	Total area (ha)	Effective area (ha)
Pahia Dairy platform	471	445
Pahia Dairy fenced trees/scrub	40	40
Combined	511	485

11.2. Soil type

Table 12: Area of different soils modelled in current farm system and proposed farm system

Soil type	Description	YE2020-Current farm system, across whole farm (ha)	Proposed expanded dairy platform, across whole farm (ha)
Waiki_16a.1	Deep, well drained, silt	159.2	164.9
Kaip_9a.1	Deep, very poorly drained, peat	112.6	112.8
Orep_2a.1	Moderately deep, moderately well drained, silt over loam	77.3	77.1
Otwy_3a.1	Deep, very poorly drained, peat	58.6	52.4
Orik_2b.1	Deep, moderately well drained silt	23.3	25.5
Piak_5b.1	Deep, very poorly drained, peat	14	12.3

11.3. MA milking cows

- Breed = Friesian x Jersey cross
- Breeding replacement rate = 22%
- Lactation length = 266 days
- Milk solids = 338,200 kg MS/yr
- Once a day milking during drying off
- Average mob weight = 450 kg
- Mean calving date = 20th August

- Drying off date = 25st May
- 778 are on farm on the 1st of July having stayed on farm over the winter weighing 440 kg lwt. At start of calving in August these MA cows weight 450 kg lwt.
- 220 heifers enter mob on 15th August at 450 kg lwt.
- Peak numbers of 980
- 11 leave on 15 December
- 10 leave on 15th January
- 84 leave on 1st April
- 97 leave on 1st June
- Remainder are on farm over the winter

11.4. Carry overs

11.4.1. Carry over cows

- Average mob weight = 450 kg
- 42 starting on 1st July
 - 21 leave the mob 1st August at 450 kg lwt
 - 11 enter mob 15th December
 - 10 enter mob 15th January

11.4.2. Replacements

Calves, to weaning from milk

- 150 calves on 15th August
- Another 100 calves by 1st September
- Leave mob at 100kg at 1st December
- All female
- Mature weight 450 kg lwt.

R1s

- 250 enter mob from calf mob at 100 kg in December
- 250 leave mob/farm at 150 kg lwt at 1st February for grazing off farm
- 100 return on the 1st June at 220 kg lwt for grazing on farm over winter
- Weight at end of June 230 kg lwt.
- Mature weight 450 kg lwt.

R2s

- 100 on farm at opening on 1st July at 230 kg lwt and 11 months
- 150 arrive back on farm from grazing on 1st October
- 30 leave on 1st April at 410 kg
- Weight at end of June 440 kg lwt.
- Mature weight 450 kg lwt. Heifers

In Calf Heifers

- 220 on farm at opening on 1st July at 440 kg lwt and 23 months.

- 220 leave to enter dairy mob for calving on 15th August at 450 kg lwt.
- Mature weight 450 kg lwt.

R1 Bulls

- 25 Bought onto farm on 1st January at weaning, 100 kg lwt and 5 months old.
- Liveweight end of June 300 kg.
- Mature weight 680 kg lwt.

R2 Bulls

- 25 on farm at opening on 1st July at 300 kg lwt and 11 months.
- 25 sold to works on 1st March at 550 kg lwt.
- Mature weight 680 kg lwt.

11.5. Blocking and rotations in Overseer

Blocks are mapped in Overseer and are defined by topography, drainage, effluent application, relative productivity and cropping blocks. All stock are present on all blocks excepting no dairy stock on one block near the coast.

Pasture blocks:

- Dairy farm, flat, drained, effluent – relative productivity 1
- Dairy farm, flat, drained, no effluent – relative productivity 1
- Dairy farm, rolling, no drainage, no effluent – relative productivity 0.8
- Dairy farm, rolling, drained, no effluent – relative productivity 0.8
- Dairy farm, young stock only, rolling, no drainage, no effluent, no fert – relative productivity 0.3

Crop blocks (all with drainage):

- FB-FB (10 ha)
- FB-Pasture (41 ha)
- Pasture-FB (41 ha)

Crop blocks:

- Fodder beet – Fodder beet 7 years in pasture, grazed by dairy support stock (dry MA cows and young stock). Fodder beet sown in November of year 1 with minimum tillage and grazed from May-September yielding 18 T DM/ha. Fodder beet sown again in November of reporting year this time with conventional cultivation but with the same yield and grazing management.
- Fodder beet – Pasture and Pasture – Fodder beet blocks have the same management in terms of yield, sowing month and grazing. Because these blocks are only a single year in fodder beet cultivation is minimum tillage with pasture sown back in in November with conventional cultivation.

Other blocks:

- Trees/scrub

11.6. Fertiliser

11.6.1. Rolling pasture, non-effluent blocks

- 100 kg/ha Sulphate of Ammonia in September
- 50 kg/ha Urea in September, March and April
- 55 kg/ha Urea in November, December, January and February
- 350 kg/ha Sulphur gain 15S in February
- 100 kg/ha Potash in February
- 150 kg/ha Lime in February

11.6.2. Dairy farm, pasture, effluent block

- 100 kg/ha Sulphate of Ammonia in September
- 50 kg/ha Urea in September, March and April
- 55 kg/ha Urea in November, December, January and February
- 250 kg/ha Sulphur gain 15S in February
- 150 kg/ha Lime in February
- 50 kg/ha Potash in February

11.6.3. Dairy farm, pasture, non-effluent block (receives solid effluent)

- 100 kg/ha Sulphate of Ammonia in September
- 50 kg/ha Urea in September, March and April
- 55 kg/ha Urea in November, December, January and February
- 300 kg/ha Sulphur gain 15S in February
- 150 kg/ha Lime in February
- 100 kg/ha Potash in February

11.6.4. Fodder beet fertiliser

- 33-39-0-2 in November at sowing
- 150 kg/ha Urea in December
- 100 kg/ha Urea in February

11.6.5. New Pasture (following fodder beet)

- 100 kg/ha DAP in November at sowing
- 50 kg/ha Urea in March and April
- 55 kg/ha Urea in January and February
- 150 kg/ha Lime in February

11.7. Structures

- All milking cows are fed PKE in the milking shed during the season

11.8. Effluent system

11.8.1. Dairy Effluent system

- Holding pond – solids are separated, sprayed regularly
- Applied to Effluent block through the year at <12 mm/application.

- Pond solids are spread on the 'DF, drainage, non-eff', 'FB-FB', 'FB-Pasture' and 'Pasture-FB' blocks every 3 years in November and February.
- The farm is able to apply effluent over an additional 18 ha on Browns block under their new discharge permit. This has not been modelled due to the inability to apply effluent over only part of a cropping block in Overseer.

11.9. Supplements

- 340 Tonnes DM imported PKE fed in milking shed throughout season
- 200 Tonnes DM imported baleage fed to dairy stock throughout season
- 130 Tonnes DM imported baleage fed out to dairy support stock on fodder beet equally over June and July.
- 150 Tonnes DM harvested baleage from 'DF, effluent, drainage' in December and February and exported off farm (for ease of accounting).

12. Key Findings

12.1. Nutrient losses

The YE2020 farm system (representative of current system) and the proposed farm system were modelled in Overseer v6.4.3. The current dairy farm platform and Browns block were blocked separately in the YE2020 budget so that nutrient losses could be separated as per Table 13 below. Due to the lack of reporting of RSUs for crop blocks in Overseer the RSU split in the YE2020 budget for the dairy platform and Browns block could not be given. However there are only dairy support stock (young stock and dry stock) grazed on crop and pasture at Brown's block in the YE2020 budget.

Table 13: Comparison of nutrient losses, DM intake and RSU between the current blocks and proposed combined system

	YE2020-current Dairy platform	YE2020-current Browns block	YE2020 combined	Proposed farm system combined	Difference
Total kg N lost	17128	6162	24052	22220	-7.6%
Kg N/ha lost	49	65	47	43	
Total kg P lost	685	260	945	764	-19.2%
Kg P/ha lost	1	3	2	2	
DM intake kg total	4256183	445451	5817782	5789432	
Total RSU			10,548	10,480	

12.2. Factors which have not changed

The nutrient budget inputs which impact nutrient losses that changed or remained the same between the two budgets are summarised in Table 14.

Table 14: Summary of any changes in inputs between the current and proposed nutrient budgets for Pahia

Input	Comparison	Explanation
Total area	Same	
Effective area	Same overall	The effective dairy platform area increases in the proposed budget

Soil types/ area	As similar as possible	Some small differences as per Tables 10 and 12
Climate	Same	
Drainage	Same	
Stock numbers	Same	
Milk production	Same	
Imported supplement	Different	Slight decrease in imported supplement in proposed system
Effluent area	Different	Slight decrease in effluent area in the proposed farm system due to limitations with modelling liquid effluent applications over only part of cropping blocks
Fertiliser applied	Different	Different fertiliser applied for fodder beet and kale and slightly different maintenance P fertilisers applied due to different spreading of effluent. Nitrogen fertiliser applications on pasture remain the same

12.3.Changes in nutrient loss

There are a few main reasons behind the reduction in nutrient loss between the YE2020 budget (current system) and the proposed system. These are explained in more detail in this section but broadly are: change from growing kale to fodder beet, reduction in the area of intensive winter grazing, reduction in imported supplements.

12.3.1. Change to growing fodder beet

The nitrogen loss per ha from a fodder beet to pasture rotation is 105 kg N/ha in comparison to 123 kg N/ha from a kale to pasture rotation. This is despite a higher number of years in pasture in the fodder beet to pasture regime, with an increase in years in pasture contributing to the modelling assumptions around amount of N that becomes mineralised from the soil and potentially lost from the root zone.

The phosphorus loss per ha from the fodder beet paddocks in the proposed farm system in comparison to the kale paddocks in the YE2020 budget varies by block however on average is lower from the phosphorus than from the kale. In total across the whole kale area 371 kg P is lost in comparison to 184 kg P lost across the fodder beet area. This is a combination of less loss of P/ha from fodder beet and a smaller area of fodder beet grown than kale. This difference in P loss is responsible for nearly all of the decrease in P loss between the YE2020 and proposed nutrient budgets.

The fertiliser and management practices of the kale have been modelled as per current practices and the fertiliser and management practices for the fodder beet have been modelled as per the recommendations of the farm's fertiliser advisor.

12.3.2. Reduction in area of winter grazing

The reduction in the area of winter grazing by 11 ha from the YE2020 budget to the proposed farm system has meant that 11 ha has gone from an N loss of 123 kg/ha to an average loss of 40 kg N/ha

for a flat pasture block. As previously mentioned, this is the area of fodder beet that will be grown in an average season. If there are adverse weather events or conditions early in the season after sowing which result in a decrease in forecasted crop yield, then additional area will be resown up to a combined total of 55 ha to ensure there is sufficient winter feed available. This extra area will typically be sown by the end of January.

12.3.3. Ensuring a more resilient system

The reduction in area of intensive winter grazing means that there is more area in pasture which means in some seasons there may be a decrease in imported supplement as the farm will be able to make their own. Due to the harsh climatic conditions however there are often times where the farm needs to buy extra baleage to get through the season due to the effect of the cold on animal condition and pasture growth. This pastoral area will mainly be a buffer for the farm against these conditions.

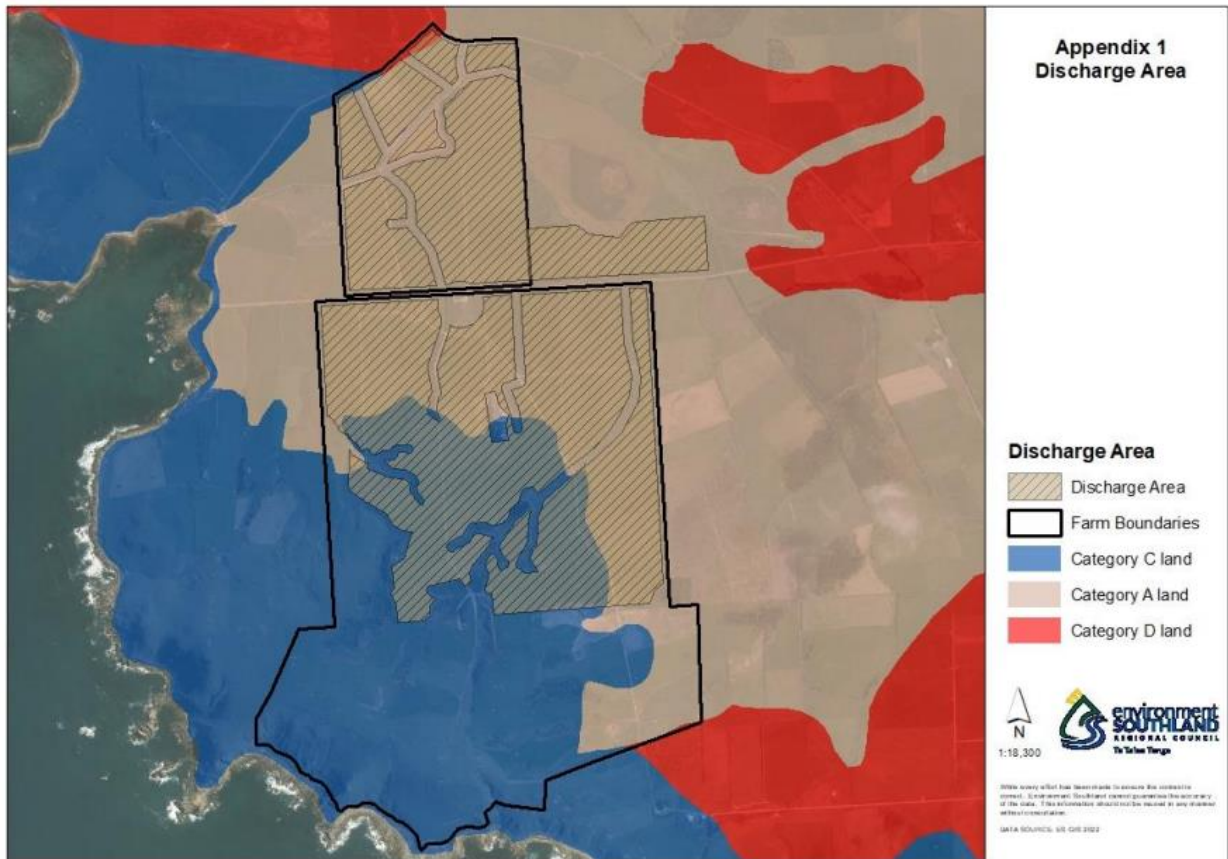
12.4. Inconsistencies with modelling

The previously mentioned factor around climate conditions has resulted in an over estimation of the ME value of the fodder beet grown on farm. Overseer is estimating a typical sugar content translating into a high ME value for the fodder beet grown as average results from across the country have been used to inform the model. However due to the conditions at the coast Pahia will not receive enough sunlight or growing degree days to generate this ME content in the fodder beet crop. The yield of the crop is also likely to be highly variable. As a result, in the proposed farm system nutrient budget there is a decrease in the pasture production predicted by Overseer as the animals are thought to be getting more energy than they will be from the fodder beet and therefore the programme assumes a lower requirement for pasture than what it will be in reality.

13. Appendices

Appendix 1: Existing effluent discharge area – AUTH20222602

AUTH-20222602



Environment Southland is the brand name of the Southland Regional Council

Appendix 2: Farm Riparian management plan

Pahia Dairies riparian management plan

Farm: Pahia Dairies Ltd

Date: 15/12/2022

Consultant: Nicole Mesman

Topics: Riparian management, shelter belts, carbon sequestration

14. Introduction

Riparian management at Pahia includes planting along waterways, planting shelter belts, assisting with regenerating areas of native bush, planting swampy areas and planting some sheltered gullies in pine trees for carbon sequestration. Pahia has already carried out planting of waterways and has seen benefits from this with increased biodiversity on farm, shelter for stock and stabilisation of banks. The key challenges faced at Pahia are the proximity to the sea and strong winds meaning that any vegetation needs to be able to withstand burn from salt carried in the wind. As a result, species planted must be able to withstand harsh, saline conditions and Pahia have found that Harakeke are best suited to this environment. Their approach has been to fence off waterways or surface water bodies and allow the grass and weeds to grow prior to spraying out to allow a good seed strike and kill to reduce interference with flaxes when they begin establishment. New Harakeke plants are taken off the fan of the parent bush when soil is moist and trimmed back so when planted the new plant is two parent leaves either side of a growing shoot. At least 3 m spacing is left between plants to allow room for growth. Pahia have noticed that the quick establishment of the Harakeke disturbs airflow from the wind and encourages bird and insects to inhabit around the plants.

All waterways and surface water bodies at Pahia Dairies are already fenced off to exclude stock. In areas of intensive winter grazing this setback of stock from waterways is increased using temporary fencing to ensure 5 m setbacks are maintained.

15. Existing riparian planting at Pahia

The farm has carried out riparian planting along several waterways on the farm as per Figure 6 and has fenced areas of bush and scrub to ensure continued regeneration of these areas.

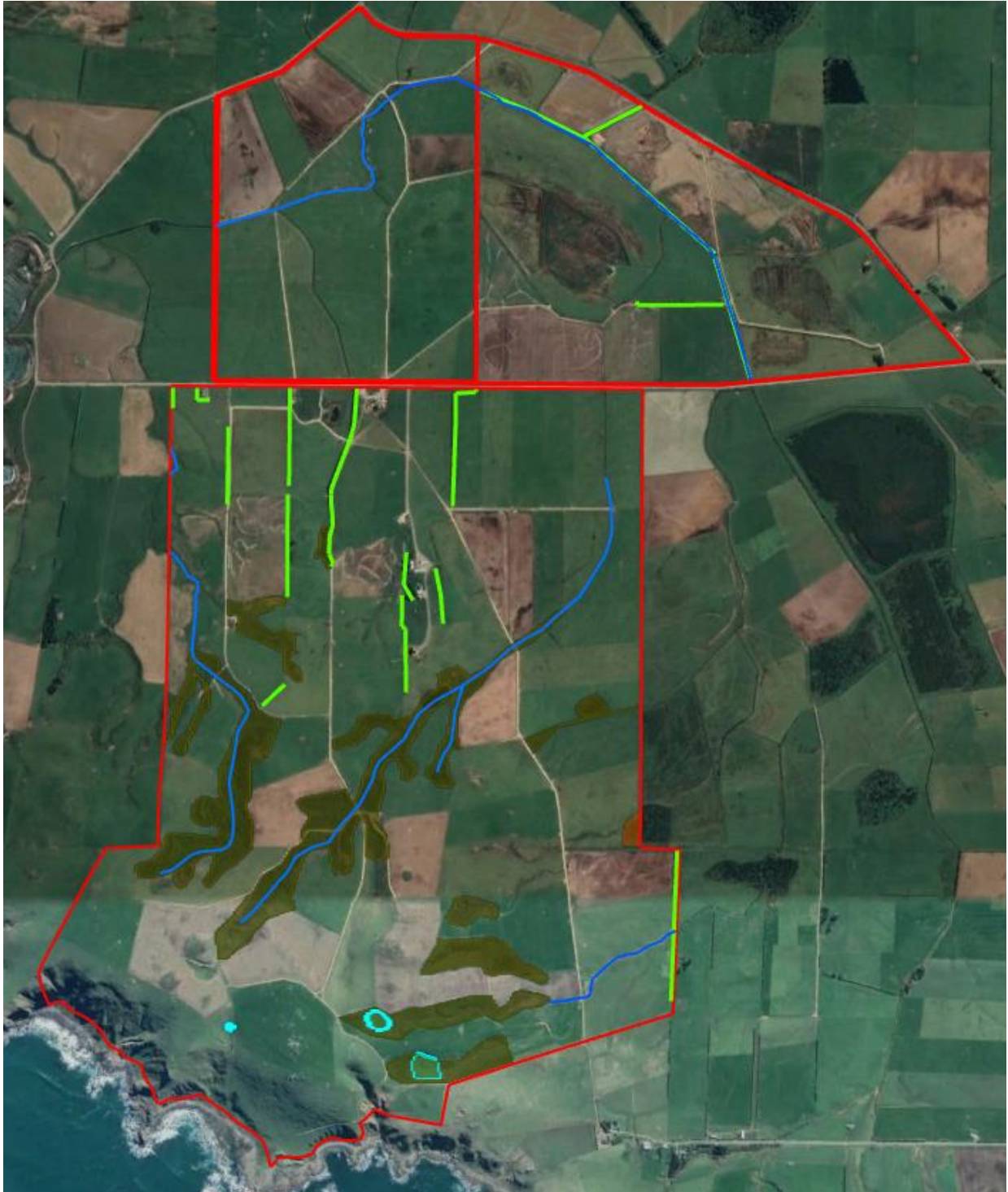






Figure 6: Current shelter belts and riparian plantings at Pahia

Legend:

-  Farm Boundary
-  Fenced off Bush/Scrub
-  Shelter Belt/Planting
-  [Waterway](#)

16. Examples of existing riparian planting and shelter belts



Fenced bush under active management



Shelter belt planting



Fenced dam and vegetative buffers, fenced bush and riparian filter prior to dam

17. Five-year planting programme

Pahia intends to continue planting areas in flax by harvesting flax from areas of existing riparian planting where the flax is getting big, splitting them up and planting next to creeks and drains that currently have only grass in the margin. Grass is sprayed out prior to planting and flax planted soon after.

If carbon sequestration opportunities through He Waka Eke Noa eventuate the farm plans to plant the noted gullies in pine trees to generate some financial offsetting from them. The areas chosen, as shown in Figure 7, are relatively sheltered gullies to ensure survival against wind and are currently unproductive areas.

The five-year programme in Figure 7 shows area of riparian planting along creeks/ drains, as shelter along the coastal margin and planting of the repo on Browns block.

17.1. Budget

The farm has determined their budget based on previous riparian work carried out on the farm. The expected budget for the next 5 years is \$10,000. This is mainly allocated to labour as well as weed control, fence maintenance and bank maintenance.

17.2. Update of plan

This plan will be reviewed again at the start of 2025 and subsequently every 2 years. The team at Pahia are committed to ongoing improvement on the farm and are motivated to implement this plan and the continued updating of it which will allow them to continue to see progress and drive improvement.

17.1. Ongoing maintenance of areas of native bush

There are a number of fenced blocks on the farm where sections of native bush and scrub can be found. These are fenced well back of the bush line to protect the surround steeper areas and exclude grazing. Fenced areas where the native bush and scrub has not grown to the fence line are sprayed regularly to enable continued growth and regeneration of the bush.

17.2. Long term vision

Simon and Lynne see themselves as caretakers of the land and will continue to improve the property by carrying out riparian planting and enabling native regeneration for as long as they remain there. They know how special the area is and are committed to chipping away at protecting and improving this slice of the country. They have no doubt they will find many more regeneration projects to succeed the current 5 year plan in due course.

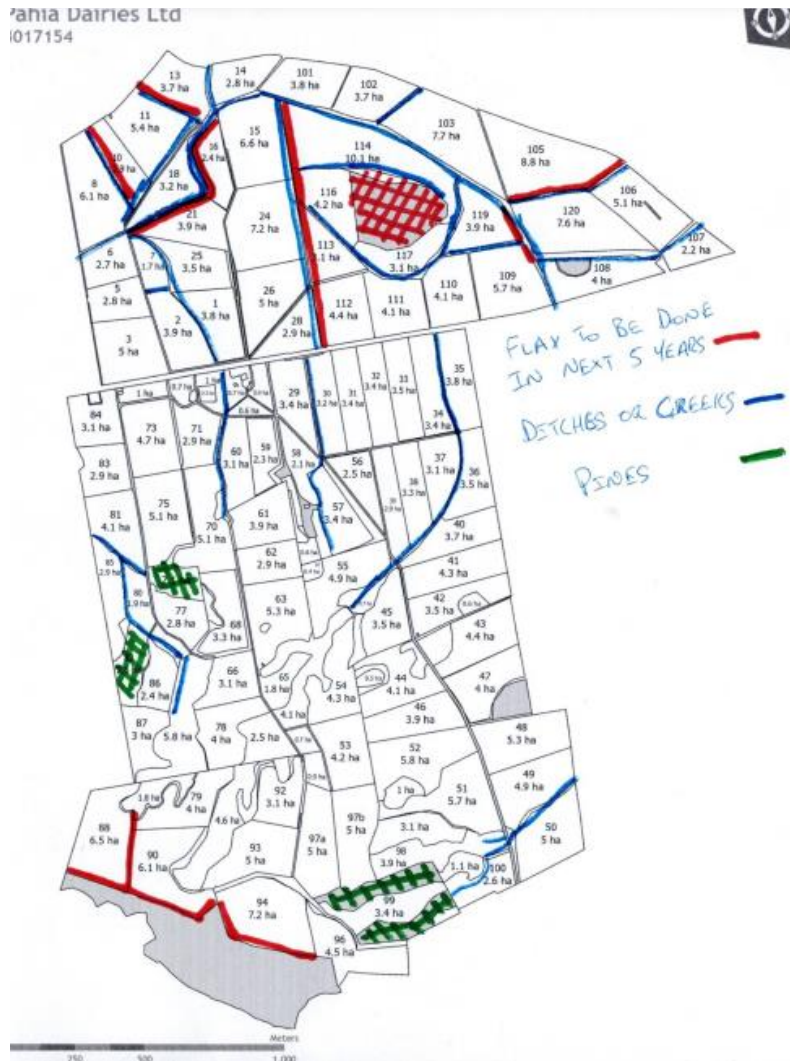


Figure 7: Five-year planting programme at Pahia including areas around creeks and ditches to be planted in flaxes, areas next to the coast to be planted in flaxes as a shelter belt from the sea wind and a swamp in browns block to be completely planted. Pine plantings in sheltered gullies for carbon sequestration.



Integrated environmental management

0800 458 636

PAHIA DAIRIES LTD

FARM ENVIRONMENT PLAN

Prepared by: *Jenna Sutton*

Date: October 2022 (V4)

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Ownership and contact Information

Property Name	Pahia Dairies
Entity name	Pahia Dairies Ltd
Owner	7 Shareholder allocations including Anderson & Lynne Stitchbury
Address of Property	171 Ruahine Road West, Orepuki (Map reference D46:060-157)
Contact details	Phone: 0274 911 975 Email: Pahia.dairies@gmail.com ; fdenterprisesltd@gmail.com
Property size	511 Hectares Total Approximately 445 Hectares Effective (including 30ha dairy grazing, 40ha fenced tree & scrub & 7.5ha pine)
Legal Description	LOT 2 DP 10746, Section 11 and 12 Block V Longwood Survey District, Lot DP 401670, Part Section 14 Block V Longwood SD
Supply Details	Fonterra, 34652
Catchment	Rurikaka Creek

Manager (if different from owner)	Simon Anderson
Address	171 Ruahine Road West, RD1 Riverton
Contact details	Phone: 027 491 1975 Email: pahia.dairies@gmail.com

FEP Prepared by:	Jenna Sutton
Publication Date & Version	October 2022; V4
Organisation:	Lumen
Contact details	Phone: 0272970962 Email: jenna@lumen.co.nz
Person with responsibility for implementing this plan:	Simon Anderson
Address	171 Ruahine Road West
Contact details	Phone: 027 491 1975 Email: pahia.dairies@gmail.com
Signature:	Date:

Review of FEP	Annually
Scope of Review	Update: Any system changes Intensive winter grazing maps & management plans Any changes to cultivation practices or areas Changes to any good management practices Any significant change in environmental risk

Document Summary

This Farm Environment Plan (FEP) articulates environmental risk, good management practices and mitigations in place at Pahia Dairies Ltd at time of writing.

All contact and relevant legal details are recorded prior to this document summary.

An operational action point summary with key policies, practices and implementation timeline is listed immediately after this executive summary. This is provided for operational farm staff, aligning with policy and key good management principles listed throughout the remainder of the document.

The farm system is then outlined and following this, detailed maps, management practices and activities are outlined as applicable to each land management unit (LMU).

Nutrient loss and greenhouse gas numbers are listed in the relevant sections. Additional maps, photographic evidence and grazing management plans are outlined in the appendices.

Additional data and maps are held by Lumen Environmental and can be provided on request.

Key Policies & Practices - Operational

Anything outside of these policies must be remedied, reported or noted as applicable.

Stock Exclusion:

- All dairy cattle and dairy support cattle excluded from waterbodies, with new exclusions having a 5m setback on slopes >10°
- All dairy support cattle excluded from waterbodies, with new exclusions having a 5m setback when being break-fed on slopes >10°+
- Any farmed stock crossing waterbodies does so over dedicated culverts/bridges

Intensive Winter Grazing:

- Stock grazed from top to bottom of slope where animal health allows or 20m last bite strip left at the base of the slope
- 5m vegetative buffer strip to all waterbodies at all times (to the side of the waterbody, not the fence around it)
- Critical source areas which flow to receiving waters left in pasture (& not grazed) or 10m buffer strip prior to receiving waters
- Back-fencing practiced avoiding structural damage to soil
- Southern bale system in use always (or portable feeders)
- Portable troughs used where needed to avoid soil structural damage
- Strip tillage used where agronomically practical (cultivation only used where needed for paddock renewal/severe pest/weed control)

Point Source:

- All potential point source nutrient loss is prevented by using vegetative buffers or diverting any overland flow away from receiving waters
- All containers and baleage wrap recycled and off farm by end of current year

Effluent

- Effluent only applied in accordance with consent and not applied to area A (identified on consented map) when the wind is blowing from the east
- Effluent is not applied within 50m of any waterbody & never when soils are saturated or prior to a weather event which could cause overland flow
- Emergency Management Plan implemented if there is a containment issue/risk of loss of waterways to effluent

Fertiliser

- Records on synthetic nitrogen are kept and provided annually to environment southland
- All applicators coming on to farm are made aware of sensitive areas and provided farm maps with highlighted LMUs/areas for application
- No fertiliser is to be applied prior to a large weather event and no synthetic nitrogen to be applied in dry conditions

NOTE VEGETATIVE BUFFER STRIPS: Plants must remain with active biomass to be effective - strips must not be grazed or cultivated

Annual Flow Chart of Actions

Practice	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Record N Applications x paddock	[Green bar]											
Grazing Management Plans for YE23 winter grazing										[Green bar]		
Scour Hole in Effluent storage Facility repaired							[Green bar]	[Green bar]	[Green bar]			
Gorse ID in effluent storage facility removed								[Green bar]	[Green bar]	[Green bar]		
Fertiliser Plan reviewed by CNMA <small>EMR map, bullet points of key</small>												[Green bar]
practices & policies made available for staff	[Green bar]											
Feed storage areas assessed for run-off										[Green bar]	[Green bar]	
Observational assessment of Mahinga Kai across LMUs	[Green bar]			[Green bar]			[Green bar]			[Green bar]		
Update of FEP-FW												[Green bar]
Year End Overseer Nutrient budget completed												[Green bar]
Photos of coastline to record erosion							[Green bar]	[Green bar]	[Green bar]			

Farm System

Pahia is an owner-operated Dairy Milking Unit situated on the South Coast of New Zealand. The property is located in the Southland region of New Zealand, approximately 19km West of Riverton, 6km S-Southeast of Orepuki and 1km S-Southwest of Pahia.

There are a number of shareholders, including Manager/Director Simon Anderson. Simon has been managing the property since 2013. The property has an effluent consent for 1,000 cows. In 2018 a further 100ha was purchased to increase the property to an effective area of approximately 445ha. There is also 40 ha of fenced scrub and bush, 7.5ha of fenced pine and 30ha of yearling country, bringing the property to a total of approximately 511ha.

All cows are wintered on the property with a maximum of 64 ha of IWG between the 2014 and 2019 reference period.

Replacement rate is approximately 25% currently and working towards 20%. R1s and R2s are typically grazed on farm, but could be grazed off farm if seasonally growth is low. Approximately 400 calves are reared to weaning (bulls, heifers, Herefords) and approximately 25 bulls are raised each year (25 x R1s & 25 x R2s). The main breed is Jersey x Friesian cross with an approximate MA liveweight of 450kgs (this allows maximum production with a lighter animal than full Friesian, allowing for less impact on the land).

Peak Milk: 980 cows (Dec)

Production: 380KgMS/cow/year

Replacement rate: 25% to 20%

Mean Calving: 20th August

Mean Dry Off: 25th May

Wintering: All on winter crop on farm

Climate & Consented Activities

Longitude/Latitude	Original Block: -46.211939S, 167.451437E; New Block: -46.203296S, 167.454615E
Average Rainfall	1,224mm/yr
Average Temperature	10.3°C
Average PET (Potential evapotranspiration)	756mm/yr
Distance from the coast (prevailing wind)	1km (west)

Consented Activities:

Resource Consent Number	Activity	Expiry	Audit?
301719-V1	Discharge dairy shed effluent to land (Maximum consented milking herd 1000)	10 November 2022	
301714	Water Permit (60,000L/day)	November 2022	

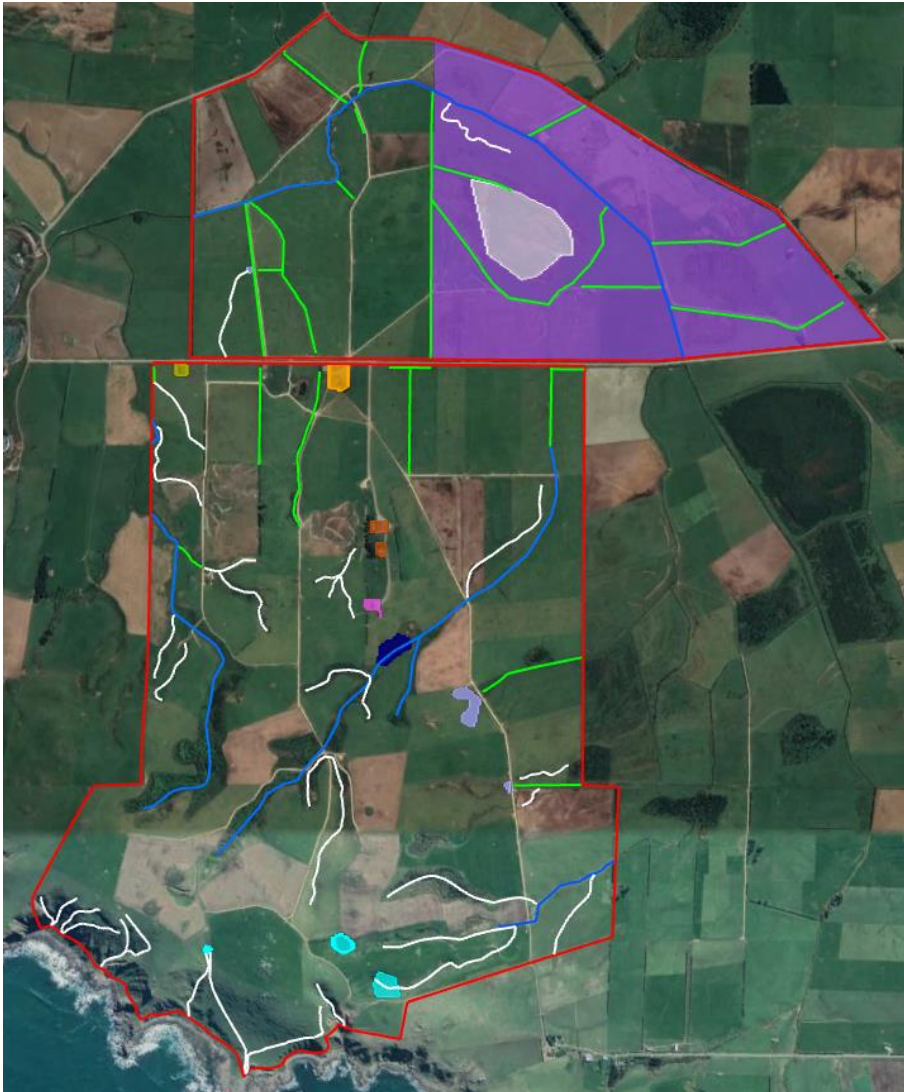
Freshwater Management Unit & Catchment Values










The farm is located in the Aparima freshwater management unit (FMU) in Southland (fig 1) and is part of the Orepuke Groundwater Management Zone in the proposed Southland Water and Land plan. The Aparima FMU stretches from the mountains to the sea. The Aparima river is one of the four major rivers in Southland, beginning in the Takitimu mountains south of lake Te Anau, flowing 100kms south before entering Foveaux Strait near Riverton (which is approximately 17km east of Pahia Dairies). Environment Southland are currently working through a values and objectives programme to establish FMU and catchment values for Aparima. Catchment Group: Rurikaka Creek.



Fig 1: Pahia Freshwater Management Unit (Aparima)

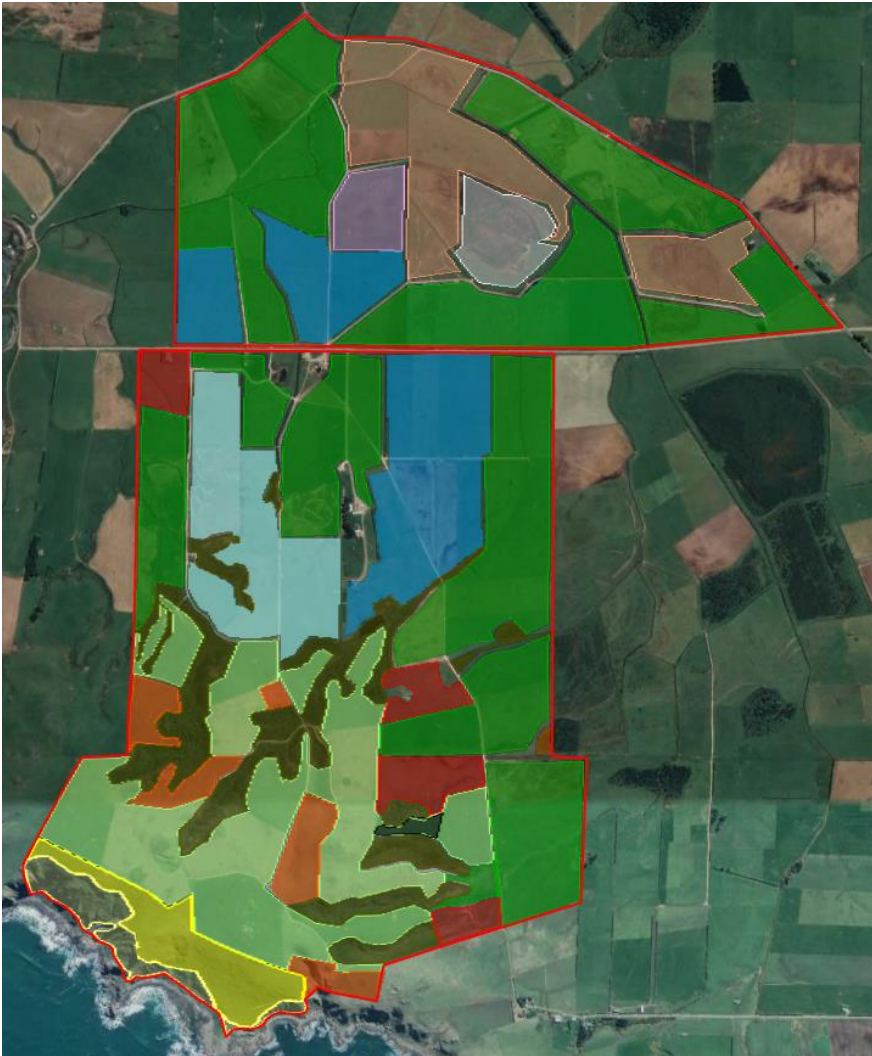
Overall Farm Map



- | | | |
|---|---|---|
|  Farm Boundary |  Calf Sheds |  Waterbody |
|  New Block |  Shed |  Drain |
|  Main House |  Dam |  swamp |
|  House |  CSA |  Waterway |
|  Dairy Shed |  CSA ephemeral | |














Note: Blank Paddock Map in Appendix

Land Management Unit Map: Master

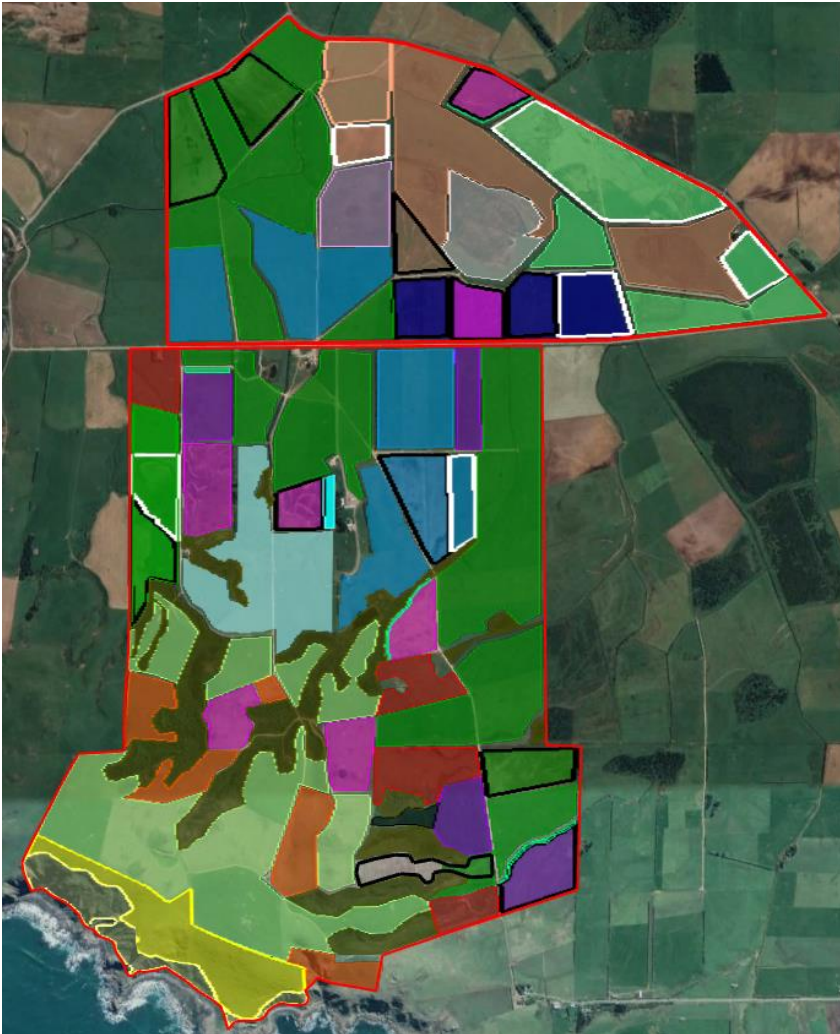


Master LMU for all paddocks (before cultivation blocks for the year have been taken out)





















Legend:

- | | | |
|--|--|--|
|  Farm Boundary |  Non Effluent |  Average 10 slope |
|  swamp Pdk 117 |  Non Cropped Peat Land Effluent |  Slope 10+ |
|  Effluent Area Actual |  Non Cropped Peat Land |  Yearling Country |
|  Effluent Area actual A |  Drained Average 10 slope |  Fenced off Bush/Scrub |
|  Non Effluent Drained | | |

Land Management Unit Map: YE22



Legend:

- | | | |
|--|--|--|
|  Farm Boundary |  Non Effluent |  Fodder Beet YE22 |
|  swamp Pdk 117 (new block) |  Non Effluent Drained |  Swedes YE22 |
|  New Block Non Effluent |  Peat Non Crop Effluent |  5m Buffer strip |
|  New Block Peat Non Crop |  Original Block Peat Non Crop |  Permanent Grass Buffer |
|  Proposed new block Effluent area |  Slope 10+ |  Yearling Country |
|  Effluent Area Actual |  Drained average 10 |  Fenced off Bush/Scrub |
|  Effluent Area actual A |  Average 10 slope | |

Note: Black outline = YE21 ex winter crop, White outline = YE21 New Grass

Land Management Units (areas listed as blocked for YE22)

The farm has been blocked based on best practice and science and as per OverseerFM best input guidelines. In order to align closely with the way the units are managed across the property, those managed the same/similarly have been given the same number with a letter as a suffix to acknowledge the subset, as well as similar colours for ease of use. This allows for effective management on farm as well as effects on the land to be monitored separately via OverseerFM.

LMU	Description	Area (ha)	Strengths	Weaknesses	Management	LMU
Effluent Area (Drained)	Milking platform receiving effluent (actual)	40.6	<p>As per YE22 88% soil in this area is a brown soil with the other 12% an organic/peat soil.</p> <p>Both soils have inherently high water-holding capacities, low N leaching and moderate structural vulnerability. The Brown soil is well drained and is a perfect filter for effluent (Matrix flow).</p> <p>Nutrient and organic matter continuously being put back in the soil, increasing the water and nutrient holding capacity of the soil.</p>	<p>The organic/peat component can see higher losses of N to the atmosphere than soils with less organic matter.</p> <p>Both soils have had artificial drainage installed, which could potentially see higher bypass flow and more nutrient/sediment entering waterways when initially installed and in drought.</p>	<p>Effluent is applied in accordance with the effluent consent, ensuring minimum 50m setbacks from waterways and sensitive areas for application.</p> <p>Effluent is never applied when soils are saturated or close to field capacity. See effluent management section for system details.</p> <p>Strategic N applications to ensure timing matches needs and response curve</p> <p>Fertiliser regimes are altered to reflect the nutrient in the effluent being applied.</p>	1a
Effluent Area A (Drained)	Milking platform receiving effluent in accordance with	20.3	As above	As above, however effluent cannot be applied when the wind is coming from the East.	Managed the same as Effluent Area (LMU1a) with the exception of wind direction originating from the east, in	1b

	conditions of consent (area A)				which case effluent is not applied to this land area.	
Non-Effluent Drained	Milking platform not receiving effluent (with artificial drainage)	91.4	As per YE22 LMU has approximately 56% organic soils and 44% brown soils. This combination of soils is ideal for dairying, being able to hold onto water and nutrients, relatively drought proof and with moderate phosphorous buffering.	These soils are potentially slightly more structurally vulnerable than LMU 1, due to the higher Organic content, however due to the artificial drainage, this is unlikely to be an issue.	Strategic N applications to ensure timing matches needs and response curve. Care is taken with grazing stock on saturated paddocks (with stock being moved if needed). Other nutrients applied are tailored to meet production and pasture demand to achieve desired operation goals.	2a
New Block Non-Effluent Drained	New Block, milking platform not receiving effluent (with artificial drainage)	10.8	As above – blocked separately simple so can assess new block environmental effects	As above	As above	2b
Non-Effluent Area	Milking platform not receiving effluent	51.8	100% of YE22 LMU is a brown soil (64% Orepuki & 36% Waikiwi). Great soils for dairying due to their good water and nutrient holding characteristics, low risk of nutrient leaching, high matrix flow pathways (filter) and low risk of loss via overland flow.	Structural vulnerability varies across these soils (low to moderate vulnerability).	Grazing management is a high priority ensuring that areas are not over grazed, or animals left on an area too long particularly in saturated soils as this can cause damage via pugging. Other nutrients applied are tailored to meet production and pasture demand to achieve desired operation goals.	3

Peat Non-Crop (Drained)	Milking platform not receiving effluent identified as 'peat based' & not cropped	6.1	Approx 90% of this LMU is made of organic soils (73% Kaipaki & 16% Otway). These soils have inherently excellent water holding capacity, very low N leaching risk with moderate structural vulnerability. This has been artificially drained and so structural vulnerability would now be considered low during normal grazing pressure.	The land has been identified as higher risk for structural damage by Simon, and as such has been retired from intensive winter cropping to avoid soil structural damage and increased overland flow.	Moving forward, the land will no longer remain part of the intensive winter cropping regime on Pahia. Extra care is taken with grazing stock on saturated soils (with stock being moved if needed). Fertiliser tailored to match peat buffering capacities and non-effluent area.	4a
New Block Peat Non-Crop (Drained)	New Block, milking platform not receiving effluent identified as 'peat based' & not cropped	19	As above – blocked separately so can assess new block environmental effects	As above	As above	
Peat Non Crop Effluent (Drained)	Milking platform identified as 'peat based' & not cropped	7.1	100% organic soils (Kaipaki). Strengths as above for Peat Non-Cropped LMU 4a. Effluent application should be building naturally fertile and structurally sound soil.	Weaknesses as above for Peat Non-Cropped LMU 4a.	Management as above for LMU 4a, however fertiliser tailored to match peat buffering capacities and effluent applications.	4b
Slope >10	Half of paddock 51 identified as >10° slope	Cultivated block this year	100% Brown soil (Waikiwi). The soil has good drainage, nutrient and water-holding capacity when structure isn't damaged.	At risk of nutrient and sediment loss via overland flow if soil structure is	Significant vegetative buffer strip is used at the base of the paddock as a filter if in crop.	5a

				damaged or during large rainfall depositions.	Care is taken when grazing on saturated soils (stock removed). Fertiliser is not applied nor is paddock grazed immediately before large rainfall event. This area is not cultivated without 20m buffer strips to waterways in place.	
Slope mean 10° Drained	Paddocks identified as mean slope of 10° with drainage	14.5	80% of these soils are a brown soil (Waikiwi) and the other 20% an organic (Otway). This combination gives excellent drainage, nutrient and water-holding capacity when structure isn't damaged. Moderate structural vulnerability.	At risk of nutrient and sediment loss via overland flow if soil structure is damaged or during large rainfall depositions.	Care is taken when grazing on saturated soils (stock removed). Where practical, fertiliser is not applied nor paddock grazed immediately before a large rainfall event. This are is not cultivated without 10m buffer strips to waterways in place.	5b
Slope mean 10°	Paddocks identified as mean slope of 10°	15.8	100% of these soils are Brown (Orepuki & Waikiwi) and act as an excellent filter, ideal for dairying. Strengths as above for LMU 5b. Low structural vulnerability.	Weaknesses as listed above for LMU 5b, however soils will be slightly more forgiving structurally.	Management as per LMU 5b.	5c
Swamp	Paddock 117. Identified potential wet area*	9.8	100% of these soils have been identified as Organic soils formed on the edge of peat/swamp areas.	Drainage characteristics are very poor in these soils. Soils are at high risk of structural damage with increased risk of	More than 50% is a sown species therefore not a natural wetland.	6

			Excellent water-holding capacity and low N leaching potential.	nutrient and sediment loss via overland flow.	Extra care will be taken with grazing to ensure structural damage is avoided, with stock removed during periods of prolonged wet. This area is not to be cultivated.	
Trees/Scrub	Retired areas of Tree/Scrub under active management	40	Regenerating bush and scrub providing potential homes for native flora and fauna and their prey. Acts as a vegetative buffer and is actively sequestering carbon.	Can be a host for pests of native flora and fauna if not managed.	Areas are actively managed for pests. Weeds are sprayed out where practical. Pigs, deer, stoats, ferrets, possums and the odd hare are actively managed via traps and shooting.	7
Yearling	Rolling hill country (non-milking)	30	Non intensive area of the farm which can provide grazing for multiple stock classes. Brown soil which has good nutrient and water-holding capacity as well as considered relatively 'drought proof'.	Area can be at risk of overland flow due to slopes over 10°+. Sensitive coastal area which is capable of providing home to native flora and fauna.	Minimal fertiliser is applied to the area. The area is extensively grazed. Stock are moved off sensitive slopes to more suitable areas ahead of significant rainfall/weather events to minimise erosion and overland flow.	8
Intensive Winter Grazing/Cultivation	Paddocks intensively grazed for winter feed or cultivated/newly re-grassed ex	127 in crop blocks: 52.1 in winter crop, 74.9	The soils will change each year in this LMU. This year they are predominantly Brown soils, which have excellent nutrient & water-holding capacity with low N leaching vulnerability and low	Artificial drainage may increase the chance of N leaching loss and P entering waterways. Any structural damage will affect the way water flows	Paddocks are selected that need renewal. Strategic fertiliser applications are made that are tailored to the	9

	IWG year previous. (This rotates through LMUs 1, 2, 5a & 5b)	cultivated (ex crop or pasture renewal)	structural vulnerability. This makes them Ideal paddocks for intensive winter grazing.	through this soil and could increase overland flow risk. Significant amounts of nutrient can be applied on a small area of land, increasing risk of loss to waterbodies if not managed well.	plant requirements and climate risks at time of application. Extra care is taken observing grazing, with animals removed if needed in extreme conditions. Back-fencing is always used. The Southland bale system is in use to minimise damage to paddocks. At least 5m buffer strips to waterbodies in place. These are increased if slope or other high risk is noted.	
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Physiographic Zones

Physiographic zones are a way of grouping areas that have similar characteristics that affect water quality, nutrients and contaminants. Nutrients and contaminants will move via overland flow, deep drainage (leaching to groundwater) or by artificial drainage (depending on soil type, slope and drainage).

The farm has four main physiographic zones (shown in the map below) including Lignite Marine Terrace, Oxidising, Peat Wetlands and Bedrock Hill Country.

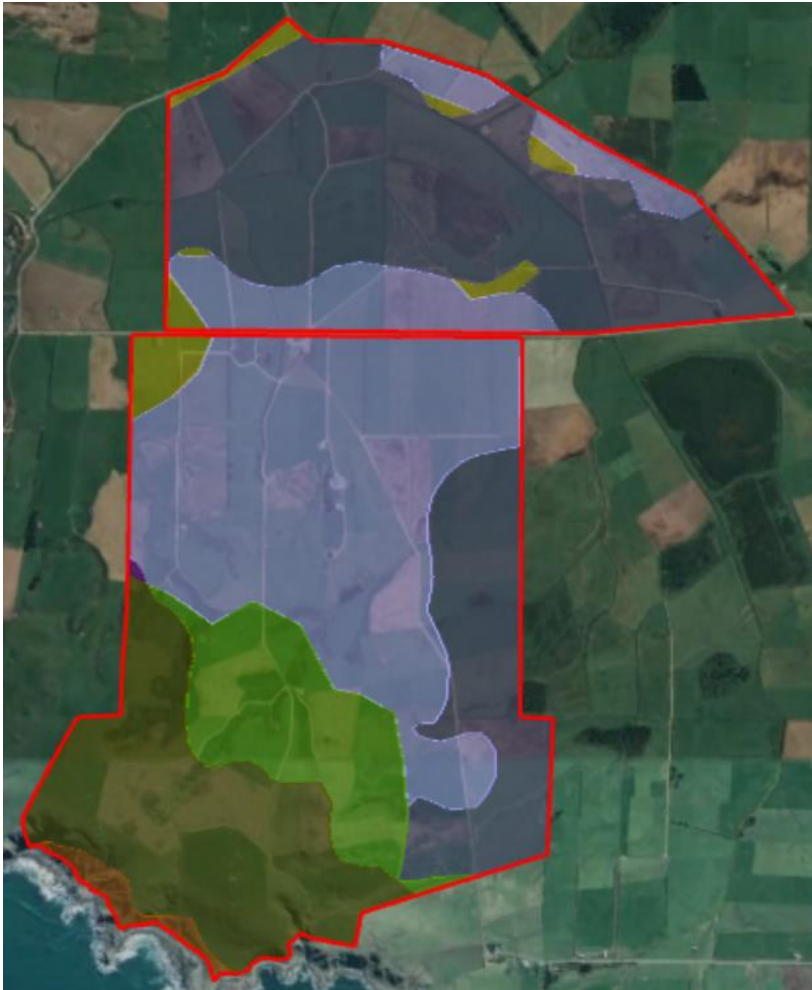
A significant portion of the farm is peat wetlands. These have a naturally high water-table, however as artificial drainage has been installed, this is not a significant issue on Pahia Dairies.

Another major physiographic zone on the property is Lignite Marine Terraces. The soils in this zone have a high organic carbon content. The high organic matter/carbon content of this zone means soils can hold more nitrogen (N) within them compared to soils with less organic carbon content and furthermore, there is a high denitrification potential of these soils, meaning there is minimal N build-up in soils and aquifers and the greatest risk of N loss will be through overland flow or potentially through bypass flow.

Physiographic Zone	Approximate area (ha)	Features	Risk to Water Quality	Comments
Lignite/Marine Terraces	182.5 (99.9% artificial drainage variant, 0.01% overland flow variant)	This zone inherently has a very strong ability to remove N through denitrification as aquifer and soils have high organic contents.	Risks are largely associated with soil zone losses following periods of heavy rainfall. Protecting soil structure and CSAs will prevent overland flow and contaminants moving to waterways.	Strategic N applications (rate and timing) will prevent N moving into groundwater via drainage.
Oxidising	19.88 (29% Overland flow variant, 71% no variant)	Soils have good phosphorous retention with limited potential for contaminant losses to rivers and	High risk of N build up in groundwater due to the low denitrifying ability of this soil.	Where artificial drainage has been installed, contaminant losses to rivers and streams through preferential flow could be higher.

		streams via overland flow as deep drainage is the main pathway.		
Peat Wetlands	184.8	Naturally high water table (except where drainage has been installed). Extremely acidic soils with a high soil and aquifer denitrification potential.	Soils and aquifers are very effective at removing N, but a lack of silt and clay combined with the acidic properties of peat soils mean P is poorly retained and at risk of being lost to waterways, especially with preferential flow associated with installed drainage.	Artificial drainage installed which means there is a significantly reduced issue with high water tables and saturated soils drain quicker. This means nutrient level and soil structure should be monitored.
Bedrock Hill Country	127.1 (64% Oxidising variant, 36% no variant)	Little N build up in groundwater due to denitrification in the soil.	Contaminant loss to streams as water flows at pace down slopes	Main concern is nutrient, sediment and biological contaminant loss via overland flow.

Physiographic Zone Map:



Legend:

-  Farm Boundary
-  Peat Wetlands - No Variant
-  Lignite Marine Terraces - Overland Flow
-  Lignite Marine Terraces - Artificial Drainage
-  Oxidising - Overland Flow
-  Oxidising - No Variant
-  Bedrock/Hill Country - Artificial Drainage
-  Bedrock/Hill Country - Overland Flow

Soils

Summary of soil types:

S-Map reference Name	Soil Order	Area of farm covered (ha)	Drainage Class	Structural Vulnerability	N Leaching Vulnerability	Topsoil P Retention	PAW 60cm (profile available water)
Waikiwi_16a.1	Brown Soil	253	Well Drained	Moderate (0.51)	Low	Medium (43%)	Very High (113mm)
Kaipaki_9a.1	Organic Soil	102	Very Poor	Low (0.50)	Very Low	Medium (37%)	Very High (270mm)
Orepuki_2a.1	Brown Soil	85.5	Moderately Well	Moderate (0.54)	Medium	Medium (36%)	High (98mm)
Otway_3a.1	Organic Soil	67	Very Poor	Very High (0.76)	Very Low	Low (26%)	Very High (270mm)

Soils on Pahia Dairies belong to one of two soil orders:

Brown:

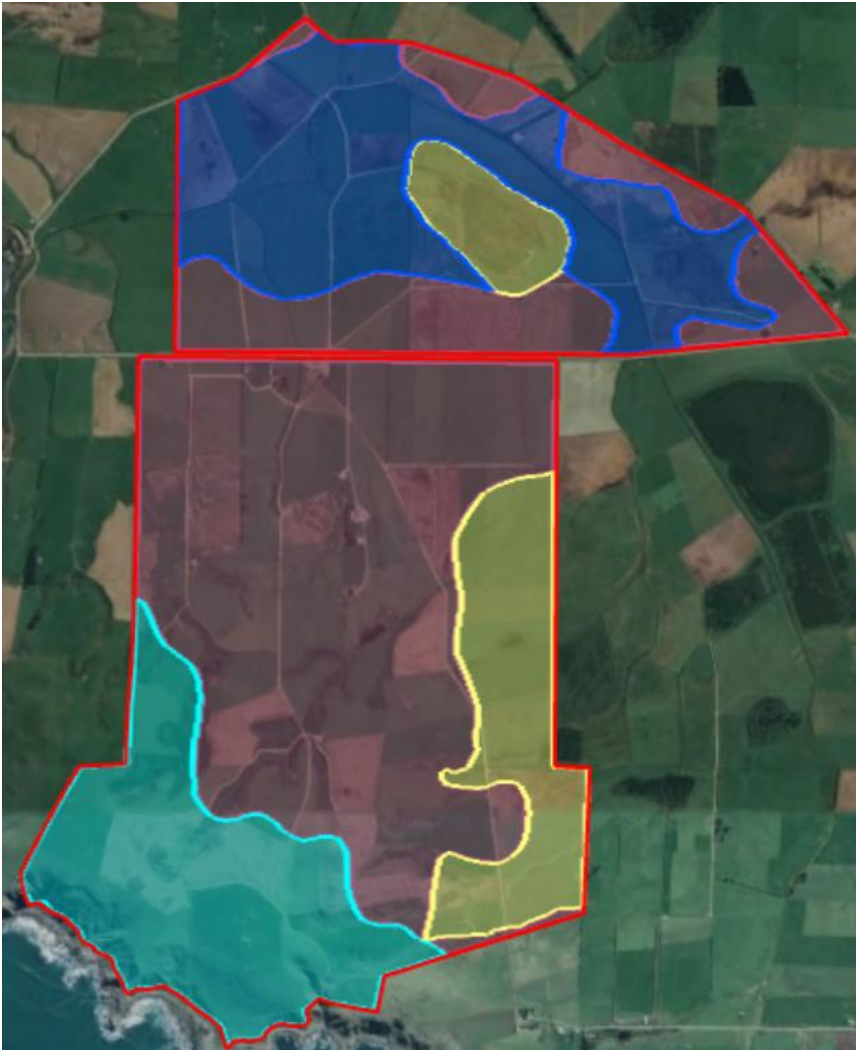
- Generally found in places where summer drought is uncommon and where soils are not waterlogged in winter
- They are generally well drained and have a moderate structural vulnerability and a low-moderate N leaching potential due to their high PAW capacities (which directly influences how much water drains through the soil, with high PAW meaning less water drains through the soil in a drainage event, therefore resulting in less N leaching)
- The moderate structural vulnerability means care will need to be taken when grazing intensive fodder crops on this land or with heavy stock classes or high stocking rates on pastoral land when the soils are saturated.

Organic:






- These are formed in the partly decomposed remains of wetland plants (peat) or forest litter
- Some mineral material could be present, but the soil is dominated by organic matter

- These soils have a med-high pH buffering capacity and low phosphorous retention, and this should be taken into consideration when making fertiliser recommendations
- Although the drainage class for the Organic Kaipaki and Otway soils is inherently very poor, the installation of artificial drainage in the form of novaflow pipe, has meant the drainage characteristics have been altered slightly and these soils on Pahia now have considerably less risk than previous in terms of waterlogging, vulnerability to structural damage and overland flow
- The moderately well drained soils allow water to drain through the soil profile during most periods of the year. An observation on farm is that these soils can be wet and at saturation point after a rain event yet drained the next day.
- Noted is that although the PAW is Very High and N Leaching Vulnerability for these organic soils is very low by nature, with the introduction of artificial drainage, the soil could now be subject to bypass flow, which could result in higher contaminant loss to water than via matrix flow (through the soil profile), so care is taken with fertiliser and effluent application rates and timings especially prior to predicted heavy rainfall events.

Soil Map:



Legend:

-  Farm Boundary
-  Orepuke_2a.1
-  Otway_3a.1
-  Kaipaki_9a.1
-  Waikiwi_16a.1

Soil Structural Management

Objective: To maintain or improve the physical & biological condition of soils in order to minimise the movement of sediment, phosphorus and other contaminants to waterways.

Targets:

- Erosion caused through land use activities is minimised
- Soils are well-managed to optimise infiltration and minimise runoff
- Land use activities are managed to preserve soil structure and health

Pahia Dairies is made up of 4 soil types (obtained from S-Maps, with map shown above).

Good Management Practises currently exercised to meet objective:

Practice	Management	When Used	Evidence	LMU
Cultivation and soil structure	Cultivation is timed to reduce the risk of soil damage. Soil moisture, weather and wind are all considered prior to cultivating areas to ensure cultivation is carried out at the best time to maintain soil structure.	<ul style="list-style-type: none"> • When cultivating 	<ul style="list-style-type: none"> • Paddock records 	1, 2, 3, 4, 5, 9
	Cultivation is carried out using practices to minimise erosion and preserve organic matter content. Direct drilling and minimum tillage are used when possible.	<ul style="list-style-type: none"> • When the soil doesn't need to be fully prepped and cultivated for the next crop. • All fodder crops are strip tilled to preserve soil structure, moisture and provide wind protection for the newly emerging crop. 	<ul style="list-style-type: none"> • Site observation 	1, 2, 3, 4, 5, 9

	Erosion/pugging and compaction from grazing is managed through several practices.	<ul style="list-style-type: none"> • As required. • Where pasture has thinned out or been overgrazed, grass is direct drilled in as soon as practical. • Back fencing is used where possible during intensive grazing of fodder crops. • CSAs identified in crop paddocks are left in pasture if possible, fenced off when paddock is grazed or a buffer strip between the CSA and receiving waters is used. 		1, 2, 3, 4, 5, 8, 9
Ground Cover	Manage periods of exposed soil between crops/pasture. This reduces risk of erosion, overland flow, sediment loss and nutrient leaching.	<ul style="list-style-type: none"> • Always. • Crop paddocks are resown as soon as practical (i.e., when soil & climate conditions allow for the crop to be sown with minimum structural soil damage & when the crop will grow). 	<ul style="list-style-type: none"> • Seed and agronomy records. 	All
Artificial drainage	Managing nutrients and grazing over tile drains	<ul style="list-style-type: none"> • Winter cropping paddocks are planted back in pasture as soon as practical. • Vegetative buffer areas are utilised when possible to strip out and reduce the impact to the receiving environment. 	<ul style="list-style-type: none"> • Site observation 	1, 2, 5, 5b, 9
Sediment & phosphorous	Farmed stock are excluded from waterways (this avoids direct nutrient loss via effluent into waterways and instead keeps this on the paddocks, it also prevents further degradation of waterway banks).	<ul style="list-style-type: none"> • All streams and rivers 1m wide have stock excluded via permanent fencing. • All ponds and wetlands are fenced to exclude stock. 	<ul style="list-style-type: none"> • See images in appendix 1 	All

	<p>Risk of transported nutrients & sediment via overland flow is managed</p>	<ul style="list-style-type: none"> CSAs are identified and remain as pasture in intensive forage crop paddocks with vegetative buffers in place between the crops and receiving environments. Portable water troughs are used when practical in winter grazing paddocks so that break fences and animals can remain out of critical source areas. Winter crop is predominantly fed on a long face increasing the area for stock access to crop face which minimises social disruption when feeding. Winter crop break fences are shifted daily to ensure utilisation of crop and keep animals fully fed. Almost all winter cropping is on land with flat topography, minimising overland flow risk. Peat soils are not used for winter cropping 	<ul style="list-style-type: none"> Buffer strips are identified in the intensive winter grazing map. CSAs are identified in the waterbodies map. 	<p>9, 4</p>
	<p>Monitor soil phosphorous levels and maintain them at the agronomic optimum for this system. Fertiliser applications varied to target nutrient applications based on soil test results.</p>	<ul style="list-style-type: none"> Agronomic Optimum Olsen P approx. 30-35 (lower on organic soils due to buffering) This is a significant practice in the fertiliser programme. 	<ul style="list-style-type: none"> Soil test results and fertiliser records. 	<p>All</p>
	<p>Farm tracks & gateways</p>	<ul style="list-style-type: none"> Track have lips constructed along much of the length, designed to run water 	<ul style="list-style-type: none"> Site observation Images in appendix 1 	<p>All</p>

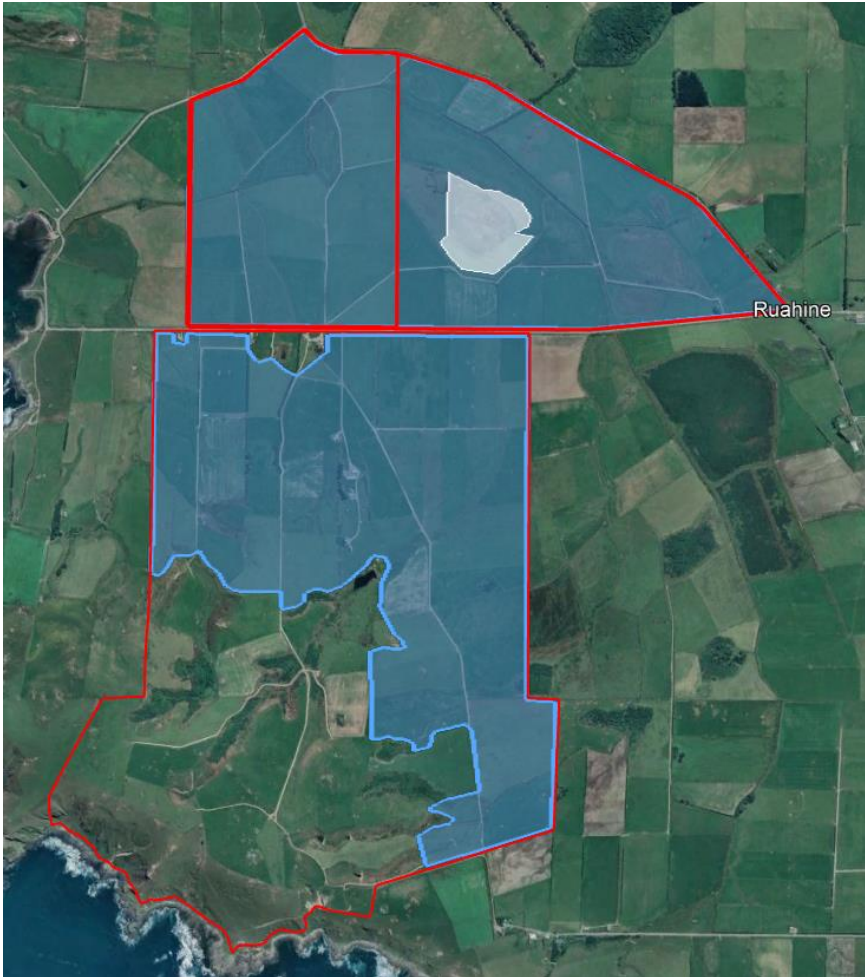
		<p>away from creeks, drains, rivers and CSA's and into an appropriate pastoral receiving area.</p> <ul style="list-style-type: none"> • Stock are placed in paddocks with sufficient feed overnight to prevent crowding at gateways 		
Faecal bacteria loss	Overland flow	<ul style="list-style-type: none"> • Buffer strips are utilised next to receiving waterbody environments. • CSAs are identified and un-grazed on steeper slopes at higher risk of overland flow to reduce bacteria entering water ways. • Effluent is not spread near sensitive environments and on CSAs to reduce potential bacteria entering waterways via overland flow. 	<ul style="list-style-type: none"> • Intensive Grazing map identifies buffer strips around crop paddocks. • Waterbodies maps identify CSAs. • Effluent map shows effluent is not applied to CSAs and sensitive environments. 	1, 2, 3, 4, 5, 8, 9

Continued over page.




Key Actions that will be undertaken to meet the objective:

Practice	When by?	Who?	Evidence	Applicable LMU	Completed
Grazing Management Plan Completed for intensively grazed crops, identifying CSAs and stand-off areas- updated in FEP	Before commencement of intensive grazing 2023	Simon Anderson	Grazing management plans in appendix 2 for YE22	9	Yes
CSAs in forage crops to be kept in pasture where high risk. Where impractical to keep in pasture, a minimum of 5m buffer strip at the end of the CSA is kept + 20m last bite strip.	Always	Simon Anderson	Grazing management plan in appendix 2, photos, IWG & Cultivation maps	9	Yes
Soil tests to be taken prior to sowing crops/applying seed and fertiliser plans tailored appropriately to crop needs and current fertility.	At least 6-8 weeks prior to sowing of the crop	Balance Fertiliser	Soil test records	1, 2, 3, 4, 5, 9	Yes

Drainage Map:



Legend:

-  Farm Boundary
-  Swamp Pdk Undrained
-  Drainage

Soil Nutrient Management

Objective: To maximise nutrient use efficiency while minimising nutrient losses to water

Targets:

- **Must not exceed an average annual amount of nitrogen phosphorus, sediment and microbial contaminants for previous 5 years.**
- Phosphorous and Nitrogen losses from farming activities are minimised
- Manage the amount, timing and application of fertiliser inputs to match the predicted plant requirements and minimise nutrient losses
- Store and load fertiliser to minimise the risk of spillage, leaching and loss into water bodies.
- No more than 190kg/ha N is applied to any hectare of pastoral land and no more than 190kgN/ha is applied averaged out over all of the property

Practice	Management	When Used	Evidence	LMU
Fertiliser applications	Ensure application rates, timing and placement of fertiliser matches plant needs and minimises high risk nutrient loss situations.	<ul style="list-style-type: none"> • Fertiliser is applied to match plant demand. • Fertiliser recommendations are tailored to block needs • Olsen P level are managed at or about agronomic optimum. • Nitrogen fertiliser is only applied at the rates the plant can take up. • Fertiliser applicators are spreadmark certified. • Urease inhibitors are used to ensure an efficient use of nitrogen fertiliser. 	<ul style="list-style-type: none"> • Fertiliser records • FEP • Nutrient Budget YE22 	1, 2, 3, 4, 5, 6, 8, 9

		<ul style="list-style-type: none"> Nitrogen fertiliser is not applied unless the soil temperature is appropriate for plant growth. Fertiliser plans are reviewed by farm systems consultant and certified nutrient management advisors. 		
Non nitrogenous stimulant applications	Non nitrogenous growth promotants & biological stimulants are used where applicable	<ul style="list-style-type: none"> 	<ul style="list-style-type: none"> Invoices where applicable 	1, 2, 3, 4, 5, 9
Nutrient Availability	Ensure nutrient cycling and availability in the soil is at optimum to avoid soil and stock health issues as well as the need for excessive fertiliser application.	<ul style="list-style-type: none"> Lime is applied as needed to keep pH in optimum range and ensure plant nutrients remain available for plant use. Soil structure and organic matter are preserved via minimum till cultivation where possible. 	<ul style="list-style-type: none"> Fertiliser, soil test and paddock records. 	1, 2, 3, 4, 5, 6, 8, 9
Soil testing	Testing is carried out as needed to help with fertility decisions on farm	<ul style="list-style-type: none"> Soil testing is carried out at least annually and prior to crop sowing so fertility can be managed for crop needs and soil characteristics. Macronutrient levels are maintained at agronomic optimum. Soil nitrogen tests to be undertaken occasionally in intensive forage crops to aid in nitrogen side dressing decisions. 	<ul style="list-style-type: none"> Soil Test Records 	1, 2, 3, 4, 5, 9

Key Actions that will be undertaken to meet the objective:

Practice	When by?	Who?	Evidence	LMU	Completed?
Fertiliser plans and soil tests will be reviewed by a certified nutrient management advisor	Prior to Crops sown	Certified CNMA advisor	Reports as they are produced	1, 2, 3, 4, 5, 6, 8, 9	
LMU Farm map & bullet point of key practices and policies is made accessible for farm staff	YE22	Lumen Environmental & Simon Anderson		All	

Intensive Winter Grazing & Cultivation

Intensive grazing and cultivation paddocks are high risk situations for nutrient and sediment loss. Intensive grazing is part of pasture renewal programme for the property, with paddocks in need of renewal being identified as potential for intensive crop for the season ahead.

Strip tilling is used in crop paddocks to minimise the disturbance to soil structure and minimise risk of sediment or nutrient loss as well as protect newly emerging plants from wind damage. Specific GMPs are listed throughout this FEP under the applicable section.

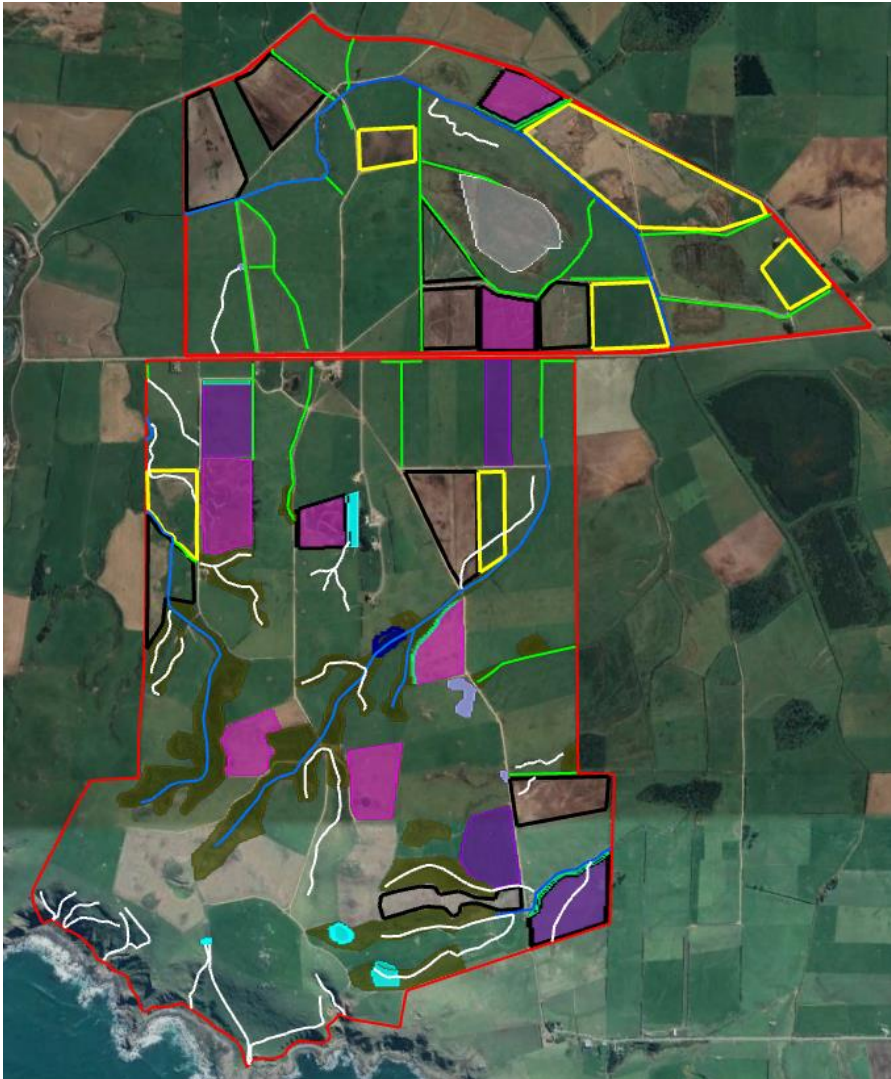
Areas:

	Original Block	New 100ha block	Total (for both blocks)	Commentary
Steady State prior to purchase of new block	34	30	64	100ha steady state prior to purchase modelled in overseer – series of assumptions made based on previous land use information at time of sale: Dairy Support with winter grazing and a carrying capacity of 800-1000SU.
Area modelled during reference period: (July 2014 - June 2019)	34	30	64	Original Block YE16,17 & 18 modelled in Overseer. Both Blocks modelled in Overseer YE19
YE22 area in crop	40.2	11.9	52	Buffer strips are included in this area




The Map below shows:

- Intensive winter grazing paddocks for winter grazing with defoliation starting May of YE22
- Cultivation which has occurred in the last 12months
 - Last years winter grazing paddocks (black outline)
 - Any new grass paddocks on top of these renewed ex crop paddocks (yellow outline)

Intensive Winter Grazing & Cultivation Map YE22



Legend:

- | | | |
|---|---|--|
|  Farm Boundary |  Drain |  Fodder Beet YE22 |
|  Dam |  Waterway |  Swedes YE22 |
|  CSA |  Waterbody |  5m Buffer strip |
|  CSA ephemeral |  swamp |  Permanent Grass Buffer |
| | |  Fenced off Bush/Scrub |

Note: Black outline = YE21 ex winter crop, Yellow outline = YE21 New Grass

IWG: Paddocks Not Cropped or with Management Conditions

Do Not Crop - Soil Type or Physical Properties (as identified by Simon)					
Pdk	Area	Soil	Slope	Block	Management
6	2.7	100% Kaipaki	0-7°	OB Non-Eff Drainage DNC	These have been retired from cropping & haven't been included in blocks/soils as part of the predictive rotation for Pahia Moving forward
14	2.8	87% Kaipaki, 13% Waikiwi	0-7°	OB Peat Non Crop D	
15	6.6	100% Kaipaki	0-7°	OB Peat Non Crop D	
18	3.2	100% Kaipaki	0-7°	OB Non-Eff Drainage DNC	
21	3.9	100% Kaipaki	0-7°	OB Non-Eff Drainage DNC	
23	3.5	100% Kaipaki	0-7°	OB Peat Non Crop Effluent D	
24	3.6	100% Kaipaki	0-7°	OB Peat Non Crop Effluent D	
101	3.9	66% Waikiwi, 34% Kaipaki	0-7°	NB Peat Non Crop	
103	7.7	66% Kaipaki, 34% Waikiwi	0-7°	NB Peat Non Crop	
109	5.7	50% Waikiwi & Kaipaki	0-7°	NB Prop Effluent DNC	
110	4.1	100% Waikiwi	0-7°	NB Prop Effluent DNC	
111	4.1	100% Waikiwi	0-7°	NB Prop Effluent DNC	
112	4.4	100% Waikiwi	0-7°	NB Prop Effluent DNC	
113	3.1	95% Kaipaki, 5% Waikiwi	0-7°	NB Peat Non Crop	
114	10.9	80% Kaipaki, 20% Otway	0-7°	NB Peat Non Crop	
116	4.2	95% Otway, 5% Kaipaki	0-7°	NB Peat Non Crop	
117	9.8	93% Otway, 7% Kaipaki	0-7°	NB Swamp 117 DNC	
120	9.8	90% Kaipaki, 10% Waikiwi	0-7°	NB Peat Non Crop (ex swamp 120)	

These soils have been identified by Simon as Peat in nature and despite having drainage in, to preserve soil structure and minimise potential contaminant loss to waterways, these paddocks have been taken out of the cropping rotation at this stage.

Do Not Crop - Slope					
Pdk	Area	Soil	Slope	Block	Management
79	4.4	70% Orepuki, 30% Waikiwi	8-15°	OB Slope 16+ DNC	These soils are not cropped and haven't been included in IWG rotation
87	3	100% Orepuki	8-15°	OB Slope 16+ DNC	
96	3.4	100% Orepuki	8-15°	OB Slope 16+ DNC	
100	2.6	66% Otway, 34% Waikiwi	8-15°	OB Non Eff Slop 8-15 Drained	
Avoid Cropping unless pasture renewal needed					
Pdk	Area	Soil	Slope	Block	Management
65	1.8	100% Waikiwi	0-7°	OB Non Eff	low slope, close to waterways, buffers req. are impractical
80	2	100% Waikiwi	0-7°	OB Non-EFF Drainage	low slope, close to waterways, buffers req. are impractical
90	3.1	100% Orepuki	0-7°	OB Non-EFF	Ave 10%, 20m last bite prior to yearling country if grazed that way
98	3.9	50% Waikiwi & Orepuki	0-7°	OB Non-EFF	Ave 10%, 20m last bite + buffer at easter base of slope
99	3.4	80% Otway, 20% Waikiwi	0-7°	OB Non-EFF	Despite pines, proximity to dam and buffers make it impractical

These soils (avoiding cropping) have been included in the rotation for IWG, however due to size/slope and proximity to waterways or sensitive coastal areas, it is impractical to economically crop including the buffers - these have been identified as only to be cropped when pasture renewal is needed.

Manage with Vegetative Buffers & Last Bite Strips					
Pdk	Area	Soil	Slope	Block	Management
44	3.3	100% Waikiwi	8-15°	OB Non-Eff Slope 8-15	Ave 10% - buffer on East side
50	5.2	83% Otway, 17% Waikiwi	0-7°	OB Non-Eff Drainage	Ave 10% - buffer at north & base of CSA
51	5.8	80% Waikiwi, 20% Otway	8-15°	OB Non-Eff Slope 8-15	8-15% west, buffer at northern or southern east end of paddock, depending on grazing direction
52	5.8	80% Waikiwi, 20% Otway	8-15°	OB Non-Eff Slope 8-15 Drainage	Manage with buffer in bottom right
54	4.3	100% Waikiwi	0-7°	OB Non Eff	low slope, buffer strip & 20m last bite at north end
78	4.1	100% Waikiwi	0-7°	OB Non Eff	Buffer on north eastern side
83	3	100% Waikiwi	0-7°	OB Non Eff	Buffer at west side at end of CSA
84	2.8	100% Waikiwi	0-7°	OB Non-Eff Slope ave 5-10	ID'd by simon as needing mgmt
85	2.9	100% Waikiwi	0-3°	Non Effluent Drainage	Buffers along waterways
86	7.5	66% Orepuki, 34% Waikiwi	0-7°	OB Non Eff	Buffers at north end of slope
88	6.6	100% Orepuki	0-7°	OB Non Eff	Ave 10%, Bottom south shouldn't be cropped
89	3.6	100% Orepuki	8-15°	OB Non-Eff Slope 8-15	8-15% at base close to Pdk79. Pdk 79 is the buffer
92	3.5	80% Waikiwi, 20% Orepuki	0-7°	OB Non Eff	Ave 10% (top 15, bot 5). Buffer & last bite strip at north end
93	4.5	100% Orepuki	8-15°	OB Non-Eff Slope 8-15	8-15%. Paddocks 92, 94 & 97b as buffers
94	7.2	100% Orepuki	8-15°	OB Non-Eff Slope 8-15	8-15% 10m buffer in SW corner. 3m buffer at base along yearling country
97a	5	70% Orepuki, 30% Waikiwi	8-15°	OB Non-Eff Slope 8-15	8-15% 5m buffer
97b	5	66% Orepuki, 34% Waikiwi	8-15°	OB Non-Eff Slope 8-15	10% Ave. Buffer at north base of slope (Pdk 53 acts as buffer). 5m buffer South before pond

Wetland & Waterway Management

Objective: Wetlands, riparian areas and the margins of surface waterbodies are managed to avoid damage to the bed and margins of the water body, and to avoid the direct input of sediment nutrients and biological pathogens.

Targets:

- Stock are excluded from waterbodies in accordance with regional council rules or any granted resource consent
 - Low slope, undulating plains and flats (0-15°) have all dairy cattle & dairy support stock excluded from all waterbodies
 - Steeper slope (15°+) all dairy cattle excluded from all waterbodies and all dairy support stock being break fed are excluded
 - All dairy stock excluded from wetlands
- Farm tracks, gateways, water troughs, self-feeding areas, stock camps and other farming activities that are potential sources of sediment, nutrient and microbial loss are located so as to minimise the risks to surface water quality.

Good Management Practises currently exercised to meet objective:

Practice	Management	When Used	Evidence	LMU
Vegetative buffer strips	Vegetative buffer strips are maintained along all waterways on the property. This allows for filtration of any overland flow of nutrients.	Always	Photos in appendix 1	1, 2, 3, 4, 5, 6, 8, 9
Water course Crossings	At vehicle and stock crossings the entrance and exit tracks are cornered with vegetative areas so that overland flow is filtered before entering waterway.	always		All
	Overland flow originating from stock and vehicle bridges is diverted away from receiving waterbody.		Photo in appendix 1	All
	Stock use a dedicated crossing	always		All

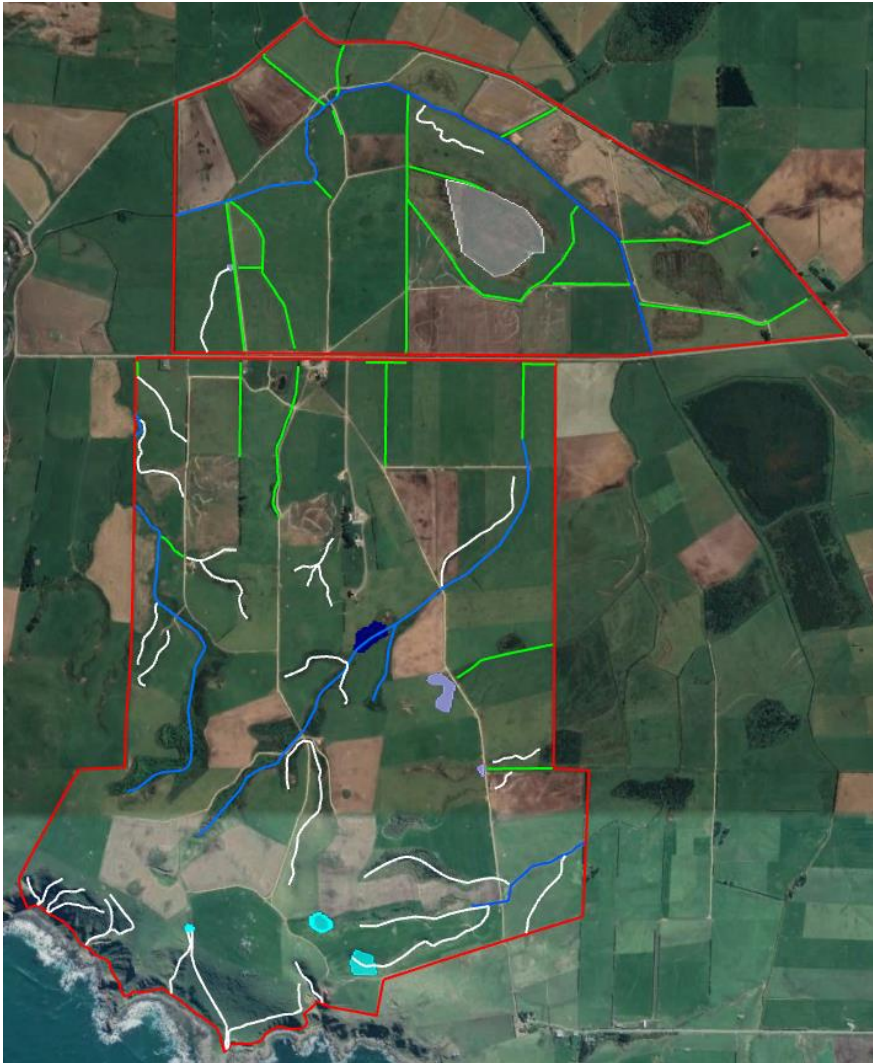
Sensitive receptors	Truck drivers, pilots and sprayers are aware as to the sensitive areas such as adjacent to waterways and relevant buffer zones to be aware of and avoid when spraying/spreading chemical/fertiliser.	Always	Site Observation, discussion	All
	Any runoff from stock feeding areas or high stock traffic areas are directed away from any waterways.	Always	Site observation, discussion	All
Coastal Area Protection	30ha of land against the coastline is under active management to protect against man made erosion.	Coastal land has been identified as at-risk and is not milked off, when it is grazed, it is extensively grazed by young stock to ensure risk of soil structural damage through pugging is minimal. The steeper slopes and land directly adjacent to the coast has been fenced off, so no stock access this area. Plantings have been considered and attempted, however due to the harsh nature of the environment, haven't been able to be established.	Site observation, LMU map	8

Continued over page.






Key Actions that will be undertaken to meet the objective:

Practice	When by	Who	Evidence	LMU	Completed?
Any new or temporary fencing of surface waterways will have a setback of 5m or more from the apex of the bank.	Ongoing	Simon Anderson	Site observation, maps	All	
Pictures of the coastline will be taken annually to enable better understanding of the level of any erosion which may occur.	Annually	Simon Anderson		8	

Waterbodies Map:



Legend:

-  [Farm Boundary](#)
-  [Dam](#)
-  [CSA](#)
-  [CSA ephemeral](#)
-  [Drain](#)
-  [Waterway](#)
-  [Waterbody](#)
-  [swamp](#)

Effluent Management

Objective: To manage the operation of the effluent system to avoid adverse effects on water quality

Targets:

- Effluent system and application fully compliant
- Effluent correctly applied to avoid contamination of surface or ground water
- Effluent correctly applied to avoid contamination of surface or ground water

System Details:

Effluent flows under gravity to a sump where it is pumped to a clay lined storage pond. The effluent is then stored until suitable ground conditions permit application and effluent is then discharged via a Larrall low application sprinkler system.

Max Cows consented: 1000

Area consented: 170ha* (application submitted in 2022 to increase consented area to 190)

Note: the actual discharge area can often be lower than the consented area, however having a larger area consented means the effluent can be discharged to the best suited area at the time (as paddocks can be taken out for cropping, pasture renewal or rehabilitation following a weather event or in the event of structural damage requiring rehabilitation prior to effluent discharge to the area again)

Main Pond Material & Size: Clay 3,696m³ capacity (not including freeboard/sludge)

Sump/Small Pond Material & Size: Concrete 300m³ (not including freeboard/sludge)

Application rates: 6 x sprinklers pump effluent for 10mins/hour each sprinkler at an instantaneous rate of 12mm/hour. Note because the sprinklers run for 10mins only each the actual application rate of effluent is 2mm/hour. Some silage paddocks and Category A land may receive more than one application per 24 hour period if soil conditions allow

Good Management Practises currently exercised to meet objective:

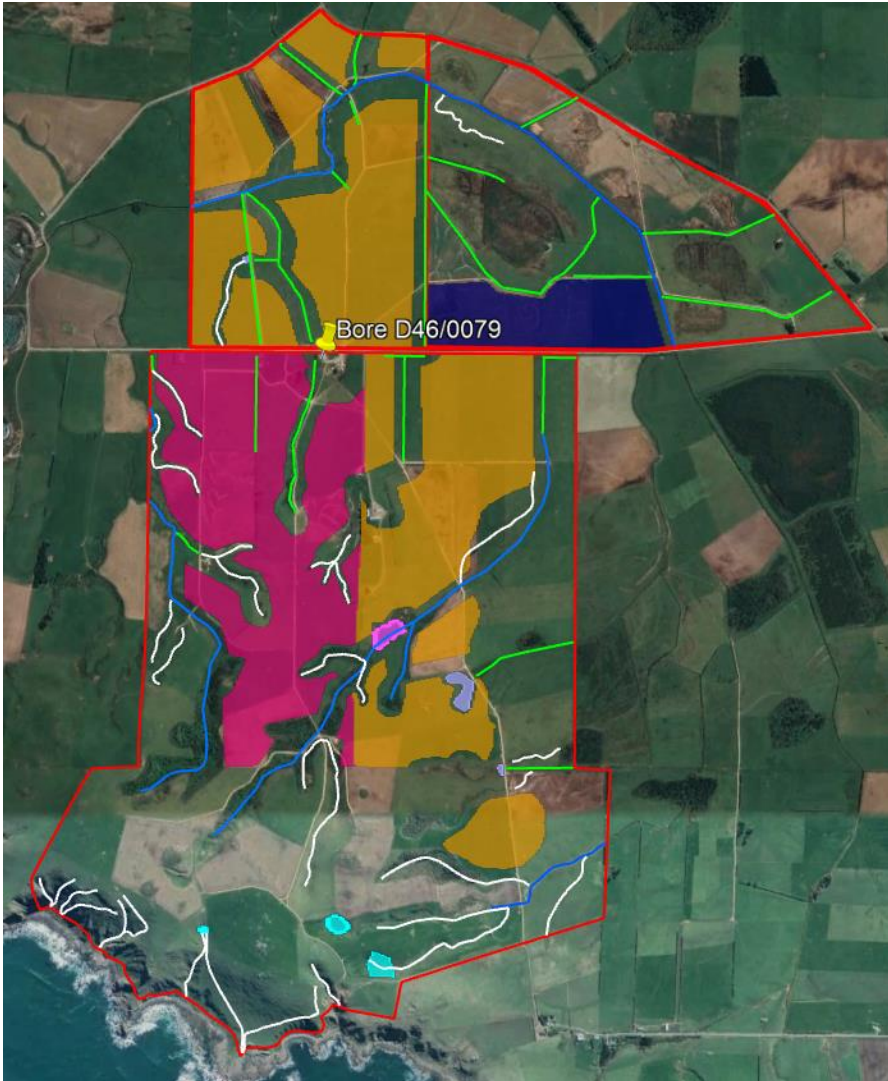
Practice	Management	When Used	Evidence	LMU
System meets COP	<p>All farm dairy effluent storage facilities installed on the property are designed in accordance with the Effluent Design Code of Practice</p> <p>No effluent is applied within 40 metres of a rivers, streams, or drains.</p> <p>All effluent from dairy sheds, yards, and feed pads is collected for land application</p>	Always	<p>See Effluent Map</p> <p>See Description of Effluent system above</p>	1, 4a, 9
Discharge	<p>All effluent is applied when soil moisture and temperature conditions allow.</p> <p>Immediate action taken when incidents occur. Includes rectifying problem, cleaning up and putting in place actions to reduce risk of recurrence.</p> <p>No effluent is spread, over drains or water races, within 50m of bore, within 20m of public road, within 150m of residential dwelling</p> <p>Runoff originating from stored solids is captured and diverted back to effluent pond.</p> <p>Effluent discharges are managed so as not to create an offensive odour beyond the property boundary.</p>	Effluent is not applied on Area A identified land when the wind is coming from the east	Area A identified on Effluent Map	1, 4a, 9

Operations	<p>Emergency management – major risks identified & emergency procedures in place</p> <p>Staff are trained to ensure they understand the management of the system and appropriate decision-making process for when and where to apply effluent.</p> <p>Emergency management plan in place if system fails.v Bale gets placed to block the spill whilst it is being cleaned up. Water samples are taken at the time of any occurrence. Stop flow, suck it out & spread back onto paddocks.</p> <p>2nd back up pump for the sump</p> <p>Alarm system for sump overflow has been ordered</p>	Always (as needed)	Seed Appendix 3 for emergency management plan	1, 4a, 9
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





Key Actions that will be undertaken to meet the objective:

Practice	When by	Who	Evidence	LMU	Completed?
Investigate taking an effluent sample each season to test for nutrient concentration	2025	Simon Anderson	Effluent sample data	1, 4a, 9	
Accurate modelling of an Overseer Nutrient budget annually, complete with effluent analysis	Annually	Environmental Consultant	Overseer Nutrient Budget Analysis	1, 4a, 9	
Repair Scour Hole in Effluent Storage facility as ID'd by Dairy Green	YE2023	Simon Anderson		1	Yes
Remove Gorse around effluent storage facility as ID'd by Dairy Green	YE2023	Simon Anderson		1	Yes

Effluent Map – Currently & Proposed Consented:



Legend:

-  Farm Boundary
-  Consented Effluent Area
-  Consented Effluent Area A
-  Proposed new block Effluent area
-  Dam
-  CSA
-  Waterbody
-  CSA ephemeral
-  Bore D46/0079
-  Waterway
-  Drain

Water Use

Objective: To use water efficiently.

Targets:

- All new systems are designed and installed with industry codes of practice and standards.
- Ensure all water takes are metered as required under Regional Council rules.

Good Management Practises currently exercised to meet objective:

Practice	Management	When Used	Evidence	LMU
	Stock water troughs are present on the farm	Always	Site Maps, Observation	All except 7
	Water systems are managed and maintained to avoid wasted water.	Always	Site observation – no leaking troughs	
	To ensure water is used efficiently around the farm checks are in place such as when stock is moved, troughs are checked for leaks. Any leaks are fixed as soon as possible.	Always	Discussion	
	Shelter belts are well established on the property as shade for livestock and to help maintain soil moisture	Always	Site observation Photos	All
	Ensure all water takes are metered as required under regional council rules.	Always	Data	All except 7
	Well heads are securely protected from contaminants.			

Note:

- Bore produces 800-1000L/day maximum and this is used solely for shed water.
- Dam is used for stock water, this fills naturally from the gully.

Point Source Nutrient loss

Objective: The number and location of pits are managed to minimise risks to health and water quality.

Targets: All on farm silage, offal pits and rubbish dump discharges are managed to avoid discharge of contaminants to ground and surface waterbodies.

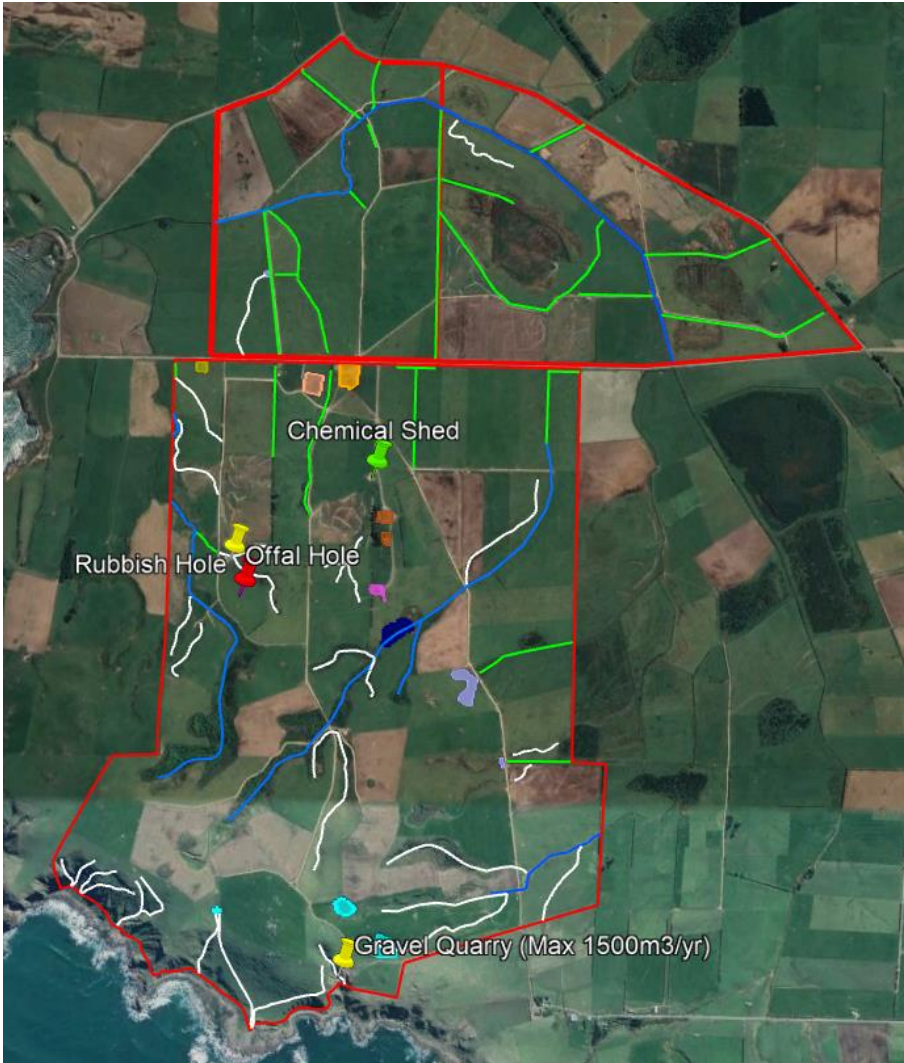
Good Management Practises currently exercised to meet objective:

Practice	When Used	Evidence	LMU
Chemical containers are recycled and removed from the farm.	As required	Site observation	All
Offal holes are located more than 100m from water abstraction points, dwellings and more than 50m from any waterways	Always	See Point Source Map	7, 1
Feed is stored in a manner that prevents run-off of nutrients to waterbodies	Always	Site observation, photos in appendix 1	1, 2, 3, 4, 5
Gravel Quarry near South Coast - used to extract gravel for track maintenance. Max 1500m3 extracted/year. Only extracted when conditions allow and won't result in sediment run-off in overland flow.	As needed	Map Below	8

Key Actions that will be undertaken to meet the objective:

Practice	When by	Who	Evidence	LMU	Completed?
All feed storage areas will be assessed for run-off risk	YE23	Environmental Consultant		1, 2, 3, 4, 5	
Gravel Quarry – buffer to be increased to coast	YE23	Simon Anderson		8	

Point Source Nutrient Loss Map:



Legend:

- | | | |
|---|--|---|
|  Farm Boundary |  Waterbody |  Offal Hole |
|  CSA |  swamp |  Chemical Shed |
|  CSA ephemeral |  Dam |  Rubbish Hole |
|  Drain |  Dairy Shed |  Effluent Pond |
|  Waterway |  Calf Sheds |  Shed |

Mahinga Kai

Objectives: To protect Mahinga Kai and manage waterways and drains recognising their cultural and ecological sensitivity to discharges of contaminants.

- To avoid damage to the beds and margins of water bodies.
- To avoid the direct input of nutrients, sediment and microbial pathogens to water bodies

Mahinga Kai values are protected by implementing all other FEP Objectives and Targets taking Mahinga Kai values into account.

Good Management Practises currently exercised to meet objective:

Practise	Management	When Used	Evidence
	Mahinga Kai values are protected by implementing all other FEP objectives and targets taking Mahinga Kai values into account.	Always	Site observation, FEP document
	Demonstrate an understanding of Mahinga Kai values and species present on the property and what aspects of their habitat need to be nurtured in order to allow appropriate species to flourish.	Journey is underway	Discussion
	Assess the risk of land use on water quality, lake health, Mahinga Kai habitat. Including actions that may exacerbate or result in discharge of sediment, effluent and nutrients to water (particularly in wet seasons)	Ongoing	Discussion, FEP document
	Identify risk of overland flow of sediment and faecal bacteria on the property and implement measures to minimise transport of these to waterbodies	As per GMPs above	Discussion, site observation, FEP document

Key Actions that will be undertaken to meet the objective:

Practice	When by	Who	Evidence	Completed
Observational assessment carried out on the property to better understand mahinga kai on the property (including Ouki Creek)	YE24	Simon Anderson	Assessment Notes	
Continue involvement in local catchment group	Ongoing	Simon Anderson	Discussion	

Ecosystem Health

Ecosystem health considers the interactions between the physical environment, such as soil water and air, and is an integral part to our well-being.

Measuring these components is complicated and varies for different types of ecosystems. The following five components are important when considering freshwater ecosystems:

1. Aquatic life: The abundance and diversity of biota including microbes, invertebrates, plants, fish, and birds, and any invasive species present.
2. Habitat: The physical form, structure, and extent of the waterbody, its bed, banks and margins, riparian vegetation, and connections to the floodplain.
3. Water quality: The physical and chemical measures of the water, including the presence of pollutants (eg excessive nutrients).
4. Water quantity: The extent and variability in the level or flow of water, including connections between different water bodies.
5. Ecological processes: The interactions among biota and their physical and chemical environment.

At present, there is insufficient high-quality data available to describe all the aspects of a healthy ecosystem in this location. The landowners are aware of the importance of this issue and address this issue by being involved in their local catchment group.

Cultural values of the ecosystem have been given affect to through the Mahinga Kai section. Freshwater waterbodies have been considered throughout the good management practices implemented and risk assessment completed.

Throughout the farm Environment management plan Pahia Dairies Ltd farm considers and seeks to adopt practices that minimise the effects on the ecosystem both within and beyond the farm boundary.

Biodiversity

Definition: Biodiversity is the variety of all living things and ecosystems. It includes plants, animals, fungi and micro-organisms as well as the ecosystems (on land or in water) where they live.

Objective: To integrate, protect and enhance biodiversity within the farming system

Targets:

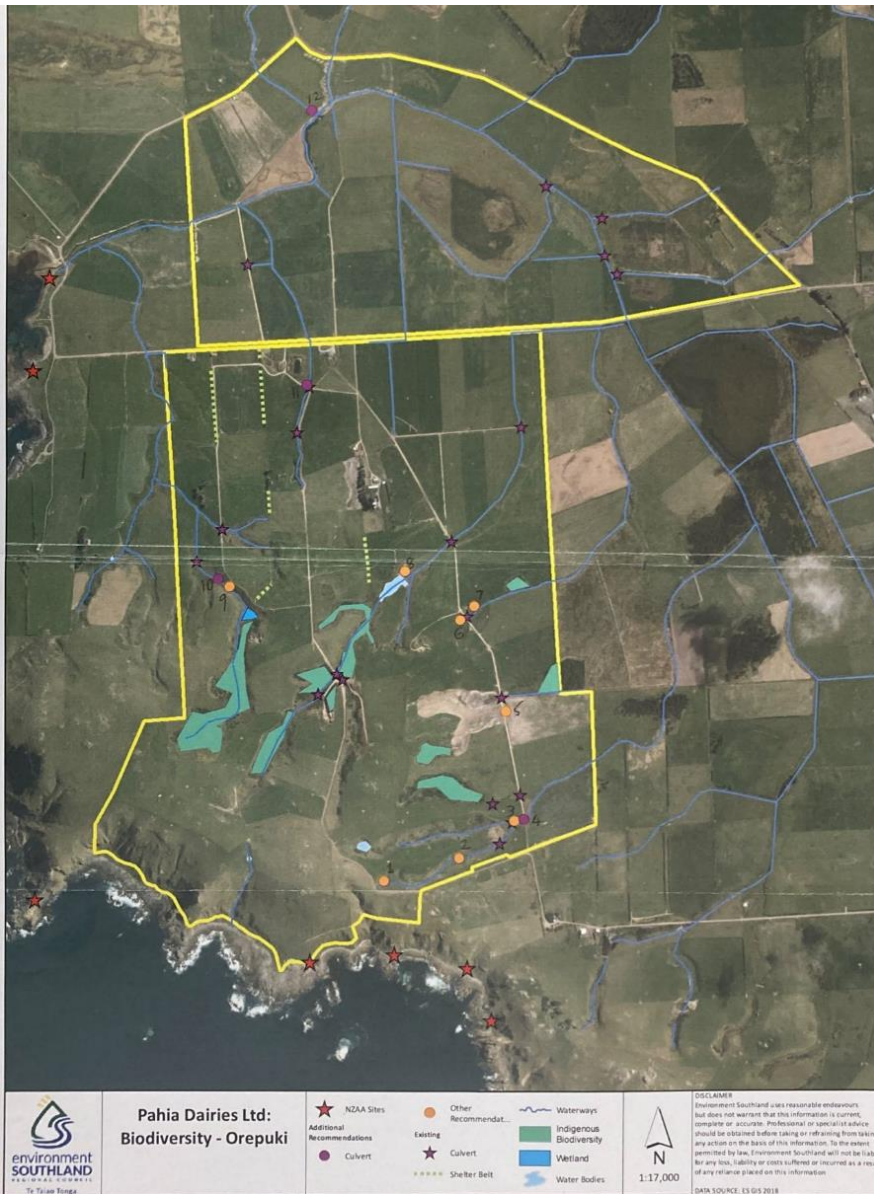
- Assess and map any native vegetation resources on your farm
- Complete a risk assessment and identify goals and actions to manage your biodiversity resources
- Establish ongoing monitoring of your biodiversity resources

Pests and Weeds identified on property	Mitigation Plan	Trend
Gorse & Broom	Spot Spraying occurs in summer by on farm staff	On decline
Possums, stoats, ferrets, wild pigs & deer	Traps and shooting where applicable	Relatively well managed

Key Actions that will be undertaken to meet the objective:

Practice	When by	Who	Evidence	Completed
Observation of and care taken of sown legume and herb species in swards to preserve symbiotic relationship and promote biodiversity	Ongoing	Simon Anderson	Seed purchasing records	
Ongoing pest and weed management (trapping, spraying, shooting)	Ongoing	Simon Anderson & identified staff		

Biodiversity Map



(Note: Map was completed by environment southland with no changes since creation in 2018)

Green House Gases

Commented [JS1]: Update these from Overseer

The Climate Change Response (Zero Carbon) Amendment Act (2019) provides a framework by which New Zealand can develop and implement clear and stable climate change policies that contribute to the global effort under the Paris Agreement to limit the global average temperature increase to 1.5°C above preindustrial levels. The Act sets a new domestic greenhouse gas emissions reduction target for New Zealand to:

- reduce net emissions of all greenhouse gases (except biogenic methane) to zero by 2050. (Biogenic methane is produced from plant and animal sources).
- reduce emissions of biogenic methane to 24–47 per cent below 2017 levels by 2050, including to 10 % below 2017 levels by 2030.

The Government, primary sector and Iwi came together to develop an appropriate strategy and farm gate emission pricing mechanism by 2025. The primary sector's proposed 5-year programme of action is aimed at ensuring farmers and growers are equipped with the knowledge and tools they need to deliver emissions reductions while maintaining profitability. The first step in the project delivery is for farm businesses to be aware of and able to report their on-farm greenhouse gas emissions and have a plan in place.

Pahia Dairies GHG Emissions:

	eCO ₂ (carbon dioxide equivalents) tonnes/yr				
	Methane GHG Emissions	N ₂ O GHG Emissions	CO ₂ GHG Emissions	Total GHG Emissions	Tool Used
Predictive 2022	3167.7	945.9	834	4947.5	Overseer FM v6.4.3
Year End 2022	3205.5	951	813.5	4970	Overseer FM v6.4.3

Managing Green House Gas Emissions:

Methane emissions are driven predominantly by Dry Matter Intake of animals. Simplistically, the more feed that is harvested by ruminants, the more methane that will be emitted. Nitrous oxide emissions are driven by the nitrogen cycle, fertiliser and effluent applications and the wetness of the soil. Carbon dioxide is generated every time fossil fuels are burnt.

Key Actions that will be undertaken to meet the objective:

Practice	When by	Who	Evidence	Completed
Manage N fertiliser application timing to limit volatilisation	Ongoing	Simon Anderson	Fertiliser placement records	
Urease Inhibitors with N applications through the dry season e.g. SustaiN	Ongoing	Simon Anderson	Fertiliser records	
Start accumulating data on mineralizable N levels for N fertiliser decisions	Ongoing	Ballance	Soil test data	

Purchased 100ha Block Commentary

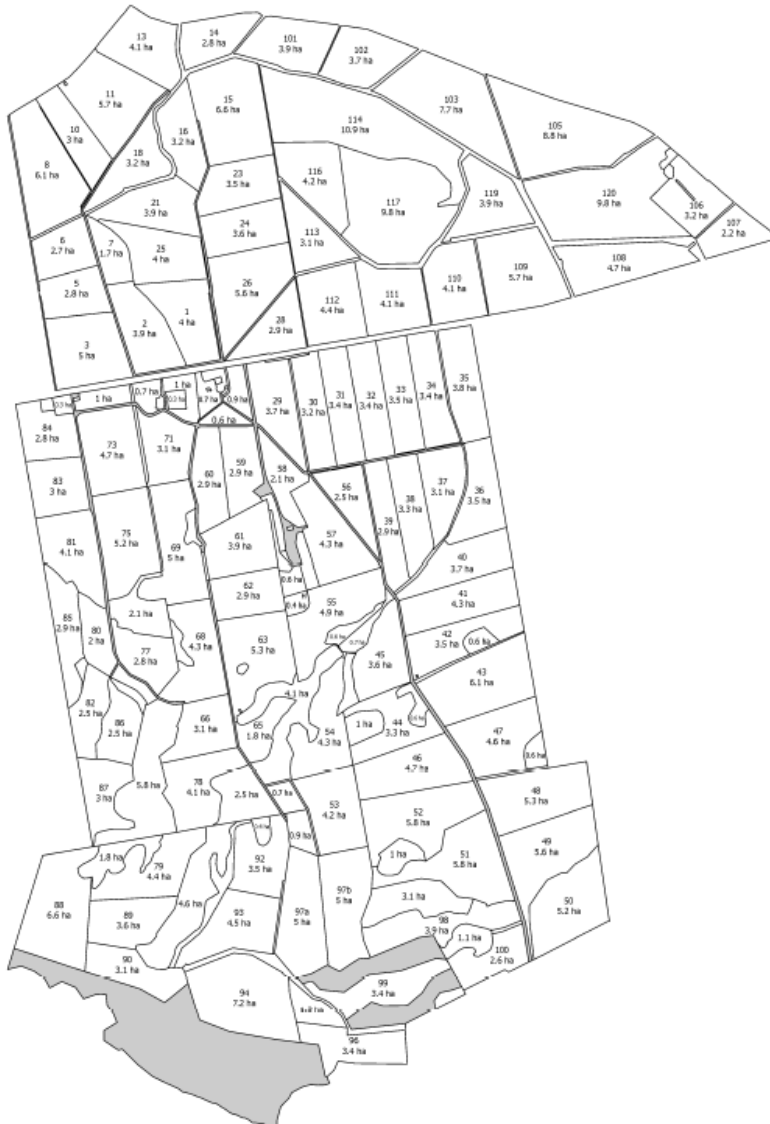
Information Provided

- 384 Pahia Wakapatu Road “100ha” block purchased in late 2017.
- Legal Description: 98, 8994m²; Part Section 14 BK V Longwood S.D; DP: B3/1317
- Prior Land use:
 - Dairy Support
 - Approx 35ha winter crop
 - Carrying capacity of 800-1000SU
- 100ha block steady state pre-purchase baseline modelled in Overseer

Assumptions Made when modelling baseline in Overseer Can be provided by Lumen Environmental Ltd.

Appendix 1: Blank Farm Map

Pahia Dairies Ltd
4017154



Appendix 2: Images



Main Effluent Pond with buffers



Main Effluent Pond showing vegetative buffers



Small effluent pond fenced off



Fencing around effluent pond showing vegetative buffer and signage



Chemical storage showing fencing



Baleage storage with vegetative buffer



PKE Storage



Strip Tilled Beet with Southland Bale System and vegetative buffer



Buffer strip in crop: Maroon ink “VB” shows the 5m+ buffer strip to the fence line from the crop and the yellow “VFW” ink shows the fenced waterway with vegetative buffer



Permanent fencing of waterway with vegetative buffer



Example of fenced river and over 5m vegetative buffer strip to river bed



Culvert stock crossing showing vegetative lip (more work is planned on some of these)



Fenced Dam with vegetative buffers and Mai Mai's present for pest control/recreation



Fenced Dam and vegetative buffers, fenced bush and riparian filter prior to dam



Fenced bush under active management



Fenced bush and scrub under active management (showing gorse sprayed)



Shelter Belt Planting Example

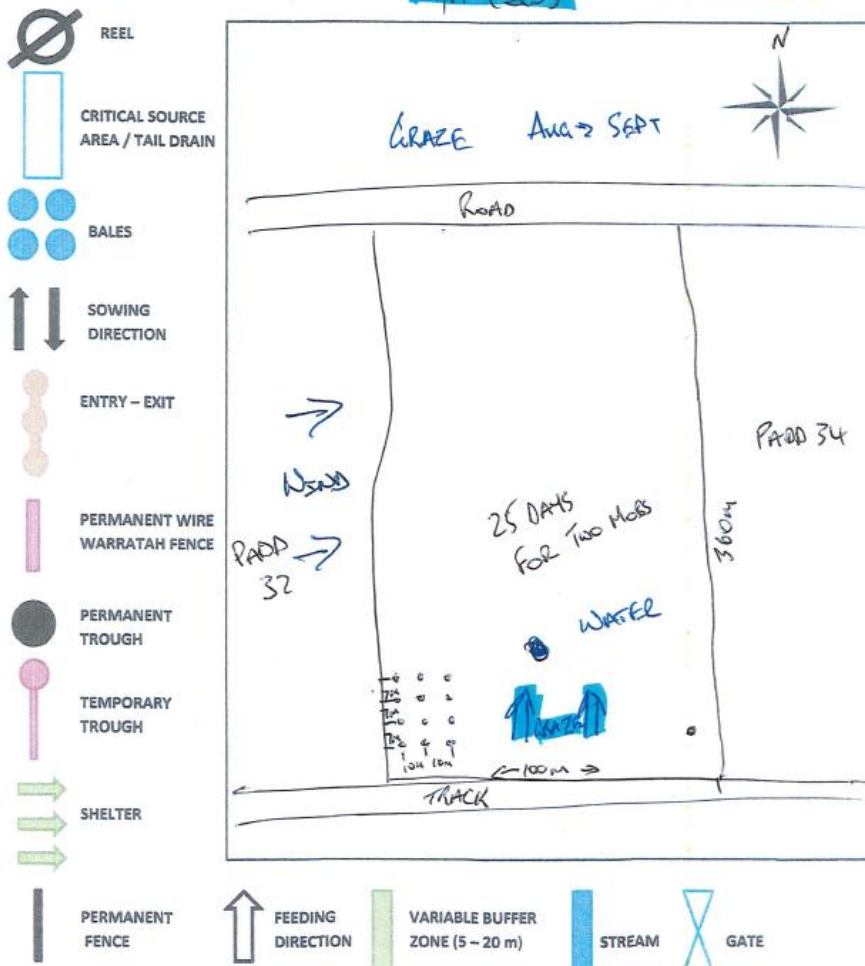
Appendix 3: Intensive Winter Grazing Plans

Paddock 33 Grazing Management Plan:

Pahia Dairies Ltd
Paddock N° 33
EFFECTIVE AREA (Ha) 3.5
EXPECTED YIELD (T) 17 Tons

SWEEPS
GRAZE AREA WITH ALGAS
EXCLUDED BUFFER AREA _____
M/A Cows

$3.5 \times 17,000 = 59,500$ KG
50 BREAKS
3 BALES / BREAK
150 BA



Paddock 45 Grazing Management Plan:

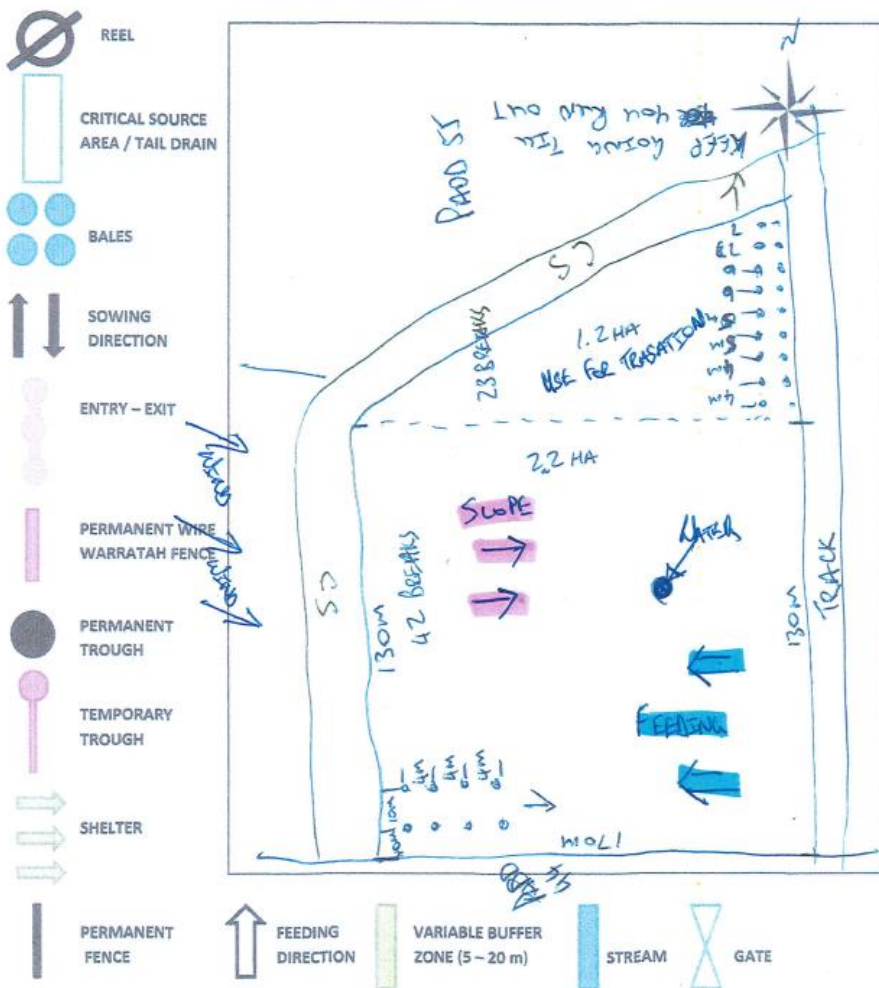
Pahia Dairies Ltd

21,000 x 3.4 TONE
= 71,600 kg DM

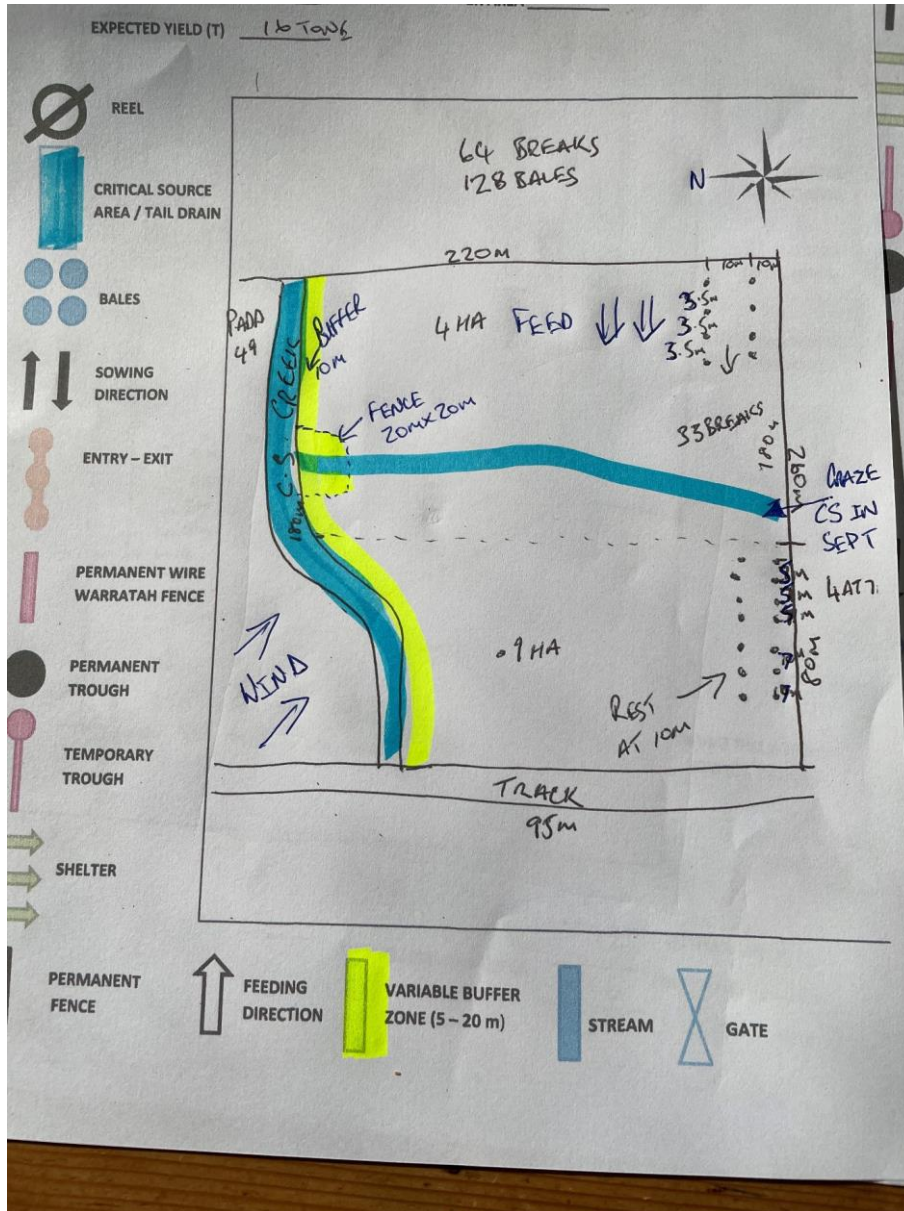
Paddock N° 45

EFFECTIVE AREA (Ha) 3.4 H EXCLUDED BUFFER AREA _____

EXPECTED YIELD (T) 21



Paddock 50 Grazing Management Plan:



Paddock 51 Grazing Management Plan:

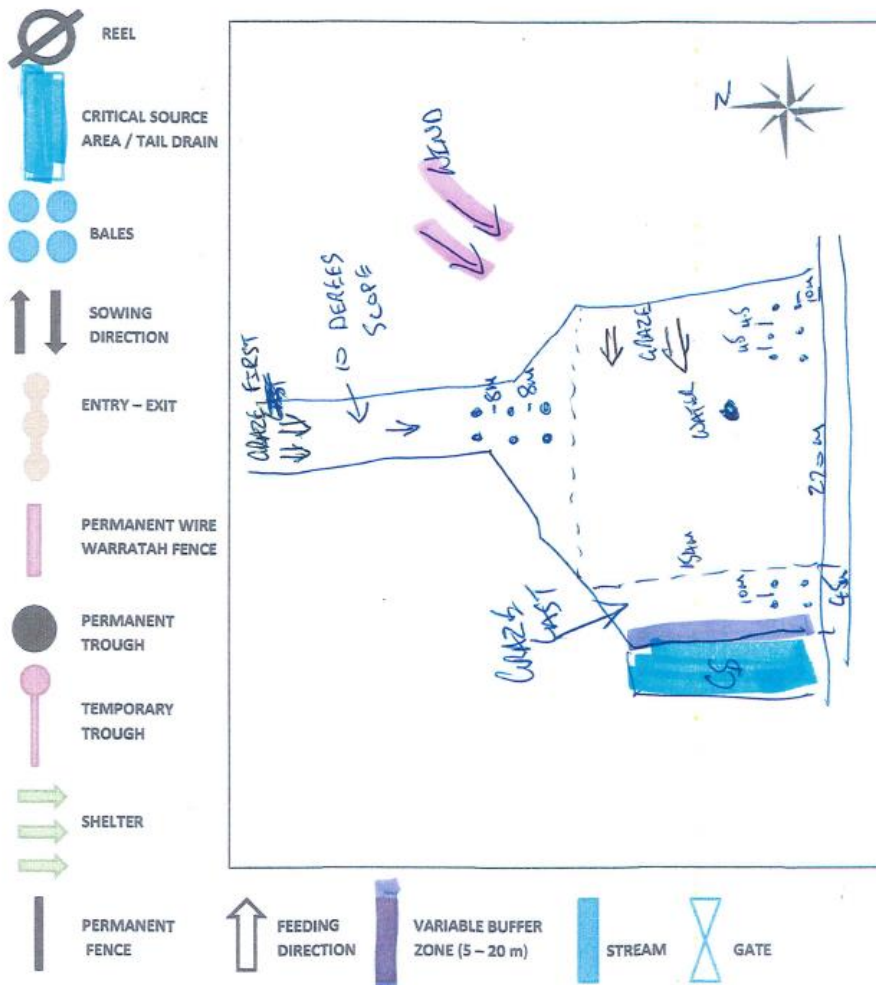
Pahia Dairies Ltd

SWEDF

Paddock N° 51

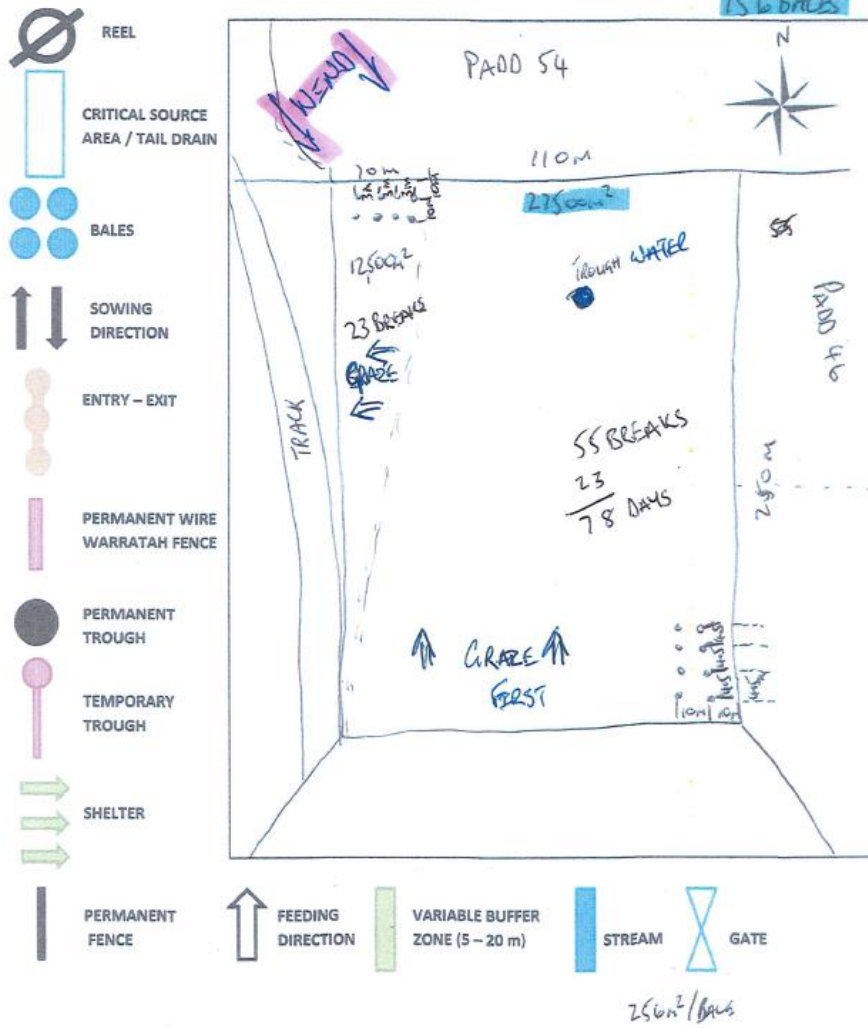
EFFECTIVE AREA (Ha) 5.4 EXCLUDED BUFFER AREA _____

EXPECTED YIELD (T) 16 Tons



Paddock 53 Grazing Management Plan:

Pahia Dairies Ltd
FOADER SEAT R2 HFA
Paddock N° 953
EFFECTIVE AREA (Ha) 4 EXCLUDED BUFFER AREA 0
EXPECTED YIELD (T) 21 Tonne
4 HA x 21000kg = 84,000
84,000 ÷ 9 = 9333
9333 ÷ 120 = 78 BREAKS DAYS
156 BALES



Paddock 61 Grazing Management Plan:

Pahla Dairies Ltd

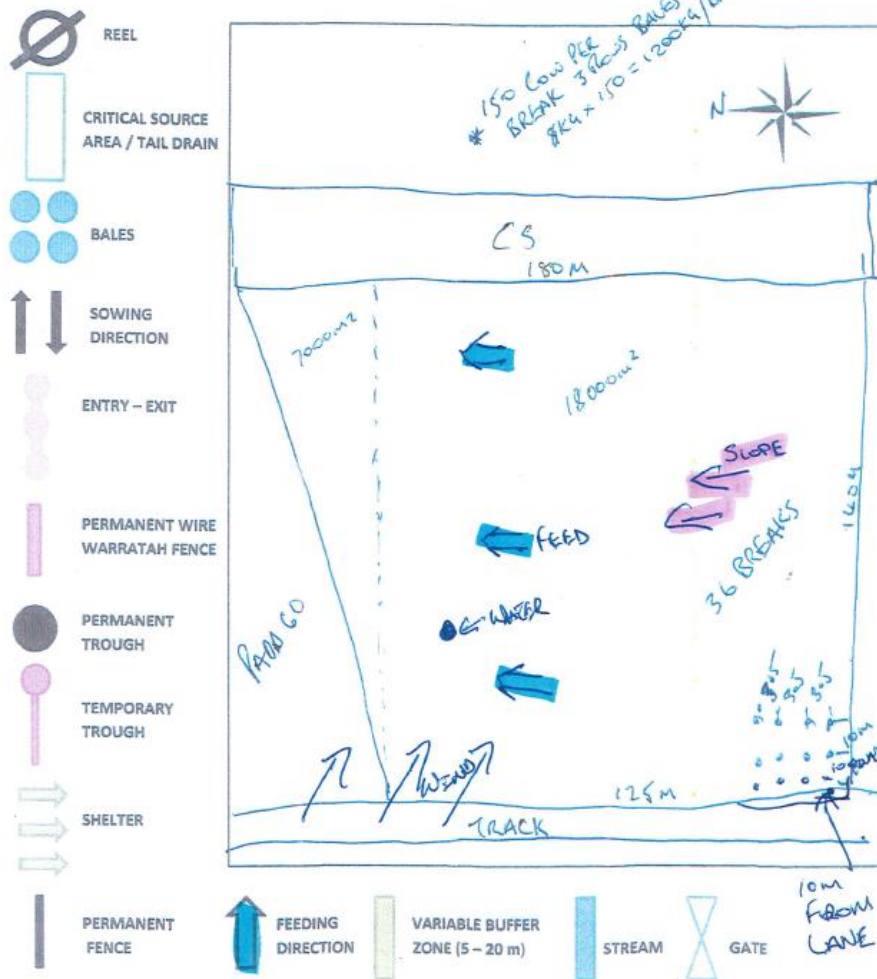
S/B

$24 \text{ tons} \times 2.5 \text{ HA} = 60,000$

Paddock N° 61

EFFECTIVE AREA (Ha) 2.5 HA EXCLUDED BUFFER AREA _____

EXPECTED YIELD (T) 24 Tons



Paddock 78 Grazing Management Plan:

Pahia Dairies Ltd

Paddock N° 78

EFFECTIVE AREA (Ha) 3.8 Ha EXCLUDED BUFFER AREA _____

EXPECTED YIELD (T) 21 Tonne

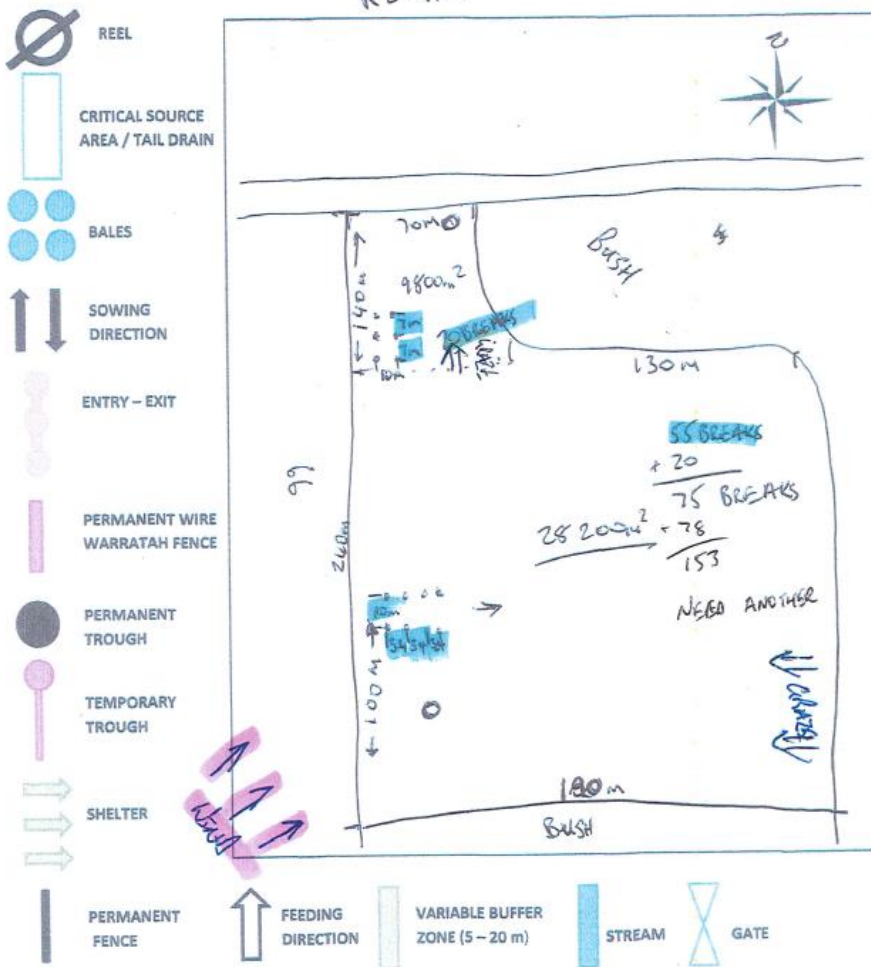
F/B

$$3.8 \times 4,000 = 15,000 \text{ Kal}$$

$$75 \times 2 \text{ BALES} = 150 \text{ BALES}$$

TOTAL 75 BREAKS

RZ HERS

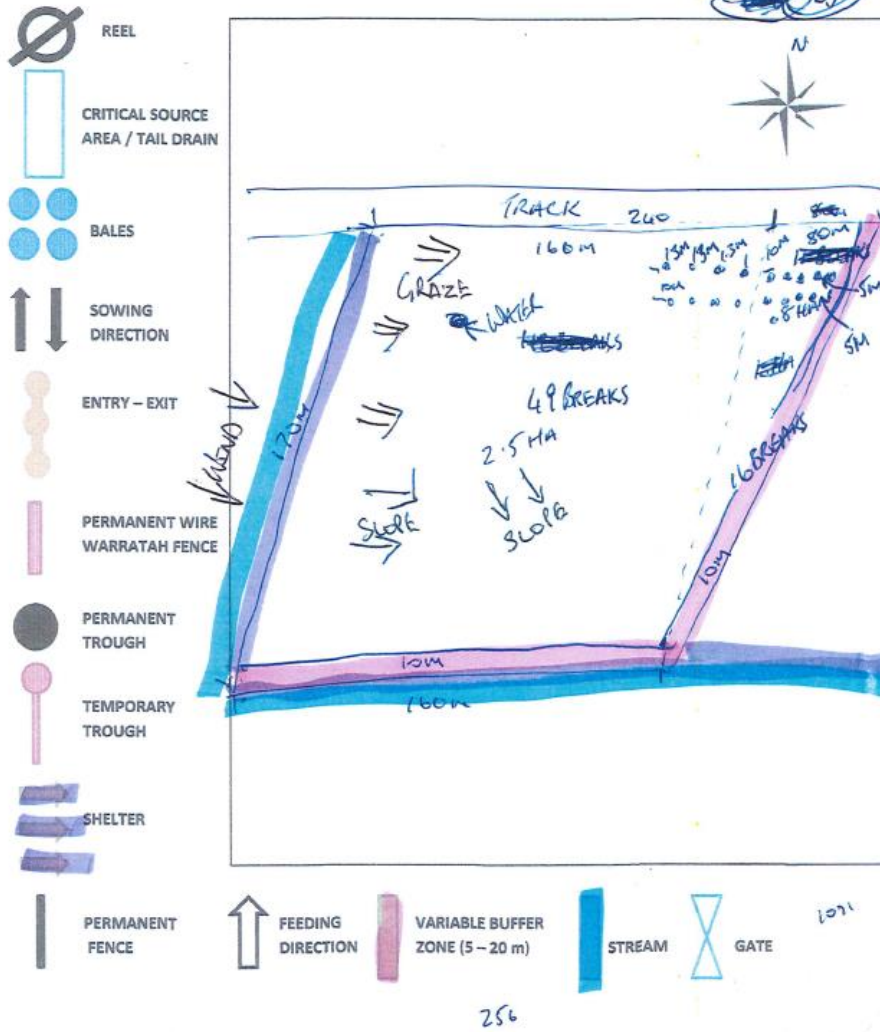


Paddock 102 Grazing Management Plan:

Pahia Dairies Ltd

Paddock N° 102
 EFFECTIVE AREA (Ha) 3.4 EXCLUDED BUFFER AREA _____
 EXPECTED YIELD (T) 21

Total BREAKS 65



Paddock 110 Grazing Management Plan:

Pahia Dairies Ltd

$4 \text{ HA} \times 15,000 = 60,000$

Paddock N° 110

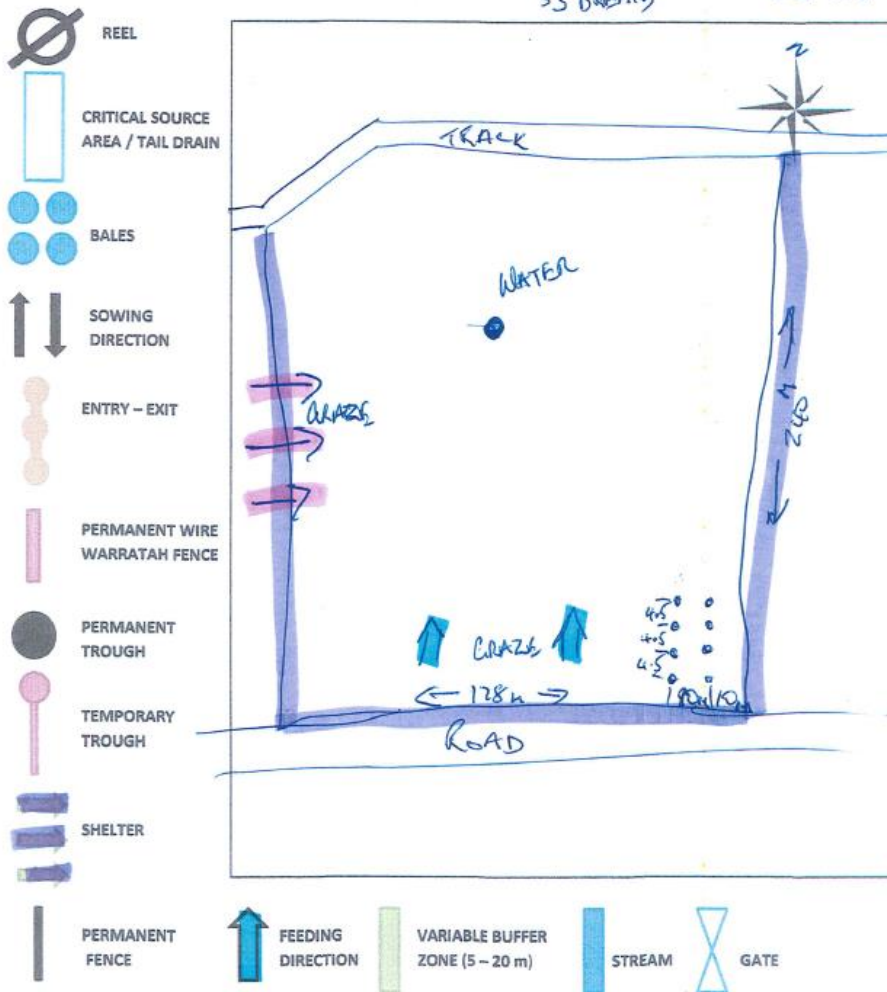
$110 \text{ cows} \times 11 = 1210$

EFFECTIVE AREA (Ha) 64 EXCLUDED BUFFER AREA _____

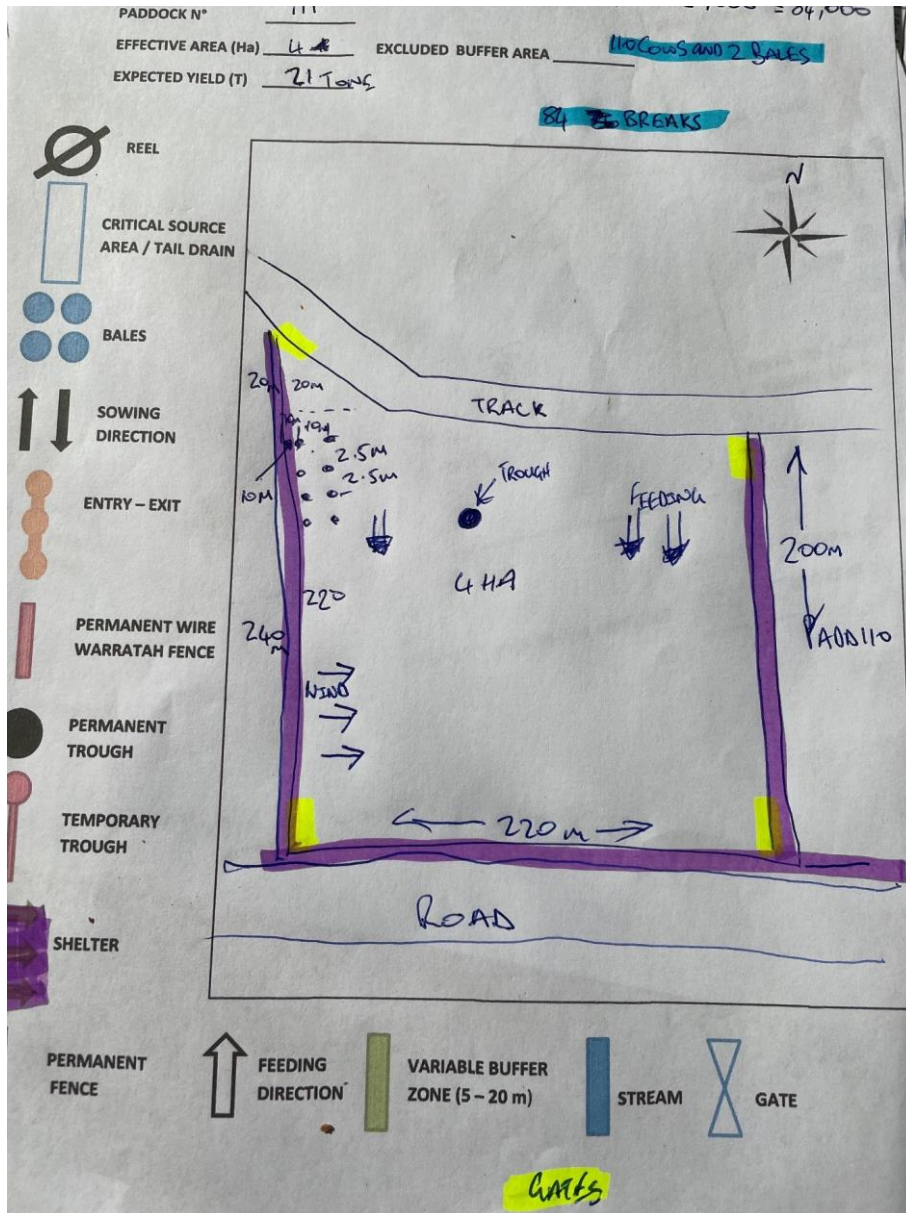
EXPECTED YIELD (T) 157 tons

53 BREAKS

106 BALES



Paddock 111 Grazing Management Plan:



Appendix 4: Effluent Emergency Management Plan

Pahia Dairies Limited

Effluent Emergency Procedures

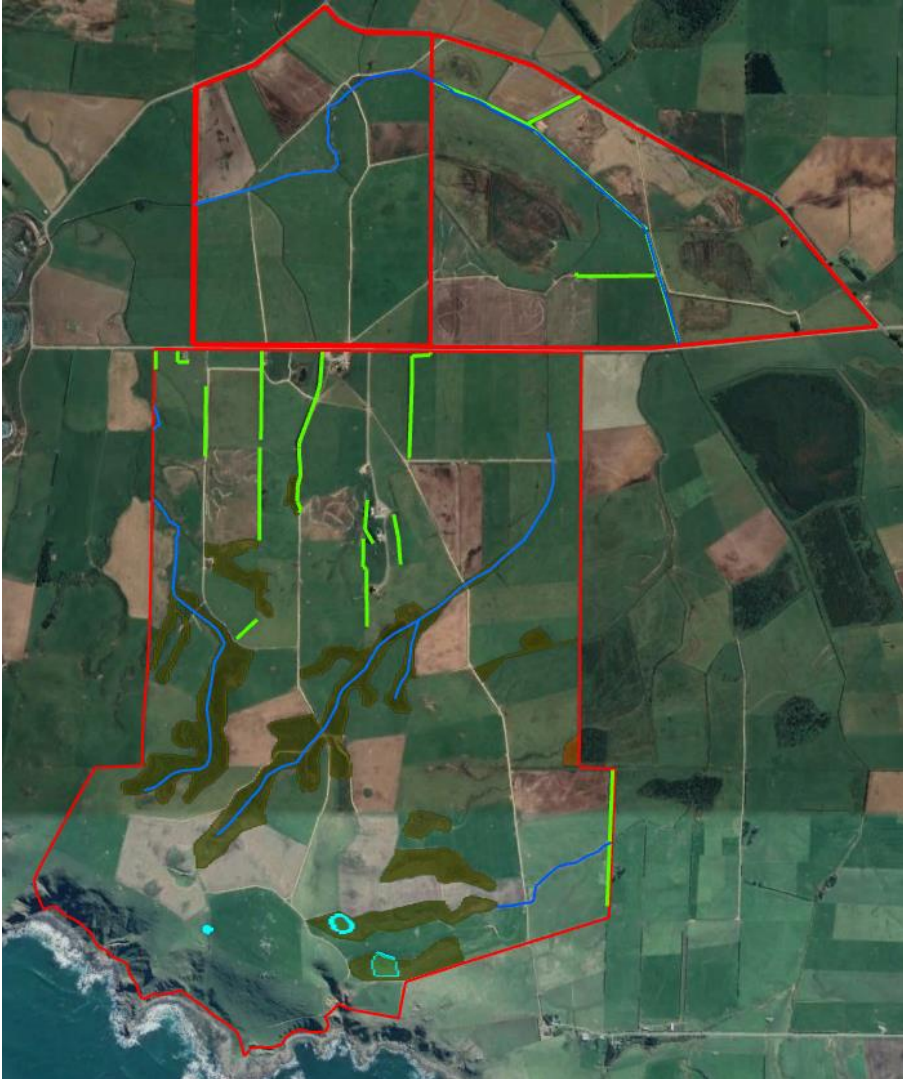
If something goes wrong, the first priority is to stop the discharge, the next step is to investigate the source of the problem and fix it immediately; in such a way the problem does not recur.

- Notify your Farm Manager – Simon Anderson 027 491 1975
- Record details of the incident and remedies





Problem	Action
Effluent has entered a waterway	<ul style="list-style-type: none"> • Block the waterway with a bale of straw (if practical) to stop the discharge exiting the property • Notify your Farm Manager – Simon Anderson – and Environment Southland
Storage pond is full and environmental conditions are prohibiting irrigation	<ul style="list-style-type: none"> • Talk with your Farm Manager – Simon Anderson 027 491 1975. Or Resource Management Advisor at Lumen – Jenna Sutton 0800 458 636. • Devise a plan of action which may include irrigating at a lower application rate and selecting drier areas of the farm to irrigate.
Effluent has gone outside the property boundary	<ul style="list-style-type: none"> • Prevent any further effluent leaving your property, eg stop or move irrigator, block tile drain • Contact the neighbour affected • Talk with your Farm Manager – Simon Anderson.
Effluent has been over applied	<ul style="list-style-type: none"> • Investigate the cause of the issue, remedy the problem and put solutions in place to prevent it occurring in the future.
Leaks in the system	<ul style="list-style-type: none"> • Investigate the cause of the issue, remedy the problem and put solutions in place to prevent it occurring in the future.

If you have a discharge into a waterway or are unsure of how to reduce the environmental impact of the discharge, then contact Environment Southland on 0800 76 88 45.

Appendix 5: Trees/Plantings



Legend:

-  Farm Boundary
-  Fenced off Bush/Scrub
-  Shelter Belt/Planting
-  [Waterway](#)