

PART A

Application for Resource Consent



This application is made under Section 88 of the Resource Management Act 1991 (Form 9)

The purpose of this Part A form and the relevant Part B form(s) is to provide applications with guidance on information that is required under the Resource Management Act 1991. Please note that these forms are to act as a guide only, and Environment Southland reserves the right to request additional information.

To: Environment Southland
Private Bag 90116
Invercargill 9840

1. Applicant(s) Details

A resource consent can only be held by a legal organisation or fully named individual(s).

1.1. Applicant's name (full name of proposed consent holder). Please complete either (a) OR (b) to whom consent is to be issued

	First Name	Middle Name	Surname
--	------------	-------------	---------

(a) Individual(s)

_____	_____	_____	_____
_____	_____	_____	_____

OR

(b) Registered company name

Platinum Dairies Limited

Company number

3448971

1.2. Applicant's address [not consultant's address]

(a) Individual(s)

Postal Address

McKenzie Road

Email

benmoredowns@farmside.co.nz

Phone

_____ Mobile _____ Fax _____

(b) Company

Contact Person

Postal Address

Email

Phone

_____ Mobile _____ Fax _____

2. Consultant/ Agent details (if applicable)

Contact person Matilda Ballinger

Company Landpro

Postal Address 13 Pinot Noir Drive

Email matilda@landpro.co.nz

Phone _____ Mobile _____ Fax _____

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

No

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)

149 McKenzie Road

Map Co-ordinates (NZTM 2000)

1241093

E

1242296

N(NZTM 2000)

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

Section 9-13 Block IX River Hundred
Section 22-24 Block IX New River Hundred
Lot 1 DO 13715
Lot 2 DP 544352
Lot 2 13820

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 checked="" 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 type="checkbox"/>	Intensive winter grazing
<input checked="" 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 checked="" 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
<input type="checkbox"/>	

What is the purpose of this application?

New resource consent

Renew resource consent

Variation of conditions according to S 127 RMA

Certificate of compliance

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

Yes

No

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

AUTH-302424
AUTH-302424

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

Yes

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.)

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

Yes

No

If yes, please provide name of staff member if known

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?

- Payment of the required deposit (*see fee schedule*)
- Written approval from all potentially affected parties (*forms available from the Environment Southland website*)
- Site plan/location map/sketch of the proposed activity
- A copy of the Certificate of Incorporation (*where applicant is a company*)
- 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) MATILDA BALLINGER (LANDPRO)

Signed

Matilda Ballinger

Date

7/12/2021

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



LANDPRO

Make the most of your land

**Resource Consent
Application to Environment
Southland**

Prepared for Platinum Dairies Ltd

Prepared For

Platinum Dairies Ltd

Prepared By

Landpro Ltd

13 Pinot Noir Drive

PO Box 302

Cromwell

Tel +64 3 445 9905

QUALITY INFORMATION

Reference:
Date: 7 December 2021
Prepared by: Matilda Ballinger
Reviewed by:
Client Review: Jared Collie
Version Number: Final

Disclaimer:

We have prepared this report for our client based on their instructions. They may use it, as agreed between us. Landpro has no duty, and does not make or give any express or implied representation or guarantee, whatsoever to any person other than our client. If you are not our client then, unless this report has been provided to you as a local authority or central government agency as part of a public process:

- *you have no right to use or to rely on this report or any part of it, and*
- *you may not reproduce any of it.*

We have done our best to ensure the information is fit for purpose at the date of preparation and meets the specific needs of our client. Sometimes things change or new information comes to light. This can affect our recommendations and findings.

TABLE OF CONTENTS

1.	INTRODUCTION	1
1.1	Overview of proposal.....	1
1.2	The Applicant	2
1.3	Purpose of documentation	2
2.	DETAILS OF PROPOSAL.....	2
2.1	Location	2
2.2	Details of consents sought.....	4
2.3	Details of current consents	4
3.	DESCRIPTION OF EXISTING ENVIRONMENT.....	5
3.1	Land use and topography.....	5
3.2	Climate	5
3.3	Soils and physiographic zones.....	6
3.3.1	<i>Soils</i>	6
3.3.2	<i>Physiographic zones</i>	8
3.3.3	<i>Farm Dairy Effluent Classification</i>	9
3.4	Water resources.....	9
3.4.1	<i>Surface waterways</i>	9
3.4.2	<i>Groundwater</i>	9
3.4.3	<i>Surface water quality</i>	13
3.4.4	<i>Estuary</i>	14
4.	ACTIVITY CLASSIFICATION	15
4.1	Consents required	15
4.2	Consents not required.....	16
5.	NON-NOTIFICATION & CONSULTATION.....	17
6.	ASSESSMENT OF ENVIRONMENTAL EFFECTS	17
6.1	Use of land for dairy farming.....	18
6.1.1	<i>OVERSEER Nutrient Budgeting</i>	18
6.1.2	<i>Changes driving nutrient loss reduction</i>	20
6.1.3	<i>Mitigations and GMPs</i>	22
6.1.4	<i>Potential water quality effects</i>	1
6.1.5	<i>Cumulative Effects</i>	2
6.1.6	<i>Other effects</i>	2
6.2	Use of Land for Intensive Winter Grazing	2
6.3	Use of Land for a Feed Lot	1
6.3.1	<i>Use of a feed pad for more than 120 cows</i>	1
6.4	Variation to Discharge Permit.....	7
6.5	Positive effects.....	7
6.6	Other Assessment Matters	7
6.7	Assessment of Alternatives	9
7.	STATUTORY CONSIDERATIONS	10
7.1	Part 2 of the RMA.....	10
7.2	Section 104(1) of the RMA.....	10
7.2.1	<i>National Policy Statement for Freshwater Management 2020</i>	11
7.2.2	<i>Land Use</i>	14

7.2.3	<i>Water Quality</i>	15
7.2.4	<i>Effluent discharge</i>	16
7.2.5	<i>Tangata Whenua</i>	16
7.3	Sections 105 and 107 of the RMA	17
8.	CONSENT DURATION, REVIEW AND LAPSE.....	18
8.1	Consent Duration.....	18
8.2	Consent Commencement.....	19
8.3	Review of Lapse	20
9.	CONCLUSION.....	20

LIST OF APPENDICES

- Appendix A: Farm Environmental Management Plan
- Appendix B: OVERSEER Nutrient Budget Modelling Report Reports
- Appendix C: Dairy Effluent Storage Calculator (DESC) Assessment
- Appendix D: Pond design drawings

1. INTRODUCTION

1.1 Overview of proposal

Platinum Dairies Ltd (the applicant) own 1000-cow dairy farm located off McKenzie Road, Winton. Discharge Permit AUTH-302423 authorises the discharge of farm dairy effluent (FDE) and Water Permit AUTH-302424 authorises the taking of groundwater at this farm. The applicant is seeking to renew these permits as part of this application. The applicant wishes to expand their dairy platform onto a neighbouring block of land, known as the "Muir Block" which was purchased by the applicants in December 2019. This neighbouring 'Muir Block' has been run by the previous owners a sheep block and by the current owners as an intensive winter grazing block in 2019 and 2020 prior to the new NES regulations being released. The Muir Block covers 61.5ha. The applicant proposes to milk 1000 cows across the new extended dairy platform. Consent is hereby sought for the following:

- to use land for dairy farming (that did not exist as of May 2016)**
- use of land for a feed pad/lot**
- conversion of land to dairy farmland**
- renewal of Discharge Permit AUTH-302423 and variation to include effluent from feed pads/lots**
- renewal of Water Permit AUTH-302424**

This assessment has been guided by advice from Environment Southland, relevant policies of the proposed Southland Water and Land Plan (pSWLP), the Regional Water Plan for Southland (RWPS), the Regional Effluent Land Application Plan (RELAP) and the incorporated water quality technical assessment. This assessment also considers the recent National Environment Standards for Freshwater (NESFW) and the National Policy Statement for Freshwater Management (NPS-FM). The proposal includes the implementation of a wide range of good management practices and mitigation measures which avoid, remedy and mitigate adverse effects on the environment. These are described in detail in this proposal and are also included in the attached Farm Environmental Management Plan (FEMP).

This proposal includes the recommendation that nitrogen and phosphorus output limits are imposed on the resulting land use consent. These limits would ensure that the activity is undertaken at a contaminant loss level which is significantly less than the existing situation when modelled using the latest version of Overseer. These limits would be implemented via the land use consent conditions and the FEMP that includes all the relevant good management practices (GMPs) and mitigation measures that go beyond GMPs.

1.2 The Applicant

Applicant Address: Jared Collie
731 Benmore Otapiri Road, RD2
9782

Address for Service: C/- Landpro Limited
PO Box 302
Cromwell 9342

1.3 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. DETAILS OF PROPOSAL

2.1 Location

The farm is located at 149 McKenzie Road, Winton. The farm is situated in the Makarewa River catchment. The farm as well as the Muir Block is shown on the figure below.

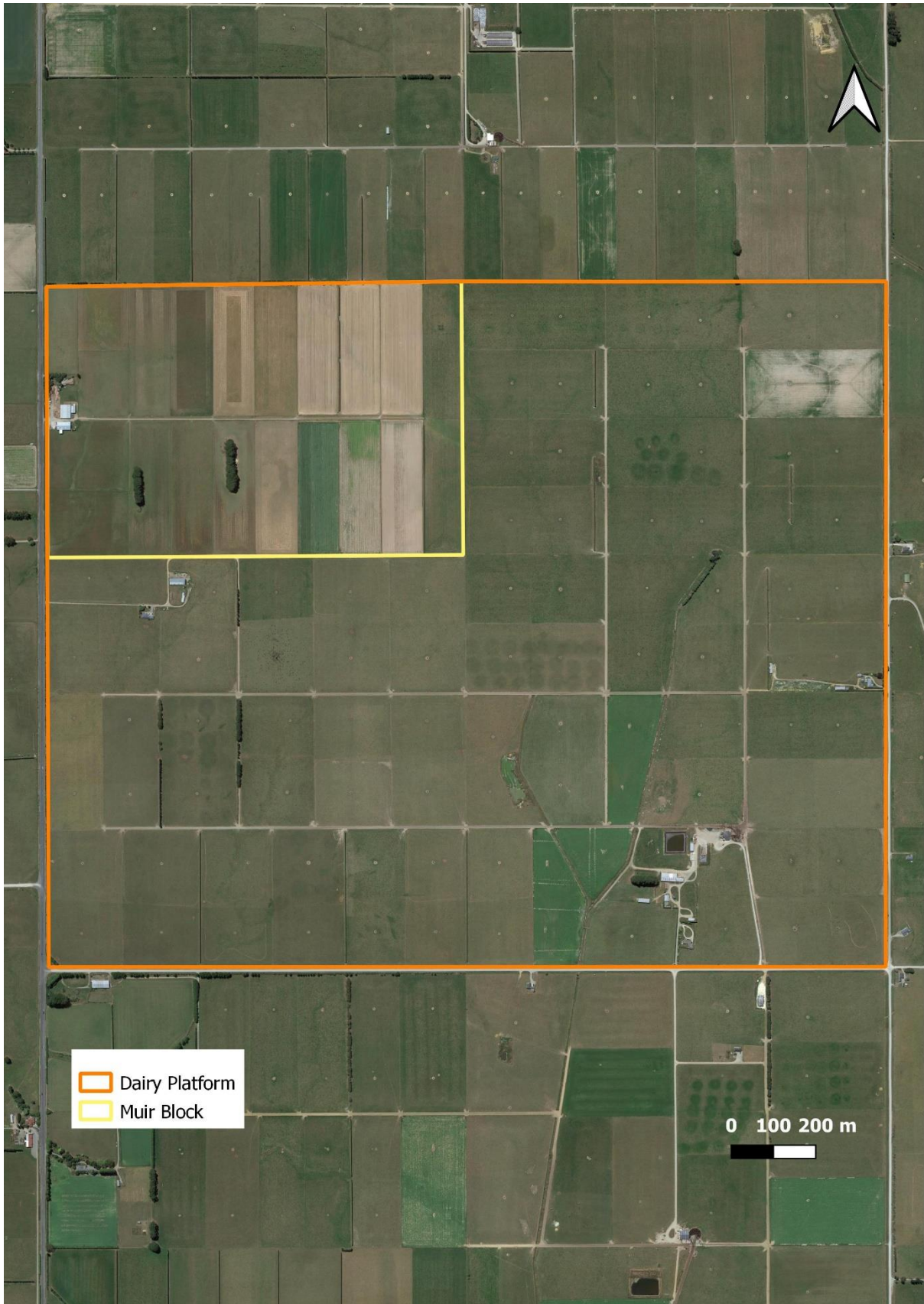


Figure 1: Map showing the locations of the dairy platform and the Muir Block.

2.2 Details of consents sought

The following provides further details of the farming system proposed.

Details of the changes to the farm system and relevant consents are listed in the tables below. Cow numbers discussed throughout this proposal refer to the peak milking cows on farm. Stock numbers throughout the year are relative to the peak number of cows able to be milked, i.e., only so many replacements and young stock are raised to maintain the milking herd number over time. Complete details of the stock numbers can be found in the attached nutrient budget report (Appendix B).

Table 1: Land Use consent for Farming

Farm Details		
Farming Operation	Dairy	
Address	149 McKenize Road	
Legal Description	Section 9-13 Block IX River Hundred Section 22-24 Block IX New River Hundred Section 79 Block IX New River Hundred Lot 1 DP 13715	Original Farm
	Lot 2 DP 544352 (Lot 1 DP 13820), Lot 2 13820	Muir Block
Area	256 ha + 61.5ha = 317.5ha	
Effective area	250.5 ha + 59.5 ha = 310 ha	

2.3 Details of current consents

Discharge Permit Details	
Replacement of permit no.	AUTH-302423
Number of dairy cows	1000
Stocking rate (cows/ha)	3.9
Winter milking?	No milking between 20 June and 20 July other than slipped cows
Wintering barn?	No
Feed pad/standoff pad?	Yes, 3
Type of shed	50 bale Waikato rotary
Effluent treatment	Screw Press
Storage available	100 m ³ Hinds concrete storage tank 4,937 m ³ HDPE lined pond (pumpable volume)
Storage required (90%)	4,214 m ³ (as per attached dairy effluent storage calculator)
Disposal area	212 ha

Irrigator proposed	Low-rate pods
Application rate and depth	10mm/hr rate and 10mm depth per application
Monitoring	Soil moisture conditions assessed by Environment Southland Beacon website before effluent application.

Water Permit Details	
Replacement of permit no.	AUTH-302424
Freshwater Management Unit	Oreti
Groundwater Zone	Makarewa and Lower Oreti
Average rate of take of 24 hours	<2L/s
Daily volume	120,000
Allocation per cow	120
Location of point of take	Well number E46/1145 NZTM 1241093E 4870826N Well number E46/0175 NZTM 1242296E 4870328N

3. DESCRIPTION OF EXISTING ENVIRONMENT

3.1 Land use and topography

The property currently operates as a self-contained dairy farm with a 256ha (250.5ha effective) dairy platform and using a 61.5a (59.5ha effective) adjacent block as a support block. The proposed dairy platform will be made up of the existing 258ha dairy platform and 61.5ha support block as part of the dairy platform, a total 319.5 ha dairy platform. Currently the support block is used for growing 10 ha of winter crop. This has been undertaken during the NES reference period of 1 July 2014 to 30 June 2019. However, the applicant also wishes to use this land for dairy support which it has not previously been used for in the reference period.

The farm is generally 40 meters above sea level. The property is generally flat.

3.2 Climate

The area receives on average 1100-1105mm of rain per annum and is a moderately wet part of the Southland Region that experiences modest climate extremes with wet and dry conditions. Temperatures are on average 10 degrees Celsius. The area experiences early frosts in April to May, with late frosts uncommon, although these can occur in early October.

3.3 Soils and physiographic zones

3.3.1 Soils

Environment Southland's Beacon indicated that there Pukemutu, Woodlands and Dacre soils on the dairy platform. The neighbouring Muir Block has been mapped as Pukemutu, Woodlands and Waikiwi.

Table 2: Soil type summary on the dairy platform with vulnerability factors (Source: S-Map).

Soil Characteristics			
	Vulnerability Factors		
Soil type	Structural compaction	Nutrient Leaching	Waterlogging
Pukuemutu	Severe	Slight	Severe
Woodlands	Moderate	Slight	Moderate
Waikiwi	Slight	Moderate	Slight
Dacre	Moderate	Slight	Severe



Figure 2: Soil types on the dairy platform and support block.

Pukemutu

A heavy silt loam soil. Pukemutu soil is poorly drained with a moderately deep potential rooting depth, restricted by the fragipan at 60-90cm. There is limited aeration in the root zone. The soil has a moderately high to high PAW. The structural vulnerability of the soil is severe, nutrient leaching vulnerability of the soil is slight, and the water logging vulnerability of the soil is severe.

Woodlands

Woodlands soils are classified as Mottled Firm Brown soils and are formed in deep wind-deposited loess derived from greywacke and schist rocks. These soils are stone free in the topsoil with a silty loam texture and are imperfectly drained. They have unlimited rooting depth and due to their compact subsoil, permeability is slow, resulting in high risk of waterlogging (and are therefore likely to have extensive artificial drainage). Nutrient leaching risk is low due to their high-water holding capacity. These soils have high Profile Available Water (PAW). The base saturation and anion storage capacity (or P-retention) of these soils is medium (43%).

Waikiwi

Waikiwi soils are classified as Brown soils (NZSC Order) and are formed in deep wind-deposited loess derived from greywacke and schist rocks. These soils are stone free in the topsoil with a silty loam texture and are well drained. They have unlimited rooting depth and due to their compact subsoil, permeability is slow, resulting in moderate risk of waterlogging (and are therefore likely to have extensive artificial drainage). Nutrient leaching risk is low due to their high-water holding capacity. These soils have high to very high Profile Available Water (PAW). The base saturation and anion storage capacity (or P-retention) of these soils is medium (43%).

Dacre

Dacre soils are classified as Acidic Recent Gley soil and are formed into fine alluvium from rewashed loess. These soils are stone free in the topsoil with a silty loam texture and are poorly drained. They have unlimited rooting depth and due to their compact subsoil, permeability is slow, resulting in high risk of waterlogging (and are therefore likely to have extensive artificial drainage). Nutrient leaching risk is very low due to their high-water holding capacity. The base saturation and anion storage capacity (or P-retention) of these soils is medium (35%).

3.3.2 Physiographic zones

The proposed dairy farming and effluent discharge activities occur within the Gleyed Physiographic Zone.

The Gleyed physiographic zone comprises predominately flat to undulating land that occurs between major river systems where soils are fine textured and poorly drained. This zone is characterised by soils which have distinctive redoximorphic features such as mottling and gleying (resulting from extending periods of soil waterlogging). Soils in this zone have some ability to remove nitrogen from water to the atmosphere via denitrification. However, this process can be bypassed when contaminants are flushed to nearby surface water bodies via artificial drains and overland flow following heavy or sustained rainfall events¹.

¹ Environment Southland Physiographic Zone Fact Sheets (2015).

3.3.3 Farm Dairy Effluent Classification

Table 3: Minimum Management Criteria for land applied effluent systems to achieve

	Category A	Category B	Category C	Category D	Category E
Soil and landscape feature	Artificial drainage or coarse soil structure	Impeded drainage or low infiltration rate	Sloping land (>7°)	Well drained flat land (<7°)	Other well drained but very stony ^X flat land (<7°)
Application depth (mm)	< SWD*	< SWD	< SWD	< 50% of PAW#	≤ 10 mm & <50% of PAW#
Instantaneous application rate (mm/hr)	N/A**	N/A**	< soil infiltration rate	N/A	N/A
Average application rate (mm/hr)	<soil infiltration rate	<soil infiltration rate	<soil infiltration rate	<soil infiltration rate	<soil infiltration rate
Storage requirement	Apply only when SWD exists	Apply only when SWD exists	Apply only when SWD exists	24 hours drainage post saturation	24 hours drainage post saturation
Maximum N load	150 kg N/ha/yr	150 kg N/ha/yr	150 kg N/ha/yr	150 kg N/ha/yr	150 kg N/ha/yr

* SWD = soil water deficit (The amount of water (mm) required to restore a soil to field capacity from its current moisture status)

PAW = Plant available water (The state of top 300mm of soil after rapid drainage has effectively ceased and the soil water content has become relatively stable)

^X Very stony= soils with > 35% stone content in the top 200 mm of soil

** N/A = Not an essential criteria, however level of risk and management is lowered if using low application rates

Effluent disposal occurs on land with FDE Risk Category A and B. As per Table 2 of Policy 42 of the Regional Water Plan for Southland, the recommended depth for Category A and B soils is less than or equal to soil water deficit.

3.4 Water resources

3.4.1 Surface waterways

Two unnamed tributaries of the Makarewa River run through the property. These typically run in a north-south direction with the waterways converging at the south of the property. All waterways on the existing dairy platform are fenced and have grassed buffers.

A third waterway is located on the western edge of the property. This is a tributary of the Tomoporakau Creek which joins the Makarewa River approximately 17km south of the property.

3.4.2 Groundwater

The property is located within the Lower Oreti and Makarewa groundwater management zones. Data from Environment Southland's Beacon shows that the estimate total oxidised nitrogen (TON) concentration under the property varies between 3.8 and 5.3 mg/l. The TON estimates are higher at the west of the property and lowest in the east. Further groundwater data from Environment Southland monitoring bores show that the groundwater data to the north of the property being of NOF ban A and B with the groundwater data to the

southwest being of NOF Band C and D.

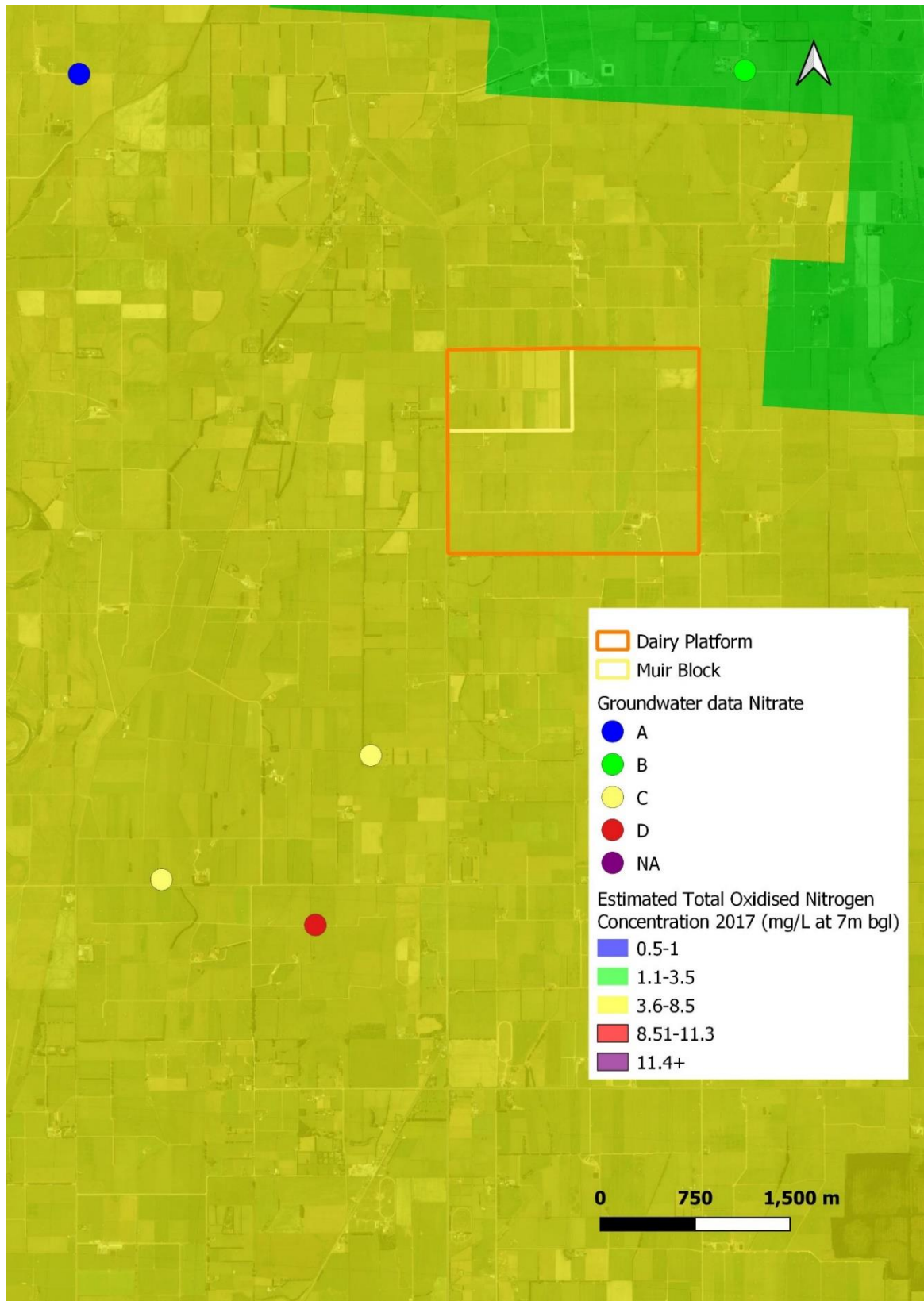


Figure 3: Nitrate Nitrite concentration from groundwater quality monitoring bores within a 10km radius

The property is within the Lower Oreti and the Makarewa Groundwater management Zones. Both of these groundwater management zones form part of the Makarewa catchment and the wider Oreti catchment. The western half of the property and the Muir block falls within the Lower Oreti Zone and the eastern half of the property falls within the Makarewa Zone. According to Environment Southland Groundwater Management Zone Factsheets groundwater flow direction for the Lower Oreti² is from north to south following the general topographic gradient. At a local scale the flow may occur obliquely towards individual surface waterways. Similarly, for the Makarewa Zone³ groundwater flow follows the general drainage pattern of the Makarewa catchment, in this case, from north to south. At a finer scale groundwater flow is likely to occur obliquely to individually connected surface waterways.

Figure 4 below estimates the groundwater flow direction. Topographic contours show the southern end of the property being lower than the northern end of the property, indicating that if following general topographic gradient, groundwater flow would be from north to south. This is consistent with the information above.

² <https://www.es.govt.nz/environment/water/groundwater/groundwater-management-zones/lower-oreti> (accessed 9/03/2021)

³ <https://www.es.govt.nz/environment/water/groundwater/groundwater-management-zones/makarewa> (accessed 9/03/2021)

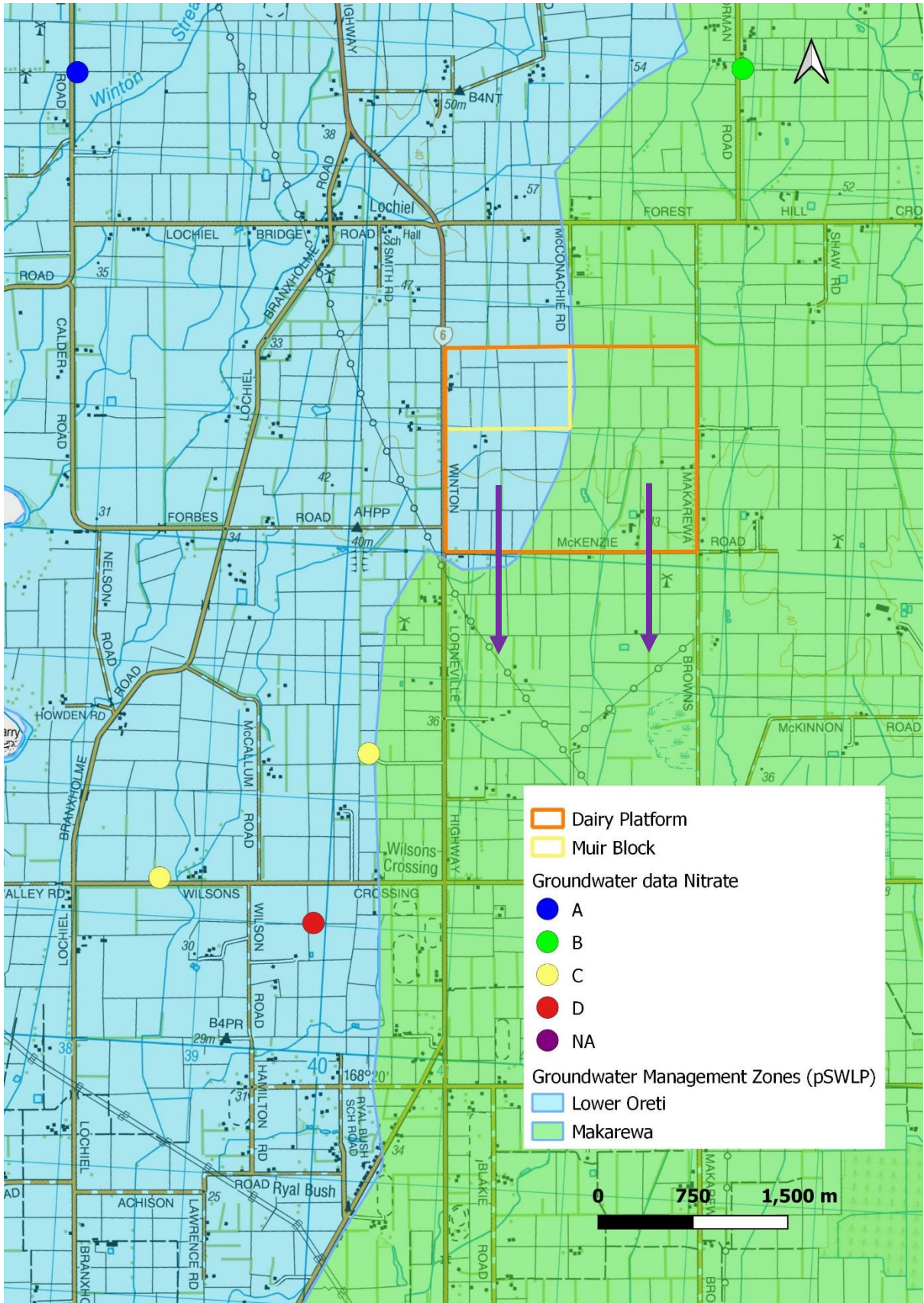


Figure 4: Estimated groundwater flow direction (purple arrows)

3.4.3 Surface water quality

The following tables provides summary information on the quality of the surface water downstream of the property. There is no water quality data upstream of the property as the tributaries originate on the applicant's property. The water quality data has been sourced from the LAWA (Land and Water Aotearoa) website. LAWA is the most up to date national database which connects people with New Zealand's environmental monitoring data, enabling communities to access information relating to the different pressures and conditions on freshwater resources. The state of water quality presented on the LAWA website compares the median of monitoring results for the last five years at a site with other sites around the country. The median for a site can be compared to all other sites with a similar land use and altitude. The data used to calculate trends is the same as used for the regional state. LAWA displays regional trends for the last five to ten years which helps to identify whether a site has improved, degraded or stayed the same. The state of water quality is assessed against the objectives within the National Policy Statement for Freshwater Management and the trigger values for physical and chemical stressors in New Zealand rivers form the ANZECC guidelines. The table below provide a summary of the state and trend of the Makarewa River at Wallacetown.

There is no water quality data on by LAWA for the Tomoporakau Creek. The Tomoporakau Creek joins the Makarewa River 1.5km south of Wallacetown.

Table 4: Water quality data for Makarewa River at Wallacetown

Variable	State	LAWA National Objective Framework (NOF) Band/Attribute State 5-year median (2015-2019)	NOF Trend; and National Policy Statement for Freshwater (NPS-FW) national bottom line (NBL).
<i>E. Coli</i>	In the worst 25% of all sites	E – For more than 30% of the time the estimated risk is ≥ 50 in 10000 (5% risk). 5yr Median: 360 n/100ml	Indeterminate NPS-FW (2020): likely meets NBL for 5-yr median. Exceedance data NA.
Clarity	In the worst 25% of all sites	In the worst 25% of all sites. 5yr Median: 0.89 metres	Likely degrading NPS-FW (2020): meets national bottom line.
Total Nitrogen	In the worst 25% of all sites	5yr Median: 1.58 g/m ³	Indeterminate
Ammoniacal N	In the best 25% of all sites	B - 95% species protection level. Starts impacting occasionally on the 5% most sensitive species 5yr Median: 0.044 g/m ³	Indeterminate NPS-FW (2020): meets NBL.
Dissolved Reactive P	In the worst 50% of all sites	C- Moderate DRP elevation about natural reference conditions 5yr Median: 0.015 g/m ³	Very Likely improving NPS-FW (2020): meets numeric attribute state for C ¹ band status.

Macroinvertebrate Community Index		D- Severe organic pollution or nutrient enrichment. Communities composed of taxa insensitive to inorganic pollution/nutrient enrichment. 5-year median: 83.0	Likely Degrading.
-----------------------------------	--	--	-------------------

¹Ecological communities are impacted by moderate DRP elevation above natural reference conditions. If other conditions also favour eutrophication, DRP enrichment may cause increased algal and plant growth, loss of sensitive macroinvertebrate and fish taxa, and high rates of respiration and decay.

The water quality trends indicate that the overall water quality in the Makarewa River is poor. Trend indicators show that for each of the parameters assessed the water quality is either improving or very likely improving.

3.4.4 Estuary

The Makarewa River joins the Oreti River which discharges into the New River Estuary approximately 30km downstream of the property boundary. This estuary drains several coastal catchments including the Makarewa Catchment.

Section 3.11 in the Regional Coastal Plan describes the key values for the New River Estuary. In summary, the key values are the exceptional bird and waterfowl habitat, recreational, shellfish gathering and heritage values which can be adversely affected by excessive levels of microbes, sediment and nutrients. The New River Estuary is listed in Appendix Q of the PSWLP as a sensitive waterbody.

A coastal risk assessment undertaken by Wriggle Coastal Management in 2008 shows that the eutrophication and sedimentation may be poor in some arms of the estuary, overall vulnerability and susceptibility ranges from low to moderate, as shown in the table below, as the estuary is well flushed (low residence time) and is already modified.

Table 5: Risk assessment for the New River Estuary (Source: Wriggle Coastal management, 2008⁴)

	Existing condition rating	Susceptibility rating	Vulnerability rating
Sedimentation	Fair	Low	Moderate
Eutrophication	Fair	Low	Moderate
Disease Risk	Fair	Low	Moderate
Contaminants	Good	Low	Low
Habitat Loss	Fair	Moderate	Moderate
Invaders	Fair	Moderate	Moderate

⁴ Robertson B & Stevens L (2008) Southland Coast Te Waewae to the Catlins Habitat Mapping, Risk Assessment and Monitoring Recommendations, Report for Environment Southland.

Shellfish	Good	Low	Low
-----------	------	-----	-----

Estimated nitrogen loadings to the estuary are moderate (being the main driver of eutrophication) and the susceptibility of the estuary to stressors is assessed as low-moderate due to the estuary being well flushed (with low residence time) and a wide range of habitat types⁵. However, due to a combination of nutrient loads and excessive sediment deposition, the nutrient enrichment condition of the estuary is poor. A contributing factor is the estuary type; shallow tidal river estuaries can receive an order of magnitude higher nitrogen loads than shallow tidal lagoons for the same nutrient enrichment condition⁶.

4. ACTIVITY CLASSIFICATION

We have carefully considered all the applicable regional rules that may be relevant to the activities on the land used by the applicants that are relevant to these farming activities. We consider that it is unlikely that any critical rules have been missed or additional consents required. If a rule or consent requirement has been overlooked, we do not consider that it would be critical to the primary suite of resource consent applications. Given the level of detail provided throughout the entire application it is unlikely that relevant effects are not assessed in this document and therefore the applications are considered to meet Section 88 requirements under the RMA.

4.1 Consents required

The following table summarises the resource consents required.

Table 6: Consents required.

Consent	Plan	Rule	Activity Status
Land use Consent for Farming	PSWLP	20(d)	<i>Restricted Discretionary</i>
Land use Consent for the use of land for a feed lot	NES-FW 2020	10(1)	<i>Discretionary</i>
Discharge Permit for the use of land for a feed lot	NES-FW	10(2)	<i>Discretionary</i>
Variation to Discharge Permit	RMA	s.127	<i>Discretionary</i>
Land use Consent for the conversion of land on farm to dairy farmland	NES-FW	19(1)	<i>Discretionary</i>

⁵ Wriggle Coastal Management, 2008. Southland Coast Te Waewae Bay to the Catlins: Habitat mapping, risk assessment and monitoring recommendations. Prepared for Environment Southland, August 2008.

⁶ Condition grade: >3 is very good condition, 2.6 – 3.0 is good condition, 2.0 – 2.5 is moderate/fair condition and <2 is poor condition.

Discharge Permit for the conversion of land on farm to dairy farmland	NES-FW	19(2)	<i>Discretionary</i>
---	--------	-------	----------------------

Overall, the proposal is 'bundled' to mean that the consent applications are considered as **discretionary activities**.

4.2 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 7: Activities for which Consent is not required.

Activity	Compliance with the relevant permitted activity rules.
Intensive Winter Grazing under the NES-FW	A Land Use Consent for Intensive Winter Grazing under the NES-FW is determined to not be needed. The Intensive Winter Grazing that does occur meets the permitted activity thresholds and was conducted during the reference period.
Use of land for the maintenance and use of an existing agricultural effluent storage facility (Rule 32D of the pSWLP)	The use of land for the maintenance and use of an existing agricultural storage facility (includes ponds, sumps and stone traps etc) that was authorised before 4 April 2018 is a permitted activity providing the construction of the facility was authorised by a resource consent).
Incidental discharges from farming (Rule 24 pSWLP)	The land use associated with this discharge is or will be authorised under Rule 20, 25 or 70.
Fertiliser (Rule 10 RWPS & Rule 14 pSWLP)	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 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 are located away from sensitive receiving environments, in accordance with permitted rule setbacks and no direct discharge of silage leachate to any waterbody is proposed. The silage pad is not hooked up to the effluent system, and therefore silage leachate is discharged to land in accordance with the rules listed in the column to the left.
Sludge (Rule 38 of the pSWLP)	Solid sludge effluent collected from the stone trap and sludge beds will be dried as much as reasonably practical before applying to land when conditions are suitable, observing appropriate separation distances, and there will be no disposal of solids to any waterway.
Cleanfill, Farm Landfills	No more than 500 m ³ of material will be discharged within cleanfill sites.

and Offal Holes (Rules 53, 54 & 55 of the RWPS, and Rule 42 & 43 of the pSWLP).	Stormwater will be directed away from fill areas and no unauthorised material will be placed into proposed fill areas. No naturally formed limestone rock is known to reside within the property. Excavation of fill holes do not intercept springs and are not below the seasonal mean groundwater level in that location. Sensitive areas can be easily avoided when undertaking these associated activities. Offal sites are to be covered and the surfaces to be restored to a similar state as surrounding land upon closing.
Stock exclusion from waterbodies (Rule 70 PSWLP)	All water bodies are fenced, and crossings are bridged over unnamed tributaries. Bed disturbance from stock is thus avoided and dairy cattle on the dairy platform are excluded from water bodies.
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 metres from the point of discharge. The proposed good management practices will significantly reduce the likelihood of any contaminants reaching the subsurface drains.

5. NON-NOTIFICATION & CONSULTATION

A consent authority has the discretion whether to publicly notify an application unless a rule or National Environmental Standard (NES) precludes public notification (in which case the consent authority must not publicly notify) or section 95A(2) applies.

The effects of the activities will be no more than minor, the applicants do not request public notification and there are no rules or NES' which require the public notification of the application. In addition, there are no special circumstances relating to the application. As such, notification of the application is not necessary.

Clause 6(1)(f) of Schedule 4 of the RMA requires the identification of, and any consultation undertaken with, persons affected by the activity. No persons are considered to be adversely affected by the proposal, as determined by the larger assessment of environmental effects (Section 6 below). However, Council must decide that a person is affected pursuant to Section 95E of the RMA.

Overall, it is considered that this application should be processed non-notified and without the need for written approvals.

6. ASSESSMENT OF ENVIRONMENTAL EFFECTS

In addition to the application being made in the prescribed forms and manner, Section 88 of the RMA also requires that every application for consent includes an assessment of the effects of the activity on the environment as set out in Schedule 4 of the RMA.

6.1 Use of land for dairy farming

This assessment of environmental effects (AEE) describes the risks to the environment resulting from the expansion of the dairy platform.

This assessment below considers the specific surface water quality issues in the existing receiving environment at the nearest monitoring sites. It looks at the property scale and within the property at specific management/landscape blocks, and the likely contaminant pathways that may impact any water quality issues identified. Any potential water quality issue is considered relative to the proposal, including farm system changes proposed and OVERSEER nutrient budgets, GMPs and mitigations, including their effectiveness and appropriateness, and the contribution that these measures would provide to water quality improvements at the catchment scale.

Section 6.1.1 below presents the modelled nutrient losses for the current farm system and presents a table that summarises the estimated nutrient loads from the proposed activity.

6.1.1 OVERSEER Nutrient Budgeting

OVERSEER nutrient budgets have been prepared by Miranda Hunter of Roslin Consultancy who is a Certified Nutrient Management Advisor (CNMA). These OVERSEER budgets have been used to estimate the annual amount of nitrogen and phosphorus discharged from the property.

There have been two recent publications of note regarding the use of OVERSEER in both a regulatory framework and for water management planning. These include the Parliamentary Commissioner for the Environment's Report on Overseer⁷ and Overseer Ltd.'s review contracted to Enfocus titled Using Overseer in water Management Planning⁸. Both reports highlight various issues associated with using Overseer models in a regulatory context, as a decision-making tool and for compliance. The Enfocus report specifically provides for solutions to some of the known limitations. Using output figures in regulation together with various methods to address well known potential issues such as version changes allows a consent holder to demonstrate the improvement in N loss outputs whilst still maintaining the flexibility to farm to conditions as well as provide for innovations on farm.

A copy of all OVERSEER Nutrient Budget Farm Scenario Reports can be found attached to this application (Appendix B). Some of the assumptions and limitations of Overseer are described as below.

Overseer Assumptions

- Long term annual average model- the model uses annual average input and produces annual

⁷ Parliamentary Commissioner for the Environment, *Overseer and regulatory oversight: Models, uncertainty and cleaning up our waterways*, December 2018

⁸ Enfocus, *Using Overseer in Water Management Planning*, October 2018.

average outputs

- Near equilibrium conditions- the model assumes that the farm is at a state where there is minimal change each year
- Actual and reasonable inputs- it is assumed that input data is reasonable and a reflection of the actual farm system. If any parameter changes, it is assumed that all other parameters affected will also be changed.
- Good management practices are followed- Overseer assumes the property is managed in line with accepted industry good management practices.

Overseer Limitations

- Overseer does not predict transformations, attenuation or dilution of nutrients between the root zone of farm boundary and the eventual receiving water body. A catchment model is needed to estimate the effects of the nutrient losses from farms on groundwater, river or lake water quality.
- Overseer does not calculate outcomes from extreme events (floods and droughts) but provides a typical year's result based on long-term averages.
- Overseer does not calculate the impacts of a conversion process, rather it predicts the long-term annual average nutrient budgets for changed land use.
- Overseer is not spatially explicit beyond the level of defined blocks.
- Not all management practices or activities that have an impact on nutrient losses are captured in the Overseer model.

Existing scenario nutrient budget modelling

The existing scenario OVERSEER budget modelling includes two different scenario modelling components and is an accurate description of the existing farm systems and consequential N & P losses. The two components include:

1. The Platinum Dairy current dairy farm operating between 2020 and 2021
2. The Muir Block operating between 2020 and 2021

All inputs into both models have been taken from the most recent farm records and/or accounts and are actual figures.

It was discussed with Environment Southland that the 20/21 year would be used as it is the best representation of what was happening on farm on 2nd of September 2020. The applicant has been increasing stock units on farm to the consented levels since purchasing the farm. Modelling any previous years would underestimate the losses on farm as of the 2nd of September 2020.

Please refer to the Overseer Modelling Report contained in Appendix B for full copies of the existing nutrient budget models and a summary of the model inputs and nutrient loss to water estimates.

Table 8: Summary N and P loss estimates for the existing scenario model.

Land Use	Current Milking Platform 20/21	Current Muir Block 20/21	Current Total 2021
Kg N/yr.	13802	3514	17316
Kg N/ha/yr.	54	57	
Kg P/yr.	358	61	491
Kg P/ha/yr.	1.4	1.0	

Proposed scenario nutrient budget modelling

The proposed scenario OVERSEER budget modelling includes the expanded dairy platform and is an accurate description of the proposed farm system and consequential N & P losses. The components include:

1. The Platinum Dairies proposed dairy farm with 1000 cows

The blocks in the proposed scenario have been set up in accordance with the protocols for using OVERSEER® and they are modelled based on proposed land use, soil and management.

Table 9: Summary of Overseer N and P loss estimates outputs for the proposed model.

Land Use	Current total 20/2	Proposed	% change
Kg N/yr.	17316	16232	6.3% decrease
Kg P/yr.	419	398	5.0% decrease

Overseer modelling has been included to support this application for activities on the property. The overseer models provide two purposes:

1. To describe the activities currently occurring and describe the proposed activities in a concise manner; and
2. To compare the relative change in nutrient losses between the existing and proposed farm scenario to inform the AEE. The relative change comparison is enabled by ensuring that the existing and proposed Overseer nutrient budgets are comparing 'apples with apples' i.e., uncertainty is significantly reduced when comparing two scenarios for one farm at one location where many of the critical inputs remain unchanged, e.g., soils, climate etc.

6.1.1 Changes driving nutrient loss reduction

OverseerFM has estimated a 6.3% decrease in nitrogen loss and a 5.0% decrease in phosphorus loss from the system between the current and the proposed scenarios. There are a number of changes proposed to the

farm system as part of the incorporation of the Muir Block. These changes cumulatively result in an estimated 6.3% decrease in N and a 5.0% decrease in P. The main changes are outlined below:

- Increase in cow numbers to the consented 1000
- Reduction in cows wintered on farm
- Reduction in area of winter crop
- Reduction in nitrogen fertiliser use
- Removal of jersey bulls
- Reduced number of young stock
- Reducing the farm average Olsen P to 30, therefore reducing maintenance fertiliser P requirements.

Since taking over the farm in 2019 the applicants have been increasing cows on farm up to the consented numbers. Nutrient budgeting models an increase of 68 cows from what was being run on farm in the 20/21 season.

As part of incorporating the Muir Block into the dairy platform it is proposed to reduce the number of cows on farm over winter from 460 in July to 360 in July. Additional stock grazed elsewhere in the same, or a different catchment will be captured under a rule in the Regional Plan or National Environmental Standard for Freshwater or will be a permitted activity. And therefore, Platinum Dairies are not responsible for offsetting the offsite effects which are not in their control. Given the change in regulation that now sees off site effects either permitted or requiring consent by third parties, the off-site effects of wintering additional cows off farm is not needed to form part of the assessment.

Associated with a decrease in the number of cows wintered on farm, is a reduction in the area of winter crop. Currently around 20ha of crop is grown (19.1ha in winter of 2020 and 22ha in winter 2021). The proposed scenario sees a reduction to 10ha of crop being grown. This is half of the crop as seen in the current scenario. The reduction in crop grown will have a positive impact on the system and water quality as there will be a significant reduction in nutrients being lost from the system.

A reduction in N fertiliser application contributes to a reduction in losses. In the baseline scenario, 217 kg N/ha was applied to the dairy platform and 145 kg N/ha to the Muir block, in split dressings from August to March. Under the proposed scenario, the fertiliser application will be 189 kg N/ha across the whole extended dairy platform. This change in N fertiliser amounts applied ensures that the uptake by plants is at an optimum, and reduces the N loss.

As part of the proposal the applicant is removing 23 Jersey Bulls from the Muir Block and reducing the amount of young stock on the property.

Currently Olsen P averages around 35. This is proposed to be brought down to average at 30. P fertiliser, will be applied at maintenance levels once the optimum of 30 is reached, reducing P loss.

6.1.2 Mitigations and GMPs

OVERSEER estimates what the losses of N and P to water will be, but not what the potential or actual effects of that loss on water quality would be. The effects of the proposal on water quality are assessed in this section.

The contaminants of concern are N, P and sediment and microbiological contaminants. These contaminants and potential effects of those contaminants are outlined below.

- **Nitrogen (N) and phosphorus (P)** (nutrients) are needed by plants for growth but when the concentrations of nutrients in water are high, they can result in excessive growth of plants, e.g., periphyton, macrophytes and phytoplankton. High concentrations of nitrate in water can make it unsafe to drink for humans and can be toxic for sensitive organisms (like young trout and salmon). Ammonia at sufficiently high concentrations can be highly toxic to fish and other aquatic organisms that live in water.
- **Sediment** (as indicated by water clarity) refers to particles or eroded soil and rock. Sediment is also a major source of phosphorus because phosphorus sticks to the surface of soil particles carried to water. When erosion rates are excessive, sediment can smother stream and estuary bed macroinvertebrates and can damage the gills of fish. Finer sediment suspended in water can also reduce light penetration (visibility) which plants need to grow and some creatures need to find food.
- **Faecal indicator micro-organisms** (indicators of microbial pathogens) which can have a detrimental effect on human and animal health, particularly when ingested. The main source of pathogens in fresh water in New Zealand are human sewage and animal manure⁹.

Assessing the environmental impact of modelled nutrient losses from a property is complex because these nutrients travel via a number of different pathways through the receiving environment undergoing attenuation, mixing, dilution and dispersion processes which can significantly affect the loading and concentrations that results in the receiving water bodies.

Table 10 below summaries the potential effects of each individual farm activity. Then the applicant presents GMPs and mitigations that will/or have been applied to each activity in order to avoid, mitigate or remedy the effects of each activity of the receiving environment. The outcome column is the resulting likely implications for the consequential environmental effects. The table below forms only one part of the application and assessment and is presented below to give the Consent Authority an overview of each of the individual components of the proposal and to demonstrate that the effects at each individual scale will be avoided, mitigated or remedied. The table below needs to be read in conjunction with the overall broad scale/cumulative effects assessment in Section 6.

⁹ Parliamentary Commissioner for the Environment, 2012. *Water quality in New Zealand: Understanding the science*. New Zealand Government, Wellington. 76p.

A combination of the farm system changes and GMPs/mitigation measures as demonstrated by the nutrient modelling undertaken will result in significantly less nutrients making their way into water bodies which will make a very small contribution to improving the quality of groundwater and surface water.

Table 10: Potential effects of individual farming activities and mitigations.

Activity	Potential effects	Good Management Practices adopted	Mitigations over and above GMPs	Outcome
Construction of new dairy lanes	<p>New laneways create high risk areas for sediment, microbial and P loss.</p> <p>Short term increase in potential sediment, microbial and phosphorus losses to the environment which can cause ecological stresses on plant and animals due to sedimentation, algae blooms and water temperature increase in waterways and estuaries</p>	<p>Laneways include camber and contouring to direct runoff to pasture and away from waterways.</p> <p>Buffer zones will be created in riparian margins to waterways where appropriate.</p>	<p>The paddock and lane layout have been designed to ensure new lanes are not located adjacent to waterways.</p>	<p>Overseer assumes 30% of dung deposited on lanes is lost directly to waterways, regardless of where the waterways are located in relation to laneways. The lane ways are in good condition and the new lane ways will be constructed in a way that will ensure that any dung on laneways is transported to land to minimise dung in waterways. The P loss calculated in Overseer is likely an over representation of what is occurring on the ground.</p>
Fertiliser application regime across entire landholding	<p>The application of nutrients in fertiliser has the potential to result in direct nutrient losses to the environment if fertiliser is applied either in excess to plant requirements or at a time when it cannot be utilised for pasture/crop production.</p> <p>Nitrogen losses from fertiliser application is most likely to occur via deep drainage.</p> <p>Phosphorus losses from fertiliser is most likely to occur via soil loss and/or direct</p>	<p>Time N, P, K and S fertiliser application to meet crop and pasture demand using split applications and avoid high risk times of the year i.e., when soil temperature is less than 7 degrees Celsius, during drought periods and during periods when soils are at field capacity.</p> <p>Reduce use of P fertiliser where Olsen P values are above agronomic optimum. Maintain Olsen P levels</p>	<p>Applications on all blocks occur using a little and often approach.</p>	<p>Adverse effects both avoided and mitigated with use of GMPs for fertiliser usage and further mitigations to better manage fertiliser application across the entire landholding.</p>

	<p>loss through runoff or erosion.</p> <p>Adverse effects of inappropriate fertiliser application or excess application to include a loss of excess nutrients to enter causing water quality degradation in both groundwater and surface water bodies. Water quality degradation can adversely impact aquatic plant and animal ecosystems and impact on human health.</p>	<p>between 27 and 33, with the optimum of 30 being sought.</p> <p>Use nutrient budgeting and annual soil testing to manage nutrient inputs from fertiliser and outputs to guide farm management decisions which can maintain overall nutrient losses at desired level.</p>		
<p>Discharge of liquid effluent to land via low-rate application predominantly using pods (or equivalent low-rate application method) to effluent discharge area.</p>	<p>Potential for contaminant losses via all three pathways: leaching (N), artificial drainage (N, P, microbials) and overland flow (N, p, microbials) when nutrients in effluent are applied to land.</p> <p>Potential for contaminant losses to cause excess nutrients in surface water and groundwater bodies in the vicinity of the property.</p> <p>In general, excess nutrients result in water quality degradation causing ecological stress for plants and animals.</p>	<p>Effluent will always be applied at a depth less than the soil water deficit which ensure nutrients remain in the root zone to be taken up and utilised by plants for pasture production.</p> <p>Effluent area receiving liquid FDE is sized to ensure nutrient loadings from the application of effluent are maintained at less than 150 kg N/ha/year to avoid excess nutrient loading.</p> <p>Utilising low-rate effluent application (<10mm/hr) is appropriate to ensure nutrients in effluent are able to be taken up by plants.</p> <p>Use of deferred storage of effluent to allow effluent to be stored when it is unsafe to apply to land.</p>	<p>The effluent discharge area of 212 ha is large enough to cater for the effluent generated and maintain effluent N loadings at less than 150 kg N/ha/year. This area has been assessed as appropriate for each of the consents.</p>	<p>The current effluent pond has a sub soil drain inspection sump. The structural integrity of the pond has been deemed to be fit for purpose until the discharge consent expires in 2023 and the likelihood of it leaking is very low.</p>

		Buffer zones created from effluent application areas to critical source areas and other sensitive receptors such as bores, property boundaries and dwellings.		
Sludge effluent application across entire landholding.	The nutrient concentration of sludge is higher than liquid of FDE due to the lack of dilution from rainwater or washdown water. Due to the higher concentration of nutrients, application of sludge to land needs to be carefully managed to ensure that nutrient loadings on any particular land area do not exceed the recommended level of 150 kg N/ha/year of effluent. This loading is achieved by ensuring the land area is large enough and the application depth is restricted to 10mm. If nutrient loadings exceed 150 kg N/ha/year or nutrients are applied in excess then there is a risk of contaminant loss (N, P, sediment and microbial) to groundwater and surface water bodies. Adverse effects from contaminant loss to water include water quality degradation which can adversely impact aquatic ecosystems and the overall health of water bodies. Sludge will be applied to areas within the	The maximum loading rate of nitrogen from the application of effluent (both sludge and liquid) to land is 150 kg N/ha/year. Sludge is not discharged onto the same area any more frequently than once every two months. Sludge is only discharged to land when soil temperature is greater than 5 degrees Celsius in winter and 7 degrees Celsius in spring. Effluent will always be applied at a depth less than the soil water deficit which ensures nutrients remain in the root zone to be taken up and utilized by plants for pasture production. Effluent area receiving sludge is sized to ensure nutrient loadings from the application of effluent are maintained at less than 150 kg N/ha/year to avoid excess nutrient loading.		Adverse effects to the environment from the discharge of slurry effluent will be no more than minor. The discharge of sludge is governed by permitted activity rules giving certainty that the activity will be regulated. Application of sludge to paddocks low in P and K can act as a capital fertiliser application and bring soil test levels up to agronomical optimum which will increase pasture productivity.

	proposed liquid discharge area. Sludge is generally considered lower risk to apply to land because it doesn't have the same risks of leaching, overland flow/runoff that purely liquid effluent has.	Use of deferred storage of effluent to allow effluent to be stored when it is unsafe to apply to land. Buffer zones created from effluent application areas to critical source areas and other sensitive receptors such as bore, property boundaries and dwellings.		
--	--	--	--	--

Table 11: Summary of ES Good Management Practices (GMP) and Overseer Modelling

ES Recommended GMP	Practice Detail	Rewarded or Assumed in Overseer Modelling
Nutrient management	Prepare a nutrient budget (required by Appendix N)	Completed using Overseer
	Keep soil Olsen P levels at biological optimum; soil test regularly to check	Rewarded in Overseer. Platinum Proposed has reduction in Olsen P between current and proposed, to agronomic optimum of 30
	Use proof of placement for fertiliser and/or farm dairy effluent application	Overseer assumes that fertiliser and effluent is applied at the right time and in the right place
Riparian management	Fence stock out of waterways	Stock exclusion assumed in Overseer
	Put in culverts or bridges at regular stock crossings	
	Improve on-farm infrastructure to keep stock out of waterways (reticulate stock water, improve stock crossings, plant shade trees away from water)	
Effluent management	Increase land application area to ensure N and K returns are not excessive	Rewarded in Overseer, Platinum Proposed estimates 55 kg N / ha and 48 kg P / ha applied to effluent block

ES Recommended GMP	Practice Detail	Rewarded or Assumed in Overseer Modelling
	Increase storage volume, where needed	Overseer assumes effluent applied when ground conditions are suitable (implies enough storage)
	Minimise effluent volumes at source (by reducing wash water volumes and rainwater in the system)	
	Use low-rate effluent application methods where required - this is soil and landscape dependent	Rewarded in Overseer – Platinum Proposed has assumed less than 12mm depth

ES Recommended GMP – Gleyed (artificial drainage)	Practice Detail	Relevance to Overseer Modelling
Protect soil structure, particularly in gullies and near stream areas	Use minimum or no-till cultivation practices such as direct drilling	Rewarded in Overseer. Platinum Proposed has assumed conventional cultivational (swedes not usually grown using minimum or no tillage as can get significant reductions in yield)
	Re-sow areas of bare or damaged soil as soon as possible	Rewarded in Overseer
	Match stock management to land use capability, e.g., avoid grazing heavy stock on steeper, more vulnerable soils, especially when wet	Rewarded in Overseer
Reduce P use or loss	Reduce use of P fertiliser where Olsen P values are above agronomic optimum	Rewarded in Overseer. Proposed Platinum applying at maintenance
	Use low solubility P fertiliser forms if runoff risk is high; or fertilise outside risk months (May to September inclusive)	Rewarded in Overseer. Phosphate fertiliser applied outside risk months
	Plant split grass/clover swards in near-stream areas	

ES Recommended GMP – Gleyed (artificial drainage)	Practice Detail	Relevance to Overseer Modelling
Reduce the accumulation of surplus N in the soil, particularly during autumn and winter	Reduce inputs of N, such as fertiliser or nitrogen contained in imported feed	Rewarded in Overseer. Platinum modelling has reduction in N usage, increase in imported feed
	Control the duration of grazing of pasture and forage crops (on-off grazing)	Rewarded in Overseer. Platinum utilises calving pad for portion of herd in spring
	Winter stock off-paddock	Rewarded in Overseer. Platinum proposed to decrease winter crop and cows wintered on farm
	Optimise timing and amounts of irrigation input	Rewarded in Overseer
	Substitute autumn diets with low-N feed (such as whole crop silage)	Rewarded in Overseer. Platinum uses barley grain as a portion of the imported feed
	Time N application to meet crop demand using split applications	Rewarded in Overseer. Platinum follows Fertiliser Rep recommendations
	Re-sow areas of bare or damaged soil as soon as possible	Rewarded in Overseer
	Reduce stocking rate	Rewarded in Overseer. Platinum on milking Platform reducing from 3.7 cows / ha to 3.2 cows / ha
Avoid preferential flow of effluent through drains	Defer effluent application when soil conditions unsuitable	Overseer assumes effluent applied when ground conditions are suitable (implies enough storage)
	Avoid placing effluent applicators directly over tile drains	
	Apply effluent at low rates and depths	Rewarded in Overseer – Platinum Proposed has assumed less than 12mm depth

ES Recommended GMP – Gleyed (artificial drainage)	Practice Detail	Relevance to Overseer Modelling
Capture contaminants at drainage outflows	Where landscapes allow, run tile drainage outflows into wetlands or sediment traps prior to entering ditches	Rewarded in Overseer

6.1.3 Potential water quality effects

Assessing the environmental impact of modelled nutrient losses from a subject property is complex because these nutrients travel via a number of different pathways through the receiving environment undergoing attenuation, mixing, dilution and dispersion processes which can significantly change the quantity and nature of these nutrients in the receiving water bodies.

There are three registered drinking water supply sites downstream of the property. Drinking water is supplied to Alliance Makarewa, Wallacetown School and Alliance Lorneville, 10km, 15km and 17km respectively downstream of the property. Alliance Makarewa and Wallacetown School sites supply water to 25-501 people. Alliance Lorneville site supplies water to >501 people. Given the estimated reduction in contaminant losses it is highly unlikely that there would be any adverse effects associated with nutrient losses from the proposed activity on this drinking water supply or any other bores that may be nearby. There will be further attenuation, dilution and dispersion processes that will further reduce the concentration of nitrate nitrogen in groundwater between the discharge location and any sensitive receptors.

Groundwater nitrate concentrations are of particular concern to human health. The risk of bottle-fed infants getting 'blue baby syndrome' (methemoglobinemia) from consuming high nitrate nitrogen water is the primary driver for the current NZ Drinking water standard (Maximum Acceptable Value) for nitrate nitrogen (11.3 mg N/l).

In summary, the evidence about the current state of nitrate nitrogen concentrations in groundwater in this area of Southland and the OVERSEER® modelling strongly indicate that drainage nitrogen concentrations at the level predicted by OVERSEER® (Appendix B) are highly likely to result in an extremely small improvement in existing groundwater quality.

Sediment and microbiological contaminants are not modelled within OVERSEER® so attempting to demonstrate a reduction in the annual amount of sediment and microbiological contaminants in the proposed scenario compared to the amount which has been lawfully discharged currently is challenging. P loss modelling can be used as a proxy for sediment and microbiological contaminant losses. The reason being is that phosphorus in the soil readily bonds to fine soil particles and is therefore lost to the environment via the same contaminant pathways: runoff/overland flow and erosion. Microbiological contaminants are also lost to the environment by the mechanics of water flow via these same pathways. The P loss modelling in this application indicates sediment and microbiological contaminants will reduce under the proposal. However, P loss prediction is not exactly the same as microbial and sediment losses, and therefore the assessment cannot be absolute, but provides the best indication of likely losses and risks to the environment.

Because of the significant reduction in nitrogen and phosphorus loss from the proposal it is highly likely to result in a real but small overall improvement on local surface water quality. Quantification of the

improvement has not been completed because the contaminant load reductions are so small in the context of the wider receiving water catchment and the resulting changes in concentrations would not be measurable with the current surface water quality monitoring programme at the local scale.

The attached FEMP and GMPs detail various management practices which will be adopted in order to reduce sediment, and bacteria losses via overland flow, artificial drainage channels. The primary mechanisms of mitigating and avoiding these losses is by appropriate management of critical source areas on the farm, efficient effluent management, stock exclusion from riparian margins and CSAs and the adoption of best management practices for intensive winter grazing. These mechanisms are likely to have the greatest impact in reducing sediment losses and microbiological contamination of waterways.

6.1.4 Cumulative Effects

As described above, the proposal is very likely to achieve a 6.3% reduction in average annual N loss to water and a 5% reduction in average annual P loss to water.

Improvements made under the proposal in isolation from other farms will only have an extremely small impact on long-term water quality. This highlights the importance of catchment wide implementation in water quality mitigation measures and the ongoing restriction on the applicants' operation in accordance with the nutrient output limits will give certainty that water quality will be improved in the long term.

The proposal will result in a reduction in N and P and a likely reduction in sediment and microbiological contaminants lost to the environment and a concurrent reduction in the resulting concentration of contaminants in receiving waters, albeit at an extremely low level. The overall effects on water quality will be positive and make a very small contribution to improving water quality at the local and catchment scale.

6.1.5 Other effects

Overall, the proposal will have positive effects on the environment seeing a reduction in modelled contaminant losses.

The conversion of the Muir Block to a dairy farm will enable the applicants to operate a sound and relatively secure dairy farm operation, that is as close to a self-contained farm system as possible. The property will directly employ 5 full time equivalents which will support families and local schools. The continuation and prosperity of the business will have economic and social benefits to the landowner and the wider community.

6.2 Use of Land for Intensive Winter Grazing

Whilst a permitted activity, the applicant has addressed the intensive winter grazing component of their proposed dairy farm activities. The applicant has prepared a FEMP which includes a description of the winter grazing practices and Good Management Practices (GMPs). This aims to manage potential environmental

effects associated with the farm and IWG activities. This contains details of GMPs adopted by the applicant to ensure that the farm is operated in accordance with industry and promoted good practice.

An assessment of the soils and likely contaminant pathways has identified the GMPs recommended, and this has informed the preparation of the below grazing management GMPs and general farming GMPs included in the table below.

The applicant has been grazing following a top to bottom approach and will continue to do so. Paddocks grazed will not have a slope of greater than 10 degrees.

To ensure that less animal movement across already grazed soils, portable water troughs will be used, and back fencing set up to ensure limited transport. This will avoid excess pugging.

By selecting appropriate paddocks for winter grazing, at risk paddocks are avoided. Avoiding these paddocks will help protect soil structure and erosion, minimising sediment runoff and P loss. N losses are minimised by keeping the N in the root zone ready for a spring uptake.

The following GMPs are implemented for intensive winter grazing.

Table 12: Good management practices for intensive winter grazing.

Activity	Good Management Practices adopted	Outcome
Winter crop	Reduce periods of bare soil between crops and pasture to reduce erosion and leaching. Bare paddocks are re-sown as soon as possible. Erosion damage areas are rest and re-sown. Compacted soils are subsoil, ripped or cultivated.	By reducing periods of bare soil, soil structure is protected, and erosion damage minimised. Nutrient losses are reduced, especially P loss.
	Minimise losses of sediment and nutrient to water and maintain soil structure. Pugging and compaction of soil is avoided as much as reasonably practical. No tillage or low impact cultivation methods and timing are considered. Supplement feed-out areas are located away from waterways and critical source areas. Riparian margins or buffer strips are left beside waterways and other areas where sediment and nutrients may flow such as gullies or swales.	By reducing pugging and compaction, soil structure is protected, and erosion damage minimised. This will help minimise sediment and nutrients from entering waterways. Nutrient losses are reduced, especially P loss.
	Use appropriate paddocks for intensive winter grazing. Low risk paddocks are selected for intensive winter grazing, ideally further away from waterways, with soil least likely to pug and compact. Ideally flatter with as few gullies and swales as possible.	By selecting appropriate paddocks for intensive winter grazing, at risk paddocks are avoided. Avoiding these paddocks will help protect soil structure and erosion, minimising the sediment runoff and P loss. N losses are minimised by keeping the N in the root zone ready for a spring uptake.
Winter Management Plan	Winter Management Plan to outline the grazing policy and the grazing plan for each paddock. Showing how the paddock is to be grazed in regard to direction for waterways. CSAs identified and how they are managed.	An appropriate winter management plan will maximise the potential good winter grazing standards. Nutrient losses will be minimised.
	Crops grazed on sloping ground, to graze from top of slope to bottom. A 20m last bite strip is used.	The remaining crop acts as a sediment and contaminant buffer, minimising P loss.
	Stock to be back fenced to prevent stock entering previously grazed land.	If stock is prevented from entering previously grazed areas this will reduce pugging and sediment compaction and break down, minimising P loss.

	Portable water troughs used where appropriate or necessary. Back fencing accounts for location of existing water troughs.	This will prevent stock moving back to a fixed water trough, leading to pugging and sediment compaction and breakdown. Minimises P loss.
	Baleage placed in the breaks prior to the winter and portable ring feeders used where practicable.	This will prevent tractors etc from driving on vulnerable paddocks, contributing to sediment breakdown and erosion.
	Mob sizes are minimized where practicable.	Minimising stock in a paddock will minimise the movement of stock which leads to sediment breakdown and erosion. Minimises P loss.
	Buffer width from any creek/river to the grazed area to be 5m. Where the grazed area is the area of crop set for IWG activities. To be achieved by temporary fencing and crop sowing plan/s.	This acts as a buffer, filtering sediment before it enters the waterways. Reduced P losses to waterways.
	Straw to be on-hand for bedding in extreme conditions and for possible sediment runoff mitigations.	Reduced erosion during extreme conditions, reducing P loss.
	Wintering contracts established to avoid having to bring cows to the yards in late winter multiple times.	Avoids excessive movement of cattle which contributes to sediment breakdown and in turn an increase in P loss.
	CSAs to be managed during grazing. Necessary to prevent degraded water quality leaving the farm and stop cows from standing in mud. Last break grazed in the paddock if need to be grazed at all.	Managing CSAs will reduce soil break down and erosion and reduce P losses.

6.3 Use of Land for a Feed Lot

6.3.1 Use of a feed pad for more than 120 cows

There are three feed pads sited at the property.

Each of the pads have a woodchip base of 500m. The pads are used on the shoulders of the season, i.e., May, August and September, to feed cows before they are sent away for winter grazing and when they come home again in spring for calving. The applicant also uses the feed pads outside of the shoulder seasons during adverse weather conditions. Two of the pads are roofed or partially roofed. Neither of these pads is connected to the effluent system. The third pad, is not roofed, but is connected to a sump with is pumped to the effluent pond. Table 13 below outlines the number of cows using the feed pads per day at each farm.

More details of these features (dimensions etc) can be found in the Dairy Effluent Storage Calculator report attached. The applicant is seeking to authorise the disposal of FDE from the third, unroofed feed pad in the variation of the discharge permit.

The following table provides further details of the use of each feed pads and assessed this use against the Permitted Activity criteria under Rule 35A of the PSWLP and Subpart 1 of the NES-FW 2020. The table shows that the feed pads are consistent with Rule 35A(i) as each feed pad does not accommodate more than 120 cows. They are not consistent with Subpart 1 Regulation 9(3) as less than 90% of the cattle held on the feed lot is more than 4 months old. The feedlots do not have a base with a minimum permeability of 10^{-9} m/s and therefore are not consistent with Regulation 10(3)(a).

Table 13: Feed Pad details

Feed pad 1. PSWLP. Barn and uncovered pad area



PSWLP Rule 35A (a) The use of land for a feed pad/lot is a permitted activity provided the following conditions are met:

(i) if accommodating cattle or deer, each feed pad/lot services no more than 120 adult cattle, or 250 adult deer, or equivalent numbers of young stock at any one time	Does not accommodate more than 120 cows.
Animals no not remain on the feed pad/lot for longer than three continuous months	Feed pads are not used for more than 3 continuous months. Used in ½ July, Aug, Sep, ½ October and during adverse weather conditions.
The feed pad/lot is not located (1) within 50 meters from the nearest waterway or another feed pad/lot on the same landholding.	Not located within 50m of nearest waterway. Feed pads 1 and 3 are located with 40m of each other and therefore within 50 meters of another feed pad/lot. Row of trees between feed pads.
(2) a minimum depth of 500 millimetres of wood-based material across the base of the feed pad/lot	The feed pads have a minimum of 500 millimetres of wood-based material across the base.

(v) any material scraped from the feed pad/lot including solid animal effluent, is collected and if applied to land is in accordance with Rule 38	Solid effluent is scraped from the feed pad and disposed to land in accordance with Rule 38 of the PSLP. Liquid effluent is collected and stored in the effluent storage pond.
(vi) the overland flow of stormwater or surface runoff from surrounding land is prevented from entering the feed pad/lot.	The feed pad is unlikely to receive overland flow from surrounding land.
Feed Pad 1. NES-FW 2020	
(3) The use of land for feed pad/lot is a permitted activity if 90% or more of the cattle held in the feedlot is (a) no more than 4 months old; or (b) no more than 120kg in weight.	Less than 90% of the cattle held on the feed lot is more than 4 months old and more than 120kg in weight.
10(3). The use of land for a feed pad/lot is a discretionary activity if (a) The base area of the feed lot is sealed to a minimum permeability standard of 10^{-9} m/s and (b) Effluent expelled in the feedlot is collected, stored, and disposed of in accordance with the rule in a regional or district plan, or a resource consent and (c) The feedlot must be at least 50m away from any water body, any water abstraction bore, any drain, and the coastal marine area.	<p>The base of the feed lot is not sealed to a minimum permeability standard of 10^{-9} m/s as the base of the feed pad/lot is woodchips/bark.</p> <p>Effluent is collected by the woodchip cover, which will be spread as a permitted activity.</p> <p>The feed pad is located at least 50m from any waterway.</p>

Feed pad 2. PSWLP. Roofed calving barn with uncovered standoff area



PSWLP Rule 35A (a) The use of land for a feed pad/lot is a permitted activity provided the following conditions are met:

(i) if accommodating cattle or deer, each feed pad/lot services no more than 120 adult cattle, or 250 adult deer, or equivalent numbers of young stock at any one time	Does not accommodate more than 120 cows.
Animals no not remain on the feed pad/lot for longer than three continuous months	Feed pads are not used for more than 3 continuous months. Used in ½ July, Aug, Sep, ½ October and during adverse weather conditions.
The feed pad/lot is not located (1) within 50 meters from the nearest waterway or another feed pad/lot on the same landholding.	Not located within 50m of nearest waterway.
	Not located within 50m of another feed pad.
(2) a minimum depth of 500 millimetres of wood-based material across the base of the feed pad/lot	The feed pads have a minimum of 500 millimetres of wood-based material across the base.
(v) any material scraped from the feed pad/lot including sold animal effluent, is collected and if applied to land is in accordance with Rule 38	Solid effluent is scraped from the feed pad and disposed to land in accordance with Rule 38 of the PSLP. Liquid effluent is collected and stored in the effluent storage pond.
(vi) the overland flow of stormwater or surface runoff from surrounding land is prevented from entering the feed pad/lot.	The feed pad is unlikely to receive overland flow form surrounding land.

Feed Pad 2. NES-FW 2020

<p>(3) The use of land for feed pad/lot is a permitted activity if 90% or more of the cattle held in the feedlot is</p> <p>(a) no more than 4 months old; or</p> <p>(b) no more than 120kg in weight.</p>	<p>Less than 90% of the cattle held on the feed lot is more than 4 months old and more than 120kg in weight.</p>
<p>10(3). The use of land for a feed pad/lot is a discretionary activity if</p> <p>(a) The base area of the feed lot is sealed to a minimum permeability standard of 10^{-9} m/s and</p> <p>(b) Effluent expelled in the feedlot is collected, stored, and disposed of in accordance with the rule in a regional or district plan, or a resource consent and</p> <p>(c) The feedlot must be at least 50m away from any water body, any water abstraction bore, any drain, and the coastal marine area.</p>	<p>The base of the feed lot is not sealed to a minimum permeability standard of 10^{-9} m/s as the base of the feed pad/lot is woodchips/bark.</p> <p>Effluent is collected by the woodchip cover, which will be spread as a permitted activity.</p> <p>The feed pad is located at least 50m from any waterway.</p>

Feed pad 3. PSWLP. Uncovered stand off area under hedgerow.



PSWLP Rule 35A (a) The use of land for a feed pad/lot is a permitted activity provided the following conditions are met:	
(i) if accommodating cattle or deer, each feed pad/lot services no more than 120 adult cattle, or 250 adult deer, or equivalent numbers of young stock at any one time	Does not accommodate more than 120 cows.
Animals no not remain on the feed pad/lot for longer than three continuous months	Feed pads are not used for more than 3 continuous months. Used in ½ July, Aug, Sep, ½ October and during adverse weather conditions.
The feed pad/lot is not located (1) within 50 meters from the nearest waterway or another feed pad/lot on the same landholding.	Located 30m from nearest waterway. Waterway is located on opposite side of laneway, with a row of trees/planting in between. Feed pad is sloped to the northeast, away from waterway and to a collection sump.
	Feed pads 1 and 3 are located with 40m of each other and therefore within 50 meters of another feed pad/lot. Row of trees between feed pads.
(2) a minimum depth of 500 millimetres of wood-based material across the base of the feed pad/lot	The feed pads have a minimum of 500 millimetres of wood-based material across the base.
(v) any material scraped from the feed pad/lot including solid animal effluent, is collected and if applied to land is in accordance with Rule 38	Solid effluent is scraped from the feed pad and disposed to land in accordance with Rule 38 of the PSLP. Liquid effluent is collected and stored in the effluent storage pond.
(vi) the overland flow of stormwater or surface runoff from surrounding land is prevented from entering the feed pad/lot.	The feed pad is unlikely to receive overland flow from surrounding land.
Feed Pad 1. NES-FW 2020	
(3) The use of land for feed pad/lot is a permitted activity if 90% or more of the cattle held in the feedlot is (a) no more than 4 months old; or (b) no more than 120kg in weight.	Less than 90% of the cattle held on the feed lot is more than 4 months old and more than 120kg in weight.
10(3). The use of land for a feed pad/lot is a discretionary activity if (a) The base area of the feed lot is sealed to a minimum permeability standard of 10 ⁻⁹ m/s and (b) Effluent expelled in the feedlot is collected, stored, and disposed of in accordance with the rule in a regional or district plan, or a resource consent	The base of the feed lot is not sealed to a minimum permeability standard of 10 ⁻⁹ m/s as the base of the feed pad/lot is woodchips/bark.
	Effluent is collected by the woodchip cover, which will be spread as a permitted activity.

<p>and (c) The feedlot must be at least 50m away from any water body, any water abstraction bore, any drain, and the coastal marine area.</p>	<p>The feed pad is located at least 50m from any waterway. Located 30m from nearest waterway. Waterway is located on opposite side of laneway, with a row of trees/planting in between. Feed pad is sloped to the northeast, away from waterway and to a collection sump.</p>
---	---

6.4 Variation to Discharge Permit

The proposed variation seeks to legalise the collection and storage of effluent from the third feed pad. The other two feed pads are not connected to the effluent system and therefore do not need to be included on the discharge permit. Effluent from these two feed pads will be collected in the woodchip base, which will be spread as a solid as a permitted activity.

It is also proposed to legalise the collection of storage of silage leachate from the silage pit.

The Dairy Effluent Storage Calculator (DESC) attached in Appendix C shows that 4214m³ of pumpable storage is required to enable effective deferred irrigation of effluent generated from up to 1000 cows. The storage pond allows for a pumpable volume of 4937m³, and therefore the proposed effluent storage pond is sufficiently sized under normal operating circumstances. The amount of effluent storage is sufficient for the storage of dairy shed effluent, feed pad effluent and silage leachate.

6.5 Positive effects

The continuation of dairy farming will contribute significantly to the social and economic wellbeing of the local and regional community.

The proposal will result in a 6.3% decrease in nitrogen losses and a 5% decrease in phosphorus losses. This in turn will result in an improvement in water quality.

6.6 Other Assessment Matters

In accordance with Clause 7 of Schedule 4 of the RMA the following provides an assessment of the activity's effects **on the environment:**

- a) any effect on those in the neighbourhood and, where relevant, the wider community, including any social, economic, or cultural effects*

The immediate neighbourhood and wider community is a small rural Southland town which is serviced by similar land uses to the proposed activity. Land use of this nature is anticipated and widely supported in this area due to the local economic and cultural benefits that dairy farming brings to small rural economies. The

proposed activity will employ additional staff, as well as contractors and consultants from the wider community as well as support local schools and local rural businesses. In a more general sense, the primary industries in New Zealand continues to contribute greatly to the New Zealand economy in many ways including gross domestic productivity, employment, community growth and resilience and reinvestment capacity via tax revenues. The ability for the applicant to continue to operate their entire farming operation will enable them to provide for their own social, economic and cultural wellbeing.

In terms of the potential effects on cultural values, an assessment of the proposal against the Te Tangi a Tairua iwi Environmental Management Plan (applicable to the Southland Region), is made below. The proposal is considered to be wholly consistent with the relevant policies of the Iwi Management Plan.

b) any physical effect on the locality, including any landscape and visual effects

In terms of landscape and visual effects, the presence of effluent infrastructure, other farming equipment and cows is expected within the rural locality and is an existing activity on the applicant's current farm. The proposal will not have any significant physical effects on the locality over and above that currently experienced due to the proposed use of the existing dairy shed and effluent infrastructure on the land which will be converted to dairy farming.

c) any effect on ecosystems, including effects on plants or animals and any physical disturbance of habitats in the vicinity

The dairy farm is located within a modified ecological landscape and the proposal will not have any significant adverse effects on ecosystems. The physical works required to convert the property to a dairy farm does not involve significant physical changes to the landscape and all works are located well away from environments such as waterways, wetlands and natural bush areas which may contain plant and animal habitats.

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

It is not considered that the activities will have any effect on aesthetic values, as the proposed dairy platform will be in keeping with the general rural nature of the area. The land in this area is historically known for farming activity and the presence of a dairy operation on this property does not result in any effect contrary to the historical values associated with the natural and physical resources in the vicinity.

The waterways within the proposed dairy platform are non-navigable and public access would be by permission of the applicant only. There is no evidence to suggest popular recreation fishing spots nearby which may be affected by the proposal. The effects on any cultural values are assessed below.

e) any discharge of contaminants into the environment, including any unreasonable emission of noise, and options for the treatment and disposal of contaminants

Effluent generated on the property will be treated and discharged to land as authorised by AUTH-302423

and is consistent with the discharge methods promoted by industry groups, Regional Councils and by the relevant rules and policies for the Southland region. The assessment of alternatives (below) provided in this report has concluded that this is the preferred solution for managing animal waste generated at the property. Various mitigation measures described in this application are designed to avoid, remedy or mitigate the loss of contaminants to the wider environment with the aim of applying nutrients in a manner which enables them to be efficiently and effectively used for the benefit of pasture and crop growth.

The proposed activity is anticipated within the rural zone and no aspects of the proposal are likely to result in the emission of an unreasonable and unexpected level of noise.

f) any risk to the neighbourhood, the wider community, or the environment through natural hazards or the use of hazardous substances or hazardous installations

All hazardous materials carried and used onsite will comply with the relevant rules of the Hazardous Substances and New Organisms Act 1996. As such, there will be no risk to the neighbourhood, wider community or the environment due to natural hazards or the use of hazardous substances or hazardous installations.

6.7 Assessment of Alternatives

Schedule 4 of the RMA requires that an assessment of environmental effects must include a description of any possible alternative locations or methods for undertaking the activity if it is likely that the activity will result in any significant adverse effect on the environment and/or if the activity includes the discharge of contaminants. None of the activities described in this report are expected to result in significant adverse effects on the environment and so this assessment of alternatives considers the proposed discharge of animal waste only.

Method of Discharge

Deferred irrigation methods will be utilised on the property to ensure that effluent is only applied when conditions are suitable. Detention in the effluent pond also provides some level of treatment to the effluent before it is applied to land. Alternative methods may include direct discharge of the effluent to land on an as-required basis, regardless of the conditions. This would likely result in over-saturation of soils, ponding, overland flow and/or excessive leaching of contaminants, all of which can lead to significant adverse environmental effects. A slurry tanker could be used as an alternative to the proposed primary method but would likely have a higher operating cost for little gain and would result in a higher application rate to land. Rather the slurry tanker is used as a contingency. There are no other practicable environmentally acceptable alternatives to applying effluent to land.

Receiving Environment

Discharging effluent to land, if conducted appropriately, enables the reuse of a waste product as a soil conditioner and provides nutrients for plant growth whilst mitigating against the direct loss of contaminants to underlying or nearby water bodies. A direct effluent discharge to water has not been considered because

it would result in significant adverse effects on the environment.

Overall, the proposed discharge methods and receiving environment are the most suitable for managing the effluent generated at the farm.

7. Statutory Considerations

Schedule 4 of the RMA requires that an assessment of the activity against the matters set out in Part 2 and any relevant provisions of a document referred to in Section 104 of the RMA is provided when applying for a resource consent for any activity. These matters are assessed as follows.

7.1 Part 2 of the RMA

The proposal is consistent with the purpose and principles of the RMA. The proposal will not adversely affect the land's ability to meet the reasonably foreseeable needs of future generations, or on the life-supporting capacity of the land and any ecosystems associated with them. The proposal includes a suite of carefully considered and designed mitigation measures which ensures that adverse effects on the environment are avoided or mitigated.

There are no matters of national importance under Section 6 of the RMA that will be affected by the proposal. The proposal is also consistent with the requirements of Section 7 of the RMA, with particular regard given to the efficient use and development of natural and physical resources. Regarding Section 8, the proposed activity is not inconsistent with the principles of the Treaty of Waitangi.

Overall, the activity is considered to be consistent with Part 2 of the RMA.

7.2 Section 104(1) of the RMA

In accordance with Schedule 4 of the RMA, an assessment of the activity against the relevant provisions of a document referred to in 104(1)(b) of the RMA must be included in an application for resource consent.

Relevant documentation covered by this section are:

- National Environmental Standard for Sources of Human Drinking Water, 2007 (NES)
- National Environmental Standard for Freshwater Management, 2020 (NESFM)
- National Policy Statement for Freshwater Management, 2020 (NPSFM)
- Region Water Plan Southland (RWPS), 2010
- Proposed Southland Water and Land Plan (PSWLP), 2018

Under the RMA, regional plans need to give effect to NPSs, NESs and RPSs. For an application of this scale, an assessment of the application against the regional plan is adequate as these plans ultimately give effect to the higher order statutory instruments. As such, no individual assessment has been made against the National Environmental Standard for Sources of Human Drinking Water. A brief assessment has been made

against the recently released National Policy Statement for Freshwater Management as it contains the most up to date national policy directions that need to be considered.

Relevant policies from the RWPS, and the PSWLP are considered relevant to this application and are assessed below. The rules and policies in PSWLP have legal effect from the date of notification and weight must be given to the policies contained in PSWLP alongside the existing policies in the RWPS.

7.2.1 National Policy Statement for Freshwater Management 2020

The National Policy Statement for Freshwater Management 2020 (NPSFM) recently came into force on 3 September 2020. This document is a national direction for managing freshwater in New Zealand and has been introduced alongside some relevant National Environmental Standards for Freshwater. As both the RWPS and PSWLP were given legal effect prior to the NPSFM coming into effect it is considered appropriate to undertake a brief assessment of the proposal against the objectives and policies of the NPSFM(2020).

The policies of particular relevance to this application for resource consent are outlined below. The proposal has been carefully considered against Te Mana o te Wai, the objective and all relevant policies listed below and in the context of the detailed assessment of effects is strongly considered to be consistent with all the relevant provisions of the NPSFM.

The fundamental concept underpinning the NPSFM (2020) is Te Mana o te Wai, that is recognising the fundamental importance of water and the health of water in protecting the health and well-being of the wider environment. Within the context of the NPSFM this encompasses 6 principles relating to the roles of tangata whenua and New Zealand in the management of freshwater and the implementation of the NPSFM.

The NPSFM (2020) also sets out a hierarchy of obligations and an objective for Te Mana o Te Wai that prioritises first the health and wellbeing of water bodies and freshwater ecosystems over second the health needs of people, and third, the ability of people and communities to provide for their social, economic, cultural well-being.

A number of the principles set out for Te Mana o te Wai are directly relevant to Councils in giving effect to the NPSFM (for example through plan making processes), as they focus on tangata whenua's authority and responsibility and actions, as well as governance by the council. Many of the principles are more difficult for an applicant to give effect to. The two principles that stand out as relevant are the following:

“(e) Stewardship: the obligation of all New Zealanders to manage freshwater in a way that ensures it sustains present and future generation.”

“(f) Care and respect: the responsibility of all New Zealanders to care for freshwater in providing for the health of the nation.”

This proposal is consistent with the framework that gives direction to restoring and preserving the balance between water, the environment, and the wider community. For the reasons given in the assessment of

effects above in Section 6, this balance will be found by a reduction in nitrogen as proposed by this application and use of GMPs across the dairy farm.

This proposal has been prepared with the wider catchment in mind, and cumulative effects of farming activities in the catchment. This is consistent with the ki uta ki tai integrated management framework, where users, stakeholders, the ORC, and community have been involved in identifying values for protection through

Further discussion of relevant policies within the NPSFW (2020) is provided in the table below.

Table 14: Applicable policies from the NPSFW (2020).

Policy	Wording	Comment
1	Freshwater is managed in a way that gives effect to <i>Te Mana o te Wai</i> .	See above discussion.
2	<i>Tangata whenua</i> are actively involved in freshwater management (including decision making processes) and Māori freshwater values are identified and provided for.	See above discussion.
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.	Surface water quality in the receiving environment is considered to be generally poor when assessed against the objectives within the NPSFM and the ANZECC guidelines. Trend data indicating improving trends across all parameters. The Overseer modelling of the proposed farm system in its entirety models that nitrogen losses to below the root zone will reduce by 1,084 kg/year equating to a 6.3% reduction. Phosphorus will reduce by 21kg equating to 5%. There is also a highly likely reduction in sediment and microbial. The health and well-being of the receiving environments is predicted to improve as a result of the proposal as described.
4	Freshwater is managed as part of New Zealand's integrated response to climate change.	Same as for Policy 3.

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.	Same as for Policy 3.
12	The national target (as set out in Appendix 3) for water quality improvement is achieved.	The national targets from primary contact are based on water quality in terms of E. coli and cyanobacteria. In terms of these parameters, the effluent discharge activity has been designed to utilise low-rate application, deferred storage of effluent and strategic application to a variety of soil types in order to avoid the loss of contaminants via overland flow, deep drainage or through artificial drainage channels which could adversely impact water quality and the ability of people to come into contact with these water bodies.
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.	Water quality monitoring on the Makarewa River is currently undertaken under the State of the Environment monitoring programme to ensure continuous monitoring over time to identify trend data. The proposal includes simultaneous monitoring and management of nutrient inputs and outputs from the farm in order to identify areas of improvement which could improve water quality in the receiving waters.
15	Communities are enabled to provide for their social, economic,	The expansion of a dairy farm

	and cultural wellbeing in a way that is consistent with this National Policy Statement.”	provides greater opportunities of the local economy in terms of permanent jobs and support of local schools and communities. Positive economic, social and cultural well-being should result.
--	--	---

7.2.2 Land Use

Planning Document	Particularly relevant sections
Southland Regional Policy Statement	Objectives RURAL.1, RURAL.2, Policies RURALI.1, RURAL.2
Proposed Southland Water and Land Plan	Policies 6, 13, 16, and 39A
Te Tangi a Tauria	Section 3.5.7, 3, 5, and 13

Policies 6, 13 and 16 of the PSWLP appear to have equal weighting, and the proposal is consistent with each of these.

The proposal represents a sustainable farming operation. Through nutrient modelling the applicants have demonstrated that the loading of nutrients on the property are a negligible proportion of the total loading in the New River Estuary. Furthermore, the amalgamated farm provides for improved farm systems that will over time contribute to improved environmental outcomes and a small but likely reduction in nutrient loading. The continuation of farming would provide for the economic and social well-being of the applicant and the communities they support. The proposal is consistent with the objectives and policies in the SRPS and Policy 13 of the PSWLP by supporting the sustainable use and development of rural land resources, both environmentally and economically, if undertaken in the manner as proposed.

The applicant has implemented a farm environmental management plan which is in accordance with Appendix N of the PSWLP. Good Management Practices and mitigations are most effective at the farm scale if they are targeted to the risk area, in this instance the effects of combined deferred FDE storage, greater flexibility to better utilise the less vulnerable areas of the farm, and adherence to the appropriate buffer zones between water bodies and grazed areas, all successfully avoid or mitigate adverse effects to a practical minimum where they are less than minor. Sediment run-off is managed to a level that it is low risk for the farm system proposed. The FEMP identifies the critical source areas on the landholding and describes how they will be managed by the applicant to minimise nutrient losses at these points.

7.2.3 Water Quality

Planning Document	Particularly relevant sections
Southland Regional Policy Statement	Objectives WQUAL.1, WQUAL.2, Policies WQUAL, 1, 2, 5, 7, 8
Regional Water Plan for Southland	Policies 25, 41 and 42
Proposed Southland Water and Land Plan	Policy A4 of NPSFM Objectives 6 and 8 Policies 6, 12, 15B, 16, 17, 18, and 39A
Te Tangi a Taurira	Section 3.5.13 and 3.6.13

Objective WQUAL.1 is of significant relevance to the proposal as it sets the water quality framework for the management of water quality in Southland. The objective requires four primary things:

- The life supporting capacity of water and related ecosystems is safeguarded;
- The health of people and communities is safeguarded;
- Water quality is maintained or improved in accordance with the National Policy Statement for Freshwater Management 2020;
- Freshwater quality is managed to meet the reasonably foreseeable social, economic and cultural needs of future generations.

The dairy platform and the Muir Block are both within the Gleyed Physiographic Zone. Policy 6 requires the implementation of good management practices to manage adverse effects cumulatively and propose GMPs and mitigations (where appropriate) to mitigate and/or avoid effects of the activities on water quality. These GMPs and mitigations are proposed to be implemented by way of a FEMP that has been prepared by the applicant and appended to this application. Genuine attention and thought have been given to the potential adverse effects of the proposal on water quality, in the context of the most likely contaminant pathways. With regards to Policy 15B, a lack of data available for the tributaries of the Makarewa River and the Tomoporakau Creek has not provided a sufficient baseline in which the current state of the water quality can be determined. Effort has been made to provide an assessment of the likely nutrient loading from the property and shows that nutrient loss is unlikely to have an impact on current nutrient loads in the receiving environment and New River Estuary. The proposal would result in a reduction in contaminant losses compared to the legal existing environment over time, as the amalgamated farm provides greater opportunity to utilise the total farm area that results in positive environmental outcomes. Therefore, the proposal is consistent with the relevant policies noted above.

Policy 16 requires the minimising of adverse environmental effects from farming activities. Part (a) applies as the property is within proximity of the New River Estuary that is identified as a sensitive waterbody in Appendix A of the PSWLP. As noted elsewhere in this proposal, this proposal does not involve an increase in

the number of cows over the expanded dairy platform from what is already consented. Therefore, the proposal is consistent with Policy 16(1) as the assessment here demonstrates the GMPs and mitigation applied to minimise adverse environmental effects on the downstream sensitive receiving environments.

Policy 16(1)(b)(iii) likely applies as it is our assumption that no lowland surface water body in Southland meets the Appendix E water quality standards, and there is no data for the streams on the property to confirm or prove otherwise. However, in the context of demonstrating that there will be some improvement in water quality over time as a consequence of the amalgamated farm, it is considered that the 'generally' component of the policy applies and Policy 15B and the higher objectives would provide an appropriate approach that would support granting application that have been able to demonstrate that they would result in an improvement in water quality.

Policy 15B requires improvement of water quality where it does not meet Appendix E standards and this proposal is consistent with this policy.

The proposal to expand the dairy platform provides for a variety of measures which either avoid or further mitigate against adverse effects on water quality which are described in detail earlier.

7.2.4 Effluent discharge

Planning document	Particularly relevant sections
Southland Regional Policy Statement	Objectives WQUAL.1 Policies WQUAL.8, WQUAL.10
Regional Water Plan for Southland	Policies 7, 31A, 31C, 31D and 42A
Proposed Southland Water and Land Plan	Policies 13, 14 and 17
Te Tangi a Taurira	Section 3.5.1

Policies throughout the relevant planning documents stress a preference for the discharge of contaminants to land as it creates less environmental effects, enables an effective and efficient re-use of a waste produce and protects values as described in Te Tangi a Taurira. The management of effluent in the proposal meets best practice and is designed to avoid any surface runoff, overland flow, ponding, contamination of water via, deep drainage or overland flow from the application of effluent to land. The land which will be receiving effluent is considered suitable and the discharge areas are sized appropriately to lower overall nutrient loads from the application of effluent.

7.2.5 Tangata Whenua

Planning Document	Particularly relevant sections
Southland Regional Policy Statement	Policies TW.3, TW.4
Regional Water Plan for Southland	Polices 1A
Proposed Southland Water and Lan Plan	Policies 1 and 2

The Southland Regional Policy Statement describes the resource management issues important to Ngai Tahu in the Southland regional and includes ensuring tangata whenua is considered in decision making, iwi management plans are recognised, taonga and sites of special significance are protected and food gathering resources are protected. Te Tangi a Taurira is the iwi management plan recognised by Ngai Tahu which encompasses the Southland region. Policies TW.3 and Policy 2 of the PSWLP require iwi management plans to be taken into account.

This proposal includes activities which are contained within the property boundaries and should not materially impact on tangata whenua values or compromise sites of special significance of food gathering sites. The cumulative effects assessment concludes that any effects felt outside the boundary of the property will not degrade water quality and not impact on cultural values such as mahinga kai.

In addition, the application provides for the following in accordance with Te tangi a taurira:

- The provision of buffer zones to water abstraction sites and waterways;
- The application effluent is to land rather than water;
- The applicants already adopts best practice for land application of managing farm effluent;
- The existing riparian margins are protected;
- Deferred application of FDE and solid effluent is provided for;
- Nutrient loading from effluent discharges to land is already within industry best practice limits;
- The system and management practices are considered appropriate for the risks associated with the receiving environment;
- Water abstraction is to be monitored with metering results to be submitted to Council;
- Regarding Policies 3.5.14.17 and 3.5.1.17, the consent periods proposed are less than 25 years.

Furthermore, the application recognises proximity to the site of the New River Estuary and the significance of this Regional Significant Wetland within the coastal environment. Therefore, the policies identified in section 3.6.13 have been considered here.

7.3 Sections 105 and 107 of the RMA

In addition to the matters in Section 104(1) of the RMA, if an application is for a discharge permit a consent authority must have regard to the matters as specified in Section 105. The proposed discharge can be undertaken in a manner which avoids contaminants from entering water through controls on application method and conditions of consent. As nutrients can be reused, there is a direct benefit to the property as a method for improving soil fertility. The discharge of effluent to land is the best method for avoiding adverse effects on water as might otherwise occur in the event that the discharge was directly to water, which would

result in a worse environmental outcome.

There are no matters under Section 107(1) of the RMA that would require the consent authority to decline this application.

8. Consent Duration, Review and Lapse

8.1 Consent Duration

With regard to consent duration, special consideration has been given to Policies 14A and 43 of the RWPS and Policy 40 of the pSWLP, and Te Tangi a Tauria which have been grouped below for ease of assessment.

Certainty of the nature, scale, duration and frequency of effects

The environmental effects of the change in land use and farm system proposed are described in this application. The assessment above and contained within the attached documents explains these activities and effects so that Council may have certainty in their nature (what they are), scale (how minor they are in the wider context of the catchment), their duration and frequency of effects (i.e., ongoing positive effects overall). Potential adverse effects have in the first instance been mitigated by appropriate management techniques on farm followed by contingency planning, ongoing monitoring and reporting in an auditable format.

The existing environment is reasonably well known, and the proposal is very likely to improve water quality beyond that which is observed in the existing environment.

Matching consent duration to the level of risk of adverse effects.

The risk of adverse effects arising from dairy farming land use varies on a case-to-case basis and for the most part the risk level is greatly controlled by human behaviour and farm management.

The extent and nature of the actual and potential adverse effects of the activities on the existing environment were assessed in this document and concluded to be no more than occurring historically in the consented baseline, with a significant improvement from the consented baseline.

Overall, the risk of unanticipated or unexpected adverse effects occurring is low because of the mitigations and GMPs. Ongoing development and investigation in new technologies, mitigations and of farm education will ensure that the risks can remain low throughout the consent duration proposed.

Relevant Tangata Whenua values and Ngai Tahu Indicators of Health

The application has been assessed as consistent with the relevant tangata whenua values as outlined in the iwi management plan, with particular regard to the proposed consent duration being less than 25 years.

Duration sought by the applicant and supporting information

The applicant seeks a 10-year consent duration for all the applications. We consider that this is a reasonable timeframe which would provide adequate time for the applicants to finalise and implement the amalgamation proposal.

The permanence and economic life of any investment

Significant investment has been required just to get to the point of making the application, with expenditure on professional services, including business feasibility studies, nutrient advice, effluent system review, water quality and policy and planning assessments.

The investment in both properties is significant and in the order of millions of dollars. The market for dairy products both nationally and globally is strong. Commodity market influence is always a factor and will influence the profitability of the proposed farm. An appropriate consent duration will encourage investment and improvements on farm which can improve environmental outcomes and buffer the applicant's ability to respond to commodity market changes which secures the permanence of the activity. Furthermore, the permanence of the economic life of the activity requires resource consents to be granted from the Council for a reasonable duration.

Common expiry date for permits that affect the same resource

A common expiry date for all the permits applied for is considered appropriate.

Applicant's compliance history

The applicant has demonstrated an overall good compliance history with the existing resource consents and there is no evidence to suggest that future compliance will not continue to be good.

Timing and development of FMUs

Granting 10-year duration resource consents will not adversely affect the development and implementation of any revised framework established in the FMU section of the PSWLP, as Council has the ability to have new rules take effect from the date of notification of a plan change and would also be able to review all contents in the catchment collectively.

In conclusion, due to the low level of environmental risk of the proposed activities and substantial value of the investments on the property, 10-year consent durations are considered entirely appropriate.

8.2 Consent Commencement

Any consents granted subject to this application will commence as of the date they are given effect to.

Therefore, the existing consents will need to be surrendered (Section 128 of the RMA) or expire (Section 123

of the RMA) prior to the new consents being given effect to. Therefore, it is appropriate to apply a condition that requires consents must not be exercised until any current consents for the same activity have been surrendered or have expired.

8.3 Review of Lapse

The applicants have no objection to the Environment Southland standard review conditions. In accordance with Section 125 of the RMA, the default 5-year lapse period is appropriate.

9. Conclusion

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

- a) the adverse effects on the environment are likely to be insignificant;
- b) The proposal is consistent with the requirements of the RMA, relevant 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 highly unlikely to result in further degradation of water quality and potential adverse effects will be avoided or mitigated as far as practicable.

Appendix A: Farm Environmental Management Plan

31838



TIAKI FARM ENVIRONMENT PLAN



ABOUT YOUR TIAKI FARM ENVIRONMENT PLAN

This Tiaki Farm Environment Plan document is the result of a tailored farm environment planning service provided to you through the Co-operative Difference. It's part of the advantage you get through Farm Source as a member of the Fonterra Co-Operative. The purpose of this plan is to describe the environmental conditions present on your farm and the management of these conditions. From this, mitigations to potential impacts to water quality are documented and additional mitigations maybe planned, with sensible timeframes. Underpinning this plan, are the agreed national Good Farming Practices that are supported by the agricultural and horticultural sectors. Industry bodies along with Regional Councils and Central Government have developed the Good Farming Practice: Action Plan for Water Quality 2018 in a commitment to swimmable rivers and improving the ecological health of our waterways. The Dairy Industry Strategy (Dairy Tomorrow), as well as the Good Farming Practice: Action Plan for Water Quality 2018, both align with the goal for all dairy farms to have a Farm Environment Plan by 2025. Now that this plan has been created it's the plan owner's responsibility to ensure it is put into action and kept up to date as actions are completed or conditions on farm change. Farm Source is here to help with that implementation and ongoing management through our team of Sustainable Dairying Advisors who can be contacted via the details below.

PHONE: 0800 65 65 68

EMAIL: sustainable.dairying@fonterra.com

CONTENTS:

FARM DETAILS.....	3
FARM OVERVIEW MAP.....	5
GOOD FARMING PRACTICES	6
ACTIONS & RECOMMENDATIONS.....	9
UNDERSTANDING THE RISKS ON YOUR FARM.....	10
GENERAL FARM MANAGEMENT	12
LAND & SOIL FARM MANAGEMENT	25
IRRIGATION MANAGEMENT.....	38
EFFLUENT MANAGEMENT	39
WATERWAYS & BIODIVERSITY MANAGEMENT	47
NUTRIENT MANAGEMENT	58
WHAKAPAPA	69
APPENDIX.....	70

FARM DETAILS

SUPPLIER NUMBER 31838

FARM OWNER **Platinum Dairies Ltd**
731 Benmore Otapiri Road
RD 2
Winton 9782

PLAN OWNER **Jared Collie**
+64 27 2959987
benmoredowns@farmside.co.nz

R.D.2 731 Benmore-Otapiri Road RD 1
Winton 9782

FARM ADDRESS MCKENZIE RD
Winton

LOCATION



REGIONAL COUNCIL Southland

PLAN LAST EDITED 01 December 2021

POINTS OF NOTE

- * Southland Physiographic Zones
Gleyed: 321.71 ha - 100.00 %.
- * Southland Consents
Type:Dairy Consent,ID:AUTH-302423,Expiry:2024-09-06: 0.01 ha - 0.00 %.
Type:Water Permit,ID:AUTH-302424,Expiry:2023-10-01: 0.01 ha - 0.00 %.
Type:Water Permit,ID:AUTH-302424,Expiry:2023-10-01: 0.01 ha - 0.00 %.
- * NZLRI Land Use Capability

2c 2: 90.03 ha - 27.98 %.
2s 3: 231.67 ha - 72.01 %.

LAND PARCELS

Fee Simple, 1/1, Section 11 Block IX New River Hundred, 319,853 m2, Fee Simple, 1/1, Section 9-10 Block IX New River Hundred, 639,707 m2, Fee Simple, 1/1, Section 12 Block IX New River Hundred, 319,853 m2, Fee Simple, 1/1, Lot 2 Deposited Plan 544352, 296,490 m2, Fee Simple, 1/1, Lot 2 Deposited Plan 13820, 318,061 m2, Fee Simple, 1/1, Section 13 Block IX New River Hundred, 319,853 m2, Fee Simple, 1/1, Section 22 Block IX New River Hundred and Lot 1 Deposited Plan 13715, 323,883 m2, Fee Simple, 1/1, Section 23 Block IX New River Hundred, 320,005 m2, Fee Simple, 1/1, Section 24 Block IX New River Hundred, 319,550 m2

FARM OVERVIEW MAP

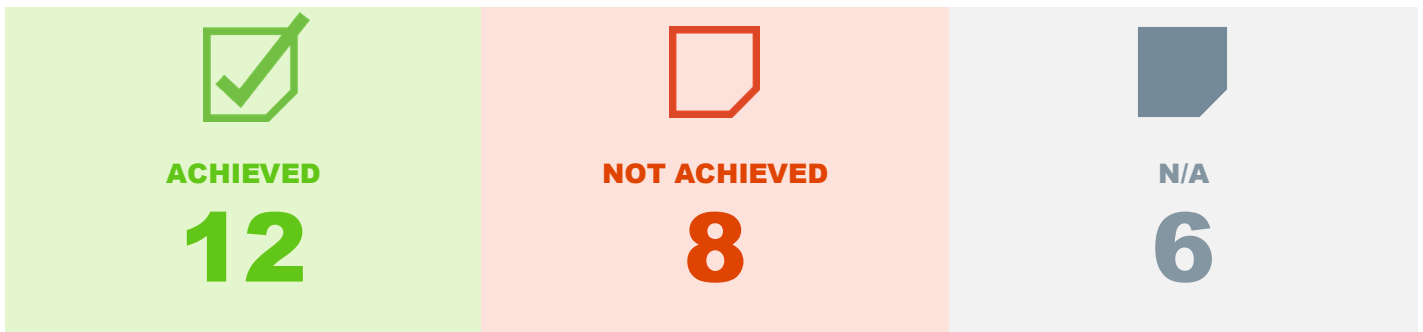
The map below presents the land in which the farming operations covered in this document occur and identifies some key points of interest. More detailed maps looking at specific environmental management topics are contained throughout the document.



- | | |
|---|--|
|  Major Stock Excluded Waterway |  Compliant Crossing |
|  Major Stock Not Excluded Waterway |  Non-Compliant Crossing |
|  Minor Stock Excluded Waterway |  Non-Compliant Non-Regular Crossing |
|  Minor Stock Not Excluded Waterway |  Dispensation Crossing |
|  Farm Boundary |  Dairy Shed |

GOOD FARMING PRACTICES

This section provides an overall snapshot of the farm’s Good Farming Practices (GFPs). Based on industry-agreed identified practices, the GFPs in this Farm Environment Plan are grouped by the six core management areas on farm. Each management area below displays the farm’s progress towards achieving all the GFPs within that area. This section also includes additional GFPs relevant to the dairy industry goals.



GENERAL FARM



LAND & SOIL



IRRIGATION



EFFLUENT



WATERWAYS & BIODIVERSITY



NUTRIENT



GOOD FARMING PRACTICES

The tables below assess the GFPs recorded in this Farm Environment Plan. GFPs already in place on this farm, will be listed as “Achieved”. GFPs yet to be achieved or in progress, will show the number of open actions required to achieve the GFP. GFPs that are not applicable in this Farm Environment Plan will be listed as “N/A”

GENERAL FARM MANAGEMENT	
Identify the physical and biophysical characteristics of the farm system, assess the risk factors to water quality associated with the farm system, and manage appropriately	ACHIEVED
Maintain accurate and auditable records of annual farm inputs, outputs and management practices	ACHIEVED
Store and load fertiliser with minimal spillage and leaching	ACHIEVED
Store, transport and distribute feed to minimise wastage, leachate and soil damage	ACHIEVED
*Farm waste is minimised and managed properly	1 ACTION(S)
*Water use for the dairy shed and stock water is efficient	ACHIEVED

LAND & SOIL MANAGEMENT	
Manage farming operations to minimise direct and indirect losses of sediment and nutrients to water, and maintain or enhance soil structure, where agronomically appropriate	1 ACTION(S)
Reduce periods of bare soil between crops and pasture to reduce erosion and leaching	ACHIEVED
Retire all LUC 8 land and retire LUC 7e land or ensure that it has soil conservation measures in place	N/A
Use appropriate paddocks for intensive grazing	ACHIEVED
Manage grazing to minimise nutrient loss from risk areas	1 ACTION(S)

IRRIGATION MANAGEMENT	
Irrigation rates and timing match plant requirements	N/A
Design, calibrate and operate irrigation systems to use water efficiently	N/A

*Additional GFP relevant to the dairy industry goals

GOOD FARMING PRACTICES

EFFLUENT MANAGEMENT

Effluent system meets code of practice	ACHIEVED
Sufficient suitable storage available	ACHIEVED
Spreading equipment is well maintained and calibrated	1 ACTION(S)
Effluent applied at correct depth, rate and time	ACHIEVED
*All effluent systems	1 ACTION(S)

WATERWAYS & BIODIVERSITY MANAGEMENT

Identify areas where runoff may occur and manage to avoid runoff entering waterways	N/A
Tracks, feed areas, gateways and troughs are located away from waterways	N/A
Stock are excluded from waterways	1 ACTION(S)
*Areas of native plants or significant biodiversity are protected	N/A

NUTRIENT MANAGEMENT

















Monitor and maintain P levels at the economic optimum	ACHIEVED
Fertiliser application matches plant requirements and minimises losses	1 ACTION(S)
Spreading equipment is well maintained and calibrated	1 ACTION(S)
*General Nutrient Management	ACHIEVED

*Additional GFP relevant to the dairy industry goals

ACTIONS & RECOMMENDATIONS

This list includes all actions and recommendations that have been agreed as part of this Farm Environment Plan. Actions are required to achieve Good Farming Practices. Actions that have a target date within 2 years are captured as “Current Actions”. Actions with a target set more than 2 years in the future are captured as “Future Actions”. “Recommendations” cover all other actions that are not related to a GFP.





CURRENT ACTIONS

		Target Date
	 Implement All Good Farming Practices for Winter Grazing	31 May 2022
	 Recycle/Reduce Farm Waste	01 Aug 2022
	 Update the Effluent Management Plan	01 Aug 2022
	 Prevent Risks Associated with CSAs	01 Oct 2022
	 Calibrate the Pods	01 Nov 2022
	 Develop a Riparian Plan	01 Jun 2023
	 Use Spreadmark Accredited Contractors	01 Aug 2023
	 Nitrogen - Assess Requirements before Applying	01 Aug 2023


FUTURE ACTIONS

	Target Date
--	-------------

RECOMMENDATIONS

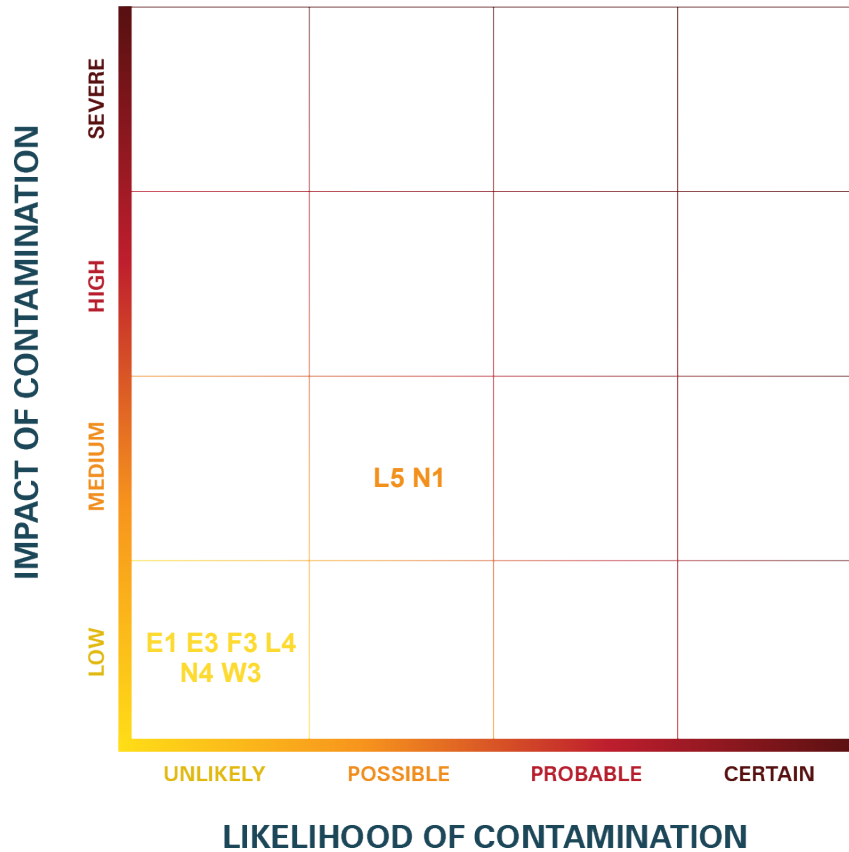
	Target Date	
	Consider Installing Tile Drain Treatment Methods	
	Maintain/Enhance Mahinga Kai Values	
	Review Nitrogen Efficiency Improvements / Loss Reduction Section of this Plan	
	Consent Renewals	01 Apr 2023

Key: Action Priority

 Low  Medium  High  Critical

UNDERSTANDING THE RISKS ON YOUR FARM

This section provides some context to help understand the relative impact and likelihood of environmental risks that have been identified on your farm. The chart on this page together with the map on the following page can be useful when thinking about what environmental risk areas on your farm need the most focus.



HOW ARE RISK RATINGS MEASURED?

The issues plotted on the chart above have been done so based upon two measures that are assigned to a specific area of your farm where an environmental risk has been identified. 1. Impact of contamination (on the vertical axis, or the first dial) is a measure of the potential scale or significance of contaminants that may be lost from this area of your farm. It's about quantifying how bad could the outcome for the environment be; 2. Likelihood of contamination (on the horizontal axis, or the second dial) is about the chance of the contamination actually occurring from that area of your farm. It takes into account things like how far the area might be from waterways as well as the slope or aspect of the area; When combined together the two measures also give an overall 'risk rating'. The measures and the combined rating are presented for each risk area along with other descriptive information about the risk area on the subsequent pages of this document.

Example:



UNDERSTANDING THE RISKS ON YOUR FARM

The map below shows the location of the risk areas identified on your farm. The Risk Rating presented here is a combined measure of the impact and likelihood of contamination occurring from each risk area.

- Low
- Medium
- High
- Critical



- F3 Infrastructure, storage, waste Overview
- L4 Winter Grazing
- L5 Critical Source Area
- E1 Effluent Overview

- E3 Effluent Irrigation
- W3 Future Riparian Planting
- N1 Nutrient Overview
- N4 Fertiliser Applications

MAHI WHAKAHAERE GENERAL FARM MANAGEMENT



- F1** FOLLOW-UP VISIT 24/11/2021
- F2** Farm Overview - Farm Overview
- F3** Infrastructure, storage, waste Overview
- F4** Standoff Areas/Feed pads
- F5** Water Use Overview - Water Use Overview
- F6** Resource Consents - Resource Consents

- F7** Key Feature - Dairy Shed
- F8** Key Feature - Bore E46/1145
- F9** Key Feature - Calving Pad 1
- F10** Key Feature - Calving Pad 2
- F11** Key Feature - Calving Pad 3
- F23** Key Feature - Bore

FARM MANAGEMENT

GOOD FARMING PRACTICES

<p>Identify a farms environmental characteristics and plan for their management</p> <p>* The physical and biophysical characteristics of the farm system are identified, risk factors to water quality associated with the farm system have been assessed and are managed appropriately by the development of a Farm Environment Plan.</p>	<p>ACHIEVED</p>
<p>Maintain records of good environmental management</p> <p>Accurate and auditable records of annual farm inputs, outputs and management practices are maintained. This is particularly important for supplementary feed, fertiliser use (location of spreading) and stock numbers. Without this data an accurate picture of the farms environmental and economic performance cannot be obtained.</p>	<p>ACHIEVED</p>
<p>Store and load fertiliser with minimal spillage and leaching</p> <p>Practices: The Fertiliser Industry - Code of Practice for fertiliser handling, storage and use is followed Storage sites are located away from waterways Stored fertiliser is covered</p>	<p>ACHIEVED</p>
<p>Store, transport and distribute feed with minimal wastage, leachate and soil damage and leaching</p> <p>Practices: Feed storage areas are located away from waterways Silage and other feed are stored on hard sealed areas and leachate is collected Overland flow and rainwater are diverted away from feed storage areas Silage is sufficiently wilted before being put into stack Silage remains sealed while stored to prevent rotting Permanent feed-out areas / facilities are sealed and effluent is collected</p>	<p>ACHIEVED</p>
<p>*Farm waste is minimised and managed properly</p>	<p>1 ACTION(S)</p>
<p>*Water use for the dairy shed and stock water is efficient</p> <p>Practices: All water use on farm is measured (water meters) Water wastage is minimised from the dairy shed All leaks are fixed as soon as possible Water troughs are checked daily where animals are grazing</p>	<p>ACHIEVED</p>

*Additional GFP relevant to the dairy industry goals

FARM MANAGEMENT

FOLLOW-UP VISIT 24/11/2021



Follow-up visit for Farm Environment Plan completed January 2020, plan updated to include the following

- Support block (Muir Block) included in the plan as this is to be added to the dairy platform, Land Use consent underway
- Most of the CSA have been mitigated
- Effluent Pond and sumps visual sign-off's completed
- Farm management blocks updated to include the Muir Block and new laneways
- Updated storage calculation has been done for consent renewal
- Updated plan to include Essential Freshwater requirements
- New technology for water use monitoring and effluent applications
- Winter Grazing, Good Farming Practices currently being undertaken

FARM MANAGEMENT

FARM OVERVIEW



The property is owned by Platinum Dairies Limited and is managed by Craig McGregor, the farm is located off McKenzie Road, Winton and is part of the Makarewa River Catchment. The farm operates under Environment Southlands discharge and water consent rules.

The total dairy platform area is 321.7ha (includes Muir Block) on flat topography of which 307.7ha is effective, made up of a regular effluent area of 171.4ha (excludes Environment Southlands discharge setbacks and buffers), non-effluent area of 136.3ha with 14ha non-effective, from dairy shed & effluent infrastructure, riparian margins, houses and sheds, shelter belts and lanes. There is a land use consent currently underway to add the Muir block (total area 64.05ha and 61.7ha effective) to the dairy platform.

Platinum Dairies is consented to milk 1000 cows and for the 21/22 season 940 cows will be peak milked, replacements go off farm from 1st December, back for calving as R2's. most of the cows will be wintered off farm apart from lighter ones.

Imported supplements used for 21/22 season will be from DDG, Barley grain, PKE and some additional silage brought on. Swedes and kale will be grazed when the cows are home from winter grazing plus grass/baleage paddocks used for calving when conditions are dry.

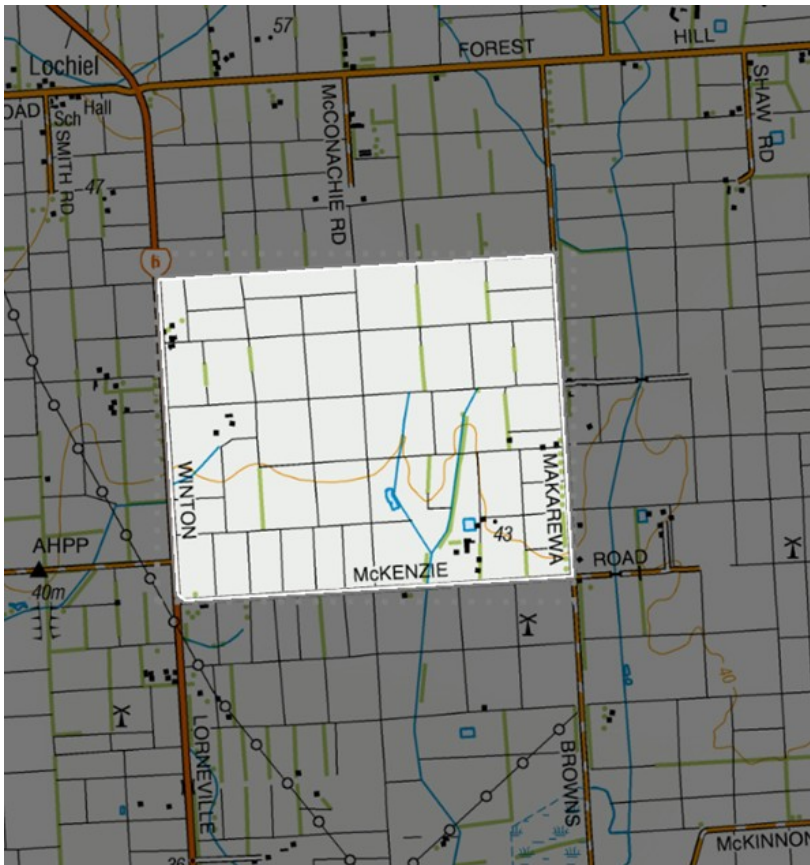
Good records are kept of stock numbers, supplementary feeds, fertiliser use and location/time of spreading.

This Farm Environment Plan covers the dairy platform and the Muir Block, the 20/21 season farm dairy records were used to produce a nitrogen risk score card for the farm as part of the Farmer Insights Report

This Farm Environment Plan is designed to

- Summarise current farming practises
- List industry agreed Good Farming Practises as either achieved (overview sections of this plan) or Good Farming Practises that need to be actioned
- Identify if any, areas of historic connections or significance and natural resources are protected for Mahinga Kai (food gathering place) value
- Highlight any risk to water quality issues and how they should be managed.
- Ensure the farm is meeting its discharge and water consent requirements
- Identify other actions which could provide additional environmental benefits

FARM MANAGEMENT



FARM MANAGEMENT

INFRASTRUCTURE, STORAGE, WASTE OVERVIEW

F3

IMPACT OF CONTAMINATION



+



LIKELIHOOD OF CONTAMINATION

=

LOW RISK RATING

The farm dairy is a 50 bale Waikato rotary shed, overall presentation is very good with a tidy shed and surrounds, effluent from the dairy shed and main yard is contained on concrete and directed to the farms effluent system.

Silage is stored on a 900sqm concrete pad and walls with all leachate collected and directed to the effluent system, baleage storage is on gravel located away from waterways, imported supplements Barley grain, PKE and DDG are stored in silos at the dairy shed and feed through the shed.

The farm has three calving pads, locations shown on the Overview Map, they meet Environment Southlands permitted rules but will require a consent under the Governments Essential freshwater rules, see calving-pad feature for recommendations.

Maintenance and the first round of Ammo fertiliser is spread direct by Sinclair Transport with all other nitrogen fertiliser spread by the farm and stored in a Ravensdown Silo. Fuel storage on farm is in above ground tanks, chemical storage in a lockable shed, both locations meet minimum distances of 20m from the farm dairy and located away from waterways and drains, see attached Overview map

Baleage and silage wrap is stored and recycled off farm through Plasback, dairy shed and the main house rubbish is removed off farm via a skip at the dairy shed, staff are responsible for their own rubbish and do not use the farm facilities. Detergent and chemical containers are stored, these can be recycled through Agrecovery. By undertaking a recycling programme through Agrecovery will help to meet one of the Co- operative difference requirements.

Currently no dead hole on farm, if one is to be dug in the future ensure it will meet Environment Southlands permitted rules, being located 50m from a waterway and 100m from the farm boundary/dwelling and does not intercept drainage/springs and groundwater.

ACTIONS | RECOMMENDATIONS

Target Date



Recycle/Reduce Farm Waste – To Achieve GFP

01 Aug 2022

Farm waste is minimised and managed properly this can be achieved by:

- Look to Reduce, Reuse and Recycle
- General recyclable farm/household waste (such as cans and bottles) should be taken to a local collection station. Use a skip or wheelie bin for regular collection and disposal of solid waste to a transfer station.
- Chemical containers from participating brand owners can be stored and

FARM MANAGEMENT

recycled through Agrecovery free of charge, non-branded containers (or containers with no labels) can be recycled through Agrecovery but at a cost, \$2.30+ GST per 10L container, \$19.50 + GST per drum 61-200L and \$80 + GST per IBC 500-1000L.

If registered at Agrecovery containers can be dropped off at the Farm Source stores, need to be triple rinsed or will not be accepted.

- Ballance fertiliser bags can be returned, need to put pressure on other companies to reuse/take back some of this material i.e. feed and mineral bags, this will reduce skip pick up costs or burning in the dead hole which is a prohibited activity.

- Plasback operate a user pays baleage wrap recycling scheme across New Zealand. See www.plasback.co.nz. Costs for recycling is approximately \$40 for 150 bale wraps (includes collection bag), the farm is to use Plasback.

- Ecolab recycle used detergent containers to Agrecovery, check to see if your supplier will do the same

Practices:

Waste is recycled where possible



FARM MANAGEMENT



FARM MANAGEMENT

STANDOFF AREAS/FEEDPADS

F4



There are three calving pads (feed pad/lots as described in pSWLP) they will have 500mm of woodchip base. Two of the pads are roofed or partially roofed, neither of these pads is connected to the effluent system, the third pad, is not roofed, but is connected to a sump with is pumped to the effluent pond.

The pads are used in the shoulders of the season for feeding, calving and for adverse weather conditions.

Calving Pad 3 had some surface water issues when the original farm environment plan was done January 2020, this has now been resolved with the pad levelled off and any liquid from this pad draining to a concrete sump and then pumped to the main effluent pond, this area is included in the Massey Dairy Effluent Storage calculation done for the farm.

Under the 2020 NES freshwater regulations, these areas would be considered a stockholding area as they are used for holding cattle at a density which pasture, or other vegetative ground cover cannot be maintained (NES definition of stockholding area).

Stockholding areas are required to meet a minimum standard of being signed off by a suitable qualified person or to meet the following

- Manage the permeability of the base area so that it is sealed to a minimum permeability standard of 10-9 m/sec
- Collect, store, and dispose of effluent in accordance with regional council regulations or a current discharge permit
- Situate the stock-holding area at least 50 metres away from waterbodies, water abstraction bores, drains and coastal marine areas.

If these standards cannot be met, a resource consent will need to be applied for within 6 months of the 1 July 2021.

A consent for the three pads is currently underway by LANDPRO.

ACTIONS | RECOMMENDATIONS

Target Date

- 

Prevent Calving Pad Ponding – To Achieve GFP
01 Jul 2020

For the calving pad under the trees look to divert surface water away to prevent ponding off the pad, may help if the pad was levelled off. Ensure all calving pads have a minimum of 500m of wood-bark/chip to meet Environment Southlands permitted rules.

This issue has been resolved, confirmed from farm visit done 22nd January 2021.

Practices:

FARM MANAGEMENT

Permanent feed-out areas / facilities are sealed and effluent is collected



Calving Pad 1



Calving Pad 3



Calving Pad 2

FARM MANAGEMENT

WATER USE OVERVIEW



Water for both dairy sheds & stock use is from Environment Southland labelled bore E46/1145, the bore is stock excluded, the bore casing is well ground level to avoid surface water contamination, the casing head is capped to avoid contamination from birds and rodents, see location on the overview map.

The farm uses a backup bore, location shown on the Overview map, it is stock excluded in a concrete chamber, casing enclosed and well above ground level, casing head is capped and bore enclosed in the concrete chamber.

Total water take is manually read from both bores, with readings taken monthly and sent to Environment Southland at the end of the season, a requirement of the new water consent (due 2023) will ask for the accuracy of water meters to be verified every 12 months for a mechanical meter and five yearly for an electromagnetic meter or ultrasonic flow meter, both meters are ultrasonic.

Water use at the dairy is minimised by recycling the cooler water, water use kept to a minimum at the dairy sheds, water troughs are checked regularly for leaks and leaks are fixed as soon as is possible. Water use is further reduced by up to 30% with recycled greenwash on the baking gate scrapper used to wash the main yard

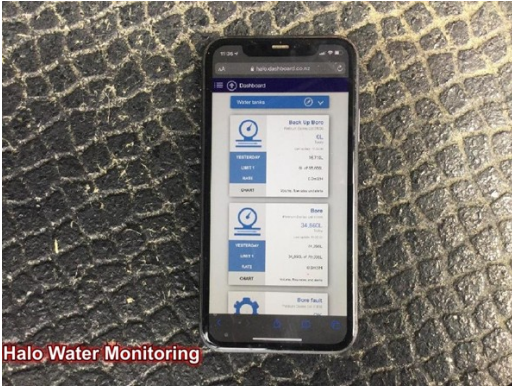
The dairy has four 30,000lt plastic water storage tanks in place and water use from the bores is also monitored through the Halo dashboard.

Water Meter

Ultrasonic Meters



FARM MANAGEMENT



Halo Water Monitoring



Backup Bore

FARM MANAGEMENT

RESOURCE CONSENTS



Platinum Dairies Ltd currently holds two resource consents, discharge & water consents from the 1st of October 2013

1- Discharge permit, AUTH-302423, To discharge dairy shed effluent to land. Expires 1 October 2023.

2- Water permit, AUTH-302424, To take groundwater for a dairy operation. Expires 1st of October 2023

The National Policy Statement for Freshwater Management has been released (August 2020) and includes a number of new environmental regulations. On your property the following activities could be impacted in the future by the new regulations:

- Cap on the use of synthetic nitrogen fertiliser
- Winter Grazing
- Stock Holding Areas

The regulations permit these activities if certain conditions are met. Where these conditions cannot be met, the farm owner is required to apply for a resource consent from the Regional Council.

The specific requirements and actions are outlined under the relevant sections of this FEP and more general information on the regulations can be found at DairyNZ website link shown below.

<https://www.dairynz.co.nz/environment/environmentpolicyandleadership/national-freshwaterregulations/>

Effluent Setbacks:	50m Waterways, 20m Property Boundary, 100m Bore, 200m Neighbours Dwelling
Max Nitrogen Loading Rate	150kg N/ha/yr from Effluent
Max Cow numbers	Consented Cow Numbers 1000
Water abstraction rate	Shall not exceed 120,000 litres per day.

ACTIONS | RECOMMENDATIONS

Target Date



Consent Renewals

01 Apr 2023

Ensure the discharge, water consent renewals and calving pad consents are lodged 6 months prior to the expiry dates (1 October 2023) so contingency rights can be used if issues arise with the applications.

WHENUA ME TE ONE LAND & SOIL MANAGEMENT

LAND & SOIL FARM MANAGEMENT



- L1** Land & Soil Overview - Land Overview
- L2** Southland Physiographic Zone - Southlands Physiographic Zones
- L3** Soil - Soils
- L4** Winter Grazing
- L5** Critical Source Area
- L6** Shelter Belts
- L7** Key Feature - Dairy Shed
- L8** Key Feature - CSA P 19
- L9** Key Feature - CSA P 15
- L10** Key Feature - Swedes-August Grazing 2022
- L11** Key Feature - Swedes-August Grazing 2022
- L12** Key Feature - Swedes-August Grazing 2022

LAND & SOIL MANAGEMENT

GOOD FARMING PRACTICES	
<p>Manage farming operations to minimise direct and indirect losses of sediment and nutrients to water, and maintain or enhance soil structure, where agronomically appropriate</p>	1 ACTION(S)
<p>Reduce periods of bare soil between crops and pasture to reduce erosion and leaching</p> <p>Practices: Bare paddocks are re-sown as soon as practical Erosion damaged areas are rest and re-sown Compacted soils are subsoil, ripped or cultivated</p>	ACHIEVED
<p>Retire all LUC 8 land and retire LUC 7e land or ensure that it has soil conservation measures in place</p>	N/A
<p>Use appropriate paddocks for intensive grazing</p> <p>Practices: Low risk paddocks are selected for intensive grazing that are ideally: --Further away from waterways --With soils least likely to pug and compact --Flatter with as few gullies and swales as possible</p>	ACHIEVED
<p>Manage grazing to minimise nutrient loss from risk areas</p>	1 ACTION(S)

LAND & SOIL MANAGEMENT

LAND OVERVIEW

L1

The farms topography is flat, underlying mainly poorly drained Pukemutu soils, imperfectly drained Woodlands soils and a very small area of Dacre soils.

With soils on the effective dairy platform being poorly drained there is tile drainage in place, where the key risks to water quality will be contaminant losses to surface water via the drains during heavy rainfall events or prolonged spells of wet weather when the soils are saturated. A tile drain map has been developed for the farm.

There were two Critical source areas identified which are linked to waterways and there is a plan to mitigate these.

Pugging and compaction of soils on the dairy platform is minimised with.

- Majority of cows to be wintered off
- Calving pad areas to be used in the shoulders of the season and in adverse weather conditions
- 50ha of the farm aerated each year
- Wetter areas aerated, drainage installed if required and these areas resown
- Swales not cropped, buffer strips are left beside waterways
- All Good Farming Practices for winter grazing are undertaken

Crops are sown conventionally, consider using minimum tillage, there are farms in Southland getting good yields using strip tillage or minimum tillage sowing.

The sowing of catch crops (oats) for reducing nutrient loss is not an option due to the poor draining soils but crop paddocks are resown as soon as is practical to take up excess nutrients after winter grazing, sediment runoff not an issue on the flat topography.



LAND & SOIL MANAGEMENT



LAND & SOIL MANAGEMENT

SOUTHLANDS PHYSIOGRAPHIC ZONES

L2

IMPACT OF CONTAMINATION



+



LIKELIHOOD OF CONTAMINATION

=

HIGH RISK RATING

The Physiographics of Southland were developed to better understand where water comes from and the processes it undergoes as it moves through drainage networks, physiographic zones are a way of grouping areas of Southland that have similar landform types and water quality, zones have been identified according to water origin, soil type, geology and topography.

On Platinum Dairies the zone breakdown is.

- Gleyed Zone - 321.7a or 100% of the total dairy platform area

Soils in the Gleyed Zone accumulate and store nitrogen during summer and early autumn when soil moisture levels are low. Some nitrogen will be removed from the soil and aquifers via denitrification (lost as nitrogen gas) so groundwater nitrate concentrations are typically low to moderate. Accumulated nitrogen starts moving with water when soils become wet in late autumn and winter and may be lost via artificial drains or overland flow on sloping topography.

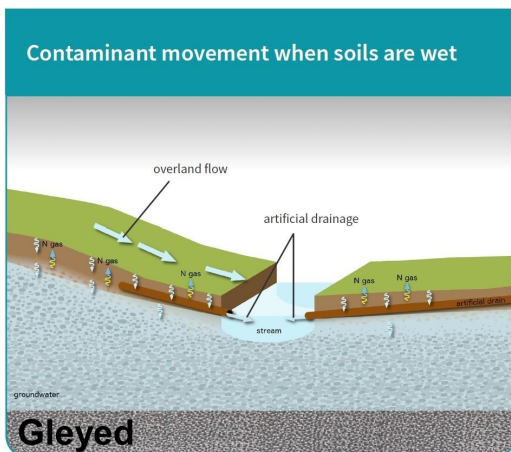
Appendix 1

Physiographic Map

On-going Management

Reduce the effects of artificial drainage by:

- Capturing and treating contaminants at drainage outflows via sediment traps, biofilters and wetland areas
- Protecting soil structure, particularly in gullies and near streams
- Reducing the build-up of surplus nitrogen in the soil during autumn and winter by assessing pasture requirements before applying nitrogen fertiliser & not applying during high-risk periods



LAND & SOIL MANAGEMENT

SOILS



The effective area for Platinum Dairies is 307.7ha and underlay's two soil types;

Pukemutu soils make up 209.1ha of the effective area (68%), they are deep poorly drained soils, soil texture is heavy silt loam with a silty clay subsoil. They have the following risk ratings:

- Structural compaction: Severe vulnerability
- Nutrient leaching: Slight vulnerability (higher where sub-surface drains are present)
- Topsoil erosion by water: Moderate vulnerability
- Organic Matter loss: Slight vulnerability
- Waterlogging: Severe vulnerability
- Bypass drainage: Medium-high risk of losing contaminants through soil macro-pores/cracks
- Dairy effluent application risk: High risk of losses via bypass drainage or run-off

Woodlands Soils make up 98.6ha of the effective area (32%), they are deep silt loams which are imperfectly drained. They have the following risk ratings:

- Structural compaction: Moderate vulnerability
- Nutrient leaching: Slight vulnerability (higher where sub-surface drains are present)
- Topsoil erosion by water: Slight vulnerability
- Organic Matter loss: Slight vulnerability
- Waterlogging: Moderate vulnerability
- Bypass drainage: Medium risk of losing contaminants through soil macro-pores/cracks
- Dairy effluent application risk: High risk of losses via bypass drainage or run-off

Dacre soils are only located along the riparian margins of the farm and have not been included.

These soils are classed as high risk for effluent applications due to their poor drainage characteristics, the farm can mitigate the risks of applying effluent to high-risk soils by being able to defer applications with sufficient effluent storage and by being able to apply effluent at a low rate with the four pulsed lines of Hi-Tech uni-pods.

LAND & SOIL MANAGEMENT



Woodlands profile



Pukemutu profile

LAND & SOIL MANAGEMENT

WINTER GRAZING

L4



Winter grazing in Southland/Otago is one of the biggest issues facing dairy farmers at present and any mitigations that can be done within a paddock to prevent sediment and nutrient loss to water, maintain soil structure and prevent cows standing in water should be undertaken.

The Essential Freshwater winter grazing regulations to be introduced by 1 May 2021 have been pushed back a year but there is an expectation from Government that appropriate mitigation actions to benefit freshwater quality and animal welfare are adhered to or further regulations will be put on the industry.

If the proposed regulations come into force in 2022 then the farm will have to comply with permitted activity rules and/or have a management plan to mitigate adverse effects from intensive winter grazing (in their certified Freshwater Farm Plan). If the grazing activity does not comply with permitted activity rules and/or have a written plan with clear mitigations then a resource consent will be required.

Need to ensure the farms winter grazing practices will meet all the Good Farming Practices for winter grazing, see Winter Grazing Checklist attached in Appendix 3, also each crop paddock will require a winter grazing paddock plan for staff, see attached template in Appendix 4.

The risks of winter grazing on the dairy platform (21/22 seasons crop paddocks shown on the Overview map) are low due to the flat topography but the risk increases with the poorly drained soils and the prescience of tile drains, the risks are reduced by

- crops are strategically grazed.
- back fencing and portable water troughs are used
- baleage placed out prior to grazing
- waterway buffers are used, minimum of 5m and will be increased on sloping ground
- swales are not cropped, left in grass and temporary fenced out, these areas are where tile drains are present
- potential CSA are not cropped and temporary fenced off

See attached examples of how CSA and gullies/swales (usually where tile drains are present) are managed for winter grazing on Platinum dairies, it is likely that managing CSA in crop paddocks will replace the pugging rule that was in last year's Essential Freshwater rules.

Catch Crops Used	N/A
Minimisation of fallow periods	>2 Months
Wintering Management Plan	No
Portable or Permanent Water Troughs	Yes
Strategic winter crop paddock selection undertaken	Yes

LAND & SOIL MANAGEMENT

Waterway buffer area established related to slope	5(<4°) Metres
Critical Source Areas fenced off and retained	Yes
Baleage placed in paddock before soil is too wet	Yes
Stock back fenced off areas already grazed	Yes
Low risk areas of paddock grazed first	Yes
Soil-and-crop-suitable fertiliser used	Yes
Slopes grazed from top to bottom	N/A
Paddock soil tested and results utilised	Yes
Silt and Sediment Traps Utilised	No
Appendix 4	Winter Grazing Paddock Plan Template
Appendix 3	Winter Grazing Checklist
Minimum till practices utilised for crop sowing	No

ACTIONS | RECOMMENDATIONS

Target Date



Implement All Good Farming Practices for Winter Grazing – To Achieve GFP

31 May 2022

- See attached winter grazing checklist in the appendix, check the farm will be meeting all the requirements. and see if

- Provide a Winter Grazing Plan, for next season's crop paddocks provide a grazing plan, a plan put on paper before the winter will save a lot of time over the winter will also show staff have been trained, help to avoid costly compliance issues and bad publicity for the dairy industry & winter grazing.

The plan should also include an adverse weather plan for each winter grazing area to ensure that animal welfare and environmental protection needs will be met in poor weather. Record evidence (photos, video, your farm diary) showing that good management practices are being implemented; and to use this year's learnings to inform next year's plan.

Evidence:

Winter management plan

Wet weather management policies

LAND & SOIL MANAGEMENT



LAND & SOIL MANAGEMENT

CRITICAL SOURCE AREA

L5

IMPACT OF CONTAMINATION



+



LIKELIHOOD OF CONTAMINATION

=

MEDIUM RISK RATING

Critical Source Areas (CSA)/wet areas have a high risk of channelling contaminants (sediment, faecal material, and nutrients) to water when conditions are wet and under winter grazing conditions the risk to water quality leaving the farm will further increase if CSA are not managed adequately.

CSA can be low-lying parts of farms such as the area above tile drains, gullies, and swales where excess water congregates, transporting nutrients, soil, E. coli and phosphorous to waterways (including drains), when stock have access.

The only CSA identified on the farm were in.

- Paddock 19, wet area next to the main creek, if stock have access sediment and nutrients could make its way to the nearby creek, it has been temporary fenced off and work is to be done on this area shortly- plan to fill in the area, drainage if required, sow short term grass to allow area to settle and then to go into permanent pasture. This work will prevent direct runoff of sediment and nutrients to water.

- Small wet area in paddock 15, at the start of the waterway, this is to be fenced off or drained, will prevent sediment and nutrients getting to water.

ACTIONS | RECOMMENDATIONS

Target Date



Prevent Risks Associated with CSAs – To Achieve GFP

01 Oct 2022

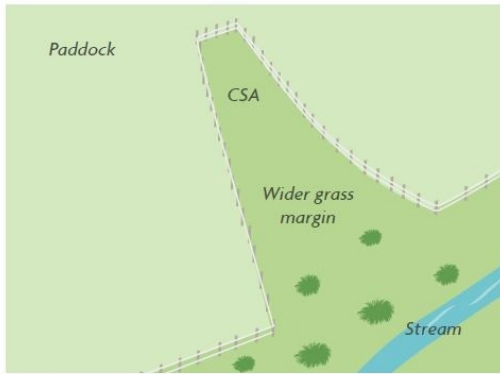
In the short-term look to temporary fence off the CSA to exclude stock, when conditions are wet and they have access to these paddocks, this is done for the area in paddock 19. Long term carry on with the plan in place to prevent the risks associated with these CSAs.

See attached pictures of other ways to mitigate CSA

Practices:

Riparian margins or buffer strips are left beside waterways and other areas where sediment and nutrients may flow such as gullies or swales.

LAND & SOIL MANAGEMENT



Fencing CSAs creates a grass buffer zone to filter out nutrients before they enter waterways.



Planted Critical Source Area



LAND & SOIL MANAGEMENT

SHELTER BELTS

L6

The farm has some shelter belts which provide stock shelter/shade, increased biodiversity (bird life, bees and spiders), can help prevent soil erosion, look aesthetically pleasing and potential increased land and farm value.



WHAKAMĀKŪKŪ IRRIGATION MANAGEMENT

GOOD FARMING PRACTICES

Irrigation rates and timing match plant requirements

N/A

Design, calibrate and operate irrigation systems to use water efficiently

N/A

PARAKAINGAKI EFFLUENT MANAGEMENT



- E1** Effluent Overview - Effluent Overview
- E2** Effluent Storage - Effluent Storage
- E3** Effluent Irrigation
- E4** Key Feature - Halo Site

- E5** Key Feature - Inspection Chamber
- E6** Key Feature - Storm Water Diversion
- E7** Key Feature - Dairy Shed & Tanker Track

EFFLUENT MANAGEMENT

GOOD FARMING PRACTICES	
<p>Effluent system meets code of practice</p> <p>Practices: Effluent is collected from all sources: dairy sheds, yards, feed pads, underpasses The system design is appropriate for the soil type, topography, and climate New systems: accredited designer has been used</p>	ACHIEVED
<p>Sufficient suitable storage available</p> <p>Practices: Dairy Effluent Storage calculator has been used to work out storage needs New storage built, has been by an accredited effluent designer Effluent is applied whenever possible to keep storage low Storage facilities are sealed Effluent solids that accumulate are routinely removed Safety barriers, equipment and signage are in place</p>	ACHIEVED
<p>Spreading equipment is well maintained and calibrated</p>	1 ACTION(S)
<p>Effluent applied at correct depth, rate and time</p> <p>Practices: Effluent application timing and rates are adjusted based on soil moisture levels Nutrient load is spread evenly across the largest area practical Tests for high potassium (K) levels on effluent block are done to avoid animal health issues Fertiliser applications are adjusted to effluent areas based on soil tests Risk areas for effluent application are identified and recorded on a map Odour impact is considered during application</p>	ACHIEVED
<p>*All effluent systems</p>	1 ACTION(S)

*Additional GFP relevant to the dairy industry goals

EFFLUENT MANAGEMENT

EFFLUENT OVERVIEW

E1

IMPACT OF CONTAMINATION



+



LIKELIHOOD OF CONTAMINATION

=

LOW RISK RATING

All effluent from the dairy shed and concrete catchments is contained on concrete and gravity feeds through a stone-trap to a 100m³ Hinds concrete tank, effluent from the tank is pumped through the screw press solid separator and then flows to the main effluent pond. Solids from the stone-trap and separator are stored on concrete to dry and are then applied to land.

The stone-trap, Hind's tank and effluent pond are fenced to prevent unauthorised access (children).

Effluent is applied to land by 4 lines of 4 Hi-Tech pods/line low-rate pods

To reduce effluent volumes the shed roof water is diverted away from the system all year and the concrete catchment is diverted in the winter months also recycled greenwash to the backing gate is used to wash the main yard.

An updated Massey storage calculation, visual sign-off for the Hinds tank has been done for the consent application, the main effluent pond being HDPE lined, having leak detection, and constructed with a resource consent, a pond droptest/visual sign-off is not required.


Soil moisture conditions are assessed by the Environment Southland Beacon web site and visually on farm before effluent is applied, applications recorded in the online Dairy Diary app. Annual maintenance is completed on the effluent system each year but the pods have not been depth tested and it is recommended to have this done each season to ensure they are meeting manufactures specifications, Fonterra can help you with this.

To remove any risk of overloading with nitrogen and potassium the area effluent is applied to should be 80ha for consented cow numbers of 1000, the regular effluent area of 171.4ha is well above this requirement.

It is Good Farming Practice to have an effluent management plan for staff and will be a requirement of the new discharge consent, the farm manager has one in place but should be updated.

ACTIONS | RECOMMENDATIONS

Target Date

	<p>Update the Effluent Management Plan – <u>To Achieve GFP</u></p> <p>For the consent application look to update the current effluent management plan, it is a practical plan and should include</p> <ul style="list-style-type: none"> - for staff on how you expect your effluent system to be operated - what and when maintenance needs to be carried out - what procedures to follow in an emergency and who to contact. 	<p>01 Aug 2022</p>
---	---	--------------------

EFFLUENT MANAGEMENT

- leak detection monitoring
- include no go areas/high risk areas for effluent application, including the tile drain map. At present effluent is not applied to areas within the consented area due to risks, these areas should be highlighted on the farm map.

Practices:

An effluent management plan is in place



EFFLUENT MANAGEMENT



Solids Concrete Pad

EFFLUENT MANAGEMENT

EFFLUENT STORAGE



The main effluent pond is HDPE lined, has a 2:1 batter with the dimensions of 48m x 48m x 3.5m deep (pond dimensions from storage report done by Rural Environmental Solutions) to give an effective volume of 4,836m³ and with freeboard/sludge allowance of 0.51m a total volume of 5,941m³.

The pond has leak detection in place, with drains underneath to an inspection chamber, location shown on the Overview map

An updated storage calculation has been done by Rural Environmental Solutions for the consent application to show the farm has enough storage available in the main effluent pond.

Certified (CPENG)	Yes
Dairy effluent storage calculator	Yes
Pond Sealed (drop test)	Yes
Stormwater diversion	Yes
Pond Lining	HDPE
Solids management	store on sealed structure then spread



Inspection Chamber



EFFLUENT MANAGEMENT

EFFLUENT IRRIGATION

E3



Effluent can be applied to a regular area of 171.4ha (this area excludes Environment Southlands setbacks & buffers), the farm is consented to apply effluent to a larger area.

Effluent is applied by 4 lines of Hi-Tech uni sprinklers low-rate pods with 4 pods/line, effluent can be pulsed between the four lines for a determined time depending on soil moisture conditions/deficits. The pods are pulsed from a manifold on the pump

The uni sprinklers with a 9mm nozzles will be applying between 4mm to 4.3mm/hour and putting out 3480lt/hour/pod if run for 1 hour the 16 pods will apply 55,680lt of effluent/hour. Effluent applications are monitored through the Halo system which also provides the high/low pressure fail-safe to avoid accidental discharges from occurring, the fail-safe is attached at the hydrants for each of the four lines. Reception for the Halo system is improved across the farm with an extended antenna in place.

The pods have not had an application rate test and it is recommended to have this done each season to ensure the pump and pods are meeting their design specifications.

Application depth testing	No
Irrigation Method	Low-rate Pods

ACTIONS | RECOMMENDATIONS

Target Date

 **Calibrate the Pods – To Achieve GFP** 01 Nov 2022

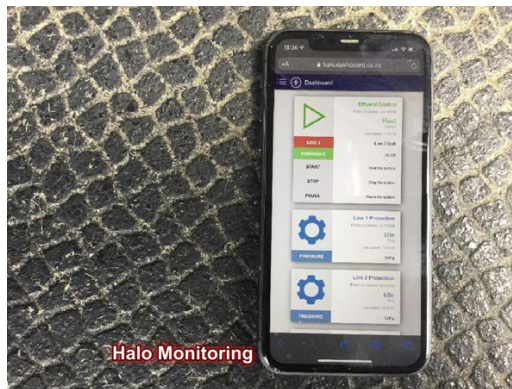
It is recommended to have the pods calibrated by doing a depth test, this will also validate application depths used in the Massey Dairy Storage Calculation and ensure the farm is meeting its discharge consent requirements.

Fonterra can help you with this test

Practices:

Effluent irrigator/spreading equipment is calibrated

EFFLUENT MANAGEMENT



RARENGA RAUROPI WATERWAYS & BIODIVERSITY MANAGEMENT

WATERWAYS & BIODIVERSITY MANAGEMENT



- W1** Waterways & Biodiversity Overview - Waterways Overview
- W2** Mahinga Kai
- W3** Future Riparian Planting
- W4** Artificial or Tile Drainage - Tile Drains

- W5** Key Feature - Riparian Margin - Pond
- W6** Key Feature - Riparian Margin
- W7** Key Feature - Riparian Margin
- W8** Laneways

WATERWAYS & BIODIVERSITY MANAGEMENT

GOOD FARMING PRACTICES	
Identify areas where runoff may occur and manage to avoid runoff entering waterways	N/A
Tracks, feed areas, gateways and troughs are located away from waterways	N/A
Stock are excluded from waterways	1 ACTION(S)
*Areas of native plants or significant biodiversity are protected	N/A

*Additional GFP relevant to the dairy industry goals

WATERWAYS & BIODIVERSITY MANAGEMENT

WATERWAYS OVERVIEW

W1



The farm is in the Makarewa River catchment and there are 1.589km of waterways associated with the farm plus one large pond. All the waterways are permanently fenced to exclude stock with wide rank grass margins of 2-3m in place.

There are no known sites of cultural or historic significance in the vicinity.

Mahinga kai is about the value of natural resources, the farm does have permanently flowing waterways to support Kai (food) but the contribution to Mahinga Kai values doesn't have to be only within the farm boundary, as individual actions on farm will have cumulative effects beyond the farm boundary to the wider catchment i.e., sediment traps & wetlands.

There are 4 stock crossing, all with culverts, they are well constructed with built-up approaches and sides to prevent direct run-off of sediment/nutrients to water.

Gateways are wide to allow good cow flow, they are in dry areas of the paddocks to reduce pugging and there has been recent work to rock these. Water troughs are in the middle of paddocks and supplements are feed out away from waterways to prevent pugging and sediment entering waterways. An uncultivated strip is left between crops and waterways to prevent direct runoff of contaminates to water.

The laneways are low risk for water quality issues as they are on flat topography, the majority of the laneways don't run next to a waterway, they are in very good condition and regular maintenance done each year. There is around 218m of lane next to a waterway, this is low risk for sediment runoff as on flat topography and a very wide rank grass margin is in place.

There are tile drains in place, these have been mapped, see if they can be directed into existing ponds, sediment traps and or wetlands to allow sediment and associated nutrients (phosphate) to be filtered, see tile drain section for further recommendations.

The farm has no formal riparian plan in place and even with the small length of waterways it would be ideal to have one, there is scope on farm for future riparian planting to occur, see future riparian planting for recommendations.



WATERWAYS & BIODIVERSITY MANAGEMENT



WATERWAYS & BIODIVERSITY MANAGEMENT

MAHINGA KAI



Mahinga kai is about the value of natural resources – our birds, plants, fish, and other animals and resources that sustain life, including the life of people.

It is critical to manage these resources to allow people to continue gathering kai (food) in the way the ancestors did. Across Aotearoa as guardians of the land we all have a commitment to work towards meeting Mahinga Kai objectives such as protecting wetlands and fish habitats for species such as Galaxia (native freshwater fish), Tuna (eels), Inanga (whitebait) and freshwater Koru (crayfish), mitigating the impact of exotic and pest fish species, and ultimately enabling the continued access to healthy Mahinga kai species that are safe to eat and in quantities to support local communities.

The contribution to Mahinga Kai values doesn't have to be only within the farm boundary, as individual actions on farm will have cumulative effects beyond the farm boundary to the wider catchment.

There are actions done on farm relating to Mahinga Kai and minimising sediment and nutrient loss, these are identified on the farm maps in this report. Specific actions are summarised below

Fish habitat protected	Waterways are fenced off and maintained to support fish habitat. If spawning sites are identified, these are prioritised and protected. If pest fish species are present, actions are in place to remove them, or mitigate their impact and distribution further
Management of contaminants	Losses of contaminants from the farm have been mitigated or removed through the actions developed within this farm environment plan. This includes management of nitrogen, phosphorus and faecal matter, which are all detrimental to waterway health and the health of Mahinga kai.
Management of sediment	Lanes and culverts are maintained to divert run off of nutrients away from the waterways.
Management of risk areas	Areas of differing soil types that require different management is done on farm as per land management section of this plan.
Waterways protected	All waterways or areas holding water are fenced to exclude stock with a buffer zone to help filter any runoff of nutrients. Any drains are managed to avoid disturbance or damage to Mahinga kai species or habitats.
Mahinga Kai access	Access to Mahinga kai is allowed for local communities.

ACTIONS | RECOMMENDATIONS

Target Date



Maintain/Enhance Mahinga Kai Values

Check to see if Platinum Dairies is meeting all the Good Farming Practices associated with Mahinga Kai values including.

WATERWAYS & BIODIVERSITY MANAGEMENT

- Allowing Mahinga Kai access
- Management of sediment, risk areas (CSA) and contaminate loss
- All waterways and fish habitat are protected



Galaxia (native freshwater fish)



Koura (native freshwater crayfish)



Tuna (freshwater eels)



Develop Native Biodiversity

WATERWAYS & BIODIVERSITY MANAGEMENT

FUTURE RIPARIAN PLANTING

W3



The value of native riparian planting contributes to the following.

- Controlling weeds
- Enhancing bird habitat and biodiversity
- Providing shelter & shade for stock
- Improving stream bank stability
- Filtering nutrients and sediment from overland flow
- Lowering stream temperature and reducing waterweed growth
- Look aesthetically pleasing and add potential value to the farm


Biodiversity literally means a variety of living things, whether they are animals, plants, insects or microorganisms, for example, birds and spiders feed on pest insects, keeping your pasture healthier. Earthworms cultivate and enrich the soil, helping to produce higher pasture yield. Bees pollinate clover flowers and increase clover coverage.

Options for future riparian planting could include;

- The large pond in paddock 25, would be an ideal place for native riparian planting to occur, would help to control weeds and provide biodiversity habitat/value to the farm.
- Both the main waterway from paddock 17 down to the boundary and the side drain from paddock 25 down to paddock 23 have areas that could be planted without the fence line being moved, at present they have long grass margins each side of the creek, riparian planting could just be to plant carex-secta (see attached example in the overview page), this will prevent weed build up in the creek, bank stability, habitat and nutrient filtering without restricting flood flows or where there are wider areas further planting of native bushes/trees could occur.
- Wet area in paddock 19 could be planted out and could also provide an outlet for tile drains so filtering of sediment and nutrients could occur.

ACTIONS | RECOMMENDATIONS

Target Date

	<p>Develop a Riparian Plan – <u>To Achieve GFP</u></p> <p>There are areas of waterways/pond that would be ideal for native riparian planting to occur, permanent fencing is already in place and there are areas available for planting.</p>	<p>01 Jun 2023</p>
--	---	--------------------

Having a formal riparian plan in place will help progress riparian and shelter

WATERWAYS & BIODIVERSITY MANAGEMENT

planting for the property and record the work that has already been carried out, see attached example pictures of native riparian planting.

The Plant Store can provide riparian plans free of charge and I have seen some of their plans and they are good, there will be other nurseries nearby which offer the same service.

Practices:

A riparian management plan has been developed (include any plantings)



Example of Mixed Native planting



Wetland Area Fenced off



Carex-secta Drain Planting



WATERWAYS & BIODIVERSITY MANAGEMENT

TILE DRAINS



IMPACT OF CONTAMINATION



+



LIKELIHOOD OF CONTAMINATION

=

HIGH RISK RATING

Subsurface drain allow water to be quickly transported from the land surface and subsoil to waterways on the farm. This prevents soil damage, protects pasture and allows the land to be used for intensive farming. The downside is subsurface drainage provides a rapid transport mechanism for contaminants such as sediment, E. coli and nutrients to also be transported from the land and subsoil to waterways on the farm.

See attached example pictures of sediment traps/wetlands that have been setup on farms in the West Otago district by the Pomahaka Water Care Group and have had water quality testing done by the Otago Regional Council and AgResearch showing remarkable reductions in contaminate levels leaving the farm. These were low cost and relatively easy to setup.

If the above are not practical or possible for the farm then larger buffer areas could be left at the ends of tile drain outlets to filter drainage, before they discharge into waterways. They can either be left in rank grass or planted in low plants such as Carex secta, red tussock, flax and Toe-toe (see attached examples)

Tile drains on farm have been mapped, knowing where the tile drains are will help to reduce the risk of effluent ponding over a tile drain, sediment loss via tile drains from intensive grazing on crops and tile drain outlets can also be checked for blockages.

Subsurface Drains Mapped	Yes
Outfall location	Stream
Outlets marked	No
Appendix 5	Tile Drain Map

ACTIONS | RECOMMENDATIONS

Target Date

- Provide a Tile Drain Map**

The tile drains on Platinum Dairies have not been mapped, it is Good Farming Practice to have a tile drain map for the farm, if the staff on farm know the location of drains it will help them to.

 - Manage effluent applications by not placing the pod line along a tile drain.
 - Develop a grazing plan for intensive grazing of crops.
 - Check tile outlets for blockages.

01 Aug 2020

A tile drain map is also a requirement of Environment Southlands Appendix N which outlines what they want to see in a farm Environment plan

WATERWAYS & BIODIVERSITY MANAGEMENT

A tile drain map has been provided for the farm and is attached in appendix 5



Consider Installing Tile Drain Treatment Methods

Tile drains are a pathway for the transportation of contaminants such as sediment and nutrients to surface waterways.

Where practical, consider creating further sediment traps/ponds prior to major tile drains discharging into surface water bodies or diverting tile outlets into existing ponds or wetlands, they do not need to be big, can be low cost to install and reduce nutrient/sediment loss to water markedly.

The pond would be an ideal place for this to occur or consider tile drain outlet buffers, the tile in, sediment trap, wetland out example was put in at a cost of less than 2k and would suit areas of the farm where tiles drain a large catchment area.

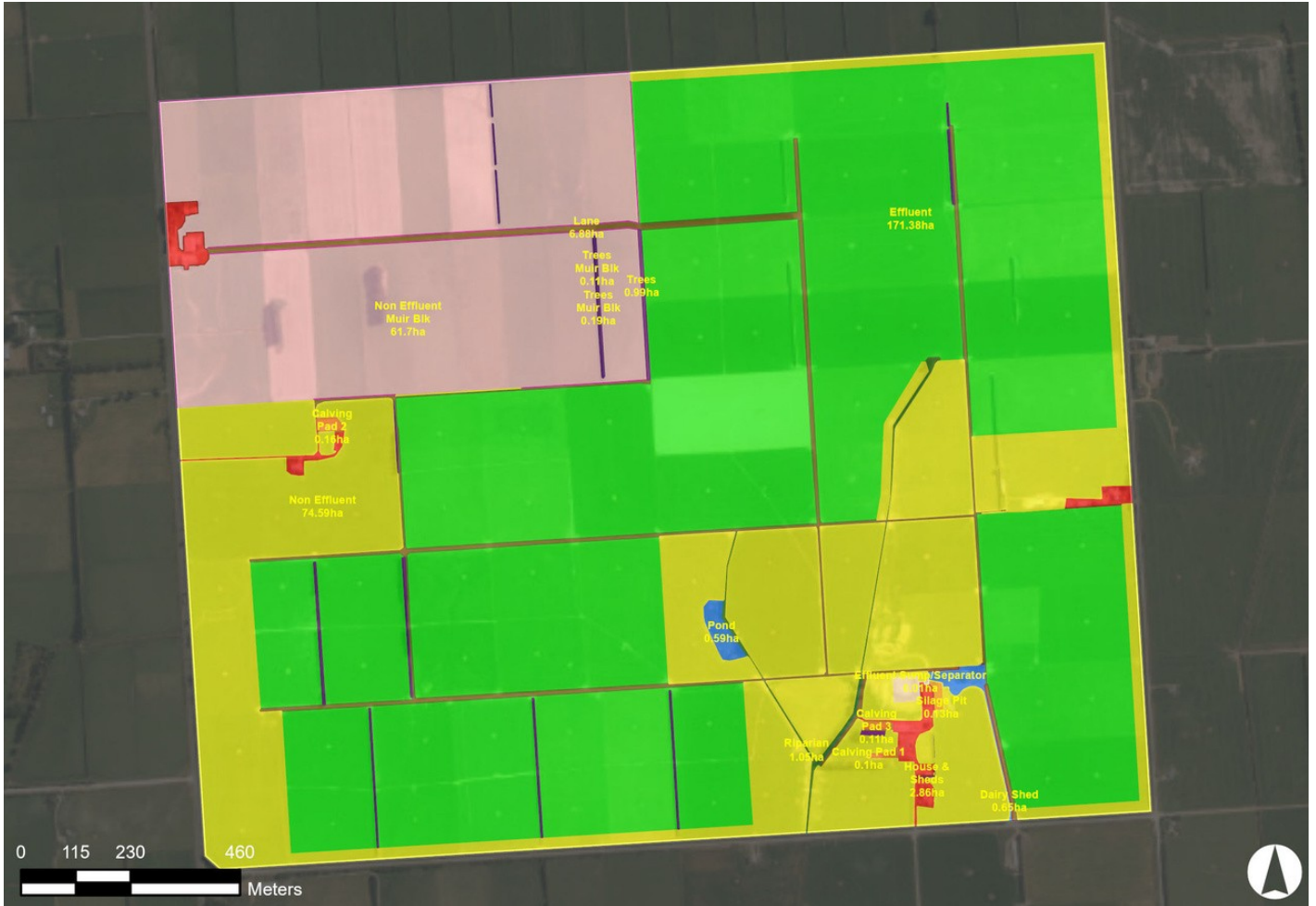


Wetland Area



Tile Drain Outlet Buffer Area

TAIORA NUTRIENT MANAGEMENT



N1 Nutrient Overview - Nutrient Overview

N2 Nitrogen Efficiency Improvements

N3 End of Season Nitrogen Report

N4 Fertiliser applications - Fertiliser Applications

NUTRIENT MANAGEMENT

GOOD FARMING PRACTICES

<p>Monitor and maintain P levels at the economic optimum</p> <p>Practices: Olsen P trends continue to be monitored over successive years Olsen P is maintained in the optimum range Fertiliser applications are tailored for different management blocks</p>	ACHIEVED
<p>Fertiliser application matches plant requirements and minimises losses</p>	1 ACTION(S)
<p>Spreading equipment is well maintained and calibrated</p>	1 ACTION(S)
<p>*General nutrient management</p> <p>Practices: Soil-testing is done each year for each different management block Soil-testing is done well before crops are planted to identify nutrient levels A nutrient budget is used to help fertiliser decision making Supply farm nutrient information to your milk company at the end of each season</p>	ACHIEVED

*Additional GFP relevant to the dairy industry goals

NUTRIENT MANAGEMENT

NUTRIENT OVERVIEW

N1

IMPACT OF CONTAMINATION



+



LIKELIHOOD OF CONTAMINATION

=

MEDIUM RISK RATING

The appropriate use of nutrients on the farm is determined by regular soil testing and advice from the farm's fertiliser representative Ravensdown, who supply an Agronomy plan each season.

Regular soil testing is done to assess Olsen P, K, pH and other nutrient level trends over time, with the aim to have Olsen P levels in the range at the high end of 30 to 40mg/l

This seasons fertiliser plan from Ravensdown was based on monitor soil tests taken 2019 and whole farm tests done 2020, no tests done last year and monitor paddocks will be done for 22/23 season.

Maintenance fertiliser recommendations from Ravensdown were for a blanket application across the farm apart from paddocks that have received frequent effluent applications and K was not applied. With the effluent area at around 170ha, nutrients being supplied from effluent are spread over a large area and to support a high stocking-rate and/or high-production/ha, a blanket application has been recommended.

Farm pasture walks are done weekly to either identify surpluses or produce a feed budget and this information should be used before applying nitrogen. Nitrogen use can be reduced in the summer months when clover content is at its highest and when combined with favourable soil temperatures/moisture levels, clover can fix significant amounts of nitrogen for grass growth, resulting in reduced responses to nitrogen fertiliser.

Generally, the farms nitrogen policy is to follow the cows with weekly applications of N, look to only apply nitrogen strategically to fill feed gaps and when surplus feed is required. I have included a section on Nitrogen Efficiency & N loss mitigations ideas for future consideration on nitrogen fertiliser applications.

Soil temperature & moisture levels are assessed prior to application, N is applied when pasture is actively growing, fertiliser is only applied if conditions are suitable.

The farm dairy records for the 20/21 season showed 174 kgN/ha was applied across the effective dairy platform, this is below the Governments Essential Freshwater Rules of 190 kgN/ha cap of N fertiliser applied.

Farm information has been supplied to Fonterra in the past for a nutrient budget and/or a nitrogen risk score card to be produced for the farm, a nutrient budget was last done for the farm in the 20/21 season. With the uncertainty around Overseer at present I would not be looking at getting an updated nutrient budget done for the farm unless the regional council asks for one, to support a land use change or to support fertiliser recommendations. Fonterra can do a nutrient budget for you if required.

On-going Management

Continue to monitor Nitrogen fertiliser use so the farm can be below the 190 kgN/ha/yr cap set by the Government and report to your regional council on the amount used each year, ending 30 June 2022.

NUTRIENT MANAGEMENT

ACTIONS | RECOMMENDATIONS

Target Date

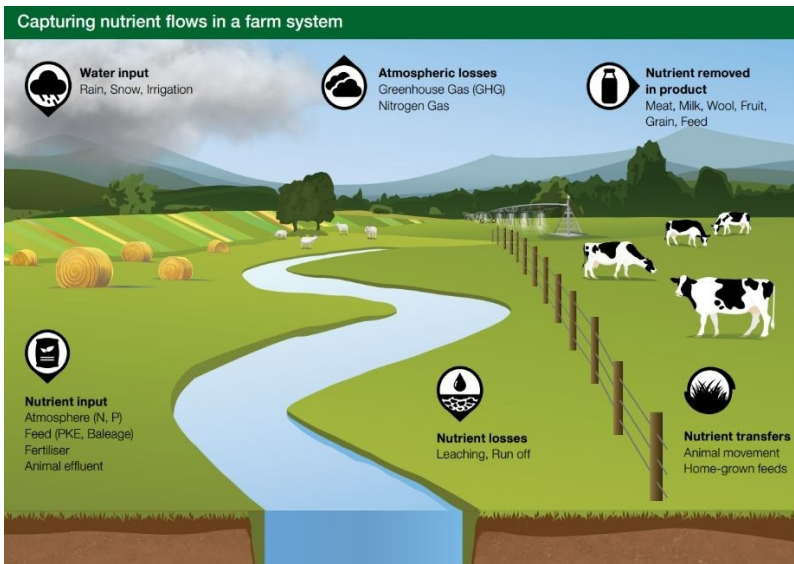
Nitrogen - Assess Requirements before Applying – To Achieve GFP

01 Aug 2023

Assess pasture and feed requirements before applying nitrogen fertiliser. To meet Good Farming Practice, look to only apply nitrogen to meet specific feed demands. The higher the amount of imported nitrogen the greater the nitrogen loss risk, look to assess if the amount of N being brought onto the farm can be reduced.

Practices:

Pasture or crop growth and feed requirements are assessed before applying N



NUTRIENT MANAGEMENT

NITROGEN EFFICIENCY IMPROVEMENTS



Several changes to the way nitrogen fertiliser is used on the farm have been suggested to enable the more efficient use of nitrogen fertiliser and a subsequent reduction in costs. The strategies are focused on a more tactical use of nitrogen to fill feed deficits rather than relying on nitrogen fertiliser all year round. The strategies are all based on maintaining the current milk solids production and stocking rate. It is strongly recommended that the strategies are trialled using a staged approach over the coming seasons.

Initial guidance on the efficiency of nitrogen use was determined by comparing your farms purchased nitrogen surplus against the average nitrogen surplus of farms in your region producing similar milk solids per ha. This indicates there may be opportunities to use nitrogen inputs more efficiently without impacting on milk solids production.

Clover Content

For most of the strategies outlined below paddocks must have a well-managed ryegrass/clover mix with good swards of clover present to promote nitrogen fixation. Care needs to be taken to avoid long-lasting shading of clover runners in spring by prolonged canopy closure (i.e. heavy silage cuts). Shading will reduce clover branching and reduce clover production. This will impact nitrogen fixation later in the year, risking lower summer pasture yields.

Remove a Summer Nitrogen Fertiliser Application	In late autumn to early spring, low temperatures usually restrict clover growth, nitrogen fixation and mineralisation, resulting in less nitrogen being available to grow grass. This results in nitrogen deficiencies being more pronounced in spring, when soil temperature and moisture don't limit grass growth, and a rapid response to nitrogen fertiliser can be expected. During summer, clover content is at its highest, when combined with favourable soil temperatures and soil moisture clover is able to fix significant amounts of nitrogen for grass growth, resulting in reduced responses to nitrogen fertiliser.
Utilise an Environmental Plantain in Pasture Mix	Research has shown that utilising an environmental plantain cultivar can reduce nitrogen leaching as less nitrogen ends up in cow urine (main driver of nitrogen leaching) and urine patches have a lower nitrogen load due to a greater urine volume per animal per day. Depending on the proportion of plantain in the cows diet, this will reduce the nitrogen leached.
Remove late autumn applications of Nitrogen Fert	Reduce or do not apply nitrogen fertiliser in late autumn, when average covers are generally sufficient, soil temperatures are falling (lower response to nitrogen) and there is an increased risk of nitrogen loss through soil drainage.
Reduce Nitrogen Application Rates	Reduce nitrogen fertiliser application rates. Using an application of 25-30kg/N/ha is likely to be enough to overcome any spring nitrogen deficiencies. Higher rates (40kg/N/ha max) should be restricted to when conditions for pasture growth are optimal and surplus pasture is going to be harvested for silage. This will avoid high pre-grazing covers and residuals.
Skip Individual Paddocks and Optimise Round Length	It takes 20 (spring) and up to 40 (autumn) days after an application of nitrogen fertiliser to get a significant yield response. Ensure your round length is not faster than the number of days needed for a significant yield response (e.g. 20 days in spring) and that pasture is

NUTRIENT MANAGEMENT

consistently grazed at the 2.5- to three-leaf stage. This may reduce the total number of grazings per year and automatically reduce the number of nitrogen applications, if routinely following the cows with fertiliser. A longer round length also reduces the nitrogen content in pasture and, therefore, urinary nitrogen excretion from stock.

In addition to the above, a feed wedge and weekly pasture walks should be used to identify when pasture growth rates are high and silage making is not required, enabling an application of nitrogen to be skipped from these paddocks.

Fill Feed Deficits with Low Crude Protein Feed

If additional feed is required to fill a deficit a low crude protein supplement such as cereal silage, maize silage, fodder beet, etc could be used. This will result in less nitrogen being imported into your farming system and less nitrogen being available to leach via cow urine patches.

Reduce Nitrogen Fertiliser on the Effluent Block

Reduce the frequency and/or rate of nitrogen fertiliser applications on the effluent block to account for the nitrogen being supplied from farm dairy effluent. It is recommended this is progressively decreased over the coming seasons to approximately 150kg/N/ha. This could be reduced further if the full effluent area is not utilised.

Utilise more uniform spreading technology

Consider utilising newer forms of spreading technology such as Fine Particle Application (FPA), these give a more accurate and uniform application of fertiliser with associated pasture growth benefits and reduced nitrogen fertiliser rates can be obtained for the same pasture growth.

P Loss Mitigations

- Introducing dung beetles (which feed on dung and will bury it), Tunnelling beetles.

- * increase the level of nutrients in the subsoils
- * increase aeration and reduce compaction
- * increase the amount of organic matter in the soil, stimulates microbial activity, and nutrient cycling
- * provides a food source for soil organisms such as earthworms

These provide a flow on effect to improve water infiltration and reduces surface ponding to reduce the level of contaminants entering the waterways

- Strip-till involves cultivating narrow planting strips while leaving much of the paddock uncultivated, generally, less than half the soil is cultivated under a strip-till system.

Advantages of Strip-Till.

- * Wind Erosion Prevention
- * Improved Soil Physical Quality
- * Reduces adverse effects of cultivation.
- * Time and Cost Savings
- * Disease control
- * Reduced Pugging under Intensive Winter Grazing
- * Increased Crop Margins

NUTRIENT MANAGEMENT



Review Nitrogen Efficiency Improvements / Loss Reduction Section of this Plan

It is strongly recommended if these strategies listed above are trialled then use a staged approach over the coming seasons



One-year-old perennial ryegrass/plantain/clover mix near Dannevirke. The pasture was sprayed, drilled and rolled in March 2017.



Paddock split in half for a strip-till trial



Dung Beetles



Photo showing the uniformity of spread of fertiliser under the FPA system.

NUTRIENT MANAGEMENT

END OF SEASON NITROGEN REPORT

N3

IMPACT OF
CONTAMINATION



+



LIKELIHOOD OF
CONTAMINATION

=

LOW RISK RATING

A Farmer Insights Report has been produced based on the information provided in your 20/21 seasons Farm Dairy Records, this report includes an overview showing your:

- Purchased Nitrogen Surplus (PNS)
- Nitrogen Risk Scorecard
- % of Farm grown feed
- Milk Quality Excellence details

The Nitrogen Risk Scorecard is an alternative method to Overseer for identifying nitrogen loss risks from your farming operation. In some regions an Overseer budget may still be required to meet regulatory requirements and a nutrient budget is recommended for developing your fertiliser programme for the season.

The Nitrogen Scorecard shows that the farm will have a Purchased Nitrogen Surplus of 172kg N/ha, Purchased Nitrogen Surplus reflects the relationship between the amount of nitrogen entering your farming system through fertiliser (174kg N/ha) and feed (120kg N/ha), versus the amount leaving the farm as product, milk, (122 kgN/ha). A low number means you are using purchased nitrogen efficiently and therefore, minimising losses to the environment.

Your farms nitrogen surplus is bench marked against other farms in Otago/Southland with production above 1,350kg MS/ha your farm produced 1,706kg MS/ha, your PNS was above average for farms in your benchmark group.

Due to silage brought onto the farm entered as tonnes instead of kg in the Farm Dairy Records your Farmer Insights report for the 20/21 season is not accurate, I have corrected this and a new report will be available online the week of 13th December, see attached summary pictures of the corrected report

Inaccurate information supplied in your 2020/21 Farm Dairy Records means the following aspects of the Scorecard are incorrect.

Nitrogen Fertiliser - only urea entered in the farm dairy records, ensure all nitrogen fertiliser is entered,

NB: the 20/21 seasons farm dairy records did not include the Muir block, where all the cropping was done, this area will be entered for the 21/22 season as it is being added to the dairy platform.

The following areas in the 20/21 Score Card have been identified as having a high to very high risk of nitrogen loss and should be investigated further to minimise losses:

Stock Management (very high) - main drivers are due to stocking rate of 33.4 su/ha (milking herd 28.7 su/ha or 3.6 cows/ha & replacements at 4.7 su/ha combined with total dry matter eaten of 20.4 tDM/ha (grown & imported feed), the

NUTRIENT MANAGEMENT

more dry matter eaten per hectare, the more nitrogen ingested by the animal and returned to pasture as dung and urine.

Imported Feed (very high) - main driver is the 120 kgN/ha supplied from imported feed combined with an average N content of 3.02%.

Your Farm's Nitrogen Risks	
Stock Management	VERY HIGH
Nitrogen Fertiliser	MEDIUM
Imported Feed	VERY HIGH
Cropping & Cultivation	VERY LOW
Effluent Management	VERY LOW
Irrigation	VERY LOW

Nitrogen Risk Scorecard

Your Farm's Purchased Nitrogen Surplus

Nitrogen Fertiliser	+	Imported Feed	-	Exported Product	=	Purchased Nitrogen Surplus ⓘ 172 kgN/ha
174 <small>kgN/ha</small>		120 <small>kgN/ha</small>		122 <small>kgN/ha</small>		

NUTRIENT MANAGEMENT

Key Information

Purchased Nitrogen Surplus ⓘ	172 kgN/ha	Greenhouse Gas Emissions ⓘ	14,991 kgCO ₂ e/ha
-------------------------------------	----------------------	-----------------------------------	---

YOUR FARM

Dairy farm effective area	256.7 ha
Peak cows	920 cows
Stocking rate (milking cows)	3.6 cows/ha
Production (milk solids produced)	438,007 kgMS
Production per cow	476 kgMS
Production per hectare (dairy farm effective area)	1,706 kgMS/ha
Nitrogen fertiliser applied per hectare (dairy farm effective area)	174 kgN/ha
Imported supplementary feed fed	1,025 t
Imported supplementary feed fed per cow	1.1 t/cow



NUTRIENT MANAGEMENT

FERTILISER APPLICATIONS

N4



Maintenance, crop fertiliser and the first round of Ammo is applied by Sinclair Transport, they are not listed as being Spreadmark certified, this certification ensures that staff are well trained, equipment is properly calibrated and fertiliser is being applied in the correct location at the correct rate.

Other N fertiliser is applied by the farms 3.7t spreader which is calibrated by a known weight to an area.

Fertiliser is ordered through Ravensdowns Hawkeye programme and proof of placement is supplied through the transport plus the tractor has Tracmap capability.

Fertiliser Programme Planned	Yes
Proof of placement/Fertiliser application records	Yes
Spreadmark certified/spreader calibrated	No

ACTIONS | RECOMMENDATIONS

- | | Target Date |
|---|--------------------|
| <p> Proof of Placement – <u>To Achieve GFP</u></p> <p>Look to using proof of placement for fertiliser applications in the future.</p> <p>This action has been completed with Tracmap used by Sinclair Transport for their fertiliser applications and the farms tractor also has Tracmap capability</p> | 01 Aug 2020 |
| <p> Use Spreadmark Accredited Contractors – <u>To Achieve GFP</u></p> <p>When using contractors for fertiliser spreading ensure they are Spreadmark accredited or can provide documentation to show staff are adequately trained, equipment is properly calibrated, and fertiliser is being applied in the correct location at the correct rate.</p> <p>If your current contractor has all the above documentation, encourage them to become Spreadmark Accredited</p> <p>Practices:
Contractors are Spreadmark accredited</p> | 01 Aug 2023 |

NUTRIENT MANAGEMENT



WHAKAPAPA

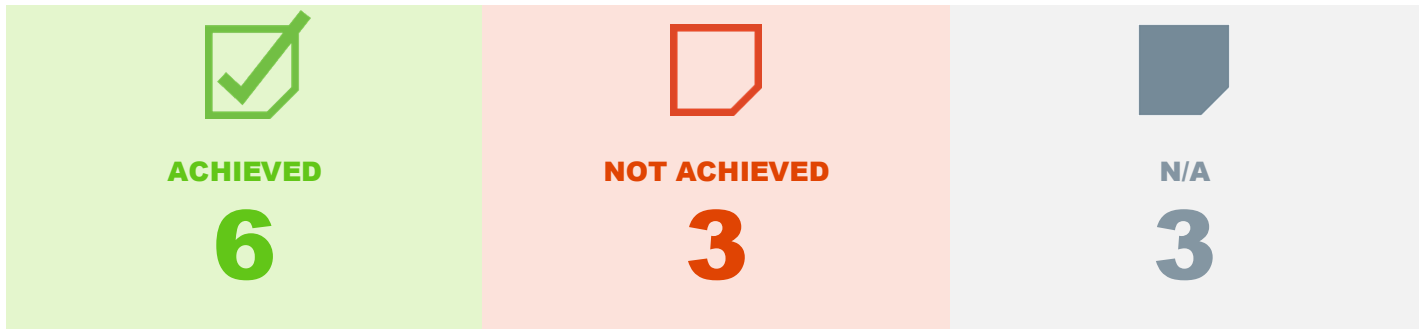
WHAKAPAPA

History of the farm and local area has not been assessed as part of this Tiaki Farm Environment Plan.

APPENDIX

GREENHOUSE GAS EMISSIONS

Climate change affects all New Zealanders, including the primary sector. Reducing greenhouse gas emissions is a priority and action is required across New Zealand and internationally. The New Zealand dairy sector is one of the lowest emissions producers of dairy nutrition in the world due to our efficient year-round pastoral grazing system and healthy cows. Through innovation and continued Kiwi ingenuity, our farmers, scientists, and sector partners can ensure New Zealand dairy continues to stay a world leader, while making meaningful contributions to New Zealand’s GHG mitigation targets. This section provides an overview of the current GFPs that could have an impact on reducing emissions on farm.



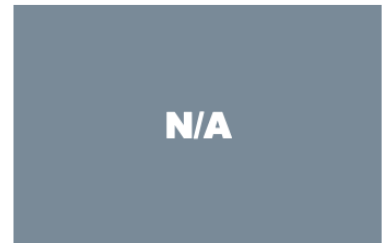
GENERAL FARM



LAND & SOIL



IRRIGATION



EFFLUENT



WATERWAYS & BIODIVERSITY



NUTRIENT



APPENDIX

GREENHOUSE GAS EMISSIONS

The tables below list the GFPs that have an impact on reducing greenhouse gas emissions on farm.

GENERAL FARM MANAGEMENT	
Identify the physical and biophysical characteristics of the farm system, assess the risk factors to water quality associated with the farm system, and manage appropriately	ACHIEVED
Store and load fertiliser with minimal spillage and leaching	ACHIEVED
Store, transport and distribute feed to minimise wastage, leachate and soil damage	ACHIEVED

LAND & SOIL MANAGEMENT	
Reduce periods of bare soil between crops and pasture to reduce erosion and leaching	ACHIEVED
Retire all LUC 8 land and retire LUC 7e land or ensure that it has soil conservation measures in place	N/A

IRRIGATION MANAGEMENT	
Irrigation rates and timing match plant requirements	N/A

EFFLUENT MANAGEMENT	
Effluent system meets code of practice	ACHIEVED
Spreading equipment is well maintained and calibrated	1 ACTION(S)
Effluent applied at correct depth, rate and time	ACHIEVED

WATERWAYS & BIODIVERSITY MANAGEMENT	
*Areas of native plants or significant biodiversity are protected	N/A

NUTRIENT MANAGEMENT	
Fertiliser application matches plant requirements and minimises losses	1 ACTION(S)
Spreading equipment is well maintained and calibrated	1 ACTION(S)

*Additional GFP relevant to the dairy industry goals

APPENDIX

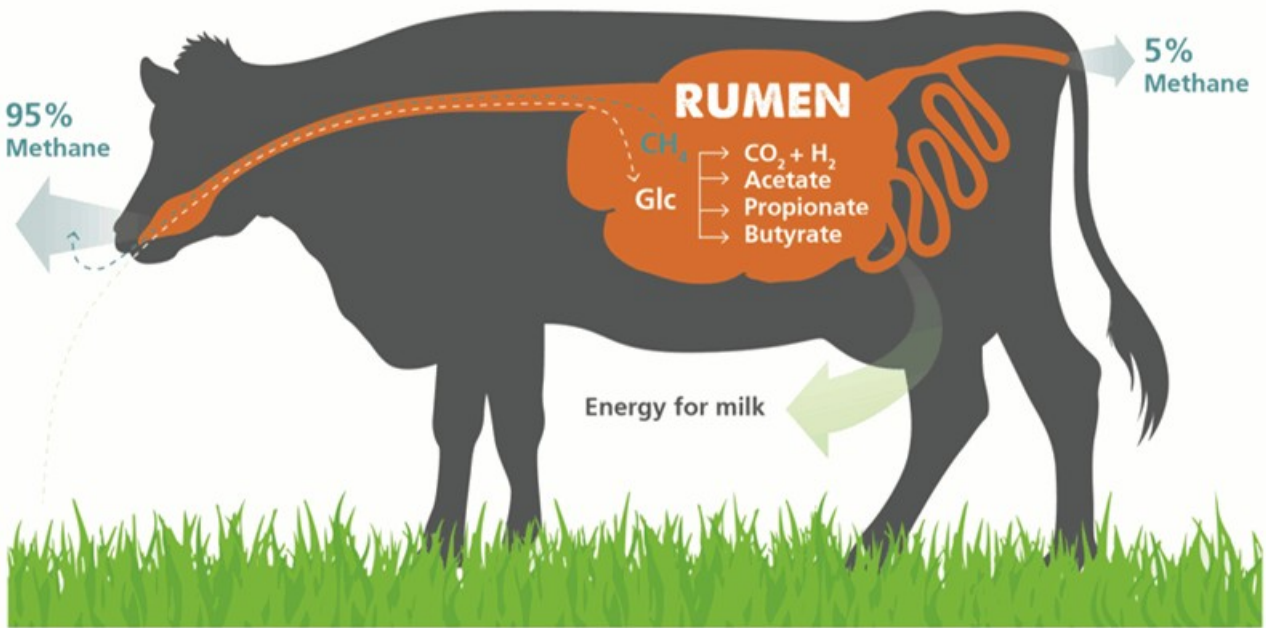
GREENHOUSE GAS EMISSIONS

WHAT ARE GREENHOUSE GAS EMISSIONS?

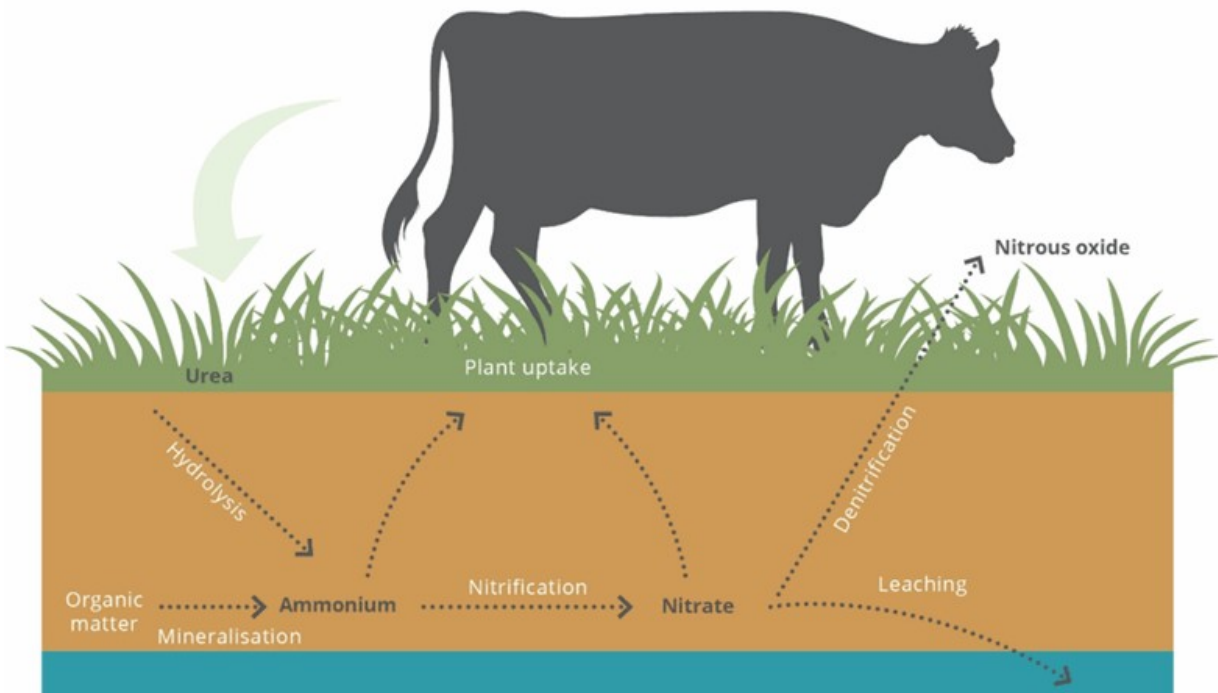
The main agricultural GHGs are methane (CH₄) and nitrous oxide (N₂O). Methane is produced by ruminants (e.g. cows and sheep) by methanogen microbes that are naturally present in the rumen. Most methane is emitted when cattle burp. The amount of methane produced for each farm is directly related to the total feed intake for that farm (including cows, heifers and calves).

Nitrous oxide is emitted from soil when urine, faeces and fertilisers are broken down by microbes in the soil.

How methane (CH₄) is produced



How nitrous oxide (N₂O) is produced



GREENHOUSE GAS EMISSIONS

ADDITIONAL GREENHOUSE GAS EMISSIONS

Options to reduce and mitigate greenhouse gas emissions on farms fall into three categories: farm management changes, infrastructure investment, and retiring or planting land. The best options for each farm will vary depending on factors such as the farm system and the region. When choosing changes to adopt on your farm, you may find options from all three of these categories work well together.

Farm management changes

The final report of the Biological Emissions Reference Group (BERG), a cumulative effort by the wider agricultural sector, estimated that biological emissions can be reduced by up to 10% for the dairy sector with currently available farm management practices. Most of these mitigations involve good farm practices, such as feed utilisation, choice of feed type and being more selective about how and when to apply fertiliser and effluent to our land. Outlined below are some options to consider. Before you make changes to your farm system or invest in infrastructure, you should seek advice to help determine what will work best for your situation.

OPTIONS TO REDUCE METHANE EMISSIONS

Managing dry matter intake

Current options available to reduce methane emissions are limited, but managing efficient use of dry matter intake (DMI) is the most important. Research shows that for every additional kg of total feed eaten per hectare, total methane emissions increase proportionally. Managing DMI is about reducing the amount of feed eaten per hectare, and increasing per cow performance for every kg of feed that is eaten.

Over time, as cow performance improves it may be possible to adjust stocking rates (but the DMI per cow must remain constant). Increasing reproductive performance of the herd to allow for reduced replacement rates will decrease your emissions as there is less DMI requirement for young stock and less methane emissions.

OPTIONS TO REDUCE NITROGEN LEACHING AND NITROUS OXIDE EMISSIONS

Nitrous oxide emissions occur when bacteria in the soil remove oxygen from nitrate (NO₃⁻). This mainly happens when the soils are in an anaerobic state (e.g. waterlogged soils). Because nitrogen is supplied to the soil from fertiliser, animal excreta, and effluent irrigation, there are a number of options to manage nitrous oxide emissions and nitrogen leaching.

The mitigations options involve reducing nitrogen loss through:

- better fertiliser application
- planting low-nitrogen forages or crops to reduce nitrogen excretion (eg fodder beet and plantain)
- use of low nitrogen feeds
- improving pasture quality.

APPENDIX

GREENHOUSE GAS EMISSIONS

Reducing nitrogen surplus

Many of the supplementary feeds contain less nitrogen than normal pastures and can help reduce nitrous oxide emissions on farms. You can evaluate supplements used to see if there is potential to change to a lower-emissions feed.

- Evaluate existing cropping activity and the species grown. This can improve nitrogen inputs to the farm and nitrogen surplus through different types of crop and different methods in cultivation/feeding.
- Exploring the use of alternative forages in the pasture sward such as plantain to reduce nitrogen loss to water and atmosphere. These species can retain more nitrogen in the system allowing for less to be lost.

Optimising your fertiliser and effluent use

DairyNZ analysis shows that for every additional 100 kg N/ha applied via fertiliser, total greenhouse gas emissions increase by 2.6 t/ha. As well as using less nitrogen fertiliser per hectare, mitigations strategies include:

- Ensure you are applying the right type of fertiliser in the right places. Test the soil to gauge optimal levels and use precision application to ensure accurate placement.
- Avoid direct leaching and nitrous oxide emissions by not applying in winter or to waterlogged soils.
- Improve effluent management to accurately apply appropriate depths and rates to the soil so that there are less losses.
- Reduce N fertiliser applications on effluent blocks.

Paddock strategies

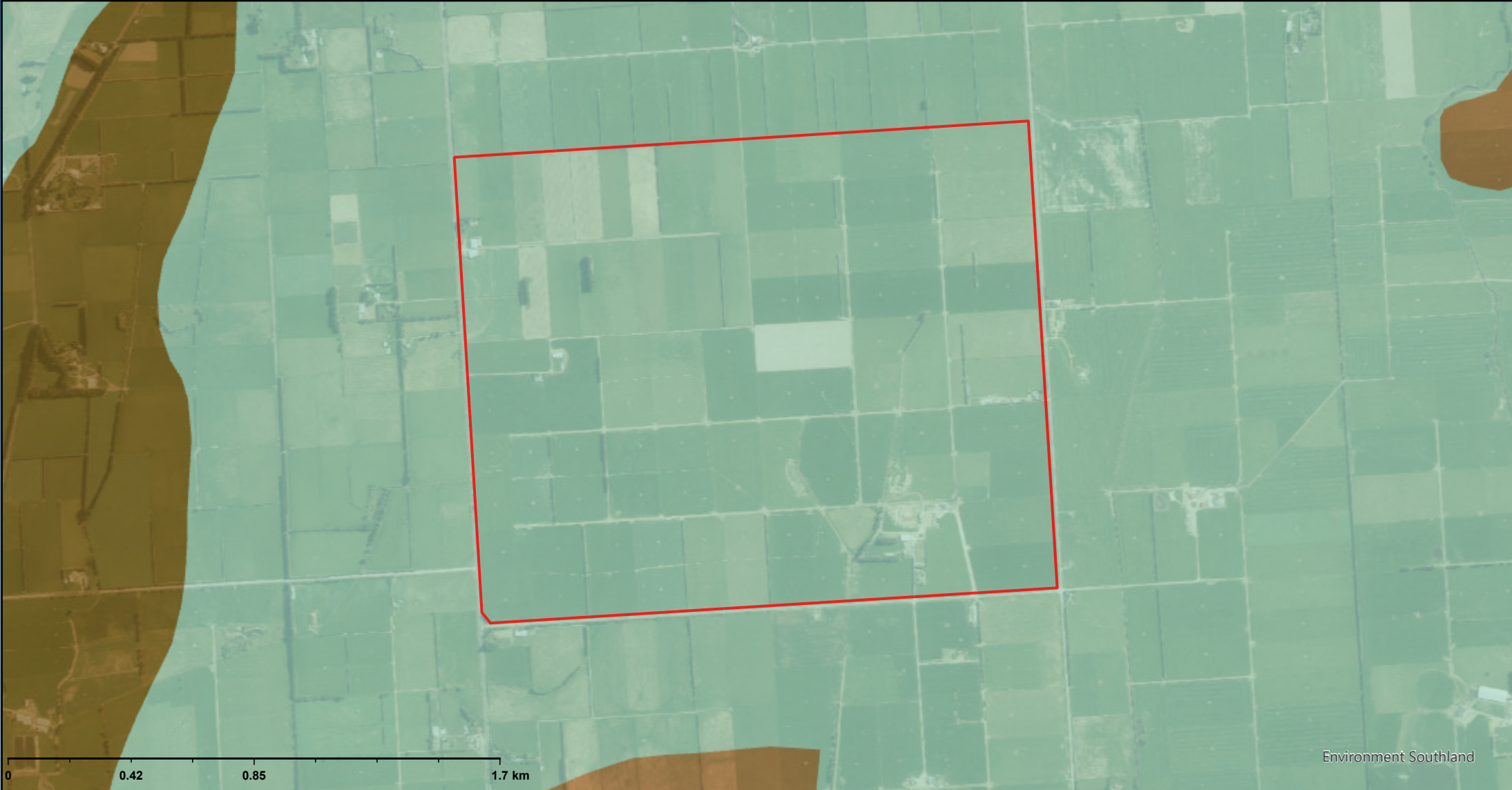
- Grazing cows off-paddock in the autumn months limits the build-up of nitrate in the soil when the plant growth is reduced. This build-up is then available to be lost to both water and atmosphere of the following winter and spring months. This strategy can reduce nitrogen leaching and nitrous oxide emissions if the associated effluent is well managed.
- Improve irrigation practices so that water is only applied when the soil profile has the capacity to absorb it and the plants need it and that there is no over application. This can be done by using precision water irrigation and scheduling.
- During wintering urine nitrogen leaching and nitrous oxide emissions can be reduced through appropriate paddock selection, grazing time, and grazing regime.
- Using a 'catch crop' to minimise the fallow period following a winter crop. This will reduce nitrogen leaching and nitrous oxide emissions during this period.

Planting to offset carbon dioxide

Planting trees can help 'offset' emissions from your farm business without impacting on production. As trees grow, they store carbon in trunks, branches, leaves, and roots. Planting will also improve water quality by helping to filter out sediment and nutrients before they enter waterways. Planting could take place in riparian areas, shelter belts, and through retiring land to forestry. Planting also helps to prevent soil erosion and increase the habitat for native wildlife.

APPENDIX 1





Environment Southland

— Override 1

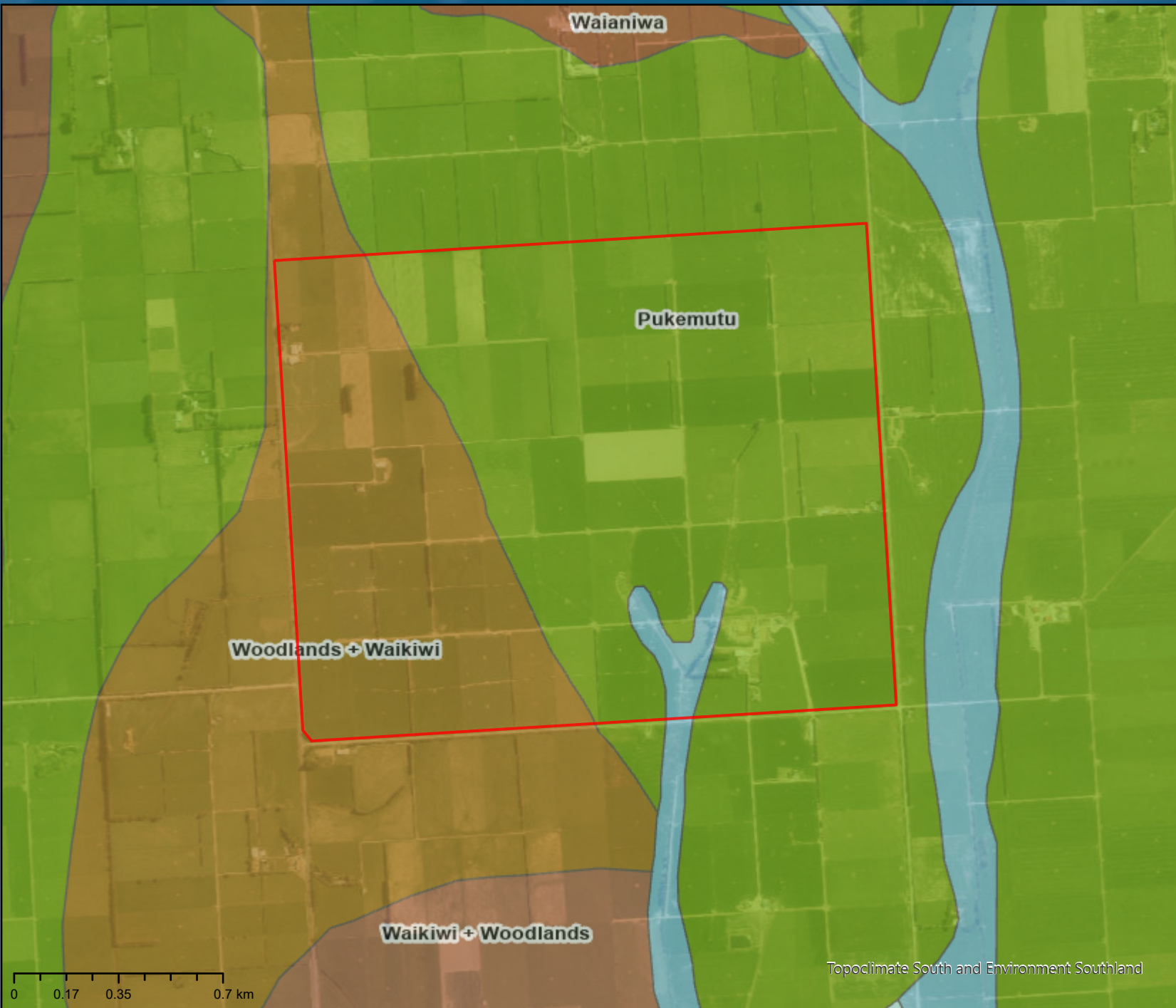
Physiographic Zones

- Gleyed - No Variant
- Oxidising - Artificial Drainage
- Oxidising - No Variant

Environment Southland uses reasonable endeavours but does not warrant that this information is current, complete or accurate. Professional or specialist advice should be obtained before taking or refraining from taking any action on the basis of this information. To the extent permitted by law, Environment Southland will not be liable for any loss, liability or costs suffered or incurred as a result of any reliance placed on this information.

APPENDIX 2





Legend

Acton	Grove Burn	Mine	Scrubby Hill
Alton	Haldane	Mokotua	Sobig
Andrews	Haycocks	Monowai	Stirling
Aparima	Hazlett	Mossburn	Stonycreek
Ardlussa	Hedgehope	Mount Mistake	Tailings
Arthurton	Hill Soil	Niagara	Taringatura
Ashers	Hokonui	Nithdale	Te Anau
Ashton	Honeywood	Nokomai	Te Mara
Athol	Howe	Northope	Te Waewae
Benio	Invercargill	Ohai	Tisbury
Berwen	Isla Bank	Omaui	Titipua
Borland	Jacobs	Orawia	Tiwai
Braxton	Jacobstown	Orepuki	Tokanui
Caroline	Josephville	Oreti	Tomoporakau
Charlton	Kaihiku	Oreti Scarp	Trail
Chaslans	Kaiwera	Otahu	Tuapeka
Chatton	Kakapo	Otahuti	Tuatapere
Chewings	Kapuka	Otaitai	Tuturau
Clinton	Kauana	Otakau	Tyneholm
Clydevale	Kaweku	Otama	Upukerora
Colac	Kaweku Scarp	Otanomomo	Venlaw
Conical Hill	Kuriwao	Otarara	Waianiwa
Craigdale	Landslip	Otatara	Waiau
Crookston	Lilburn	Otepuni	Waihoaka
Dacre	Lintley	Oteramika	Waikaka
Dipton	Lithosol	Otikerama	Waikiwi
Dome	Longridge	Oughton	Waikoiko
Drummond	Lumsden	Papatotara	Waimahaka
Edendale	Lyoncross	Paretai	Waimatuku
Excelsior	Mahara	Pebbly Hills	Waipapa
Fairfax	Makarewa	Pomahaka	Wairaki
Ferndale	Malakoff	Pourakino	Waituna
Fleming	Manapouri	Princhester	Warepa
Forestry	Mandeville	Pukeawa	Wendon
Fortification	Mangapiri	Pukekoma	Wendonside
Fortrose	Mararoa	Pukemutu	Weydon
Freestone	Mataura	Pukerangi	Winton
Glenelg	McGaw	Pukerau	Woodlands
Glenlea	McIvor	Pyramid	Woodlaw
Glenure	McKerchar	Redcliff	Wyndham
Gore	McLeish	Riversdale	Other
Grasmere	McNab	Riverton	
Greenfield	Merrivale	Rosemarkie	

Environment Southland uses reasonable endeavours but does not warrant that this information is current, complete or accurate. Professional or specialist advice should be obtained before taking or refraining from taking any action on the basis of this information. To the extent permitted by law, Environment Southland will not be liable for any loss, liability or costs suffered or incurred as a result of any reliance placed on this information.

APPENDIX 3



ARE YOU SET FOR WINTER?

Use our winter grazing 2021 checklist to check and improve your winter preparations

What you do this winter matters to all farmers

This year, what we do during winter will be scrutinized more than ever so it is important we all do our bit and get it right. It isn't too late to make improvements for this winter. Animal welfare and environmental protection are both extremely important.

Use our easy checklist

The checklist below will help you assess whether you've covered off the key preparations for grazing.

Note: your regional council may have more stringent rules which apply in your area. If you're unsure please check with them.

Wintering Checklist	Green I'm all set to go	Orange This could be improved	Red Not planned, needs more preparation
Stock are excluded from waterways. You have a minimum buffer of 5m (more is required for sloping ground).			
Critical source areas (CSAs) are protected: ideally keep stock off them for the whole winter period. If you have cropped CSAs, fence them off and graze them last during good weather after the rest of the crop has been fed. Leave a good buffer area at the lowest point to filter any sediment run-off.			
Graze paddocks strategically. If adjacent to a waterway, graze towards the waterway. If on a slope graze downwards and in the direction of the water flow, or using a strategic plan suited to your location (such as an extra wide buffer).			
Plan the placement of supplementary feed and portable water troughs away from waterways, critical source areas, and ponding areas.			
Animal welfare requirements are critical: transition carefully, consider shelter, ability to lie down on firm ground, and access to water.			
Measure feed to accurately assess quantity, and plan daily feeding to ensure adequate feed for the whole winter (including extra feed for poor weather).			
Plan and manage mobs to reduce the risk of lambing / calving on crop.			
Develop an adverse weather plan for each winter grazing area to ensure that animal welfare and environmental protection needs will be met in poor weather.			
Make a plan to record evidence (photos, video, your farm diary) showing that good management practices are being implemented; and to use this year's learnings to inform next year's plan.			

Green

You're confident you're ready for the coming season, great work!

Orange

Check your preparations are in order, and complete any further necessary work. Check out the resources below which can help you.

Red

Now's the time to take action and sort out your planning – all farmers will be under scrutiny so you don't want to let the team down. Check out the resources below to help your preparations so you're winter ready.

Resources to help your winter planning and preparations

Beef & Lamb – beeflambnz.com/wintergrazing

Dairy NZ – dairynz.co.nz/wintergrazing. Dairy farmers can also contact their milk company for information.

Deer NZ – visit deernz.org and search for 'wintering feed systems'

MPI – mpi.govt.nz/protecting-freshwater-health

Foundation for Arable Research (FAR) – visit far.org.nz/resources and search for 'winter grazing'

In some regions, your local catchment group may also have information to assist you.

To check if there are any local rules you need to meet, contact your local regional council. If you're planning to expand your grazing or become more intensive you may need to check with your regional council if you need a consent.

Looking to the future

Going forward, all farmers who graze stock over winter will need to have a documented winter grazing plan. This plan can become part of your Farm Environment Plan.

DairyNZ and Beef + Lamb NZ are supporting farmers with wintering resources, information and events – look out for more information on these.

This information is brought to you and supported by:



APPENDIX 4



Your 2021 Winter Grazing Plan

On the ground action this winter

Farm: _____ Person in charge: _____

Property Address: _____

Farm Size: _____ ha Wintering area: _____ ha No. of paddocks wintered on: _____

Wintering description: _____

How this Winter Grazing Plan can help you

By using this guide, you're taking the right steps to continue lifting on-farm winter grazing standards.

We are strongly encouraging all farmers to make use of this Winter Grazing Plan to demonstrate to the Government that there is a commitment amongst farmers to continue lifting wintering standards.

This template is intended to help you develop a simple effective paddock plan for any break fed wintering system this winter.

This template will help you action good management practices at the paddock level to look after the environment, stock and the people working within the system.

Why have a winter grazing plan?

- It creates clear expectations for everyone on the farm on how wintering is to be done
- It identifies areas for improvement
- It provides proof of good practice (to your council, your dairy company and your farm team).

An effective wintering system:

- supports good animal health and welfare
- minimises soil and nutrient loss to the environment
- complies with regional council regulations
- protects valuable topsoil
- complements the overall dairy farm system and the farm team's work
- has a contingency plan for periods of adverse weather.

→ Download a copy of this plan online at dairynz.co.nz/wintering

DairyNZ 

Planning your winter grazing - wintering tips from farmers on areas to focus on

Critical source areas (CSAs)

These are areas that collect surface water after rain. Nutrients can pool and get into waterways or groundwater from these areas.

Farmer tip

"I fence these off with a semi-permanent fence (waratahs and poly wire) at the start of the winter and graze them last when ground conditions are good. If in doubt about where to fence, I fence off a bigger area."

Direction of grazing

Planning the direction of your grazing can reduce mud levels, creating a better environment for cows and reducing nutrient and sediment loss.

Farmer tips

"Where practical I graze towards Critical Source Areas and waterways. If this is not possible, I leave a large buffer (at least 25m) and graze away. I graze the buffer last."

"We winter our sheep in blocks and shift them every 4 days. We find that the sheep are more content and there is less soil damage with the longer grazing periods provided, the yields are adequate. We check the sheep every two days to ensure feeding levels are adequate."

Bale placement

Well considered bale placement can reduce mud in the paddock, reduce how much time stock spend around waterways and Critical Source Areas, and reduce workload for your team.

Farmer tip

"I keep baleage away from swales and waterways. I also think about how far my team have to carry baleage wrap out of the paddock."

Portable troughs and back fences

A back fence and portable trough will reduce cow movements and therefore limit soil damage through unnecessary stock movement.

Farmer tips

"I put my portable trough and pipes along the side fence. This keeps the pipes away from stock and means that we aren't moving them through muddy paddocks."

"Back fences have been a game changer for us. Although it is another job to do, it means that all the stock are up at the feed face which saves energy, and if we need to get them out of the paddock, the back fence makes this much easier."

"We have found that back fences reduce soil damage. Less soil damage means less groundwork and better new grass."



Planning for the weather

Winter weather can play havoc with paddocks, so having a Plan B, and knowing when to implement it, is critical.

Farmer tips

“We have a few areas planted in crop that are sheltered. We use these areas for any mobs that need more care – lighter, younger or multiples. The shelter dramatically reduces the energy required to stay warm. Since doing this, we have found that ewes finish winter in a much more even state and are well prepared for lambing.”

“We winter on fodder beet. It is too difficult and risky to change the diet, so in poor weather we create a straw bale fence using 4 or 5 bales. This gives the stock shelter, and they lie down in the straw warm and comfortable until the weather passes.”

Animal welfare

Planning in advance with your team how you will check up on stock, and what to look for helps ensure everyone is on the same page.

Farmer tip

“We check our stock each day to make sure they healthy and well fed. If a team member sees an animal with sunken eyes or poor gut fill, we go back and check it later in the day and take them off crop. We aim to notice that the animal is sick before she notices it herself.”

Time efficiency

Forward planning can save time over winter and help protect your stock.

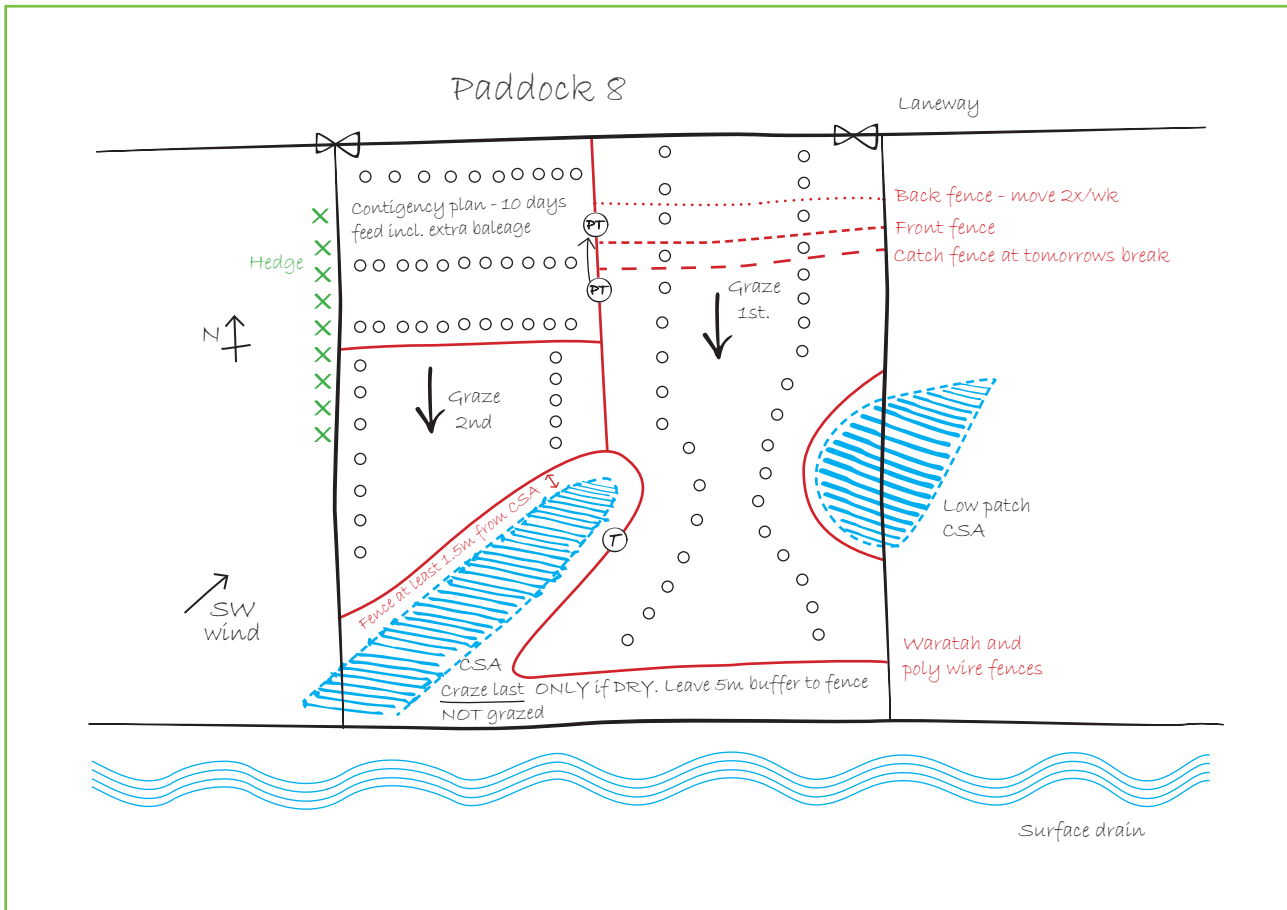
Farmer tip

“We draw our plan on a big farm map as a team initially. As a team, we create the ‘master plan’ which includes transitioning, animal welfare and our wet weather plan. Any paddocks that are a bit more complex or have a different wet weather plan, I later draw individually to make sure CSAs and waterways are protected.”

Paddock wintering plan – Example Paddock

Mob name and size: 100 cows, mid calvers, fat condition

Diet following transition: 10kg/day kale and 4kg/day baleage (8m crop and 2bales)



Step 1: Draw an outline of the paddock	Symbol or Complete (tick)
Note map direction (e.g. North arrow)	N
Mark on obvious features (eg hills)	
Direction prevailing wind	SW

Step 2: Identify risk areas/ paddock features	Symbol or Complete (tick)
Critical Source Areas and wet areas	
Areas of slope	
Waterways and wetlands	
Gateways	
Permanent water troughs	
Shelter	

Step 3: Grazing plan	Symbol or Complete (tick)
Semi-permanent fences for winter	
Direction of grazing	
Buffer zones to critical source areas/ waterways	
Baleage placement	
Portable troughs and hoses	
Back fence	
Front grazing fence	
Break out fence	

Step 4: Day to day management	
Cows will be fed	Daily in the morning and checked each afternoon
Back fences will be moved	2x/wk
Portable troughs will be moved	2x/wk with the back fence

Step 5: Executing your paddock plan

Our transition plan for our stock is...	<i>Transition over 7 days. There is extra baleage in the first weeks' breaks. 1st day will be 4 bales and 5m crop. Cows will be monitored each day for mastitis, lameness, poor gut transition and general poor health. Any animal that does not adapt well will be drafted out and treated if appropriate</i>
We reduce mud in the paddock by...	<i>Grazing direction, fencing off wet areas, baleage and water troughs on high areas and small mob sizes</i>
We monitor animal health and welfare by...	<i>During the morning shift, we will keep an eye on any cows who are slow to come up to feed or are by themselves in the paddock. Monitor the herd during afternoon check – we want to see lying hollows, at least a third of the herd lying down and some feed left in the ring feeders.</i>
We reduce the risk of calving/lambing on crop by...	<i>All cows have been date scanned. Mobs split by calving date and BCS. Cows will be transitioned off crop 10-14 days before their due date. We will look every day for signs of animals springing up and any animals identified will immediately be taken off crop.</i>
We ensure our stock are well fed by...	<i>A feed budget is done prior to the start of winter. We update the budget in late June to ensure we will have enough crop for the winter. We have ten days contingency feed in the budget for wet/windy weather. We also spray paint some baleage bales with dates showing the expected grazing dates. The herd will be checked each afternoon to ensure that there is 1/3 of each baleage bale left and that the herd are content. If not, or if wet/windy weather is forecast, we give the cows extra feed.</i>
We ensure everyone understands this plan by...	<i>Whole team will set up paddock together using this map as a guide. The team will get a refresher on how to identify sick cows, when to implement plans, and the targets of our wintering system.</i>

Step 6: Our plan for wet weather and poor soil conditions

Our wet weather plan will be implemented....	<i>As per paddock 5 plan - If there is a period of cold wet and windy weather forecast.</i>
Our wet weather and poor soil conditions plan is...	<i>Cows will be offered more feed during the afternoon check to ensure they are content and that they have access to a drier lying surface at the feed face.</i>

Step 7: Adverse event plan

We will implement our adverse plan when...	<i>There has been, or is going to be a storm event, or, if it is too wet for the cows to lie comfortably (there are no lying hollows).</i>
Our adverse event plan requires us to...	<i>We will move the cows to the North West area of the paddock which is easy to access from the laneway. Extra hay and baleage will be fed to the herd and straw can be spread for bedding if needed.</i>
We will ensure animal welfare requirements continue to be met by...	<i>Shelter: Hedge along west of paddock Lying time: High and dry area of the paddock Access to water: Portable trough can be set up quickly Feeding: Ad lib feed will be made available (hay and baleage).</i>

Step 8: Documentation and review

The evidence we have to show we are following good management practice includes....	<i>We will take photos periodically – before, during and after grazing the paddock. This will show the use of back fences, good buffers, portable troughs and show healthy content well fed cows.</i>
Our plan to review this winter's wintering plan is...	<i>Throughout the winter we will discuss ways to improve our practices. At the end of winter, we will update our paddock plan diagram with all our ideas and use this to help with next winter's planning.</i>

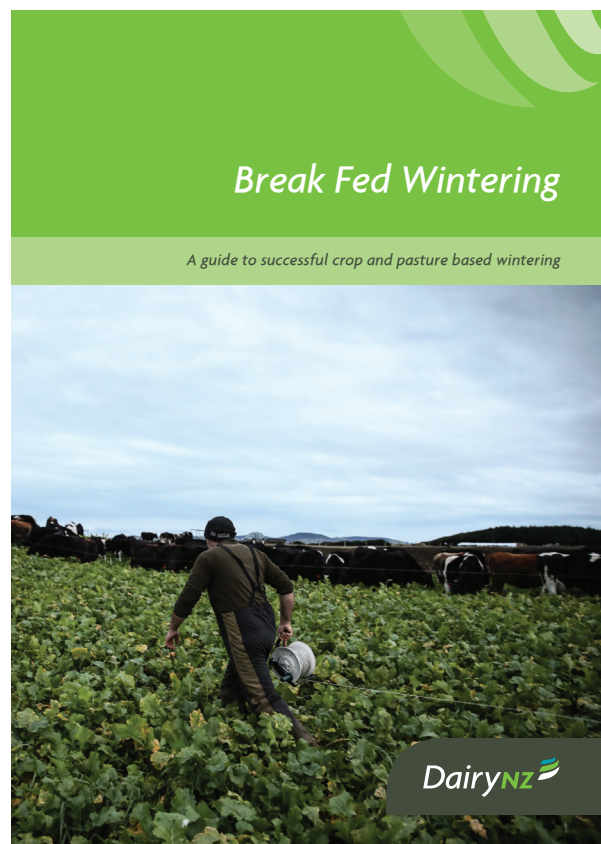


Resources to help you plan your approach to wintering

For more information on planning your wintering approach see:

- DairyNZ – Break Fed Wintering guide – at dairynz.co.nz/wintering
- Beef and Lamb NZ – Winter grazing site beeflambnz.com/wintergrazing
- **MPI - Winter Grazing Action Group report on short term animal welfare expectations** – at mpi.govt.nz search for ‘winter grazing action group animal welfare’
- MPI - Codes of welfare for dairy cattle, sheep and beef cattle and deer – at mpi.govt.nz/welfarecodes
- Your local regional council website for any regionally specific rules and support.

If you would like a second opinion on your planning, ring your local DairyNZ Consulting Officer (on 0800 4 324 7969), your regional council, farm consultant, technical field rep or Catchment Group Coordinator.

















Paddock wintering plan for paddock number _____

Mob name and size: _____

Diet following transition: _____

Step 1: Draw an outline of the paddock	Symbol or Complete (tick)
Note map direction (e.g. North arrow)	N
Mark on obvious features (eg hills)	
Direction prevailing wind	SW

Step 2: Identify risk areas/ paddock features	Symbol or Complete (tick)
Critical Source Areas and wet areas	
Areas of slope	
Waterways and wetlands	
Gateways	
Permanent water troughs	
Shelter	

Step 3: Grazing plan	Symbol or Complete (tick)
Semi-permanent fences for winter	
Direction of grazing	
Buffer zones to critical source areas/ waterways	
Baleage placement	
Portable troughs and hoses	
Back fence	
Front grazing fence	
Break out fence	

Step 4: Day to day management	
Cows will be fed	
Back fences will be moved	
Portable troughs will be moved	

Describe below your **master plan** for managing environmental and animal welfare risks.

Step 5: Executing your paddock plan

Our transition plan for our stock is...	
We reduce mud in the paddock by...	
We monitor animal health and welfare by...	
We reduce the risk of calving/lambing on crop by...	
We ensure our stock are well fed by...	
We ensure everyone understands this plan by...	

Step 6: Our plan for wet weather and poor soil conditions

Our wet weather plan will be implemented...	
Our wet weather and poor soil conditions plan is...	

Step 7: Adverse event plan

We will implement our adverse plan when...	
Our adverse event plan requires us to...	
We will ensure animal welfare requirements continue to be met by...	

Step 8: Documentation and review

The evidence we have to show we are following good management practice includes...	
Our plan to review this winter's wintering plan is...	

Paddock wintering plan for paddock number _____







Mob name and size: _____

Diet following transition: _____









Step 1: Draw an outline of the paddock	Symbol or Complete (tick)
---	---------------------------

Note map direction (e.g. North arrow)	N
Mark on obvious features (eg hills)	
Direction prevailing wind	SW

Step 2: Identify risk areas/ paddock features	Symbol or Complete (tick)
--	---------------------------

Critical Source Areas and wet areas	
Areas of slope	
Waterways and wetlands	
Gateways	
Permanent water troughs	
Shelter	

Step 3: Grazing plan	Symbol or Complete (tick)
-----------------------------	---------------------------

Semi-permanent fences for winter	
Direction of grazing	
Buffer zones to critical source areas/ waterways	
Baleage placement	
Portable troughs and hoses	
Back fence	
Front grazing fence	
Break out fence	

Step 4: Day to day management	
--------------------------------------	--

Cows will be fed	
Back fences will be moved	
Portable troughs will be moved	

How to complete this page:

Note below *any differences* from your **master plan** for managing adverse effects set out for your first paddock in this document. Except where otherwise noted the approach used in your master plan will be adopted.

Step 5: Executing your paddock plan

Our transition plan for our stock is...	
We reduce mud in the paddock by...	
We monitor animal health and welfare by...	
We reduce the risk of calving/lambing on crop by...	
We ensure our stock are well fed by...	
We ensure everyone understands this plan by...	

Step 6: Our plan for wet weather and poor soil conditions

Our wet weather plan will be implemented...	
Our wet weather and poor soil conditions plan is...	

Step 7: Adverse event plan

We will implement our adverse plan when...	
Our adverse event plan requires us to...	
We will ensure animal welfare requirements continue to be met by...	

Step 8: Documentation and review

The evidence we have to show we are following good management practice includes....	
Our plan to review this winter's wintering plan is...	

Paddock wintering plan for paddock number _____







Mob name and size: _____

Diet following transition: _____









Step 1: Draw an outline of the paddock	Symbol or Complete (tick)
---	---------------------------

Note map direction (e.g. North arrow)	N
Mark on obvious features (eg hills)	
Direction prevailing wind	SW

Step 2: Identify risk areas/ paddock features	Symbol or Complete (tick)
--	---------------------------

Critical Source Areas and wet areas	
Areas of slope	
Waterways and wetlands	
Gateways	
Permanent water troughs	
Shelter	

Step 3: Grazing plan	Symbol or Complete (tick)
-----------------------------	---------------------------

Semi-permanent fences for winter	
Direction of grazing	
Buffer zones to critical source areas/ waterways	
Baleage placement	
Portable troughs and hoses	
Back fence	
Front grazing fence	
Break out fence	

Step 4: Day to day management	
--------------------------------------	--

Cows will be fed	
Back fences will be moved	
Portable troughs will be moved	

How to complete this page:

Note below *any differences* from your **master plan** for managing adverse effects set out for your first paddock in this document. Except where otherwise noted the approach used in your master plan will be adopted.

Step 5: Executing your paddock plan

Our transition plan for our stock is...	
We reduce mud in the paddock by...	
We monitor animal health and welfare by...	
We reduce the risk of calving/lambing on crop by...	
We ensure our stock are well fed by...	
We ensure everyone understands this plan by...	

Step 6: Our plan for wet weather and poor soil conditions

Our wet weather plan will be implemented....	
Our wet weather and poor soil conditions plan is...	

Step 7: Adverse event plan

We will implement our adverse plan when...	
Our adverse event plan requires us to...	
We will ensure animal welfare requirements continue to be met by...	

Step 8: Documentation and review

The evidence we have to show we are following good management practice includes....	
Our plan to review this winter's wintering plan is...	

APPENDIX 5



Tile Map Platform.



THANK YOU



DISCLAIMER

*Provision of advice in relation to effluent storage, effluent irrigation systems and the management of other environmental risk areas on farm.

The advice that Fonterra Co-operative Group Ltd (Fonterra, we, us) provides to farmers in relation to effluent storage capacity and other environmental compliance practices, including mitigation actions described in Farm Environment Plans, is based on the information and assumptions that farmers and their agents have provided to us and on our knowledge and understanding of current best practice in the industry. Fonterra does not purport to replace sound engineering or other professional advice and as such we strongly encourage farmers to seek independent expert advice before any construction, upgrades, or other change to your on farm practices. Farmers are ultimately responsible for the environmental compliance of their farm and on farm practices. Fonterra gives no warranties (express or implied) and, to the maximum extent permissible by law, excludes all liability in contract or tort (including, without limitation, liability for negligence) or otherwise in relation to the advice provided.

Appendix B: OVERSEER Nutrient Budget Modelling Report

Roslin Consultancy Ltd

Platinum Dairies Limited

OverseerFM farm system modelling to support
a consent application for expanded dairy

Report prepared for:
Platinum Dairies Limited

Property Address:
149 McKenzie Road
R D 1 Winton, 9781

Overseer File and Report

Prepared By:

Miranda Hunter
Roslin Consultancy Ltd
B.Agr.Sci



miranda.hunter@xtra.co.nz
0274 341 140

Overseer Files and Report

Reviewed By:

Mo Topham
AgriAce



18th October 2021

Platinum Dairies Limited

Disclaimer

Roslin Consultancy Limited is not liable for any loss, damage or other disadvantage of any form suffered by the client or any third party arising in any way from this document or the services provided by Roslin Consultancy Limited in connection with this document, whether in contract, tort or otherwise.

This document was compiled with information provided by the client. Although this information is checked for sensibility, the customer has reviewed this report and is responsible for quality and accuracy of this information.

Use of this Report

Any use of this document should be authorised by Roslin Consultancy Limited or the client.

This report is designed to be read in its entirety and any excerpts should reference the report for completeness of understanding.

The following warnings attach to this communication

This material is intended for the named recipient only and has been created solely for the purposes and functions Roslin Consultancy Limited and may contain information that is subject to the Privacy Act/Confidentiality/Privilege/Copyright. Any person other than the named recipient is prohibited from retaining / disclosing/copying/distributing/using all or part of this material

Platinum Dairies Limited

Contents

.....	1
1.0 Executive summary:.....	4
1.1 Nutrient loss estimates	5
1.2 Drivers of changes in nutrient losses	5
1.2.1 Nitrogen loss estimates.....	5
1.2.2 Phosphorus loss estimates	5
2.0 Report purpose.....	6
3.0 Farm overview.....	7
3.1 Ownership	7
3.2 Location.....	7
3.3 Farm particulars:.....	7
3.4 Consent Application Modelling Requirements.....	8
3.5 Farm system overview	8
3.5.1 Current Farm.....	8
3.5.2 Farm System.....	8
3.5.3 Proposed Dairy System	9
4.0 OverseerFM nutrient loss estimates	11
4.1 OverseerFM loss estimates	11
5.0 Drivers of changes in nutrient losses	12
5.1 Nitrogen Loss estimates	12
5.2 Phosphorus loss estimates	12
6.0 Recommendations from here	12
Appendices.....	14
Appendix 1. Modelling Methodology	14
OverseerFM assumptions	14
OverseerFM limitations	14
Data input standards	15
Appendix 2. Modelling Inputs.....	16
Soil types	16
Climate Data.....	16
Blocks	17
Farm System Inputs	18

Platinum Dairies Limited

1.0 Executive summary:

The milking platform of 256.2 ha (250.5 ha effective) is owned by Platinum Dairies. In December 2019 Platinum Dairies completed the purchase of an adjoining block (the Muir Block). The Muir Block is 61.5 ha (59.5 ha).

It is intended to operate the Platinum Dairies and Muir blocks as one integrated unit. Platinum Dairies is required to apply for a consent to expand dairying across the Muir Block. The Muir Block has not been previously milked off.

To inform the assessment of effects nutrient budgets have been prepared to compare the current to proposed land use.

A portion of the Muir Block was purchased in March 2019, and a portion of the property was leased post March 2019 while the subdivision consent was in process. The Muir Block is currently utilised as a dairy support unit to the neighbouring Platinum Dairies dairy platform. The Muir Block has been cropped and resown in new pastures since take over.

Advice has been sought from Environment Southland to determine the best methodology for modelling the current landuse. Their advice was to use the 20/21 season as this is the best representation for what was happening on the farm on 2nd Sept 2020.

The property is flat and comprises of predominately Pukemutu, Woodlands and Waikiwi soils.

It is proposed to:

- Increase peak milked cows by 68 cows (from 932 to 1000)
- Reduce cows wintered
- Reduce winter crop
- Remove 23 jersey bulls
- Reduce young stock numbers (herd now in a status quo situation)
- Reduce nitrogen fertiliser use
- Target Olsen P at agronomic optimum

Nutrient budgeting has been completed using Overseer version 6.4.1 to support a consent application for expanded dairy. These budgets estimate the nitrogen and phosphorus losses from the farm. Three budgets have been completed:

- Current
 - The current dairy farm system (OverseerFM file “Year Ending 2021”)
 - The current Muir Block (OverseerFM file “Muir Year End 21”)
- The proposed combined dairy system (OverseerFM file “Proposed Combined”)

The following warnings attach to this communication

This material is intended for the named recipient only and has been created solely for the purposes and functions Roslin Consultancy Limited and may contain information that is subject to the Privacy Act/Confidentiality/Privilege/Copyright. Any person other than the named recipient is prohibited from retaining / disclosing/copying/distributing/using all or part of this material

Platinum Dairies Limited

1.1 Nutrient loss estimates

The table below compares the estimated nutrient losses from the current landuse with the estimated losses under the proposed system.

	Current Milking Platform 20/21	Current Muir Block 20/21	Current Total 20/21	Proposed Combined	
Total Farm N Loss (kg)	13802	3514	17316	16232	6.3% decrease
N Loss/ha (kgN/ha/yr)	54	57		51	
Total Farm P Loss (kg)	358	61	419	398	5.0% decrease
P loss/ha (kgP/ha/yr)	1.4	1.0		1.3	
Pasture Grown (tDM/ha)	18.7	17.8		18.0	

1.2 Drivers of changes in nutrient losses

1.2.1 Nitrogen loss estimates

Nitrogen losses from a farm system can have negative impacts on water quality downstream. This in turn can have negative implications on aquatic life and human health.

OverseerFM has estimated a 6.3% decrease in nitrogen losses between the current and proposed scenarios. This is the cumulative result of many changes to the farm system including:

- Increase in cow numbers
- Reduction in cows wintered
- Reduction in area of winter crop
- Reduced nitrogen fertiliser use
- Removal of jersey bulls
- Reduced young stock numbers

1.2.2 Phosphorus loss estimates

Phosphorus losses from the farm can cause algal growth in surface waterways. OverseerFM has estimated a 5.0% decrease in Phosphorus losses in the proposed system. Key changes include:

- Reducing the farm average Olsen P to 30 and therefore reduce maintenance fertiliser P requirements

The following warnings attach to this communication

This material is intended for the named recipient only and has been created solely for the purposes and functions Roslin Consultancy Limited and may contain information that is subject to the Privacy Act/Confidentiality/Privilege/Copyright. Any person other than the named recipient is prohibited from retaining / disclosing/copying/distributing/using all or part of this material

Platinum Dairies Limited

- Increase in cow numbers
- Reduction in cows wintered
- Reduction in winter crop area
- Removal of jersey bulls
- Reduced young stock numbers

OverseerFM is not spatially explicit and a phosphorus mitigation plan should be developed as part of the Farm Environmental Management Plan to reduce phosphorus losses.

2.0 Report purpose

The results of the budgets will be utilised to support a land use consent application for expanded dairying.

This report will emphasise the relevant requirements in the proposed Southland Water and Land Plan, and the National Environmental Standards from a nutrient budgeting perspective. The broader range of requirements should be captured in the Farm Environmental Management Plan (FEMP). This report will inform the FEMP which will be completed separately.

Potential environmental risks on the property have been considered and should be included in the FEMP. These include:

- Contamination of ground water
- Contamination of surface water
- Undesired changes in soil nutrient status
- Nutrient application to non-target land
- Accumulation of non-nutrient impurities in the soil profile
- Excess stocking rate
- Pugging and compaction
- Poor cultivation methods

The following warnings attach to this communication

This material is intended for the named recipient only and has been created solely for the purposes and functions Roslin Consultancy Limited and may contain information that is subject to the Privacy Act/Confidentiality/Privilege/Copyright. Any person other than the named recipient is prohibited from retaining / disclosing/copying/distributing/using all or part of this material

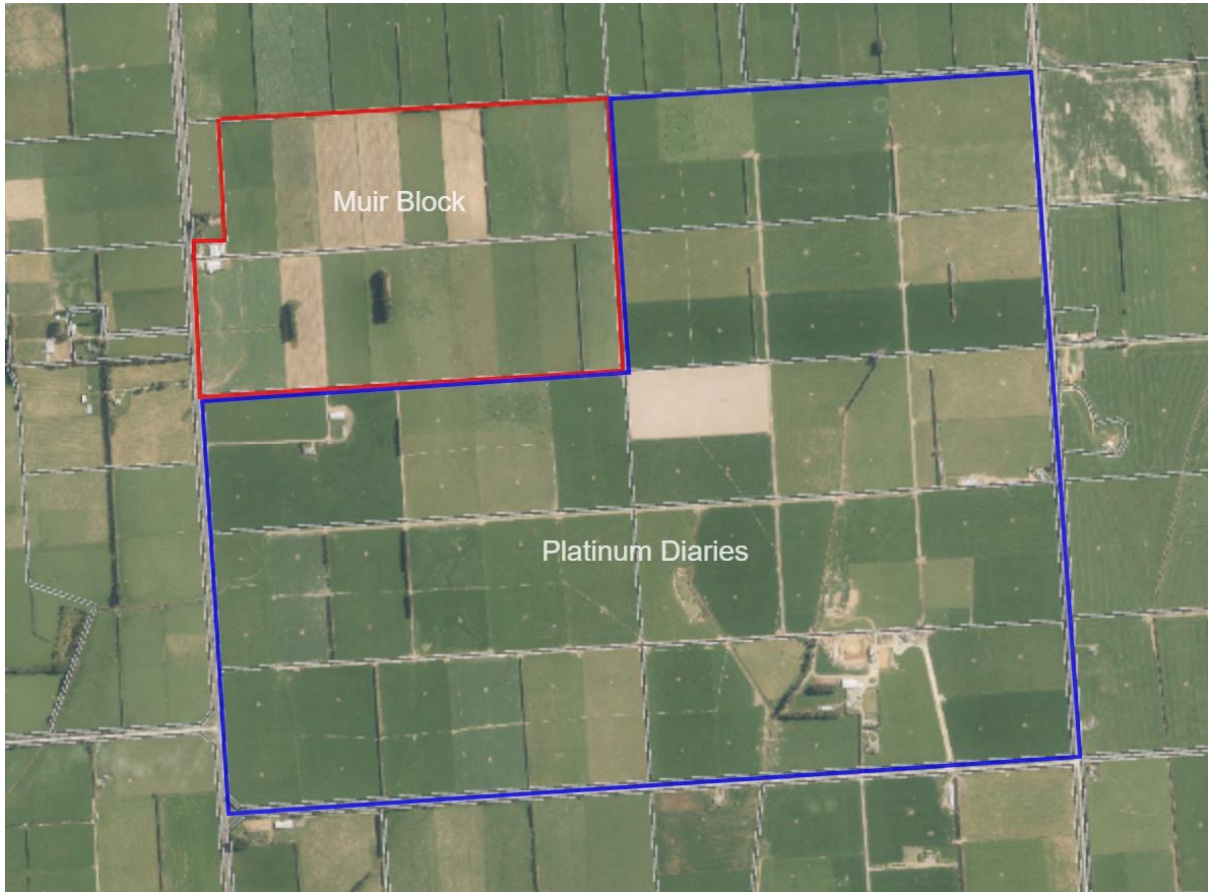
Platinum Dairies Limited

3.0 Farm overview

3.1 Ownership

The milking platform of 256.2 ha (250.5 ha effective) is owned by Platinum Dairies. Platinum Dairies purchased the adjoining block (the Muir Block). The Muir Block is 61.5 ha (59.5 ha effective).

3.2 Location



3.3 Farm particulars:

Address	149 McKenzie Road Lochiel
Legal Description	Sec 9 -13, 22 - 24 Block IX New River Hun Lot 2 DP 544352, Lot 2 13820
Area	317.7 ha

The following warnings attach to this communication

This material is intended for the named recipient only and has been created solely for the purposes and functions Roslin Consultancy Limited and may contain information that is subject to the Privacy Act/Confidentiality/Privilege/Copyright. Any person other than the named recipient is prohibited from retaining / disclosing/copying/distributing/using all or part of this material

Platinum Dairies Limited

3.4 Consent Application Modelling Requirements

It is intended to operate the Platinum Dairies and Muir blocks as one integrated unit. Platinum Dairies is required to apply for a consent to expand dairying across the Muir Block. The Muir Block has not been previously milked off.

To inform the assessment of effects a nutrient budget has been prepared to compare the current to proposed land use.

A portion of the Muir Block was purchased in March 2019 and a portion of the property was leased post March 2019 while the subdivision consent was in process. The Muir Block is currently utilised as a dairy support unit to the neighbouring Platinum Dairies dairy platform. The Muir Block has been cropped and resown in new pastures since take over.

Advice from Environment Southland has been sought as to the best methodology for budgeting the current system. Their advice was to use the 20/21 season as this is the best representation for what was happening on the farm on 2nd Sept 2020.

3.5 Farm system overview

A detailed description of the modelling methodology and Overseer input data is given in the appendices of this report. This section gives an overview of the farm system modelled in each budget.

3.5.1 Current Farm

A nutrient budget was completed using the following actuals from the 20/21 season:

Stock and production:

- Milking Platform
 - 932 FrJx cows were milked at peak producing 437773 kg ms for the season
 - 29 cows were wintered on until the end of July 20 when they were culled
 - No other cows were wintered on the property
 - 287 calves were reared
- Muir Block
 - On average 349 cows were wintered on the property during June and July, additional cows arrived home from external grazing early spring and gradually returned to the milking platform
 - 23 R2 jersey bulls were grazed from April to June
 - 287 calves from October until December / January (13 lighter calves returned in April)

Feed

- Milking Platform
 - No winter crop
 - Imported feed
 - PKE – 282 t DM fed in shed
 - Barley grain – 210 t DM fed in shed

The following warnings attach to this communication

This material is intended for the named recipient only and has been created solely for the purposes and functions Roslin Consultancy Limited and may contain information that is subject to the Privacy Act/Confidentiality/Privilege/Copyright. Any person other than the named recipient is prohibited from retaining / disclosing/copying/distributing/using all or part of this material

Platinum Dairies Limited

- Molasses – 11 t DM fed in shed
- DDG – 205 t DM fed in shed
- Silage – 267 t DM fed in paddock
- Muir Block
 - Crops
 - Winter 20 (19.1 ha)
 - 6.2 ha swedes (ex pasture)
 - 3.2 ha swedes (ex pasture) – lifted and exported
 - 9.7 ha fodderbeet (ex swedes)
 - Winter 21 (22 ha)
 - 8.8 ha swedes (ex pasture)
 - 3.8 ha swedes (ex pasture) – lifted and exported
 - 6.2 ha kale (ex swedes)
 - 3.2 ha kale (ex swedes lifted)
 - No imported feed
 - Pasture includes short rotation ryegrasses
 - Exported feed
 - 267 t DM of silage

Fertiliser

- Milking Platform and Muir Block
 - Soil test results from Ravensdown in July 20
 - Fertiliser applications as per Ravensdown records
 - Milking Platform - 217 kgN/ha applied in split dressings from August to March
 - Muir Block – 145 kg N / ha applied in split dressing August to March

Structures

- Milking Platform
 - Farm dairy effluent is spread to 212.6 ha using less than 12 mm application
 - Solids are applied to pastoral areas
 - A calving pad is utilised in August and September for part of the herd

3.4.3 Proposed Dairy System

A budget was completed for the proposed integrated dairy system

Stock and production:

- 1000 FrJX cows will be milked at peak producing 470000kgms
- 100 cows wintered on the property
- 265 dairy young stock would be reared on farm. They would be grazed on farm until December / January when they would be grazed off to return as in calf heifers

Feed

The following warnings attach to this communication

This material is intended for the named recipient only and has been created solely for the purposes and functions Roslin Consultancy Limited and may contain information that is subject to the Privacy Act/Confidentiality/Privilege/Copyright. Any person other than the named recipient is prohibited from retaining / disclosing/copying/distributing/using all or part of this material

Platinum Dairies Limited

- Imported feed in an average season is estimated to be:
 - PKE – 300 t DM fed in shed
 - Barley grain – 300 t DM fed in shed
 - DDG – 300 t DM fed in shed
 - Silage – 250 t DM fed in paddock
 - Crops (10 ha)
 - 6.5 ha swedes (ex pasture)
 - 3.5 ha swedes (ex pasture) – lifted and exported

Fertiliser

- Soil fertility will target the agronomic optimum. This will mean a decrease in the average Olsen P from the current Olsen P average of 35 to 30.
- Maintenance fertiliser rates have been entered into Overseer
- Farm nitrogen at
 - 189 kg N / ha on non effluent areas applied in split dressings from August to March
 - 154 kg N / ha on effluent areas applied in split dressings from August to March

Structures

- Milking Platform
 - Farm dairy effluent is spread to 212.6 ha using less than 12mm application
 - Solids are applied to pastoral areas
 - A calving pad is utilised in August and September for part of the herd

The following warnings attach to this communication

This material is intended for the named recipient only and has been created solely for the purposes and functions Roslin Consultancy Limited and may contain information that is subject to the Privacy Act/Confidentiality/Privilege/Copyright. Any person other than the named recipient is prohibited from retaining / disclosing/copying/distributing/using all or part of this material

Platinum Dairies Limited

4.0 OverseerFM nutrient loss estimates

4.1 OverseerFM loss estimates

Nutrient budgets have been prepared to support the assessment of effects of the current and proposed dairy systems. The table below shows the OverseerFM version 6.4.1 estimated nutrient losses from the current and proposed land use

	Current Milking Platform 20/21	Current Muir Block 20/21	Current Total 20/21	Proposed Combined	
Total Farm N Loss (kg)	13802	3514	17316	16232	6.3% decrease
N Loss/ha (kgN/ha/yr)	54	57		51	
Total Farm P Loss (kg)	358	61	419	398	5.0% decrease
P loss/ha (kgP/ha/yr)	1.4	1.0		1.3	
Pasture Grown (tDM/ha)	18.7	17.8		18.0	

Note:

- The estimated pasture grown outputs from Overseer are higher than expected. Overseer uses a default value for ryegrass/white clover pasture quality irrespective of the land use and management. The default Overseer value in Southland ranges from 10.5 to 11.17 MJ ME/ kg DM depending on the month (reference: Characteristics of pasture, June 2018, D M Wheeler AgResearch Ltd). Pasture cuts from an Eastern Southland monitor farm show MEs of 11.5 to 12.2 (reference: Pasture growth and quality on Southland and Otago dairy farms, D. E. Dalley and T. Geddes, DairyNZ, NZ Grasslands Publication 2012).

The Overseer default values have been used throughout the entirety of this modelling as the Best Practice Data Input Standards state that “there needs to be a very good long-term average evidence of clover content, pasture utilisation, pasture N content and pasture quality to justify changes from the default OVERSEER values. This level of information would be rare.

To ensure that comparisons are valid between the baseline and proposed the same method has been used to ensure that an “apples with apples” approach is taken.

- There is an increase in biological fixation between the current and proposed, it is expected with a reduction in nitrogen usage (and an increase in nitrogen fixation by clovers)

The following warnings attach to this communication

This material is intended for the named recipient only and has been created solely for the purposes and functions Roslin Consultancy Limited and may contain information that is subject to the Privacy Act/Confidentiality/Privilege/Copyright. Any person other than the named recipient is prohibited from retaining / disclosing/copying/distributing/using all or part of this material

Platinum Dairies Limited

5.0 Drivers of changes in nutrient losses

5.1 Nitrogen Loss estimates

Nitrogen losses from a farm system can have negative impacts on water quality downstream. This in turn can have negative implications on aquatic life and human health.

OverseerFM has estimated a 6.3% decrease in nitrogen losses between the current and proposed scenarios. This is the cumulative result of many changes to the farm system including:

- Increase in cow numbers
- Reduction in cows wintered
- Reduced nitrogen fertiliser use
- Reduced winter crop area
- Removal of jersey bulls
- Reduced young stock numbers

5.2 Phosphorus loss estimates

Phosphorus losses from the farm can cause algal growth in surface waterways. OverseerFM has estimated a 5.0% decrease in Phosphorus losses in the proposed system. Key changes include:

- Reducing the farm average Olsen P to 30 and therefore reduce maintenance fertiliser P requirements
- Increase in cow numbers
- Reduction in cows wintered
- Reduction in winter crop area
- Removal of jersey bulls
- Reduced young stock numbers

OverseerFM is not spatially explicit and a phosphorus mitigation plan should be developed as part of the FEMP to reduce phosphorus losses.

6.0 Recommendations from here

OverseerFM can model a specific range of good management practices. Below is a summary of the potential environmental risks on this property and gives recommendations to mitigate these risks.

Good practice for fertiliser use:

- Regular soil testing is used to inform fertiliser recommendations that target agronomic optimum P, K, S, Mg and Ca levels.
- Develop a fertiliser plan with your fertiliser representative. Recommend you make this OverseerFM modelling available to your fertiliser representative to assist them in developing the fertiliser recommendations.
- Apply using a Spreadmark accredited company for fertiliser application – apply at correct rate and with a buffer to waterways.

The following warnings attach to this communication

This material is intended for the named recipient only and has been created solely for the purposes and functions Roslin Consultancy Limited and may contain information that is subject to the Privacy Act/Confidentiality/Privilege/Copyright. Any person other than the named recipient is prohibited from retaining / disclosing/copying/distributing/using all or part of this material

Platinum Dairies Limited

- Use of Fertmark registered products.
- Record fertiliser applications (location, date of application and amount applied).

Nitrogen:

- Apply nitrogen strategically to meet plant demand.
- Applications should generally be avoided in May due to rapidly declining growth rates.
- Spring nitrogen applications should not be on soil less than 7 degrees Celsius.

Phosphorus:

- OverseerFM is not spatially explicit and a phosphorus mitigation plan should be developed to reduce phosphorus losses.

Critical source areas:

- These include laneways, gateways, swales in paddocks and wallows.
- Review your Farm Environmental Management Plan to update as required and take action on mitigating risk on any new critical source areas identified.

The Proposed Water and Land Plan is currently in the appeals process and is partially operative. It will be important to stay up to date with developments in Environment Southland policy and rules, including the limit setting process which will develop over the next few years.

A National Environmental Standard (NES) has recently been gazetted. This has implications for the wintering of stock on crop, stock exclusion from waterways, nitrogen fertiliser use, changes in landuse and the use of stockholding areas for cattle.

Both the Proposed Water and Land Plan and the National Environmental Standards require a farm of this size to have a farm environmental management plan. This should be updated to include the recommendations within this report.

Appendices

Appendix 1. Modelling Methodology

Nutrient losses have been estimated using the OverseerFM Version 6.4.1 model. OverseerFM is a software application that models nutrient movements within a farm system. Input data detailing the farm system is entered into the software and interpreted through the use of a series of sub-model that calculate the flow of seven major farm nutrients (Nitrogen, Phosphorus, Sulphur, Calcium, Magnesium and Sodium). Output data is reported for interpretation and to inform farm management practices. It currently requires an expert user to describe the physical and management details of a farm.

OverseerFM assumptions

Within the OverseerFM software, assumptions have been made of the farm management:

- Long term annual average model
The model uses annual average input and produces annual average outputs.
- Near equilibrium conditions
Model assumes that that the farm is at a state where there is minimal change each year.
- Actual and reasonable inputs
It is assumed that input data is reasonable and a reflection of the actual farm system. If any parameter changes, it is assumed that all other parameters affected will also be changed.
- Good management practices are followed
OverseerFM assumes the property is managed at industry agreed good management practice for a specific list of factors including effluent and fertiliser applications. OverseerFM does not assume that all industry agreed good management practices are undertaken on farm.

OverseerFM limitations

Key limitations of the OverseerFM model are:

- OverseerFM does not predict transformations, attenuation or dilution of nutrients between the root zone or farm boundary and the eventual receiving water body. A catchment model is needed to estimate the effects of the nutrient losses from farms on groundwater, river or lake water quality.
- OverseerFM does not calculate outcomes from extreme events (floods and droughts) but provides a typical years result based on a long-term average.
- OverseerFM does not calculate the impacts of a conversion process, rather it predicts the long-term annual average nutrient budgets for changed land use.
- OverseerFM is not spatially explicit beyond the level of defined blocks.
- Not all management practices or activities that have an impact on nutrient losses are captured in the OverseerFM model.
- OverseerFM does not represent all farm systems in New Zealand.
- Components of OverseerFM have not been calibrated against measured data from every combination of farm systems and environment.

Information on OverseerFM can be obtained from the following reports:

The following warnings attach to this communication

This material is intended for the named recipient only and has been created solely for the purposes and functions Roslin Consultancy Limited and may contain information that is subject to the Privacy Act/Confidentiality/Privilege/Copyright. Any person other than the named recipient is prohibited from retaining / disclosing/copying/distributing/using all or part of this material

Platinum Dairies Limited

- Technical Description of OVERSEER for Regional Councils, September 2015
- Review of the phosphorus loss submodel in OVERSEER®, September 2016
- Using OVERSEER® in Regulation – Technical Resources and Guidance for Regional Councils, August 2016

Data input standards

Nutrient budgets have been constructed using the OverseerFM Version 6.4.1 model.

The nutrient budgets have been developed in accordance with the Overseer data input protocols - “Overseer, Best Practice Data Input Standards, March 2018” and the “OverseerFM User Guide, October 2019.” No deviations have been made from these protocols.

The following warnings attach to this communication

This material is intended for the named recipient only and has been created solely for the purposes and functions Roslin Consultancy Limited and may contain information that is subject to the Privacy Act/Confidentiality/Privilege/Copyright. Any person other than the named recipient is prohibited from retaining / disclosing/copying/distributing/using all or part of this material

Platinum Dairies Limited

Appendix 2. Modelling Inputs

Soil types

Soil type has a large bearing on nutrient loss levels from a property. This is due to different soil types having different water holding capacities, and drainage characteristics. It is therefore important that soil type is inputted correctly.

The table below gives a brief description of the soil types found on the Platinum Dairies and the Muir Block.

S-map ref	Group	Soil Order	Drainage class	Description
Pukem_6a.1	Recent/YBE/BGE	Pallic	Poor	Moderately deep, poorly drained, silt over clay
Wood_29a.1	Sedimentary	Brown	Imperfect	Deep, imperfectly drained, silt
Waiki_34a.1	Sedimentary	Brown	Well	Deep, well drained, silt
Paro_4a.1	Sedimentary	Gley	Poor	Deep, poorly drained, silt
Makar_3b.1	Sedimentary	Gley	Poor	Deep, poorly drained, clay

The table below shows the area and the proportion of the block that the soils identified covered:

S-map ref	Platinum Area (ha)	Muir Area (ha)	Total Area (ha)	% Area
Pukem_6a.1	180.0	34.5	214.5	69.2
Wood_29a.1	36.1	14.9	51.0	16.5
Waiki_34a.1	28.7	10.1	38.8	12.5
Paro_4a.1	3.2		3.2	1
Makar_3b.1	2.5		2.5	0.8

Climate Data

The following climate information has been used from the OverseerFM climate station tool:

Annual Rainfall (mm)	1100 - 1105
Mean Annual Temp (°C)	10.0
Annual PET (mm)	716 - 719

Platinum Dairies Limited

Blocks

The farms have been split into the following pastoral, riparian and fodder crop blocks based on soil type, contour, drainage and land use. All contour is flat.

		Current Milking Platform 20/21	Current Muir Block 20/21	Proposed Combined
Pasture blocks				
	Effluent	212.6		212.6
	Non effluent pasture	37.9	27.8	87.4
	Fodderbeet (winter 20)		9.7	
	Swedes (winter 20)		6.2	
	Swedes (winter 20) lifted		3.2	
	Swedes (winter 21)		8.8	
	Swedes (winter 21) lifted		3.8	
	Swedes			6.5
	Swedes (lifted)			3.5
	Productive Block Area	250.5	59.5	310.0
	Non-effective area	5.7	2.0	7.7
	Total area	256.2	61.5	317.7

Platinum Dairies Limited

Farm System Inputs

Description	Current Milking Platform 20/21	Current Muir Block 20/21	Proposed Combined																																																																														
Area	Total: 256.2 ha Productive farm area: 250.5 ha	Total: 61.5 ha Productive farm area: 59.5 ha	Total: 317.7 ha Productive farm area: 310.0 ha																																																																														
Dairy cows (note: stock numbers refer to those on the last day of the month)	Production: 437773kgMS (470kgMS/cow at peak) Mean calving date: 23 Aug Dry off date: 28 May		Production: 470000kgMS (470kgMS/cow at peak) Mean calving date: 23 Aug Dry off date: 28 May																																																																														
	<table border="1"> <thead> <tr> <th>Month</th> <th>Dairy Herd – FrJx</th> </tr> </thead> <tbody> <tr><td>Jul</td><td>0</td></tr> <tr><td>Aug</td><td>537</td></tr> <tr><td>Sep</td><td>932</td></tr> <tr><td>Oct</td><td>932</td></tr> <tr><td>Nov</td><td>926</td></tr> <tr><td>Dec</td><td>916</td></tr> <tr><td>Jan</td><td>896</td></tr> <tr><td>Feb</td><td>882</td></tr> <tr><td>Mar</td><td>865</td></tr> <tr><td>Apr</td><td>855</td></tr> <tr><td>May</td><td>485 (leave 28th May)</td></tr> <tr><td>Jun</td><td>0</td></tr> </tbody> </table>	Month	Dairy Herd – FrJx	Jul	0	Aug	537	Sep	932	Oct	932	Nov	926	Dec	916	Jan	896	Feb	882	Mar	865	Apr	855	May	485 (leave 28 th May)	Jun	0	<table border="1"> <thead> <tr> <th>Month</th> <th>MA dairy cows FJx</th> </tr> </thead> <tbody> <tr><td>Jul</td><td>460</td></tr> <tr><td>Aug</td><td>414</td></tr> <tr><td>Sep</td><td></td></tr> <tr><td>Oct</td><td></td></tr> <tr><td>Nov</td><td></td></tr> <tr><td>Dec</td><td></td></tr> <tr><td>Jan</td><td></td></tr> <tr><td>Feb</td><td></td></tr> <tr><td>Mar</td><td></td></tr> <tr><td>Apr</td><td></td></tr> <tr><td>May</td><td>350</td></tr> <tr><td>Jun</td><td>436</td></tr> </tbody> </table>	Month	MA dairy cows FJx	Jul	460	Aug	414	Sep		Oct		Nov		Dec		Jan		Feb		Mar		Apr		May	350	Jun	436	<table border="1"> <thead> <tr> <th>Month</th> <th>Dairy Herd - FrJx</th> </tr> </thead> <tbody> <tr><td>Jul</td><td>360 (260 arrive 23/7)</td></tr> <tr><td>Aug</td><td>750</td></tr> <tr><td>Sep</td><td>1010</td></tr> <tr><td>Oct</td><td>1000</td></tr> <tr><td>Nov</td><td>1000</td></tr> <tr><td>Dec</td><td>995</td></tr> <tr><td>Jan</td><td>995</td></tr> <tr><td>Feb</td><td>985</td></tr> <tr><td>Mar</td><td>985</td></tr> <tr><td>Apr</td><td>920</td></tr> <tr><td>May</td><td>887</td></tr> <tr><td>Jun</td><td>100</td></tr> </tbody> </table>	Month	Dairy Herd - FrJx	Jul	360 (260 arrive 23/7)	Aug	750	Sep	1010	Oct	1000	Nov	1000	Dec	995	Jan	995	Feb	985	Mar	985	Apr	920	May	887	Jun	100
Month	Dairy Herd – FrJx																																																																																
Jul	0																																																																																
Aug	537																																																																																
Sep	932																																																																																
Oct	932																																																																																
Nov	926																																																																																
Dec	916																																																																																
Jan	896																																																																																
Feb	882																																																																																
Mar	865																																																																																
Apr	855																																																																																
May	485 (leave 28 th May)																																																																																
Jun	0																																																																																
Month	MA dairy cows FJx																																																																																
Jul	460																																																																																
Aug	414																																																																																
Sep																																																																																	
Oct																																																																																	
Nov																																																																																	
Dec																																																																																	
Jan																																																																																	
Feb																																																																																	
Mar																																																																																	
Apr																																																																																	
May	350																																																																																
Jun	436																																																																																
Month	Dairy Herd - FrJx																																																																																
Jul	360 (260 arrive 23/7)																																																																																
Aug	750																																																																																
Sep	1010																																																																																
Oct	1000																																																																																
Nov	1000																																																																																
Dec	995																																																																																
Jan	995																																																																																
Feb	985																																																																																
Mar	985																																																																																
Apr	920																																																																																
May	887																																																																																
Jun	100																																																																																
Dairy replacements	287 heifer calves August and September	287 heifer calves Oct and Nov 34 Dec 13 R1s April to June	265 calves are reared on farm and remain on farm until Dec / Jan																																																																														
Sheep	NA	NA	NA																																																																														
In shed feeding	100% of herd fed inshed Aug – May	N/A	100% of herd fed inshed Aug - May																																																																														
Structures	Stand off pad Bark surface Management: 30% of cows (160) on for 12hrs per day in Aug 21% of cows (196) on for 12hrs per day in September		Stand off pad Bark surface Management: 22% of cows (165) on for 12hrs per day in Aug 20% of cows (202) on for 12hrs per day in September																																																																														

The following warnings attach to this communication

This material is intended for the named recipient only and has been created solely for the purposes and functions Roslin Consultancy Limited and may contain information that is subject to the Privacy Act/Confidentiality/Privilege/Copyright. Any person other than the named recipient is prohibited from retaining / disclosing/copying/distributing/using all or part of this material

Platinum Dairies Limited

Description	Current Milking Platform 20/21	Current Muir Block 20/21	Proposed Combined
Animal distribution	No difference between blocks	No difference between blocks	No difference between blocks
Crop management	None	<p><u>Fodderbeet (winter 20)</u> 9.7 ha ex crop 23TDM/ha yield Planted in Oct – conventional cultivation 200kg/ha CM at sowing 100kg/ha Urea applied in Jan Grazed in June to August Sown into permanent pasture in Oct</p> <p><u>Swedes (winter 20)</u> 6.2 ha ex pasture 12TDM/ha yield Planted in Oct – conventional cultivation 200kg/ha CM at sowing 100kg/ha Urea applied in Jan Grazed in June to August Sown into kale in Oct Conventional cultivation 200kg/ha CM at sowing 100kg/ha Urea applied in Jan Grazed in June to August winter 21</p> <p><u>Swedes (winter 20) lifted</u> 3.2 ha ex pasture 12TDM/ha yield Planted in Oct – conventional cultivation 200kg/ha CM at sowing 100kg/ha Urea applied in Jan Lifted and exported June to August Sown into kale in Oct Conventional cultivation 200kg/ha CM at sowing 100kg/ha Urea applied in Jan Grazed in June to August winter 21</p> <p><u>Swedes (winter 21)</u> 8.8 ha ex pasture 12TDM/ha yield Planted in Oct – conventional cultivation 200kg/ha CM at sowing 100kg/ha Urea applied in Jan Grazed in June to August</p>	<p><u>Swedes</u> 6.5 ha ex pasture 12TDM/ha yield Planted in Oct – conventional cultivation 200kg/ha CM at sowing 100kg/ha Urea applied in Jan Grazed in June to August</p> <p><u>Swedes lifted</u> 3.5 ha ex pasture 12TDM/ha yield Planted in Oct – conventional cultivation 200kg/ha CM at sowing 100kg/ha Urea applied in Jan Lifted and exported June to August</p>

The following warnings attach to this communication

This material is intended for the named recipient only and has been created solely for the purposes and functions Roslin Consultancy Limited and may contain information that is subject to the Privacy Act/Confidentiality/Privilege/Copyright. Any person other than the named recipient is prohibited from retaining / disclosing/copying/distributing/using all or part of this material

Platinum Dairies Limited

Description	Current Milking Platform 20/21	Current Muir Block 20/21	Proposed Combined
		<p><u>Swedes (winter 21) lifted</u> 3.8 ha ex pasture 12TDM/ha yield Planted in Oct – conventional cultivation 200kg/ha CM at sowing 100kg/ha Urea applied in Jan Lifted and exported June to August</p>	
Imported Supplements	PKE – 282 t DM fed in shed Barley grain – 210 t DM fed in shed Molasses – 11 t DM fed in shed DDG – 205 t DM fed in shed Silage – 267 t DM fed in paddock From storage 155 t DM silage	From storage – 88 t DM baleage	PKE – 300 t DM fed in shed Barley grain – 300 t DM fed in shed DDG – 300 t DM fed in shed Silage – 250 t DM fed in paddock
Exported supplements	None	Silage 267 t DM	None
Soil Fertility	Soil tests were completed in 2020 Olsen P of 35 QT K of 8 QT Ca of 9 QT Mg of 27 QT Na of 8 SO ₄ of 11	Soil tests were completed in 2020 Olsen P of 29 QT K of 11 QT Ca of 7 QT Mg of 39 QT Na of 8 SO ₄ of 8	Soil fertility would be targeted at agronomic optimum Olsen P of 30 QT K of 7 QT Ca of 9 QT Mg of 17 QT Na of 6 SO ₄ of 13
Fertiliser	Fertiliser applied from actuals Total P applied – 9630 kg	Fertiliser applied from actuals Total P applied – 2365 kg	Fertiliser applied to maintenance level. Total P applied – 5982kg
Pastoral Nitrogen Fertiliser	217kgN/ha was applied to the pasture area in split application between Aug and March	145kgN/ha was applied to the pasture area in split application between Aug and March	Effluent area: 154kgN/ha was applied to the pasture area in split application between Aug and March Non effluent area: 189kgN/ha was applied to the pasture area in split application between Aug and March
Drainage	60% of property is drained using mole / tile drainage	100% of property is drained using mole / tile drainage	60% and 100% of property is drained using mole / tile drainage

The following warnings attach to this communication

This material is intended for the named recipient only and has been created solely for the purposes and functions Roslin Consultancy Limited and may contain information that is subject to the Privacy Act/Confidentiality/Privilege/Copyright. Any person other than the named recipient is prohibited from retaining / disclosing/copying/distributing/using all or part of this material

Platinum Dairies Limited

Description	Current Milking Platform 20/21	Current Muir Block 20/21	Proposed Combined
Effluent system	Holding pond Effluent is applied using low depth application of less than 12mm Liquid effluent is applied to the "eff" blocks Solids are spread on all pastoral areas		Holding pond Effluent is applied using low depth application of less than 12mm Liquid effluent is applied to the "eff" blocks Solids are spread on all pastoral areas

The following warnings attach to this communication

This material is intended for the named recipient only and has been created solely for the purposes and functions Roslin Consultancy Limited and may contain information that is subject to the Privacy Act/Confidentiality/Privilege/Copyright. Any person other than the named recipient is prohibited from retaining / disclosing/copying/distributing/using all or part of this material

Appendix C: Dairy Effluent Storage Calculator Assessment

Disclaimer

I/We acknowledge and agree that:

1. the results contained in the report which DairyNZ will provide following my/our use of the Dairy effluent storage calculator ("the calculator") are generated based on the data which I/we have inputted into the calculator; and
2. the reliability of the results and the report is dependent upon a number of variables including, without limitation, the accuracy of the input data, and the validity of the assumptions and algorithms used in the calculator in relation to the input data which may be updated to reflect development in effluent knowledge; and
3. the results contained in the report cannot be relied upon solely to ensure the effluent storage system:
 - a. meets the current or future requirements of the district or regional plans of the local territorial authority or regional council or any other authority having jurisdiction.
 - b. has the storage capacity to allow practical management of the effluent system.

Accordingly, DairyNZ does not accept liability for any loss, damage, cost or expense suffered or incurred by me/us or any third party to whom this report has been provided (whether by me/us or another person) in connection with the use of, and reliance on, the report and the results contained in it.

DairyNZ's website terms and conditions (which can be found at <https://www.dairynz.co.nz/terms-and-conditions>) otherwise apply to the use of this service and the provision of the report and the results in it.

PLA20225 Platinum Dairies Limited- S3 with uncovered pad & 1,000 peak cows

149 McKenzie Road, Lochiel

Supplier Number	31838
Storage max m³	6,129.09
90th percentile m³	4,214.40
Total pond useable volume m³	4,937.65
File owned by	Donna Corbin
Created by	Donna Corbin
Created on	09 Aug 2021
Last modified by	Donna Corbin
Last modified on	09 Aug 2021

3. RES Base Calculation with uncovered pad collection to pond.

1,000 Cows, high risk soils for effluent application, permanent shed roof diversion, yard and concrete lane diversion when cows are dried off, Silage pad drains to the effluent system, uncovered calving pad collection to the pond, NO other underpass or stand off pads or other areas drain to the pond, 35/50 lt/cow/day wash down water used in the dairy shed (green wash installed, 35 litres/cow/day, used from 1 April till 31 October), 4 sets of low rate pods (20m³/hr for a minimum of 4 hours per day when there is a soil moisture deficit of 3mm and increasing as the soil moisture levels increase), existing pond, application all year round, 3 days emergency storage.

Other areas include: half of silage pad area (as cover is diverted), sump, stone trap and solids bunker areas.

Uncovered calving pad- used for half of July, August, September and half of October. maximum 120 cows. the total area has been reduced from 1,300m² to 910m² (reduced by 30%) as the hedge line, dung staying in place and evaporation from the woodchip and cow heat are expected to reduce the collection of rainwater and urine by far more than 30%.

All information entered and assumptions made in this report are based upon information gathered from management and staff while onsite. Please check that all information and assumptions made in this report are correct.

Under the management system parameters described in this report and on the balance of probability, it is 90% likely that 4,214m³ of liquid effluent storage will be adequate for storage in any one year.

Based on the estimated pond dimensions of 48.5m x 48.5m x 4m , with a 2.5:1 batter (as per the original pond design drawings), you currently have 4,938m³ of effective storage (being a total hole in the ground volume of 6,062m³) which is over 90% probability that you will have sufficient storage in any one year.

This calculation assumes that you will irrigate for around 240 days every year and that there are around 125 days each season that effluent cannot be applied to land and should be stored in the main effluent pond.

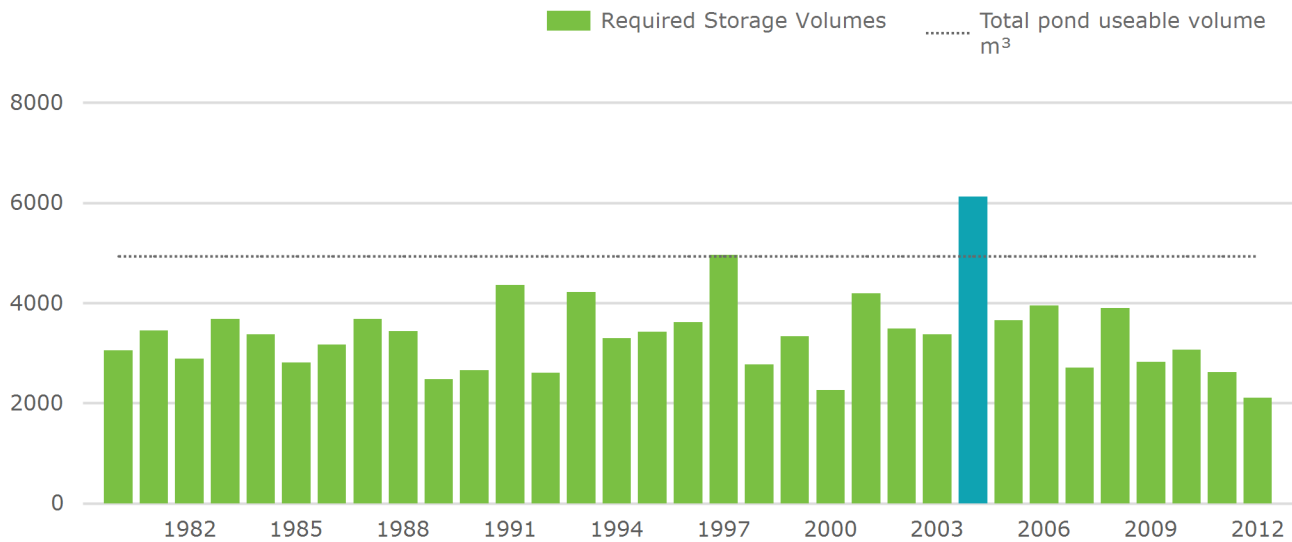
There is approximately 19,200m³ of effluent produced each season, approximately 52.6m³ per day.

Good management is essential for liquid effluent storage of this size.

The online version of the pond calculator does not supply required solids volumes, however there maybe sufficient practicable space in the solids bunker.

Good management is essential for solids storage this size.

Required Storage Volumes



Climate

Site	Mean Rainfall mm	Altitude m
Winton	958	44

Soil

Low Risk Soil ha	Minimum High Risk Soil ha	Surplus high risk soil ha
0	38	0

Irrigation

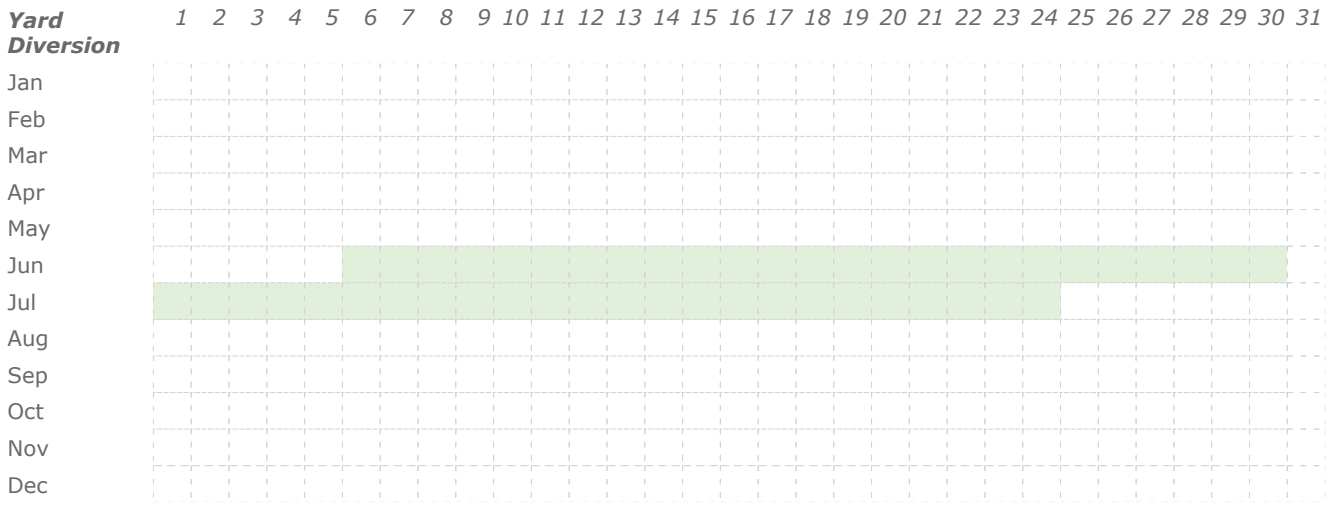
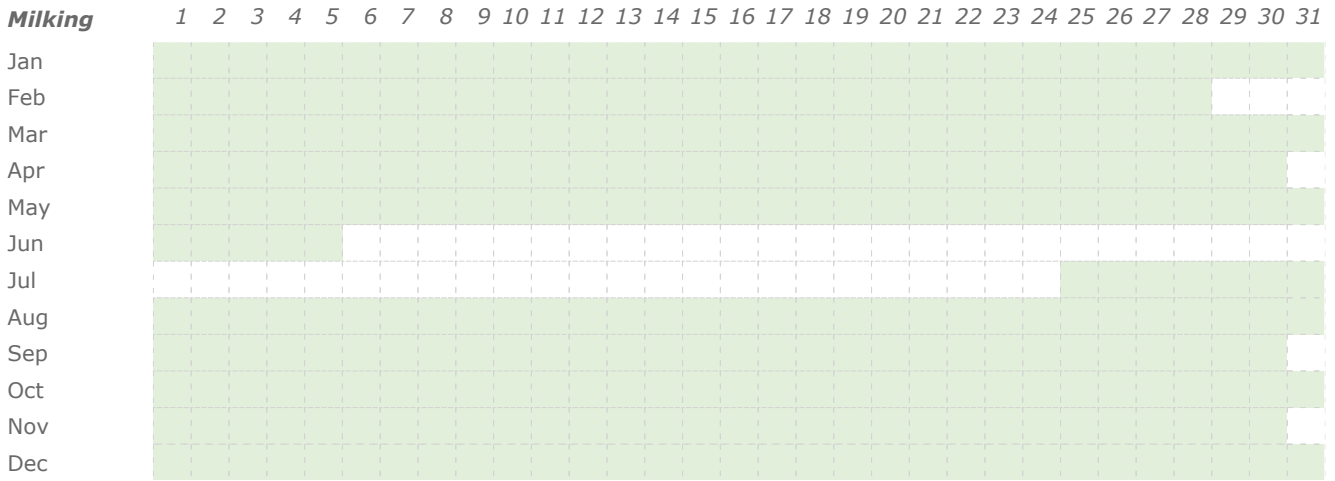
Calculated option	Application depth mm	Pump volume m ³
Option 1: Pump rate 20m ³ /hr and pump time 4hrs	3	80
Option 1: Pump rate 20m ³ /hr and pump time 8hrs	6	160
Option 1: Pump rate 20m ³ /hr and pump time 12hrs	9	240
Option 1: Pump rate 20m ³ /hr and pump time 14hrs	10.5	280
Option 1: Pump rate 20m ³ /hr and pump time 14hrs	12	280
Option 1: Pump rate 20m ³ /hr and pump time 6hrs	4.5	120
Option 1: Pump rate 20m ³ /hr and pump time 10hrs	7.5	200

Catchment

Shed		Yard		Feedpad			Animal Shelter			Other
Area m ³	Diverted	Area m ³	Diverted	Area m ³	Covered	Diverted	Area m ³	Covered	Diverted	Area m ³
338	Yes	1790	Yes	0	No	No	910	No	No	823

	Yard				Animal Shelter		
	Cows	Hours	Volume m ³	Wash LCD	Cows	Hours	Volume m ³
Jan	1000	7	50	0	0	0	0
Feb	1000	7	50	0	0	0	0
Mar	1000	7	50	0	0	0	0
Apr	1000	7	35	0	0	0	0
May	800	7	28	0	0	0	0
Jun	550	4	19.25	0	0	0	0
Jul	400	4	14	0	120	12	0
Aug	650	7	22.75	0	120	24	0
Sep	850	7	29.75	0	120	24	0
Oct	1000	7	35	0	120	12	0
Nov	1000	7	50	0	0	0	0
Dec	1000	7	50	0	0	0	0

Calendar



Solid Unit

No Data Available

Storage

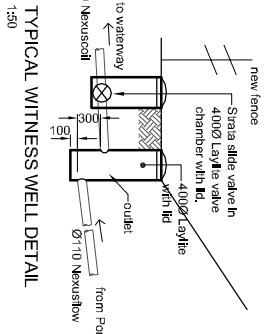
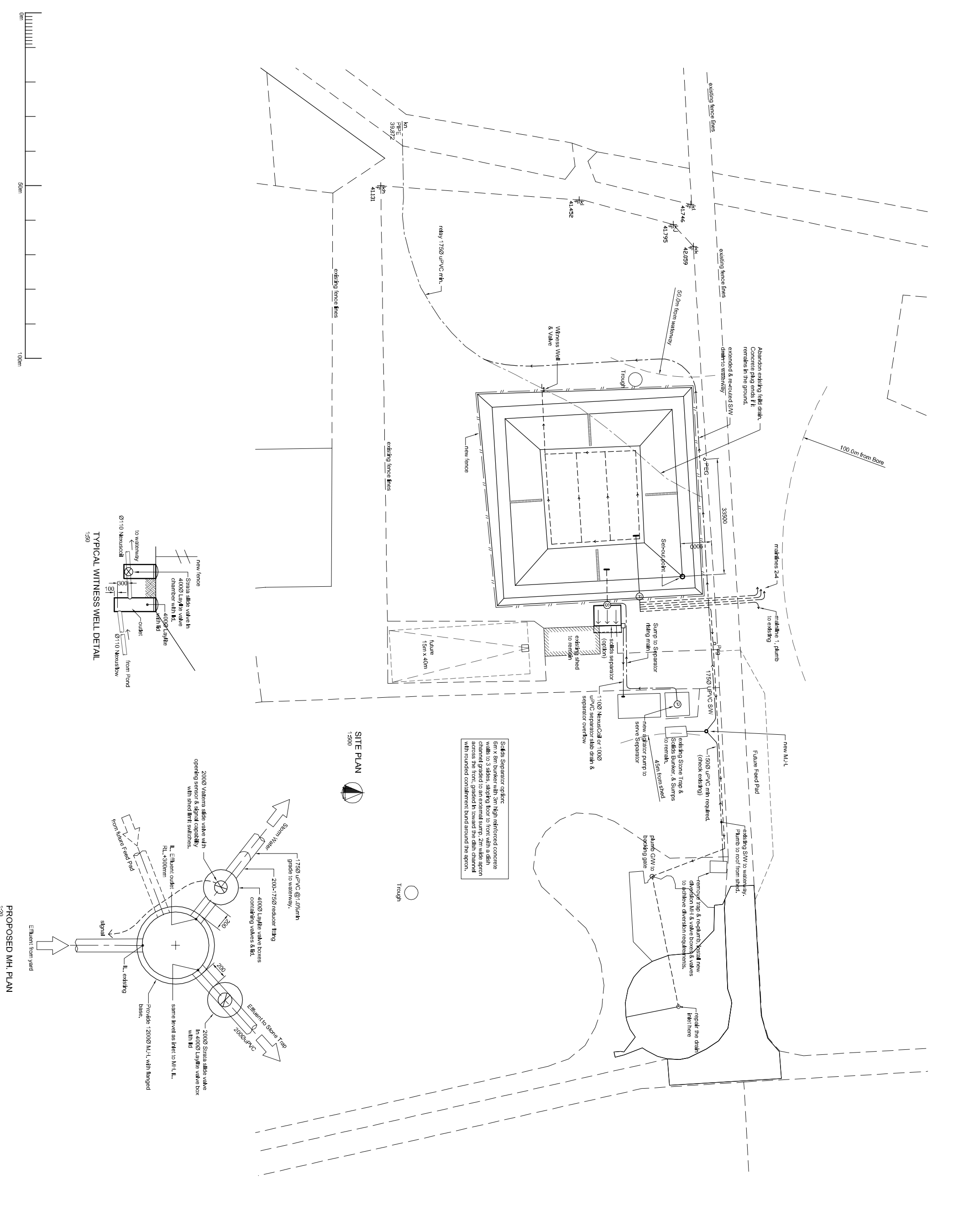
Emergency Storage Period 3

<i>Storage Name</i>	<i>Covered</i>	<i>Pumped</i>	<i>Type</i>	<i>Dimension</i>
Main Effluent Pond	No	On	Regular - Rectangular	length 48.5m, width 48.5m, height 4m, sludge height 0.01m freeboard height 0.5m and batter 2.5:1

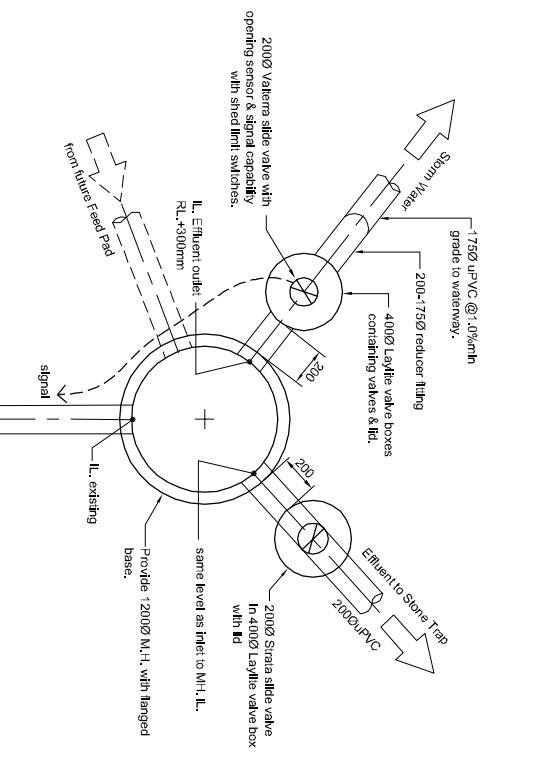
Appendix

<i>Season</i>	<i>Required Storage Volumes m³</i>
1980	3,052.96
1981	3,447.20
1982	2,893.01
1983	3,683.19
1984	3,372.53
1985	2,807.23
1986	3,165.98
1987	3,682.73
1988	3,443.74
1989	2,476.64
1990	2,653.60
1991	4,365.40
1992	2,608.37
1993	4,219.22
1994	3,297.18
1995	3,424.76
1996	3,623.38
1997	4,956.16
1998	2,777.67
1999	3,331.67
2000	2,262.25
2001	4,195.13
2002	3,485.41
2003	3,368.93
2004	6,129.09
2005	3,651.66
2006	3,947.98
2007	2,706.41
2008	3,895.13
2009	2,823.90
2010	3,065.46
2011	2,620.30
2012	2,111.37

Appendix D: Pond Design Drawings



SITE PLAN
1:500



PROPOSED MH PLAN
1:200

Note:
These drawings are site specific and shall be read in conjunction with the specification for this project.

REV. DATE. DESCRIPTION.	A 6/13 Issued for approval
DESIGNED: T.Kidd	DATE: 6/13
DRAWN: H.Kidd	DATE: 6/13
CHECKED: H.Kidd	DATE: 6/13
APPROVED:	DATE: 6/13
	SCALE: as shown @ A1

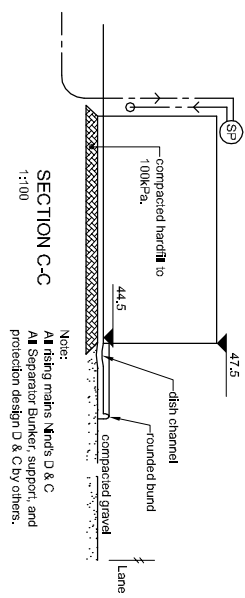
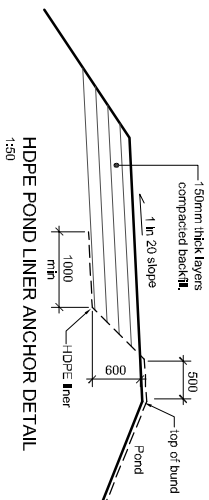
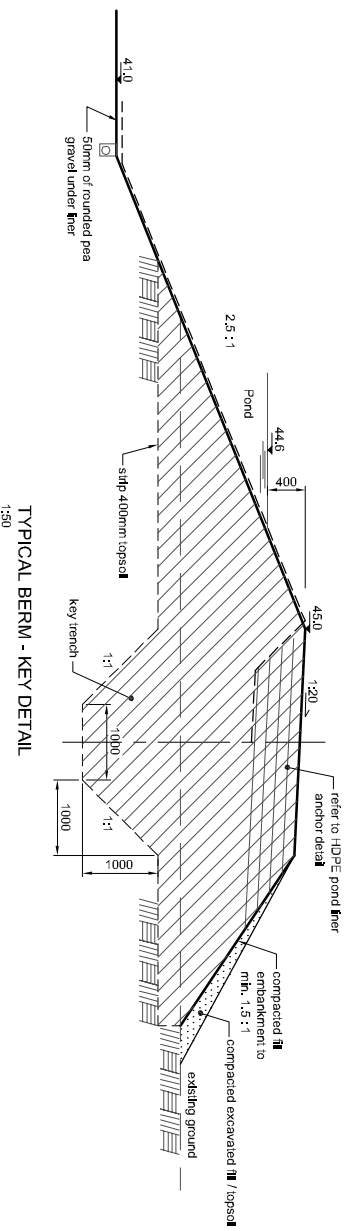
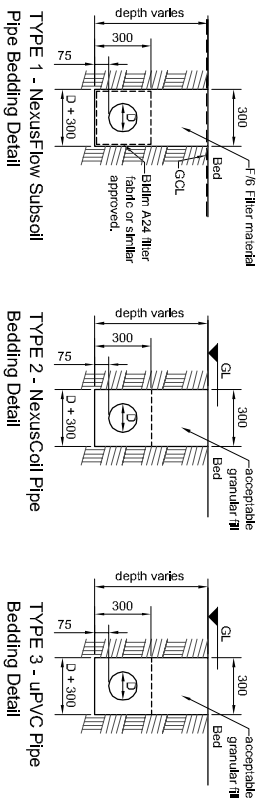
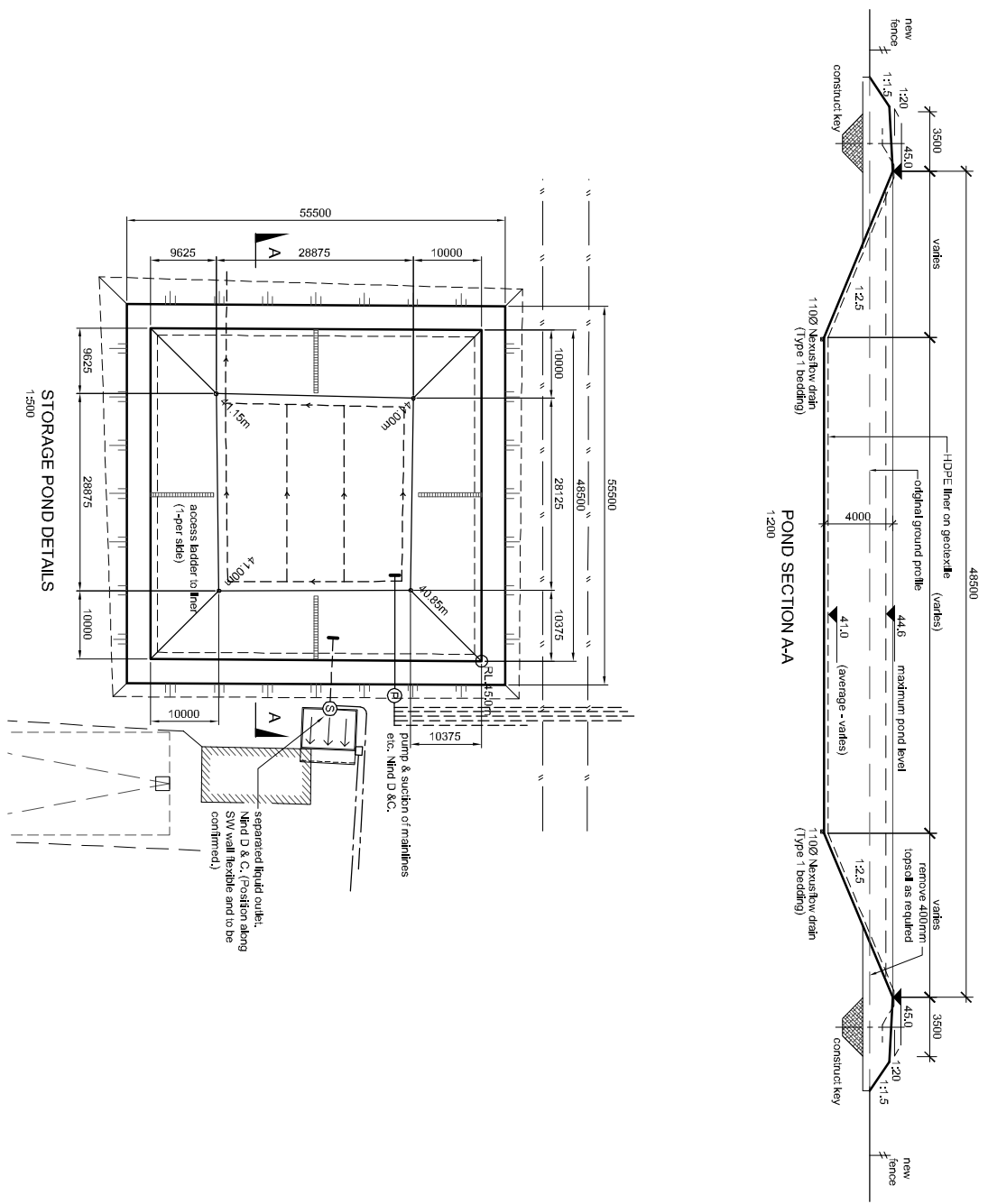
m: 021 567 770
 e: therranid@kma.co.nz

CLIENT: McKenzie

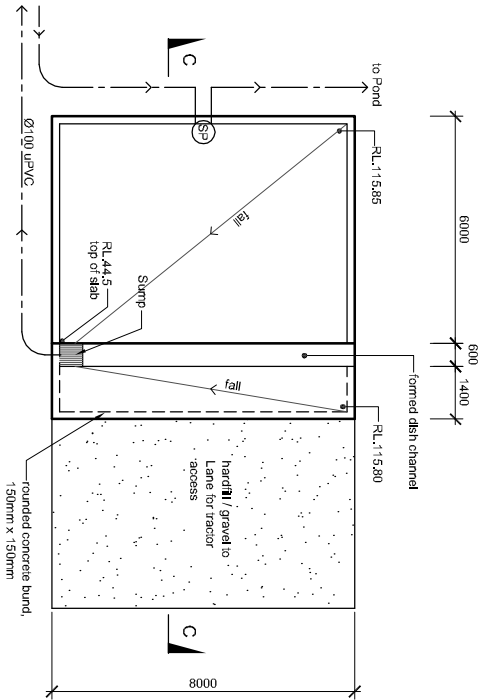
DRAWING TITLE: **SITE WORKS**
SITE PLAN

DRAWING NUMBER: CO1

REVISION: A

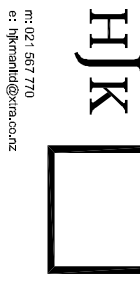


SEPARATOR BUNKER DETAILS
1:100



Note: These drawings are site specific and shall be read in conjunction with the specification for this project.

REV.	DATE	DESCRIPTION	ORIGINAL SIZE
A	6/13	Issued for approval	
DESIGNED:	DATE:	DATE:	DATE:
DRAWN:	DATE:	DATE:	DATE:
CHECKED:	DATE:	DATE:	DATE:
APPROVED:	DATE:	DATE:	DATE:



CLIENT: McKenzie

DRAWING TITLE: SITE WORKS DETAILS

DRAWING NUMBER: CO2 REVISION: A

Friday, 13 August 2021

Jared Collie
Platinum Dairies Limited
731 Benmore Otapiri Road
RD2
Winton 9782

Client Name: Platinum Dairies Limited
Supply Number: 31838
Authority Number: AUTH-302423
Client Code: PLA20225

Subject: Visual Assessment report for assessment of 1 hypond.

Dear Jared,

Thank you for engaging Donna Corbin t/a RES Rural Environmental Solutions (RES) to undertake visual assessments of facilities within your effluent system. The following areas have been assessed:

- Area 1: Hypond located at Shed – **PASS**

The visual assessment/s were requested as part of the requirements for renewing your resource consents. A review of this report has been undertaken by a CPEng being, Heiko Franz (Treatment Solutions and Design Ltd), with the review being supplied separately.

The visual assessment has been undertaken as per the requirements of Rule 32D(a)(ii)(2)(a) of the Proposed Southland Water and Land Plan, no other assessments against any other rules have been undertaken for the purposes of this report. Being:

having no visible cracks, holes or defects that would allow effluent to leak from the effluent storage facility

Photos for each facility are contained in Appendix 2.

Area 1: Hypond located at Shed (NZTM2000 1242280 mE, 4870397 mN)

<u>Inspection date:</u>	19/07/2021	<u>Construction Material:</u>	Concrete - 12 precast concrete panel walls with a poured concrete base
<u>Shape:</u>	Round	<u>Dimensions (Approximately):</u>	7m diameter 2.4m deep with a 0 to 1 internal batter

This facility is over 35m³ in storage capacity.

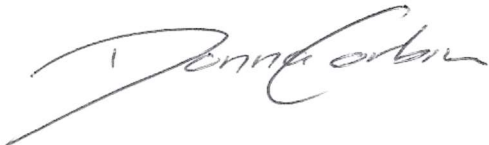
The following was noted by Donna Corbin from RES during the assessment:

- Facility location/setbacks
 - The facility is;
 - Not within 50m of a waterway. Not within 50m of the boundary. Not within 200m of dwelling not on the property. Not located on top of a drain/tile.
- Facility reasonably empty
 - The facility was emptied as much as was reasonably partible by the consent holder, however, less than half of the floor was visible for the assessment. There was still a small amount of liquid in the bottom of the facility at the time of the assessment, being less than 100mm. The facility could not be pumped out any more than this by the consent holder.
- Interior assessment
 - Floor to side junctions, joints/seals
 - The floor to side joints that were visible appeared to be intact and undamaged.
 - Corner or panel junctions, joints/seals
 - The corner and panel junctions that were visible appeared to be intact and undamaged.
 - Inflow/outflow pipes
 - A visual assessment of all incoming and outgoing pipe work did not show any damage to the pipe work or any missing sealant.
 - Interior damage
 - A visual assessment was undertaken on the interior of the facility, minor damage was noted to the concrete behind the effluent pump. This damage appeared to be minor wear marks behind the effluent pump and in RES opinion would not allow leakage from the facility.
 - This minor damage appeared to be caused by friction between the wall and the effluent pump.
 - The reason that this would not allow leakage from the facility in RES opinion is that the wear was recessed into the concrete by approximately 5mm and the panel itself is approximately 100mm thick.
 - RES recommends the repair of this area within 12 months of the date of this letter.
 - There was still a small amount of liquid in the bottom of the facility, being less than 100mm, however Donna Corbin was able to walk around the bottom of the facility and while walking and dragging her foot around the bottom of the facility she could not note damage to the base of the facility.
 - Interior assessment summary
 - The repairs to the concrete wall behind effluent pump are minor and in RES opinion will not allow leakage from the facility. However, RES recommends the repair of this area within 12 months of the date of this letter.
- Exterior assessment
 - Exterior ground assessment
 - The immediate ground around the facility appeared to be firm with no soft areas or shrinkage away from the structure.
 - Exterior structure
 - No damage or areas of concern were noted around the exterior of the structure.

- Exterior assessment summary
 - There did not appear to be any cracks, holes or defects on the exterior of the facility that would allow leakage.

A visual assessment to visually assess for cracks, holes or defects was undertaken on the structure by RES. This assessment did not note any cracks, holes or defects that would allow leakage from the facility.

Yours Faithfully,



Donna Corbin
Environmental Consultant
RES Rural Environmental Solutions

DISCLAIMER

The data and conclusions within this report are based upon the data collected onsite and the visual assessment undertaken. While every endeavour has been undertaken to ensure that any cracks, holes or defects has been undertaken this is a visual assessment only of the facility liner and seals, with no exploratory process being undertaken. The visual assessments have been undertaken in accordance with the Proposed Southland Water and Land Plan, Rule 32D and guidance given by Environment Southland. No guarantee is given or implied by the issuing of this report. No visual assessment as the structural integrity, design or suitability of the structure has ben undertaken or implied.

While reasonable endeavours have been made to ensure the accuracy of the information contained in this Report, Donna Corbin TA RES Rural Environmental Solutions does not accept responsibility for any loss or damage (whether direct, indirect, consequential or other), however caused (including through negligence), which you may directly or indirectly suffer in connection with your use of this report and the contained data and conclusions, and expressly disclaims any and all liabilities contingent or otherwise that may arise from any such loss arising out of your use of or reliance on information contained on or accessed through this report. You agree that the above exclusion of liability confer a benefit on the entities or persons listed above and are enforceable by each of them in accordance with the contracts (Privity) Act 1982.

The issuing of this report is not a warranty or confirmation that the effluent storage system fully complies with any requirements of any relevant authority either as at the date of the issue of the plan or in the future. To the maximum extent permitted by law, any condition or warranty that would otherwise be implied into these terms and conditions is hereby excluded.

Appendices

Appendix 1 - Facility Layout



Figure 1 Layout of the facilities visually assessed.

Appendix 2 - Photos

Area 1 - Hypond located at Shed



Figure 2 Incoming pipe- no damage.



Figure 3 area behind the stirrer- no damage.



Figure 4 Minor damage behind effluent pump.



Figure 5 Stirrer frame, effluent pump and float switch



Figure 6 Interior panels of facility effluent pump, and float switch



Figure 7 Interior panels of facility



Figure 8 Interior panels of facility



Figure 9 Interior panels of facility



Figure 10 Interior panels of facility



Figure 11 Interior panels of facility



Figure 12 Interior panels of facility and stirrer frame



Figure 13 Wider view of facility



Figure 14 Wider view of facility

Thursday, 18 August 2021

Rural Environmental Solutions

Attention: Donna Corbin

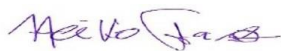
Regarding: Visual Assessment for the single hypond at Platinum Dairies Limited

I have reviewed the information and photos provided by the visual inspection of the single hypond at Platinum Dairies Limited.

The facilities on site appear to be in good working order with no damage visible that, in my opinion, would cause leakage into the surrounding environment. All visible seals and walls appear to be in good order.

Based upon my review of the photos, the report supplied by RES and the conditions stated in Rule 32D (a)(ii)(2)(a), I believe that these facilities have passed the visual inspection.

With nearly 20 years of experience in the water and wastewater industry where I started working as a draughtsman to process engineer and project manager for projects from small to large scale, including wastewater treatment ponds, and being a chartered professional engineer, I believe I am qualified to peer review this visual assessment.



Heiko FRANZ, CPEng
Principal
TREATMENT SOLUTIONS AND DESIGN

Thursday, 26 August 2021

Jared Collie
Platinum Dairies Limited
731 Benmore Otapiri Road
RD2
Winton 9782

Client Name: Platinum Dairies Limited
Supply Number: 31838
Authority Number: AUTH-302423
Client Code: PLA20225

Subject: Visual Assessment report for assessment of 3 standoff areas.

Dear Jared,

Thank you for engaging Donna Corbin t/a RES Rural Environmental Solutions (RES) to undertake visual assessments of facilities within your effluent system. The following areas have been assessed:

- Area 1: Barn & uncovered pad area (commonly known as bullpen area) located south-west of dairy shed – **discretionary activity - mitigations in place.**
- Area 2: Roofed calving barn with outside uncovered standoff area located to the north-west of the dairy shed – **permitted activity.**
- Area 3: Uncovered standoff pad area under hedgerow located south-west of dairy – **discretionary activity - mitigations in place.**

The visual assessment/s were requested as part of the requirements for renewing your resource consents.

The visual assessment has been undertaken to assess the facility against the requirements of Rule 35A(a) of the Proposed Southland Water and Land Plan, however, we have not assessed against Rules 35A(a)(iii)(2) and 35A(a)(v) of the Proposed Southland Water and Land Plan.

Photos for each facility are contained in Appendix 2.

A review of this assessment has not been undertaken by a CPENG Engineer as it is not required by the PSWLP.

Area 1: Barn & uncovered pad area (commonly known as bullpen area) located south-west of dairy shed (1242175 mE, 4870247 mN)

Inspection date:	Dimensions (Approximately):
9/07/2021	N/A - see surface area
Surface Area	Shape:
approximately 800m ²	rectangular roofed area, with triangular like uncovered area.
Construction Material:	Bedding material:
The north half of the roofed part of the facility appeared to have a concrete base. The south half of the roofed part of the facility appeared to have a compacted rock base. The outside, uncovered part of the facility has been constructed in August 2021 with topsoil being stripped, compacted rotten rock layers and at least 500mm of woodchip will be placed on top before the first use.	There appeared to be at least 100mm of woodchip across the base of the roofed facility. At least 500mm of woodchip material will be placed under the roofed area and on the outside area before the next use.

The following was noted by Donna Corbin from RES during the assessment:

- Stock in the facility:
 - There are a maximum of 120 cows in the facility at any one time. This is under the number allowed for a permitted activity under rule 35A(a)(i) of the Proposed Southland Water and Land Plan.
 - Animals do not remain on this pad for more than 3 continuous months. This is consistent with the period allowed for as a permitted activity under rule 35A(a)(ii) of the Proposed Southland Water and Land Plan.
- Sealed and impermeable base:
 - The north half of the roofed part of the facility appeared to have a concrete base. The south half of the roofed part of the facility appeared to have a compacted rock base. The outside, uncovered part of the facility has been constructed in August 2021 with photos supplied and discussion had with the consent holder, that the topsoil from the area was stripped away, layers of compacted rock were laid down and at least 500mm of woodchip will be placed on the area before the first use.
 - The consent holder stripped the topsoil from this area, placed rotten rock down and compacted it in place, then they will place at least 500mm of woodchip on top of the pad.
 - It is not possible to determine if the base is totally sealed and impermeable to the 10-9 m/s standard of the NES without further and evasive testing, however, the base is compacted and at least 500mm of woodchip material will be placed on top.
 - This is currently being mitigated as the north half of the roofed part of the facility appeared to be concrete which does meet the minimum permeability standard of 10 m/s under the NES. The south section of the roofed part of the facility has a base of well compacted rock with a layer of woodchip on top. The outside pad has been constructed with compact rotten rock and will have at least 500mm of woodchip placed on the pad before its first use.
 - This will be further mitigated by spreading a layer of 500mm of woodchip across the whole facility, both the roofed and uncovered areas.
 - Part of the facility also has a roof which provides shelter from rainfall and bad weather, this results in less potential for surface runoff from the roofed pad area.
- Minimum of 500mm of wood-based material:
 - There appeared to be at least 100mm of woodchip across the base of the roofed facility.
 - Currently the facility appeared to not have a minimum depth of 500mm of wood-based material across the base. However, before using the facility a layer of woodchip at least 500mm deep will be spread across the roofed and unroofed areas.
- Facility location/setbacks:

- The facility is not located within 50m of a sub-surface drain, lake, river (excluding ephemeral rivers), artificial watercourse, modified watercourse or natural wetland.
- The facility is not located within 50m of a water abstraction bore or coastal marine area.
- The facility is not located within 200m of a place of general assembly or dwelling not located on the property.
- The facility is not located within 20m of the boundary.
- The facility is not located within a critical source area.
- The facility is located within 50m of another feed pad/lot on the same landholding.
 - This facility is located with 50m of the uncovered standoff pad area (this is area 3 in this report).
 - This is currently being mitigated as there is a 40m separation distance with a row of trees in between, part of the pad is roofed and 500mm of woodchip material will be used on the whole of both facilities.
- Overland flow of stormwater or surface runoff from surrounding land:
 - There did not appear to be any overland flow of stormwater or surface runoff from surrounding land entering the facility.
 - Part of the facility also has a roof which provides shelter from rainfall and bad weather, this results in less potential for surface runoff from the pad.
 - There did not appear to be any evidence of surface runoff from the facility to the surrounding land.
- Effluent collected from the facility:
 - Effluent is not collected from the facility and is not stored in a sealed effluent storage system.
- Pits dug (to assess the base of the roofed facility):
 - Pit 1
 - The depth of this pit was approximately 100mm.
 - There appeared to be approximately 100mm of woodchip on top of a concrete base
 - Pit 2
 - The depth of this pit was approximately 200mm.
 - There appeared to be approximately 150mm of woodchip on top of a compacted stone and rock base.
 - Pit 3
 - The depth of this pit was approximately 100mm.
 - There appeared to be approximately 100mm of woodchip on top of a concrete base.
 - Without more extensive testing it could not be determined if the south base was compacted to 10-9 m/s required by the NES.
- Rule 35A(a) comments:
 - We have not assessed this facility against Rules 35A(a)(iii)(2) and 35A(a)(v) of the Proposed Southland Water and Land Plan.
 - It appears that the use of this facility does not meet all of the remaining conditions of Rule 35A(a) of the Proposed Southland Water and Land Plan and would be considered a discretionary activity under Rule 35A(b), it does not meet the following permitted activity rules:
 - 35A(a)(iii)(1) - The facility is located within 50m of another feed pad/lot on the same landholding.
 - NES: This is a non-complying activity, it does not meet the following discretionary activity rules:
 - Regulation 10(3)(a) - the base area of the feedlot must be sealed to a minimum permeability standard of 10-9 m/s.
 - However, this activity meets the remaining permitted activity conditions of rule 35A(a) of the PSWLP, except conditions:
 - Rule 35A(a)(iii)(1) - The facility is located within 50m of another feed pad/lot on the same landholding.
 - This is currently being mitigated as there is a 40m separation distance with a row of trees in between, part of the pad is roofed and 500mm of woodchip material will be used on the whole of both facilities.

- RES suggests the following mitigations be applied to the facility:
 - Spreading a layer of 500mm of woodchip across the whole facility, both the roofed and uncovered areas.

Based on the visual assessment of this structure undertaken by RES, the use of this structure appears to be a discretionary activity under Rule 35A(b) of the Proposed Southland Water and Land Plan. Although this is not a permitted activity with reasoning and mitigations already in place and the adoption of the mitigations recommended by RES, RES would ask that Environment Southland accept that any potential or actual effects be accepted as less than minor.

Based on the visual assessment of this structure undertaken by RES, the use of this structure appears to be a non-complying activity under Regulation 11 of the NES due to due to the base not being sealed to a minimum permeability standard of 10-9 m/s.

However, this activity meets the remaining permitted activity conditions of rule 35A(a) of the PSWLP, except conditions:

- Rule 35A(a)(iii)(1) - The facility is located within 50m of another feed pad/lot on the same landholding.
 - This is currently being mitigated as there is a 40m separation distance with a row of trees in between, part of the pad is roofed and 500mm of woodchip material will be used on the whole of both facilities.

As the facility appears to meet the remaining conditions of rule 35A(a) of the Proposed Water and Land Plan, any remaining actual or potential effects have already been assessed as less than minor during the plan process when setting Rule 35A of the plan.

Area 2: Roofed calving barn with uncovered standoff area located north-west of the diary shed (1241015 mE, 4870932 mN)

Inspection date:	Dimensions (Approximately):
9/07/2021	N/A - see surface area
Surface Area	Shape:
approximately 1560m ²	rectangular roofed area, with L shaped uncovered area that wraps around the north and east side of the roofed area
Construction Material:	Bedding material:
The eastern section of the roofed part of the barn appeared to have a well compacted dirt base with small gravel and some medium rock. The western section of the roofed part of the barn appeared to have a very well compacted dirt base. The outside area has been constructed with compacted lane material and will have 500mm of woodchip material in place before using it.	There appeared to be at least 100mm of woodchip across the facility. At least 500mm of woodchip material will be in place before the next use of this area.

The following was noted by Donna Corbin from RES during the assessment:

- Stock in the facility:
 - There are a maximum of 120 cows in the facility at any one time. This is under the number allowed for a permitted activity under rule 35A(a)(i) of the Proposed Southland Water and Land Plan.
 - Animals do not remain on this pad for more than 3 continuous months. This is consistent with the period allowed for as a permitted activity under rule 35A(a)(ii) of the Proposed Southland Water and Land Plan.
- Sealed and impermeable base:
 - The eastern section of the roofed part of the barn appeared to have a well compacted dirt base with small gravel and some medium rock. The western section of the roofed part of the barn appeared to have a very well compacted dirt base. The outside area has been constructed with compacted lane material and will have 500mm of woodchip material in place before using it.
 - This area was developed at the same time as the lanes and is compacted lane material.
 - It is not possible to determine if the base is totally sealed and impermeable to the 10-9 m/s standard of the NES without further and evasive testing, however, the base is compacted and at least 500mm of woodchip material will be placed on top.
 - This is currently being mitigated as part of the area is roofed with stormwater being diverted from the system.
 - This will be mitigated by spreading a layer of 500mm of woodchip across the whole of the facility both inside and outside the roofed area.
- Minimum of 500mm of wood-based material:
 - There appeared to be at least 100mm of woodchip across the roofed part of the facility.
 - Currently the facility appeared to not have a minimum depth of 500mm of wood-based material across the base. However, before using the facility a layer of woodchip at least 500mm deep will be spread across the facility.
- Facility location/setbacks:
 - The facility is not located within 50m of a sub-surface drain, lake, river (excluding ephemeral rivers), artificial watercourse, modified watercourse or natural wetland.
 - The facility is not located within 50m of a water abstraction bore or coastal marine area.
 - The facility is not located within 200m of a place of general assembly or dwelling not located on the property.
 - The facility is not located within 20m of the boundary.
 - The facility is not located within a critical source area.

- The facility is not located within 50m of another feed pad/lot on the same landholding.
- Overland flow of stormwater or surface runoff from surrounding land:
 - There did not appear to be any overland flow of stormwater or surface runoff from surrounding land entering the facility.
 - There did not appear to be any evidence of surface runoff from the facility to the surrounding land.
- Effluent collected from the facility:
 - Effluent is not collected from the facility and is not stored in a sealed effluent storage system.
- Pits dug (to assess the base of the roofed part of the facility):
 - Pit 1
 - The depth of this pit was approximately 200mm.
 - This pit appeared to a very compacted dirt base with a layer of wood chip on top.
 - Pit 2
 - The depth of this pit was approximately 200mm.
 - This pit appeared to a very compacted dirt base with a layer of wood chip on top.
 - Without more extensive testing it could not be determined if the base was compacted to 10-9 m/s required by the NES.
- Rule 35A(a) comments:
 - We have not assessed this facility against Rules 35A(a)(iii)(2) and 35A(a)(v) of the Proposed Southland Water and Land Plan.
 - It appears that the use of this facility meets the remaining conditions of Rule 35A(a) of the Proposed Southland Water and Land Plan and would be considered a permitted activity.
 - NES: This is a non-complying activity, it does not meet the following discretionary activity rules:
 - Regulation 10(3)(a) - the base area of the feedlot must be sealed to a minimum permeability standard of 10-9 m/s.
 - However, this activity meets the permitted activity conditions of rule 35A(a) of the PSWLP.
 - RES suggests the following mitigations be applied to the facility:
 - Spreading a layer of 500mm of woodchip across the whole facility, both the roofed and uncovered areas.

Based on the visual assessment of this structure undertaken by RES, the use of this structure appears to be a permitted activity under Rule 35A(a) of the Proposed Southland Water and Land Plan.

Based on the visual assessment of this structure undertaken by RES, the use of this structure appears to be a non-complying activity under Regulation 11 of the NES due to the base not being sealed to a minimum permeability standard of 10-9 m/s. However, this activity meets the permitted activity conditions of rule 35A(a) of the PSWLP, with any actual or potential effects having already been assessed as less than minor during the plan development process.

Area 3: Uncovered standoff pad area under hedgerow located south-west of dairy shed (1242178 mE, 4870308 mN)

Inspection date:	Dimensions (Approximately):
9/07/2021	52m long x 24.9m wide
Surface Area	Shape:
approximately 1295m ²	Rectangle
Construction Material:	Bedding material:
Woodchip over compact compacted rock or lane material base. At least 1 line of Nova Flow drainage in the northern 1/3 of the pad to drain to the sump at the east of the pad.	There appeared to be a layer of old woodchip across the facility, there was also several piles of new woodchip ready to spread across the facility.

The following was noted by Donna Corbin from RES during the assessment:

- Stock in the facility:
 - There are a maximum of 120 cows in the facility at any one time. This is under the number allowed for a permitted activity under rule 35A(a)(i) of the Proposed Southland Water and Land Plan.
 - Animals do not remain on this pad for more than 3 continuous months. This is consistent with the period allowed for as a permitted activity under rule 35A(a)(ii) of the Proposed Southland Water and Land Plan.
- Sealed and impermeable base:
 - The base appeared to be woodchip over compacted rock material.
 - The base of the facility slopes from the south to the north 1/3 of the facility and the northern 1/3 slopes towards the east sump.
 - The compacted rock base is built up from the north-west end to slope to the north-east corner to collect in a small sump (under 35m³ in volume). Liquid is pumped over to the main pond from the sump. The base has at least one nova flow drain in it along the north third of the pad that drains directly to the sump.
 - It is not possible to determine if the base is totally sealed and impermeable to the 10-9 m/s standard of the NES without further and evasive testing, however, the base is compacted and at least 500mm of woodchip material will be placed on top.
 - This is currently being mitigated as part of the facility is well protected from rainfall and weather by the large hedgerow, there will be 500mm of woodchip material in place before use, the base of the pad slopes towards the northeast corner and there is nova flow drainage installed under the northern 1/3 of the base, that drains to the collection sump.
- Minimum of 500mm of wood-based material:
 - There appeared to be a layer of old woodchip across the facility, there was also several piles of new woodchip ready to spread across the facility.
 - Currently the facility appeared to not have a minimum depth of 500mm of wood-based material across the base. However, before using the pad a layer of woodchip at least 500mm spread across the pad.
- Facility location/setbacks:
 - The facility is located within 50m of a sub-surface drain, lake, river (excluding ephemeral rivers), artificial watercourse, modified watercourse or natural wetland.
 - This is currently being mitigated as the compacted rock base has been built up from the north-west end to slope to the north-east corner to collect in a small sump. Liquid is pumped over to the main pond from the sump. The base has at least one nova flow drain in it along the north third of the pad that drains directly to the sump.
 - This will be further mitigated by bunding along the full west side of the pad and from the northwest side at least 20m of bunding constructed. Bunding to be at least 200mm high.
 - The facility is not located within 50m of a water abstraction bore or coastal marine area.

- The facility is not located within 200m of a place of general assembly or dwelling not located on the property.
- The facility is not located within 20m of the boundary.
- The facility is not located within a critical source area.
- The facility is located within 50m of another feed pad/lot on the same landholding.
 - This facility is located with 50m of the Barn & uncovered pad area (commonly known as bullpen area) (this is area 1 in this report).
 - This is currently being mitigated as the other facility is at least 40m away, each facility will have at least 500mm of woodchip on top of the base, hedgerow in between the facilities and this facility drains to a sump and is pumped to the main effluent pond.
- Overland flow of stormwater or surface runoff from surrounding land:
 - There did not appear to be any overland flow of stormwater or surface runoff from surrounding land entering the facility.
 - There did not appear to be any evidence of surface runoff from the facility to the surrounding land.
- Effluent collected from the facility:
 - Effluent is not collected from the facility and is not stored in a sealed effluent storage system.
- Pits dug (to assess the base of the facility):
 - Pit 1
 - The depth of this pit was approximately 100mm.
 - The pit appeared to show a layer of around 50mm of old woodchip with a layer of around 50mm of stones.
 - Pit 2
 - The depth of this pit was approximately 100mm.
 - The pit appeared to show a layer of around 50mm of old woodchip with a layer of around 50mm of stones.
 - Without more extensive testing it could not be determined if the base was compacted to 10-9 m/s required by the NES.
- Rule 35A(a) comments:
 - We have not assessed this facility against Rules 35A(a)(iii)(2) and 35A(a)(v) of the Proposed Southland Water and Land Plan.
 - It appears that the use of this facility does not meet all of the remaining conditions of Rule 35A(a) of the Proposed Southland Water and Land Plan and would be considered a discretionary activity under Rule 35A(b), it does not meet the following permitted activity rules:
 - 35A(a)(iii)(1) - The facility is located within 50m of a sub-surface drain, lake, river (excluding ephemeral rivers), artificial watercourse, modified watercourse or natural wetland.
 - 35A(a)(iii)(1) - The facility is located within 50m of another feed pad/lot on the same landholding.
 - NES: This is a non-complying activity, it does not meet the following discretionary activity rules:
 - Regulation 10(3)(a) - the base area of the feedlot must be sealed to a minimum permeability standard of 10-9 m/s
 - Regulation 10(3)(c) - the feedlot must be at least 50m away from any water body, any water abstraction bore, and drain, and the coastal marine area
 - However, this activity meets the remaining permitted activity conditions of rule 35A(a) of the PSWLP, except:
 - Rule 35A(a)(iii)(1) - The facility is located within 50m of a sub-surface drain, lake, river (excluding ephemeral rivers), artificial watercourse, modified watercourse or natural wetland.
 - This is currently being mitigated as the compacted rock base has been built up from the north-west end to slope to the north-east corner to collect in a small sump. Liquid is pumped over to the main pond from the sump. The base has at

- least one nova flow drain in it along the north third of the pad that drains directly to the sump.
- The sump collection is pumped to the effluent pond for storage and disposal to land.
- This will be mitigated by bunding along the full west side of the pad and from the northwest side at least 20m of bunding constructed. Bunding to be at least 200mm high.
- Rule 35A(a)(iii)(1) - The facility is located within 50m of another feed pad/lot on the same landholding.
 - This is currently being mitigated as the other facility is at least 40m away, each facility will have at least 500mm of woodchip on top of the base, hedgerow in between the facilities and this facility drains to a sump and is pumped to the main effluent pond.
 - Collection from the pad is being pumped from the sump to the main effluent pond.
- RES suggests the following mitigations be applied to the facility:
 - Constructing bunding along the full west side of the pad and from the northwest side constructing at least 20m of bunding. Bunding to be at least 200mm high.

Based on the visual assessment of this structure undertaken by RES, the use of this structure appears to be a discretionary activity under Rule 35A(b) of the Proposed Southland Water and Land Plan. Although this is not a permitted activity with reasoning and mitigations already in place and the adoption of the mitigations recommended by RES, RES would ask that Environment Southland accept that any potential or actual effects be accepted as less than minor.

Based on the visual assessment of this structure undertaken by RES, the use of this structure appears to be a non-complying activity under Regulation 11 of the NES due to the base not being sealed to a minimum permeability standard of 10⁻⁹ m/s and the feedlot being within 50m away from any water body, any water abstraction bore, and drain, and the coastal marine area.

However, this activity meets the remaining permitted activity conditions of rule 35A(a) of the PSWLP, except conditions:

- Rule 35A(a)(iii)(1) - The facility is located within 50m of a sub-surface drain, lake, river (excluding ephemeral rivers), artificial watercourse, modified watercourse or natural wetland.
 - This is currently being mitigated as the compacted rock base has been built up from the north-west end to slope to the north-east corner to collect in a small sump. Liquid is pumped over to the main pond from the sump. The base has at least one nova flow drain in it along the north third of the pad that drains directly to the sump.
 - This will be mitigated by bunding along the full west side of the pad and from the northwest side at least 20m of bunding constructed. Bunding to be at least 200mm high.
- Rule 35A(a)(iii)(1) - The facility is located within 50m of another feed pad/lot on the same landholding.
 - This is currently being mitigated as the other facility is at least 40m away, each facility will have at least 500mm of woodchip on top of the base, hedgerow in between the facilities and this facility drains to a sump and is pumped to the main effluent pond.

As the facility appears to meet the remaining conditions of rule 35A(a) of the Proposed Water and Land Plan, any remaining actual or potential effects have already been assessed as less than minor during the plan process when setting Rule 35A of the plan.

If you have any questions relating to the information contained in the document please do not hesitate to contact me on 027 890 1234 or donna@res.kiwi.nz. Thank you.

Yours Faithfully,



Donna Corbin
Environmental Consultant
RES Rural Environmental Solutions

DISCLAIMER

The data and conclusions within this report are based upon the data collected onsite and the visual assessment undertaken on the facility. While every endeavour has been undertaken to ensure that the information collected is accurate and reflects how the facility was constructed and is managed, RES has based its observations on small test pits, a non-intrusive visual assessment and information relayed by the consent holder or their representative.

No guarantee is given or implied by the issuing of this report. No visual assessment as the structural integrity, design or suitability of the structure has been undertaken or implied.

While reasonable endeavours have been made to ensure the accuracy of the information contained in this Report, Donna Corbin TA RES Rural Environmental Solutions does not accept responsibility for any loss or damage (whether direct, indirect, consequential or other), however caused (including through negligence), which you may directly or indirectly suffer in connection with your use of this report and the contained data and conclusions, and expressly disclaims any and all liabilities contingent or otherwise that may arise from any such loss arising out of your use of or reliance on information contained on or accessed through this report. You agree that the above exclusion of liability confer a benefit on the entities or persons listed above and are enforceable by each of them in accordance with the contracts (Privity) Act 1982.

The issuing of this report is not a warranty or confirmation that the effluent storage system fully complies with any requirements of any relevant authority either as at the date of the issue of the plan or in the future. To the maximum extent permitted by law, any condition or warranty that would otherwise be implied into these terms and conditions is hereby excluded.

Appendices

Appendix 1 - Facility Layout

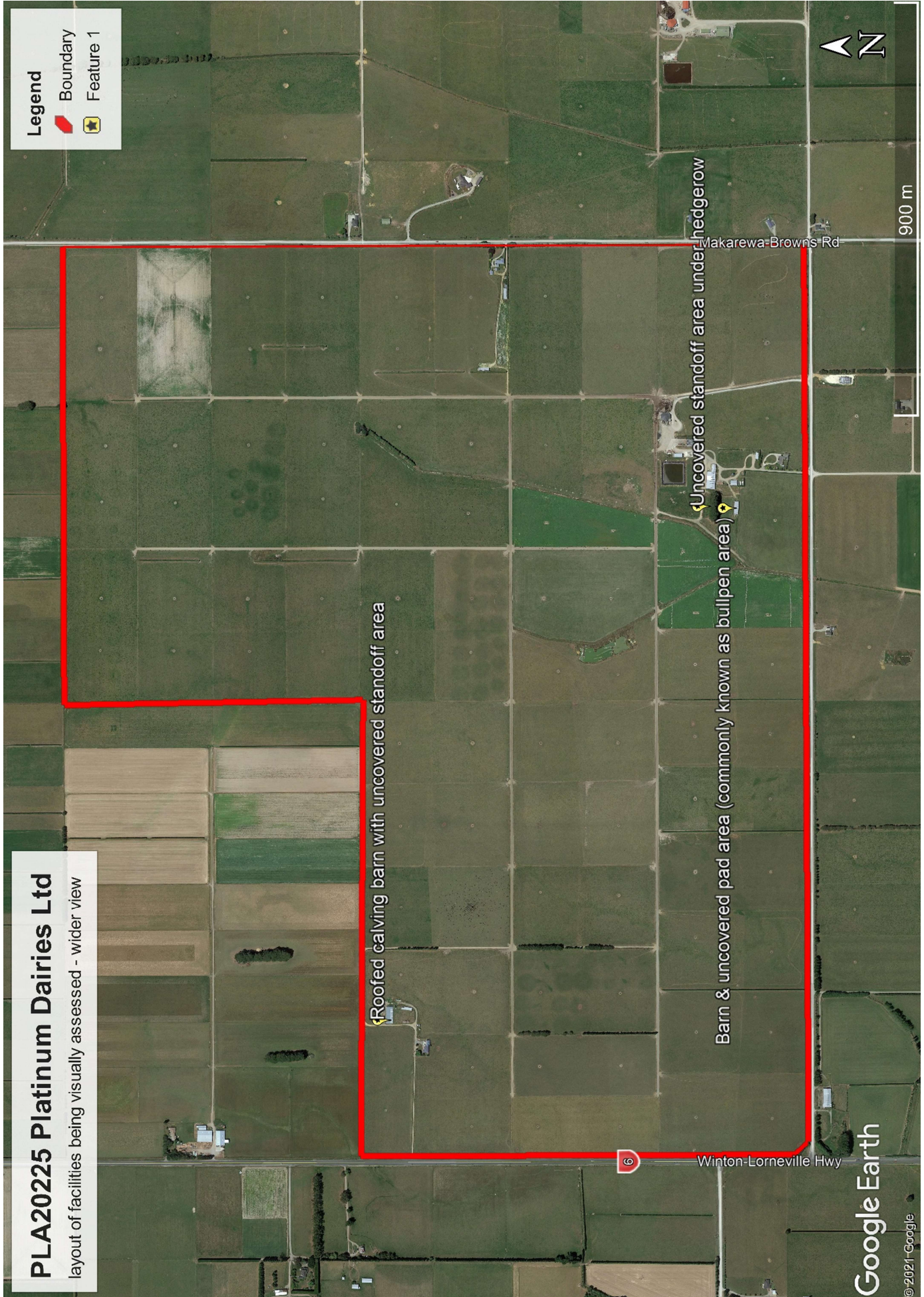
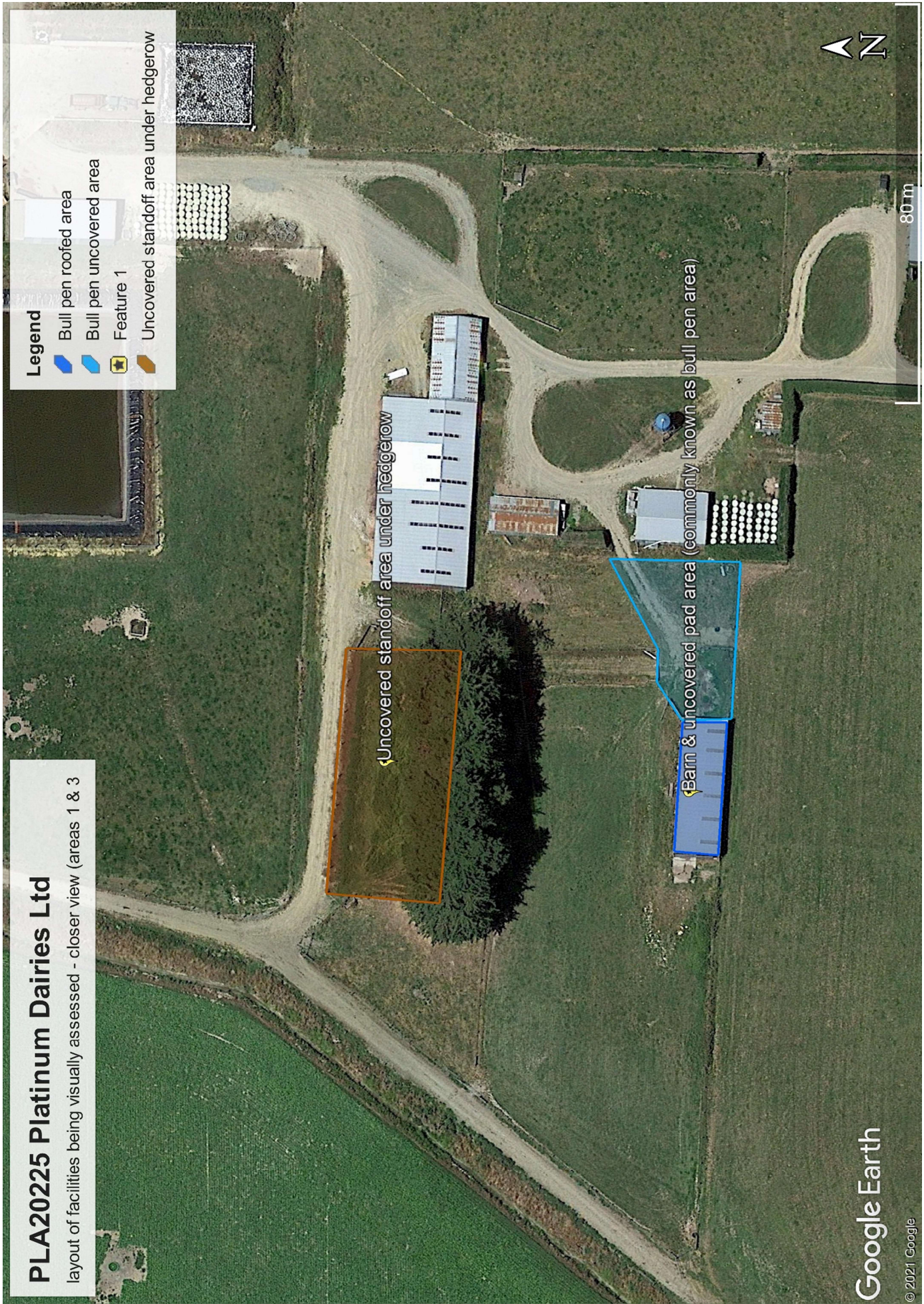


Figure 1 Layout of the facilities visually assessed – wider view.



PLA20225 Platinum Dairies Ltd

layout of facilities being visually assessed - closer view (areas 1 & 3)

Figure 2 Layout of the facilities visually assessed – closer view (areas 1 & 3).

PLA20225 Platinum Dairies Ltd

layout of facilities being visually assessed - closer view (area 2)



Legend





-  Boundary
-  Roofed calving barn
-  Roofed calving barn with uncovered standoff area
-  Uncovered standoff area

Figure 3 Layout of the facilities visually assessed – closer view (area 2).

Appendix 2 - Photos

Area 1 – Barn & uncovered pad area (commonly known as bullpen area) located southwest of dairy shed



Figure 4 Pit dug in the north half of the roofed area showing layer of woodchip on top of a concrete base.



Figure 5 Pit dug in the south half of the roofed area showing layer of woodchip on top of a compacted rock base.



Figure 6 Pit dug in the south half of the roofed area showing layer of woodchip on top of a compacted rock base.



Figure 7 Pit dug in the north half of the roofed area showing layer of woodchip on top of a concrete base.



Figure 8 View of the roofed area of the facility looking north-west showing the roof and layer of woodchip across the facility.



Figure 9 View of the roofed area looking south-west showing the roof and layer of woodchip across the facility.



Figure 10 View of the compacted rock base of uncovered area looking south-west (photo supplied by consent holder).



Figure 11 View of the compacted rock base of uncovered area looking south-west (photo supplied by consent holder).



Figure 12 View of the compacted rock base of uncovered area looking south (photo supplied by consent holder).



Figure 13 View of the compacted rock base of uncovered area looking east (photo supplied by consent holder).



Figure 14 View of the compacted rock base of uncovered area looking south-west (photo supplied by consent holder).



Figure 15 View of the uncovered area looking south-west with the topsoil stripped ready for placement of compacted rock (photo supplied by consent holder).



Figure 16 View of the uncovered area looking east with the topsoil stripped ready for placement of compacted rock (photo supplied by consent holder).



Figure 17 View of the uncovered area looking south-west with the topsoil stripped ready for placement of compacted rock (photo supplied by consent holder).



Figure 18 View of the uncovered area looking south with topsoil stripped ready for placement of compacted rock (photo supplied by consent holder).

Area 2 – Roofed calving barn with uncovered standoff area located north-west of the diary shed



Figure 19 Pit dug in western section of roofed area showing compacted dirt base.



Figure 20 View of the roofed area of the facility looks south-west showing the roof and layer of woodchip across the base of the facility.



Figure 21 Pit dug in eastern section of the roofed area showing compacted dirt base with some medium rock.



Figure 22 View of the facility looking north-west showing the roof and woodchip spread across the base of the facility.



Figure 23 View of the uncovered area of the facility showing the lane material which was used to construct the base of the uncovered area.



Figure 24 View of the uncovered area of the facility showing the lane material which was used to construct the base of the uncovered area.

Area 3 – Uncovered standoff pad area under hedgerow located south-west of dairy shed



Figure 25 View of facility looking south-east showing the hedgerow and compacted rock base.



Figure 26 View of facility looking east showing woodchip ready to spread, the rock base and the hedgerow along the south edge of the facility.



Figure 27 View of facility looking north-west showing the stream to the west of the facility and piles of woodchip ready to spread.



Figure 28 Pit dug showing compacted rock base.



Figure 29 View of facility looking east showing the piles of woodchip ready to spread and the sheltered area under the hedgerow.



Figure 30 Pit dug showing compacted rock base.



Figure 31 View of facility looking west showing the layer of woodchip spread across the base of the facility (photo supplied by consent holder).



Figure 32 View of facility looking south-west showing the layer of woodchip spread across the base of the facility (photo supplied by consent holder).



Figure 33 View of facility looing west showing where more compacted rock has been placed ready for woodchip to be spread (photo supplied by consent holder).



Figure 34 View of north-east corner of the facility looking north-east showing compacted rock base ready for woodchip to be spread (photo supplied by consent holder).



Figure 35 View of facility looking west showing compacted rock base ready for woodchip to be spread (photo supplied by consent holder).



Figure 36 View of north-west corner of the facility looking west showing rock placed on the base of the facility ready to be compacted (photo supplied by consent holder).