35225

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

SUPPLIER NUMBER

35225

FARM OWNER

Paul Turner Farm Trust

1633 Wreys Bush Mossburn Road
RD 1
Otautau 9689

PLAN OWNER

Paul Ernest Turner

+64 27 3055843

paulandkayleen@farmside.co.nz

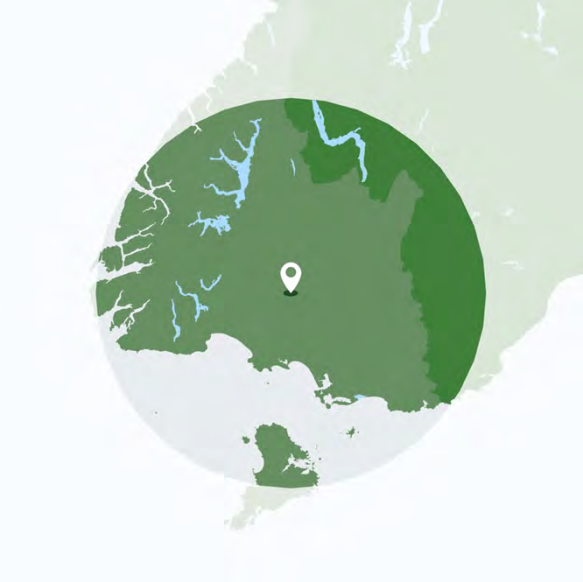
1633 Wreys Bush - Mossburn Road RD 1
Otautau 9689

FARM ADDRESS

SINCLAIR RD

Otautau

LOCATION



REGIONAL COUNCIL

Southland

PLAN LAST EDITED

18 February 2025

POINTS OF NOTE

Plan Developer: Cain Duncan
Additional Farm Owners: Kayleen Turner
Owner Contact Email: paulandkayleen@farmside.co.nz
Owner Contact Number: 027 305 5843

LAND PARCELS

Fee Simple, 1/1, Lot 1 Deposited Plan 6203
Fee Simple, 1/1, Lot 2 Deposited Plan 608014

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

GOOD FARMING PRACTICES

This section provides an overall snapshot of the Dairy Tomorrow Good Farming Practices.

FARM MANAGEMENT

The characteristics of the farm and the farm system are identified		ACHIEVED
A risk assessment of the farms inherent and management activity risks is undertaken		ACHIEVED
Accurate and auditable records are kept of annual farm inputs, outputs and management practices		ACHIEVED
Fertiliser is stored and loaded to minimise the risk of spillage and losses to waterways and groundwater		ACHIEVED
Feed is stored, transported and fed to minimise wastage, leachate and soil damage		ACHIEVED
Farm waste is minimised		ACHIEVED
Hazardous substances (agrichemicals and fuel) are stored, handled, used and disposed of to avoid contamination of waterways and groundwater		ACHIEVED

LAND & SOIL MANAGEMENT

Cultivation is managed to reduce the risk of sediment loss and maintain soil structure		ACHIEVED
Erosion-prone land is managed or retired to minimise soil losses		N/A
Grazing of pastures and crops is managed to minimise sediment and contaminant loss		ACHIEVED
Paddocks selected for Intensive Winter Grazing (including intensive baleage wintering) are low risk and managed to minimise the risk of erosion, run-off to waterways and leaching to groundwater		N/A
Critical Source Areas and farm Hot Spots are identified and managed to minimise contaminant losses to waterways		2 ACTION(S)

 indicates the achievement of the Good Farming Practice will also impact Greenhouse Gas Emissions

GOOD FARMING PRACTICES

WATER USE & IRRIGATION MANAGEMENT

Dairy shed and stock water use is efficient and prevents source contamination		ACHIEVED
The depth, rate and timing of irrigation is managed to meet plant demand and minimise the risk of leaching and run-off		N/A
The irrigation system is designed, operated and regularly checked to minimise the amount of water applied to meet plant demand, and prevent microbial contamination		N/A

EFFLUENT MANAGEMENT

Effluent and manure are applied at depths, rates and amounts that match plant requirements and minimise the loss of nutrients or microbial pathogens to waterways and groundwater		ACHIEVED
The effluent system is designed, operated and regularly checked to minimise the risk of nutrient and microbial pathogen loss to waterways and groundwater, and to prevent microbial contamination		1 ACTION(S)

WATERWAYS & BIODIVERSITY

Stock is excluded from lakes and waterways		ACHIEVED
Farm indigenous biodiversity and Mahinga Kai values are identified and protected		4 ACTION(S)

NUTRIENT MANAGEMENT

Soil phosphorus levels are monitored and maintained below or within the target ranges for the soil-type and crop		1 ACTION(S)
The amount and timing of fertiliser inputs, takes account of all sources of nitrogen and phosphorus, matches plant requirements and minimises losses to waterways and groundwater		1 ACTION(S)
Fertiliser spreading equipment is maintained and calibrated		ACHIEVED

GREENHOUSE GAS EMISSIONS

Farm greenhouse gas emissions are known, and a plan is in place to reduce or offset them, that also considers adaptation to climate change		ACHIEVED

 indicates the achievement of the Good Farming Practice will also impact Greenhouse Gas Emissions

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 Leading Practice actions (beyond GFP) or are actions, which are not related to a GFP.

CURRENT ACTIONS

	Target Date
☐ ⚠ ALL - LUs Map Known Tile Drains	06 Sep 2024
☐ ⚠ All LUs - Protect In-Stream and Riparian Habitat when undertaking Waterway Maintenance	01 Nov 2024
☐ ⚠ All LUs - Investigate & where practicable implement outlined nitrogen efficency strategies	26 Oct 2026
☐ ⚠ All LUs - Test Application Rate of Pods and Raingun	26 Oct 2026
☐ ⚠ All LUs - Extend Riparian Margins where Critical Source Areas enter Waterways	26 Oct 2026
☐ ⚠ All LUs - (L7)Slope Lane away from Waterway During Routine Maintenance	26 Oct 2026

FUTURE ACTIONS

	Target Date
☐ ⚠ All LUs - Adjust P application rates so Olsen P is maintained within the Agronomic optimum	26 Oct 2027
☐ ⚠ All LUs - Develop a Riparian Planting Plan	26 Oct 2027
☐ ⚠ All LUs - Investigate tile drain treatment methods	26 Oct 2028

RECOMMENDATIONS

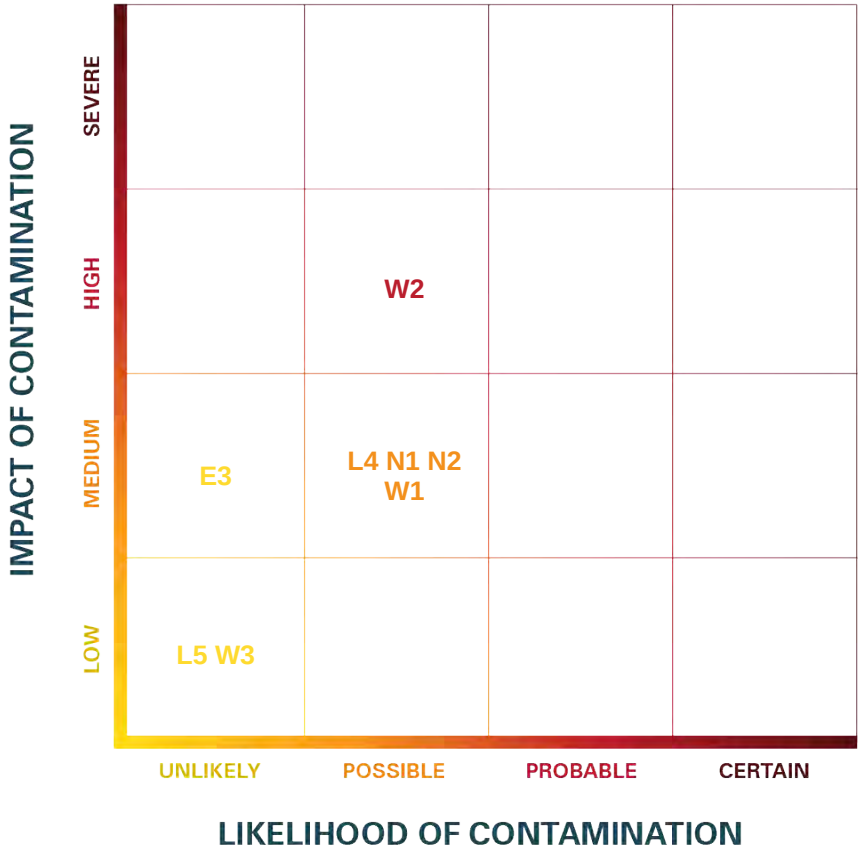
	Target Date
☐ REG - Submit Nitrogen Fertiliser Records to the Regional Council Annually (31st July)	31 Jul 2025

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:

MAHI WHAKAHAERE
FARM MANAGEMENT

F1 Farm Environment Plan Objectives - Catchment Context - Aparima/Pourakino

F2 Farm Overview - Farm Overview and Benchmark

F3 Infrastructure, storage, waste Overview

F4 Resource Consents

F5 Key Feature - Dairy Shed

F6 Key Feature - Bore D45/0037

FARM MANAGEMENT

GOOD FARMING PRACTICES

The characteristics of the farm and the farm system are identified Practices: The property and farm enterprise details are recorded, including management and ownership structure A map(s) or aerial photograph of the farm is produced at a scale that clearly shows • Key infrastructure • Natural features • Cultural sites	ACHIEVED
A risk assessment of the farms inherent and management activity risks is undertaken Practices: Risk factors to water quality associated with the landscape and farm system have been assessed and are managed appropriately	ACHIEVED
Accurate and auditable records are kept of annual farm inputs, outputs and management practices Practices: Accurate and auditable records of annual farm inputs, outputs and management practices are maintained that support the actions being undertaken to achieve the Dairy Good Farming Practices and reduce any additional risks identified through the risk assessment	ACHIEVED
Fertiliser is stored and loaded to minimise the risk of spillage and losses to waterways and groundwater Practices: The Fertiliser Industry - Code of Practice for Fertiliser handling, storage and use is followed Fertiliser storage sites are: • Located away from waterways or areas prone to flooding • Well ventilated with adequate lighting • Appropriately signed • Able to contain a spillage and provide secondary containment where appropriate Stored fertiliser is covered	ACHIEVED
Feed is stored, transported and fed to minimise wastage, leachate and soil damage Practices: Feed is stored: • at least 50 metres away from waterways • away from community drinking-water protection zone • away from critical source areas Any feed with the potential to create leachate is stored on hard-sealed or compacted areas Rainfall run-off is diverted to land 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 all run-off is collected and applied to land via the effluent system Feed-out areas are located away from critical source areas	ACHIEVED

FARM MANAGEMENT

Soil damage from feeding-out is minimised	
Farm waste is minimised Practices: A waste minimisation system is in place which prioritises waste reduction, and where this is not possible focuses on reuse and recycling Recyclable material is recycled (e.g., scrap metal, baleage wrap, agrichemical containers, tyres, paint, oil, batteries, and other hazardous substances) There is no burning of waste on farm All inorganic, non-recyclable waste is contained and removed from farm Dead animals are sent off farm for processing or correctly disposed on-farm Pests are controlled around feed storage and waste infrastructure	ACHIEVED
Hazardous substances (fertilisers, agrichemicals and fuel) are stored, handled, used and disposed of to avoid contamination of waterways and groundwater Practices: All hazards are identified, and staff made aware of these and how they are to be managed A Certified Handler certificate is held if Class 6.1A or 6.1 B are stored or used on site by farm staff Appropriate Personal Protective Equipment is made available, well-maintained, and worn Procedures are in place for managing emergencies Fertilisers, agrichemicals, and fuels are stored separately Applications follow the Safety Data Sheet (SDS) conditions and are only when weather conditions are suitable Re-entry and witholding periods are adhered to Storage locations are: • Located away from waterways or areas prone to flooding • Well ventilated with adequate lighting • Appropriately signed • Able to contain a spillage and provide secondary containment where appropriate • Agrichemicals are stored in containers constructed of non-flammable material	ACHIEVED

*Additional GFP relevant to the dairy industry goals

FARM MANAGEMENT

CATCHMENT CONTEXT - APARIMA/POURAKINO

F1

The farm is located within the Opio Stream and Aparima River catchments which sit within the wider Aparima/Pourakino Freshwater Management Unit (FMU). No sub-catchment plan exists for the Opio Stream and Aparima River catchments.

The rules contained within the Southland Water and Land Plan (SWLP), the NES Freshwater and Stock Exclusion Regulations apply to the farm, as well as the Fonterra Farmer Terms of Supply.

The key freshwater issues relevant to the catchment are:

- Nitrogen contamination of groundwater, rivers, streams, and Jacobs Estuary.
- High levels of groundwater nitrogen contamination in the Central Plains and Wreys Bush area.
- Excessive sediment and phosphorus loads in some lowland waterbodies resulting in accumulations with Jacob River Estuary.
- Animal and human faecal contamination of some lowland waterbodies.
- Declining ecosystem health (indicated by MCI score trends) at multiple river sites.
- Fish passage
- Wetland loss

Cultural aspects relevant to the catchment are:

- Threats to culturally significant indigenous species such as kanakana (lamprey) tuna (eels), and īnanga (whitebait), including loss of habitat to support these species.

The SWLP identifies the Aparima/Pourakino catchment as 'Degraded'. Actions in this plan must demonstrate a reduction in contaminants, being nitrogen, sediment and E.coli, that are contributing to this 'Degraded' status.

There are no know cultural sites of significance on or downstream of the property, however the community sites of Otautau and Riverton are downstream of the farm.

The key risk areas for the farm that may contribute to the catchments freshwater issues are:

- Areas of poorly drained soil (gleyed land unit) where contaminants such as nitrogen, sediment and E.coli are lost to surface water via artificial drainage or overland flow through critical source areas directly to tributaries of the Opio Stream and Aparima River.

- A small section of the farm (central plains land unit) is subject to nitrogen, phosphorus, sediment and E.coli losses via artificial drainage to surface water when conditions are wet and losses to the underlying aquifer during dry conditions through extensive soil cracking.

FARM MANAGEMENT

Contaminant losses from the property will mainly impact downstream surface water quality and the abundance and safety of mahinga kai and other freshwater species.

Nitrogen	Phosphorus	Sediment	*E. coli*
Large	Some	Moderate	Large

Key*	
Some	< 20% Reduction
Moderate	< 50% Reduction
Large	> 50% Reduction

*amount of reduction required to support hauora outcomes

FARM MANAGEMENT

FARM OVERVIEW AND BENCHMARK

F2

Paul Turner Farm Trust operate a 160ha dairy farm located at 237 Sinclair Road. The 47ha of the dairy farm that was previously leased has now been purchased (August 2024). Paul and Kayleen Turner are primary business contacts for the Trust with day to day management being undertaken by the farm manager, Jordan Wiseman. The property has been owned by the Paul Turner Farm Trust since 2021.

Changes are being proposed to the property boundaries to remove an area of the dairy platform (22ha) located on the western side of Nightcaps Opio Road and to add an additional 44ha of land that was previously leased (currently used as a run-off for the Paul Turner Farm Trust) and 35ha of recently acquired sheep and beef land. This will increase the total farm size to 217ha all owned by the Trust. This plan is based on the proposed farm system moving forward.

A maximum of 550 cows (pending obtaining resource consent) will be milked on the property through a 32 aside herringbone dairy shed. Two new wintering facilities are being added to the property (1 complete) that will allow all cows to be wintered on farm (other than youngstock and in-calf heifers). The facilities are self-feed silage pads (concrete) with external feed lanes for other supplements, full effluent collection, and a loafing area with rubber matting. Young stock are reared off farm at the owners home farm block. A rotating cut and carry block will circulate through the property (approximately 76ha) providing around 530T (DM) of silage for utilisation on the wintering facilities and on other properties owned by the Trust.

The farm is located within the Opio Stream and Aparima River surface water catchments, which form part of the larger Aparima/Pourakino catchment. To the east the farm has a tributary of the Aparima River running through it.

The key contaminant risks on the farm are nitrogen, sediment and E.coli losses to surface water via artificial drainage or overland flow through critical source areas directly to tributaries of the Opio Stream and Aparima River. A small section of the farm is subject to nitrogen, phosphorus, sediment and E.coli losses via artificial drainage to surface water when conditions are wet and losses to the underlying aquifer during dry conditions through extensive soil cracking.

Land uses that occur on the property are restricted to dairy farming.

This Farm Environment Plan is designed to:

- Provide an overview of the farm, farming practices and infrastructure.
- Summarise the catchment context and landscape the farm sits within.
- Identify environmental risks on the property and the land units they apply to.
- Outline how instream and riparian habitat values will be maintained or improved, including when flood conveying (drain/waterway cleaning) is being carried out.
- Address any issues relating to the Fonterra Terms of Supply including compliance with national environmental standards or regional council rules.
- List industry Good Farming Practices as either achieved or needing to be actioned.
- Identify efficiency improvement opportunities to reduce your Green House Gas (GHG) emission intensity and overall environmental footprint.

FARM MANAGEMENT

• Identify other areas that can be investigated to lower or offset absolute GHG emissions.

Benchmarked Farming Activities	Expanded Dairying Resource Consent Application (2024) and Associated OverseeFM Farm System Modelling Report - July 2024
FEMP Purpose Statement	This FEMP contributes to the management of Southland's water and land resources under the Southland Water and Land Plan (the SWLP) which embodies ki uta ki tai and upholds Te Mana o Te Wai. These concepts are to be at the forefront of water and land management in the FEMP

FARM MANAGEMENT

INFRASTRUCTURE, STORAGE, WASTE OVERVIEW

F3

Dairy Shed

The farm dairy is a 32-aside herringbone dairy shed. Nib walls and sumps allow full capture of effluent from the yard and shed. Roof water is diverted away from the effluent system.

Waste

Currently all farm and household rubbish are either recycled or disposed of off farm. Farm/dairy shed waste is disposed of in a skip on the property. The farm is using the Plasback scheme which recycles silage and baleage wrap. Dead cows are being disposed of on farm in an offal pit.

Silage Storage / Loafing Pad

The farm has moved to utilising silage as a significant source of winter feed. This is stored on a newly built self-feed silage pad and associated cow loafing area. The area is concrete with effluent contained and collected in grates between the silage stack and the loafing area. This is stored in 3m wide by 3m deep bunkers along the side of the facility, which also has a piped overflow into the main effluent pond. The facility is set up so a flood wash can be installed in the future if required, however cleaning is currently undertaken 2 times per week via scraping, which is working well. The loafing area has been sized to allow sufficient space for cows to lie down (6m2/cow) and has rubber matting for cow comfort. The facility can hold 200 cows. A second facility is being constructed shortly allowing all cows (other than young stock and in-calf heifers) to be wintered on farm.

Supplement Storage

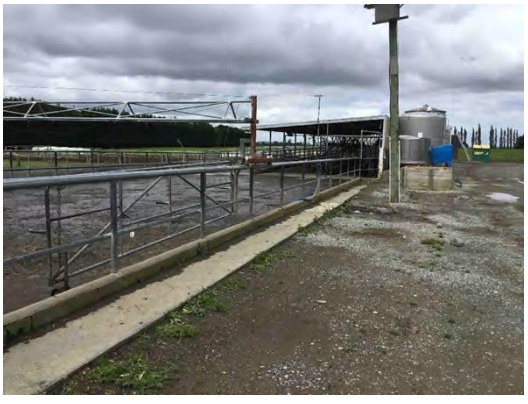
Supplements (PKE) is fed in paddock and on the loafing pad. The storage for the supplements is in silos by the farm sheds. The storage area is away from waterways and covered to protect feed.

Fertiliser Storage

Fertiliser is being stored in a covered concrete bunker by the farm sheds. The storage area is located away from waterways.

Fuel Tanks

Fuel is stored in an above ground tank which is located by the farm sheds. There were no signs of leakage or significant spillage. Due to the small size to the tanks and their location, they pose a low risk.



FARM MANAGEMENT

FARM MANAGEMENT

RESOURCE CONSENTS

F4

The dairy farm holds three resource consents, to abstract water for dairy shed and stock drinking purposes, to discharge dairy effluent to land and for the construction and use of two self-feed silage pads and associated animal loafing areas. A copy of the consents for the farm are attached in Appendix 1. The consents for the farm expire on the 31/05/2032.

Discharge Permit Number: AUTH-20211674-01-V1

Water Permit Number: AUTH-20211674-02

Wintering Pad: AUTH-20233661

National Policy Statement for Freshwater Management came into force on the 3rd September 2020 and include several new environmental regulations. On your property the following activities are likely to be impacted.

- Reporting of Synthetic Nitrogen Fertiliser
- Stockholding Areas (covered by silage pad resource consent)
- Conversion of land to dairy farming (new consent to be lodged)

The regulations permit some of the above activities if certain conditions are met. Where these conditions cannot be met the farm owner is required to apply for 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 https://www.dairynz.co.nz/regulation/policy/

Appendix Document	Appendix 1 - Resource Consents

ACTIONS | RECOMMENDATIONS

		Target Date
☐	**REG - Submit Nitrogen Fertiliser Records to the Regional Council Annually (31st July)** By the 31st July each year send to the Regional Council a full record of nitrogen fertiliser used on farm in the previous season (volume, nitrogen content of each fertiliser, date applied). Nitrogen fertiliser used on annual forage crops should be recorded separately, along with the area of land sown in crops.	31 Jul 2025

WHENUA ME TE ONE
LAND & SOIL MANAGEMENT

- L1 Southland Physiographic Zone - Land Units / Physiographic Zones
- L2 Land & Soil Overview
- L3 Soil - Soils
- L5 Race Maintenance & Management
- L6 Winter Grazing - Wintering, Cropping and Cultivation
- L7 Key Feature - Lane Adjacent to Waterway
- L8 Key Feature - Critical Source Area
- L9 Key Feature - Critical Source Area

LAND & SOIL MANAGEMENT

GOOD FARMING PRACTICES

Cultivation is managed to reduce the risk of sediment loss and maintain soil structure Practices: The suitability of each paddock for cultivation is assessed, and high-risk cultivation activities avoided. Considerations include: • Topography and soil type • Proximity to waterways • Erosion susceptibility • Crop sowing and harvest dates • Cultivation methods • Previous cropping history Pugging and compaction of soils is avoided Soil structure is assessed regularly No or minimum tillage cultivation techniques are predominantly used such as, direct drilling, strip-tillage, or non-inversion tillage Cultivation is avoided when soil moisture is at or beyond field capacity Cultivation practices and timings are considered to minimise nitrogen leaching losses associated with mineralisation	ACHIEVED
Erosion-prone land is managed or retired to minimise soil losses	N/A
Grazing of pastures and crops is managed to minimise sediment and contaminant loss Practices: A farm grazing policy is developed that considers and manages: •Erosion susceptibility •Soil pugging and compaction •Overgrazing •Adverse climatic events •Stock type, class and intensity •Grazing rounds/ rotation lengths If paddocks near waterways are used during wet periods, a buffer strip beside the waterway is fenced off A larger feeding area is offered in cold conditions when demand is high and utilisation low	ACHIEVED
Paddocks selected for Intensive Winter Grazing (including intensive baleage wintering) are low risk and managed to minimise the risk of erosion, run-off to waterways and leaching to groundwater	N/A
Critical Source Areas and farm Hot Spots are identified and managed to minimise contaminant losses to waterways	2 ACTION(S)

LAND & SOIL MANAGEMENT

LAND UNITS / PHYSIOGRAPHIC ZONES

L1

The farm has been broken into Land Units based on topography and landscape contaminant loss risk (Physiographic Zones).

Physiographic Zones were developed to give a greater understanding of the key risks to water quality throughout the Region. The risks to water quality are highly linked to where water comes from and the processes it undergoes as it moves through the soil and drainage networks. Physiographic Zones group areas of Southland that have similar landform types and water quality. The Zones have been identified according to water origin, soil type, geology and topography.

The Land Units identified on the property are:

Gleyed Land Unit – 212ha

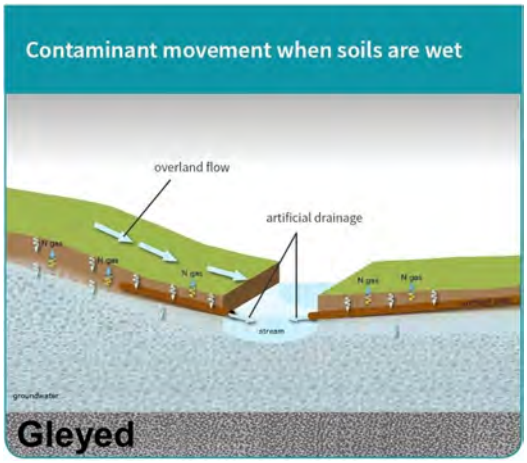
Central Plains Land Unit – 5ha

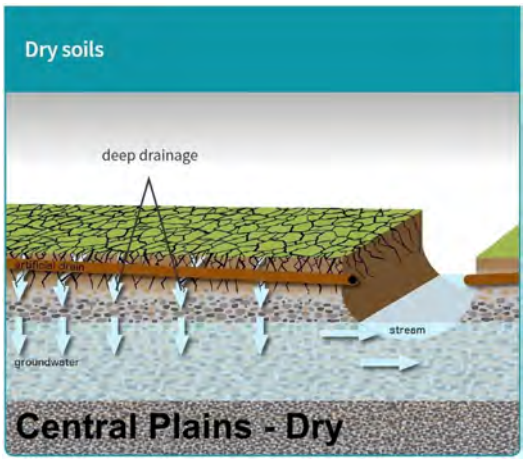
No Land Units have been differentiated due to topography (similar across the entire property).

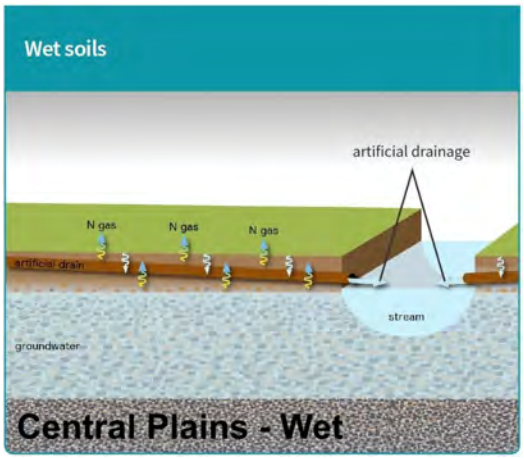
The contaminant loss risk associated with the identified Land Units are outline below:

Central Plains	Key Contaminant Pathway - Artificial/Tile Drainage to Surface Water (Wet) and Deep Drainage to Groundwater (Dry) Areas of clay-rich soils found in the central parts of the Southland Plains. These soils can crack extensively during summer as they dry out and swell when wet in winter and early spring, becoming poorly drained. Wet soils: This zone has an extensive artificial drainage network to help manage waterlogging. During heavy or prolonged rainfall, contaminants move quickly via artificial drains to streams. Dry soils: Clay minerals in the soil shrink as soils dry, resulting in the opening of cracks and fissures. During summer rain, water and contaminants move rapidly from the land surface, through the soil to underlying groundwater, resulting in elevated nitrogen concentrations.
Gleyed - No Variant	Key Contaminant Pathway - Artificial/Tile Drainage to Surface Water 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.

LAND & SOIL MANAGEMENT







LAND & SOIL MANAGEMENT

LAND & SOIL OVERVIEW

L2

The property lies on the alluvial terraces of the Aparima River. The topography of the farm is predominately flat to gently rolling with some shallow undulations and Critical Source Areas running through the property. Soils on the farm are predominately Aparima and Makarewa, with Aparima soils being imperfectly drained and slowly permeable and Makarewa soils being poorly drained.

As the property is within a Schedule X catchment the practices and actions identified in this section identify how contaminant losses will be minimised and additionally how they contribute to a reduction in adverse effects on water quality. This section specifically deals with how sediment (and associated bound phosphorus) and E.coli effects on water quality will be reduced.

To reduce sediment (and associated phosphorus) and E.coli losses from the farm, compared to the benchmarked farming activities (see Farm Overview) the 'Land & Soil Management' section of this plan focuses on actions to reduce sediment and E.coli losses including:

-Ceasing all intensive winter grazing activities and moving wintering onto two designated wintering facilities with full effluent capture.

-Moving dairy farming off areas of land to the west of Nightcaps Opio Road, which removes a road crossing and areas of slightly steeper topography that have a higher risk of overland flow of contaminants into Opio Stream.

- Reducing sediment/E.coli losses from critical source areas

- Reducing sediment/E.coli losses from higher risk areas, such as lanes and tracks.

Mitigations and actions to reduce nutrient, sediment and E.coli losses from sub-surface drainage can be found in the 'Waterways and Biodiversity' section of this plan.

Paddocks that are naturally wet, have swales/critical source areas or are located near waterways are avoided in wet conditions to minimise the risk of sediment/E.coli runoff to waterways.

Pugging and soil compaction are minimised by utilising artificial drainage, moving intensive winter grazing onto off paddock facilities, and avoiding high risk paddocks when soil moisture levels are high. Low tillage cultivation methods, such as direct drilling are used where possible for re-grassing pasture. Full cultivation is undertaken in spring when soils are drier and for paddock re-development.

Supplements are fed away from waterways and all waterways are fenced with riparian margins maintained in rank grass or plants to filter any sediment run-off.

Lanes are maintained to a high standard to prevent deterioration, minimising sediment run-off and effluent and associated E.coli ponding on or to the side of lanes.

LAND & SOIL MANAGEMENT

LAND & SOIL MANAGEMENT

SOILS

L3

There is one main soil type on the farm, Aparima with a small section of Makarewa soil running alongside the waterway on the eastern side of the farm.

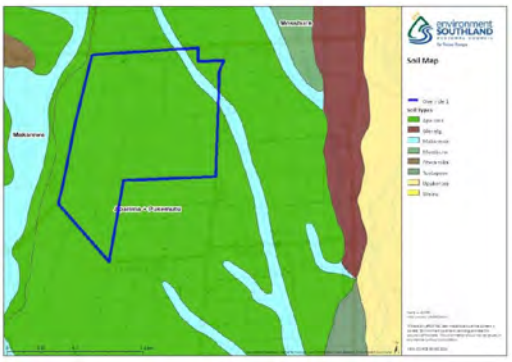
Aparima Soils

Aparima soils have a heavy silt loam texture and are imperfectly drained. A dense fragipan between 60-90cm restricts water drainage. This slow permeability can lead to waterlogging and overland flow via critical source (depression) areas on the farm. The soil responds well to artificial drainage. In some areas of the farm poorly drained Pukemutu soils may be found interspersed between the Aparima soils.

Makarewa Soils

Makarewa soils have a silty clay texture and are poorly drained making them vulnerable to waterlogging and pugging during wet periods. This creates a higher risk of overland flow occurring through critical source areas into the nearby waterway.

Appendix Document Appendix 2 - Soil Map



Aparima profile

LAND & SOIL MANAGEMENT

Makarewa profile

LAND & SOIL MANAGEMENT

CRITICAL SOURCE AREAS

L4

IMPACT OF CONTAMINATION  +  LIKELIHOOD OF CONTAMINATION = MEDIUM RISK RATING

There are swales and depressions on the farm that during heavy rain result in a concentration of water and associated contaminants (sediment, phosphorus and bacteria) from surrounding paddocks being channelled down into surface waterways on the farm. The main Critical Source Areas (L8 - L9) are shown on the map at the start of this section.

The highest risk of sediment/bacteria loss through these Critical Source Areas is when soil moisture levels are high and there is exposed soil or a source of sediment/E.coli (lanes or stock access). During these high risk periods steps need to continue to be taken to exclude stock from Critical Source Areas in addition to the recommendations outlined below.

To reduce the amount of sediment/bacteria reaching surface waterways during high risk periods and during periods of heavy rainfall, the riparian margins where overland flow paths enter surface waterways should be extended to create a larger filtering area (as pictured below) and for added filtering and biodiversity gains, planted in native grasses such as carex secta or tussock. In addition to this, technologies such as small scale wetlands (see photo of South Otago example) or simple sediment traps/ponds could be investigated if additional measures are required. These are especially suitable for naturally wet areas that have lower productivity.

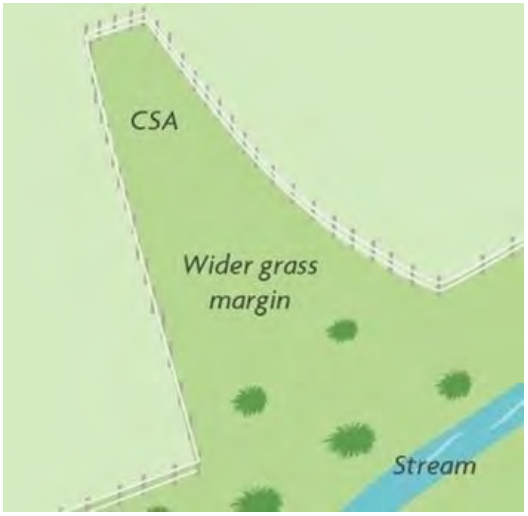
The photos below show examples of Critical Source Areas that may result in overland flow into surface waterways on the property. Most of the swales also have tile drains located under them and thus tile drain treatment options can also be investigated in these areas (see Waterways and Biodiversity Section).

The removal of intensive winter grazing from the property will result in a significant reduction in sediment/bacteria losses through Critical Source Areas compared to the benchmarked farming activities.

ACTIONS | RECOMMENDATIONS

	Target Date
ALL LUs - Continue to Exclude Stock from Critical Source Areas during High Risk Periods - To Achieve GFP The highest risk of sediment/bacteria loss through these Critical Source Areas is when soil moisture levels are high and there is exposed soil or a source of sediment/E.coli (lanes or stock access). During these high risk periods steps need to continue to be taken to exclude stock from Critical Source Areas.	01 Sep 2024
All LUs - Extend Riparian Margins where Critical Source Areas enter Waterways - To Achieve GFP Extend the riparian margins where overland flow Critical Source Areas (CSA) enter surface waterways. This creates a larger filtering area for run-off. Maintain these areas in rank grass or plant native grass species such as red tussock or carex secta.	26 Oct 2026

LAND & SOIL MANAGEMENT




Example - Planted Critical Source Area

LAND & SOIL MANAGEMENT

RACE MAINTENANCE & MANAGEMENT

L5

IMPACT OF CONTAMINATION + LIKELIHOOD OF CONTAMINATION = LOW RISK RATING

The dairy lanes over the farm are an example of good management practices for lane constructions. The lanes are wide (~7m) with a solid base and good surface incorporating an appropriate crown and camber. There were no issues noted with poor lane quality on the farm even close to the dairy shed. The quality lanes allow for good stock flow, reducing lameness issues and the build-up of effluent on the lane surface and adjacent paddocks.

A section of the farm track runs adjacent to a waterway. The buffer between the stream and the track is approximately 3-5m and helps filter runoff from the lane prior to it entering the waterway. When track maintenance next occurs, the lane should be reformed with a camber sloping away from the waterway, so runoff is diverted into the grass paddock on the opposite side of the lane.

The general quality of the lanes on the property and the continued maintenance programme minimises the loss of sediment/bacteria from these areas into surface water. Cut outs can be used to allow water to flow of the lanes into adjacent paddocks, avoiding water ponding on the lane and causing deterioration.

ACTIONS | RECOMMENDATIONS

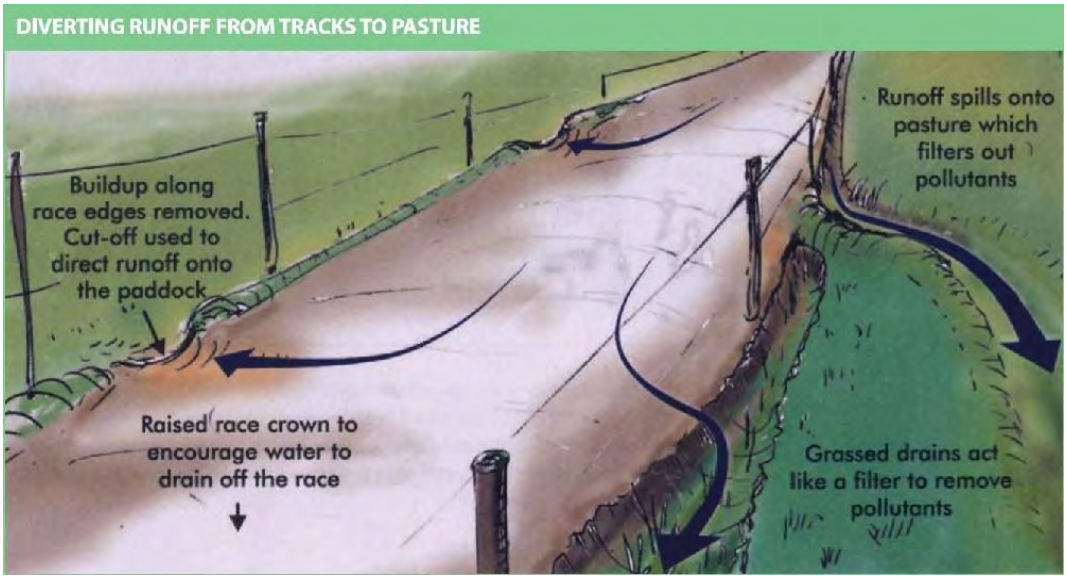
Target Date

All LUs - (L7)Slope Lane away from Waterway During Routine Maintenance - To Achieve GFP

26 Oct 2026

During routine maintenance, modify the lane (marked L7 on the map at the start of this section) camber to slope away from the adjacent waterway towards the paddock on the opposite side. Install cutouts on the paddock side of the lane so water runs off at regular intervals into the adjacent paddock.

LAND & SOIL MANAGEMENT



LAND & SOIL MANAGEMENT

WINTERING, CROPPING AND CULTIVATION

L6

Young stock are currently grazed off farm at the owners support block, including over winter. The property is undergoing significant changes to how stock are wintered with the construction of two self-feed wintering pads that will allow all dairy cows (excluding in calf heifers) to be wintered off paddock. One wintering pad has been completed with the second being constructed so it is ready for winter 2025. The change in wintering practices away from on-paddock intensive winter grazing will significantly reduce the risk of sediment, phosphorus and bacteria loss to water from the farm compared to the benchmarked farming activities.

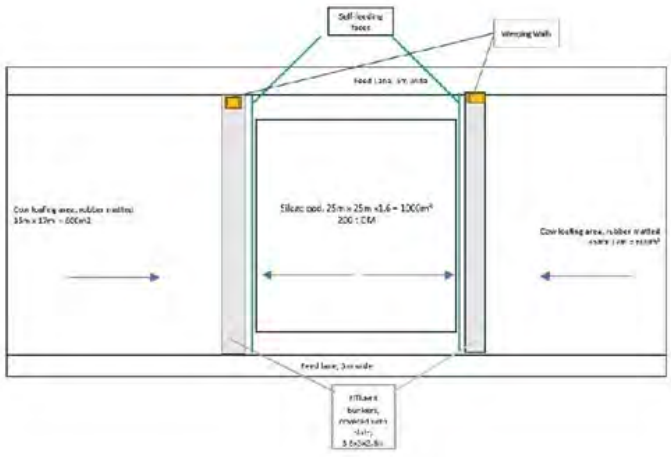
Cultivation and Re-Grassing

The 2024/25 season will see a change in the cultivation and re-grassing undertaken on the farm. Previously this has generally aligned with paddocks that have been intensively winter grazed, however moving forward this will be undertaken more strategically based on pasture renewal needs (no longer winter grazing on paddocks). Approximately 5-7% of the farm is re-grassed each year. Where re-grassing occurs, paddocks undergo full cultivation, but direct drilling could be considered depending on factors such as soils, drainage and paddock performance.

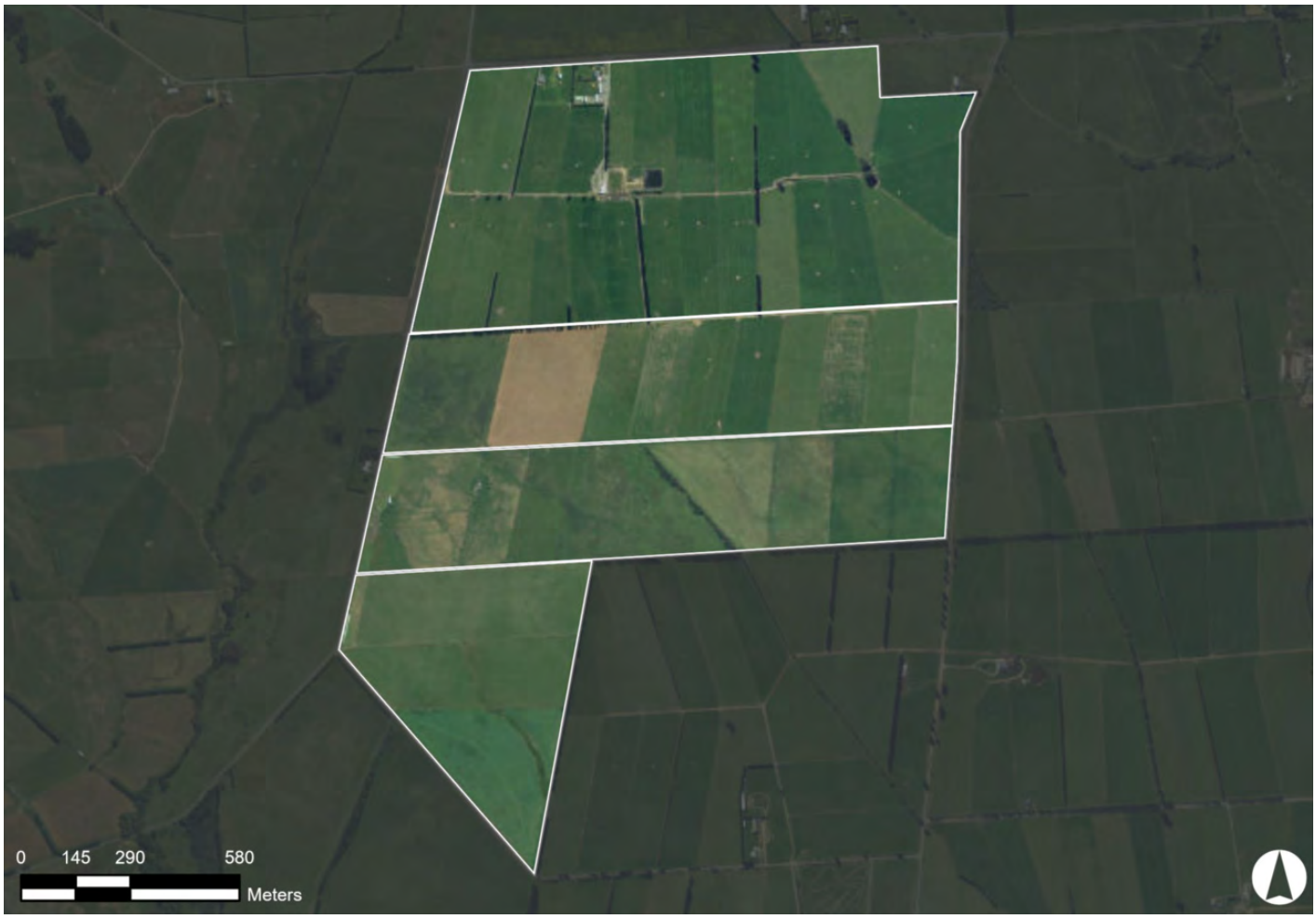
Maps

Maps showing the areas of re-grassing/cultivation that is planned in the next 12 months are contained in Appendix 3.

Appendix Document Appendix 3 - Cultivation Maps



WHAKAMĀKŪKŪ
WATER USE & IRRIGATION MANAGEMENT



I1 Water Use Overview

WATER USE & IRRIGATION MANAGEMENT

GOOD FARMING PRACTICES

Dairy shed and stock water use is efficient and prevents source contamination Practices: All water use on farm is measured (water meters) Water minimisation techniques are in place at the dairy shed A leak detection system is in place All leaks are fixed as soon as possible Water troughs are checked daily where animals are grazing All well heads are sealed, and stock permanently excluded from them A backflow prevention system is installed (where required)	ACHIEVED
The depth, rate and timing of irrigation is managed to meet plant demand and minimise the risk of leaching and run-off	N/A
The irrigation system is designed, operated and regularly checked to minimise the amount of water applied to meet plant demand, and prevent microbial contamination	N/A

WATER USE & IRRIGATION MANAGEMENT

WATER USE OVERVIEW

I1

Dairy shed and stock drinking water is taken from bore D45/0037, which is located at the entrance to the tanker loop. Up to 66.6 cubic metres of groundwater can be abstracted for use on the property. Water abstracted is initially stored in two concrete tanks beside the dairy shed before being used for stock water or within the dairy shed.

Bore D45/0037 is excluded from stock by way of its location beside the tanker loop and the corrugated iron structure surrounding it. The bore casing sit well above the ground level and is capped to prevent contamination.

A water meter is located by the water tanks to measure groundwater taken for the farm's total stock and dairy shed use. Water data is recorded and sent to the Regional Council annually.

Water use on the farm is minimised by keeping yard hosing to a minimum, recycling of cooling water and regularly checking for leaks where stock are grazing.

PARAKAINGAKI EFFLUENT MANAGEMENT

E1 Effluent Overview

E2 Effluent Storage

E3 Effluent Irrigation

E4 Key Feature - Effluent Storage Pond

E5 Key Feature - Weeping Wall Ponds

EFFLUENT MANAGEMENT

GOOD FARMING PRACTICES

Effluent and manure is applied at depths, rates and amounts that match plant requirements and minimise the loss of nutrients or microbial pathogens to waterways and groundwater Practices: An effluent management plan is in place that includes: • Regional rules and consent conditions • A farm effluent map that highlights: • Waterways • Buffer and exclusion zones • High and low risk soils • Effluent system layout (hydrants and runs) • System maintenance checks • System operating procedures • Health and safety • Emergency procedures and contacts Effluent application timing and rates are adjusted based on soil moisture levels Nutrient load is spread evenly across the largest area practical Soil tests are taken biennially in the effluent application area, and fertiliser applications adjusted accordingly Effluent is not applied when soils are at or above field capacity Effluent is not applied when rainfall that would result in the soil becoming saturated is forecast Failsafe mechanisms are in place Staff are trained in the effluent systems operation and maintenance	ACHIEVED
The effluent system is designed, operated and regularly checked to minimise the risk of nutrient and microbial pathogen loss to waterways and groundwater, and to prevent microbial contamination	1 ACTION(S)

*Additional GFP relevant to the dairy industry goals

EFFLUENT MANAGEMENT

EFFLUENT OVERVIEW

E1

Industry best practice for the management of farm dairy effluent (FDE) requires effluent to be stored and irrigated strategically when there is a suitable soil water deficit (deferred irrigation). This significantly reduces the risk of generating surface run-off or direct drainage of effluent into underlying sub-surface drains or groundwater. In addition to deferred irrigation, it is industry best practice to use low-rate (intensity) irrigation technology to reduce the risk of a soils capacity to absorb effluent (soil infiltration rate) being exceeded. Lower application rates reduce the risk of ponding and help with the retention of applied nutrients in the soil root zone be reducing the likelihood of preferential flow through soil cracks or subsurface drains.

The effluent system on the farm is in line with industry best practice for the following reasons:

- Suitably sized effluent storage is available as calculated using the Dairy Effluent Storage Calculator.
- Deferred irrigation practices are used, i.e. effluent is stored until conditions are suitable for applying effluent.
- Low rate irrigation technology is used.

Effluent is washed off the yard, tanker pad and dairy shed pit area into a series of sumps that connect into a stone trap located to the east of the dairy shed. Effluent from the stone trap flows via gravity to one of two sludgebeds with weeping walls located at their eastern end.

Effluent from the wintering pads/silage pads flows or is scraped into slatted concrete bunkers on either side of the self-feed silage section of the pad. Effluent in the bunkers is spread to land via a contractor (umbilical system or slurry tanker) with liquid effluent also able to be pumped over to the main sludgebeds after passing through weeping walls at the ends of the concrete bunkers.

Solids from the sludgebeds are cleaned out at least annually and spread to land via a muck spreader in accordance with Regional Council rules, being at a depth of less than 10mm and when soil temperatures are above 7 degrees.

Liquid effluent is pumped from the end of the sludgebeds over into a 5738m3 (usable volume), synthetically lined storage pond. A dairy effluent storage calculation was completed in October 2023 by Rural Environmental Solutions (Donna McBeath). This calculation confirmed there is adequate effluent storage available for the farm.

Liquid effluent is pumped out from the storage pond to a low rate travelling raingun (Cobra), when conditions are suitable, based on a visual assessment and data from the Environment Southland Beacon website located at Wairio on Aparima soils. The Cobra travelling raingun has a Gator Buddy failsafe installed.

Staff have been trained on the use of the effluent system and regular system maintenance is carried out. Application rate testing of the pods and raingun should be carried out on a regular basis to ensure they are operating correctly.

EFFLUENT MANAGEMENT

The locations where effluent can be applied are shown on the farms resource consent (Appendix 1). Staff are aware of the farms resource consent and the general conditions of that consent. The farm has an effluent management plan that has recently been updated (Appendix 5).

Appendix Document	Appendix 1 - Resource Consent (Effluent Discharge Area)
Appendix Document	Appendix 4 - Effluent Management Plan

EFFLUENT MANAGEMENT

EFFLUENT STORAGE

E2

There is a 5,738m3 (usable volume), synthetically lined effluent storage pond constructed on the property, which was built in 2012. A pond size calculation was completed in 2023 as part of the consent application to install two new wintering/silage pads and determined the pond was adequately sized.

The effluent storage pond has a leak detection system underneath the synthetic liner which can be monitored from the nearby inspection chamber. Due to the pond being installed under a resource consent and having a leak detection system it will only need to be drop tested when the farms discharge consent is renewed.

The pond storage area has been fenced to prevent unauthorised access.

Pond lining	plastic
Dairy effluent storage calculator	Yes
Pond volume	5738 Cubic Metres
Stormwater diversion	Yes

EFFLUENT MANAGEMENT

EFFLUENT IRRIGATION

E3

IMPACT OF CONTAMINATION  +  LIKELIHOOD OF CONTAMINATION = LOW RISK RATING

The effluent irrigation area proposed to be consented is 217ha (currently 202ha), which is larger than required to ensure nitrogen loading rates are kept below 150kg/ha/yr and potassium inputs are not excessive.

Liquid effluent is currently applied using a cobra raingun travelling irrigator. This system applies effluent at low rates (less than 10mm/hr). This is the lowest risk irrigation technology currently available. Low rate irrigation technology ensures the soil infiltration rate is not exceeded and thus minimises the risk of effluent ponding. A Gator Buddy failsafe is installed on the raingun travelling irrigator which turns off the effluent pump in the event the irrigator stops moving.

No application rate testing has been carried out (see Actions). This is required to diagnose any issues with the irrigation system, ensuring the optimal amount of effluent is being applied at the correct rate and depth.

The Discharge Permit for the farm allows for applications of effluent via a slurry tanker and umbilical system. This will occur directly from the effluent pond or the wintering pad bunkers. The application of effluent using a slurry tanker/umbilical system is high risk over tile drains and on sloping topography due to the very high application rates/intensity of these irrigators (150,000L/hr). This results in a high risk of overland flow on sloping topography and bypass flow into tile drains. These systems should only be used when soil moisture conditions are optimal.

Application depth testing	required
Irrigation method	low rate pods
Irrigation Method	Travelling Raingun
Irrigation method	Slurry wagon

ACTIONS | RECOMMENDATIONS

	Target Date
All LUs - Test Application Rate of Pods and Raingun - To Achieve GFP In order to accurately schedule your effluent irrigation and insure effluent is not being over applied, the application rate of the pods needs to be tested. A testing kit is available through Fonterra.	26 Oct 2026

EFFLUENT MANAGEMENT

RARENGA RAUROPI
WATERWAYS & BIODIVERSITY

W1 Waterways & Biodiversity Overview

W2 Artificial or Tile Drainage

W3 Riparian Management Unit - Aparima Tributary - Riparian Planting Zone

W4 Mahinga Kai

W5 Shelter

WATERWAYS & BIODIVERSITY

GOOD FARMING PRACTICES

Stock are excluded from lakes and waterways Practices: Stock are excluded from ephemeral waterways if grazing occurs while water is flowing Stock are excluded from lakes and permanently flowing or intermittent waterways Waterways are fenced with at least two electric wires All stock crossings are bridged or culverted An appropriate buffer is maintained: • that accounts for slope, • to filter runoff, • even if only temporarily during vulnerable periods. Wet areas within paddocks are managed to avoid contamination from stock or fertiliser Drains are well managed Drain cleaning minimises sediment and fish losses	ACHIEVED
Farm indigenous biodiversity and Mahinga Kai values are identified and protected	4 ACTION(S)

*Additional GFP relevant to the dairy industry goals

WATERWAYS & BIODIVERSITY

WATERWAYS & BIODIVERSITY OVERVIEW

W1

IMPACT OF CONTAMINATION  +  LIKELIHOOD OF CONTAMINATION = MEDIUM RISK RATING

Activities within waterways, critical source areas (see Land and Soil Management Section), natural wetlands and their margins are managed on the property to reduce adverse effects on water quality, as outlined below. In addition to this, the Land and Soil, Effluent and Nutrient Management Sections of this plan provide further details on how the farm will achieve this objective. This section of the Farm Environment Plan also outlines how waterways and drainage are maintained to avoid damage to and ultimately improve aquatic habitats.

Two tributaries of the Aparima River run through the property, one on the eastern side of the established dairy farm and a second on the lease block. The waterways are all fenced to exclude stock with riparian margins on the northeastern waterway (established dairy farm) generally maintained in rank grass, with the odd exotic tree. The waterway on the lease block has recently had its riparian margins cleared of gorse and broom. The owner is considering planting options for this area.

There are no notable areas biodiversity on farm but opportunities exist to improve instream habitat in the northeastern stream and biodiversity connections to an adjacent area of native vegetation that boarders the eastern side of the farm.

Stock damage to waterways on the farm is prevented by having permanent stock exclusion fencing and maintaining 2-3m wide riparian buffers between the fence and top of the stream bank. The vegetated riparian buffers also assist in filtering paddock run-off, in combination with the extended riparian margin action outlined in the Critical Source Areas Section of this plan.

Stock crossing points over waterways on the property are also culverted or bridged to prevent stock access and have built up edges to prevent run-off entering the underlying stream.

Artificial drains are a key feature/risk of the property, allowing it to be used for productive purposes, but also providing a conduit for contaminants to be rapidly transported to surface waterways. Artificial drainage is discussed later in this Section.

Internal waterways on the property are not generally cleaned out, therefore damage to aquatic habitats from drainage maintenance is minimal. If waterways are cleaned out in the future, care should be taken to avoid removing bank vegetation and areas of fish habitat.

The Aparima catchment continues to provide important habitat for culturally significant indigenous species that are threatened and at risk, including kanakana (lamprey), tuna (eels) and whitebait species. Existing protected and enhanced areas of the farm provide a habitat for native species.

ACTIONS | RECOMMENDATIONS

Target Date

WATERWAYS & BIODIVERSITY

All LUs - Protect In-Stream and Riparian Habitat when undertaking Waterway Maintenance - To Achieve GFP

01 Nov 2024

When undertaking mechanical clearance of sediment/weeds from waterways on the property protect in-stream and riparian habitat. This is achieved by generally undertaking cleaning activities during December and January which avoids key native fish spawning months for most fish (other than Tuna/Eels), not removing shallow stony areas, using a weed rake or stream-cleaning bucket on diggers to minimise spoil and protect banks from collapsing, returning any fish removed back into the stream and avoiding damage to bank and riparian vegetation.

Waterways should only be mechanically cleaned where this is essential and in stages (downstream sections last) to help capture sediment released by the digger upstream. No more than 1/5th of the waterway should be cleaned per year to ensure adequate instream habitat is maintained within the waterway.

WATERWAYS & BIODIVERSITY

WATERWAYS & BIODIVERSITY

ARTIFICIAL OR TILE DRAINAGE

W2

IMPACT OF CONTAMINATION  +  LIKELIHOOD OF CONTAMINATION = HIGH RISK RATING

Subsurface (tile) drains are the key contaminant pathway for land units on the property.

The farm is drained by a network of subsurface drains that 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 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.

Actions to direct tile drain water into sediment traps (ponds) or small scale wetlands, prior to discharging into waterways should be prioritised, where this is practicable. These treatment systems allow sediment and associated nutrients to be filtered out of drainage water prior to entering surface waterbodies. In addition to this, major tile drains may be able to be treated with bio-filtration in the future, whereby water passes through a carbon rich medium (such as woodchips) that houses bacteria that convert nitrate into nitrogen gas. Research on the practical implementation of these tools is currently being carried out by Dairy NZ and can be a focus for future iterations of this Plan.

Known tile drains are shown on the map in Appendix 5.

Outlets marked	No
Outfall location	Stream
Appendix Document	Appendix 5 - Tile Drain Map

ACTIONS | RECOMMENDATIONS

Target Date

ALL - LUs Map Known Tile Drains - To Achieve GFP — 06 Sep 2024

Continue to update the tile drain map for the farm as and when new tile drains are installed or existing tile drains are discovered.

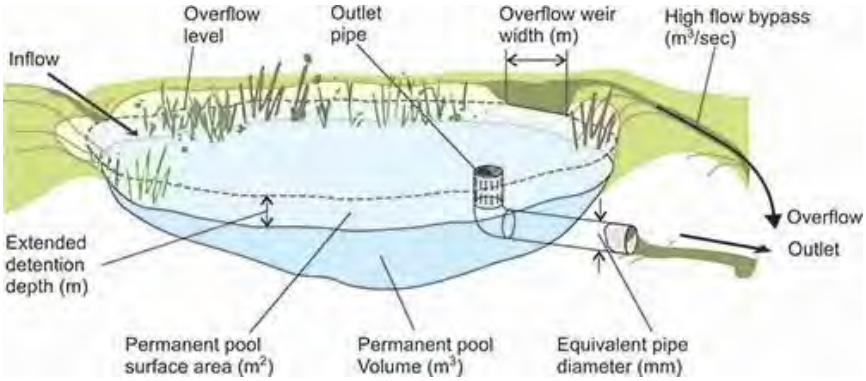
All LUs - Investigate tile drain treatment methods - To Achieve GFP — 26 Oct 2028

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

Where practicable create sediment ponds prior to major tile drains discharging into surface water bodies or divert tile outlets into existing landscape features (duck ponds) or small constructed wetland areas.

This action should be considered as a priority for the farm due to tile drains being the key contaminant loss pathway for land units on the farm.

WATERWAYS & BIODIVERSITY



Tile Drain Wetland Area

WATERWAYS & BIODIVERSITY

APARIMA TRIBUTARY - RIPARIAN PLANTING ZONE

W3

IMPACT OF CONTAMINATION + LIKELIHOOD OF CONTAMINATION = LOW RISK RATING

This 250m of the Aparima tributary stream located in the north eastern section of the farm has been identified as an area where additional riparian planting could be carried out to improve in-instream and riparian habitat compared to the benchmarked farming activites.. The riparian margins in this area are approximately 3m wide and are currently maintained in rank grass. This section of waterway also connects to a section of native vegetation on an adjacent property to the east of the road.

Develop a riparian management plan to ehance the habitat in this section of the waterway. This could include simple planting of carex secta, toetoe and tussock close to the stream edge and a second row of larger shrubs such as cabbage tree, pitosporum, flax and mingimingi closer to the fence.

Waterway type	Stream/Creek
Fencing status	Permanently Fenced
Vegetation status	Rank Grass
Riparian Management Plan	No

ACTIONS | RECOMMENDATIONS

Target Date

All LUs - Develop a Riparian Planting Plan - To Achieve GFP

26 Oct 2027

Develop a riparian management plan to enhance the habitat in this section of the waterway. This could include simple planting of carex secta, toetoe and tussock close to the stream edge and a second row of larger shrubs such as cabbage tree, pittosporum, flax and mingimingi closer to the fence.

WATERWAYS & BIODIVERSITY

MAHINGA KAI

W4

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 nanga and tuna, 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

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 risk areas	Areas of differing soil types that require different management is done on farm as per land management section of this plan.
Fish habitat protected	Waterways are fenced off and maintained to support fish habitat. The Aparima catchment continues to provide important habitat for culturally significant indigenous species that are threatened and at risk, including kanakana (lamprey), tuna (eels) and whitebait species.
Waterways protected	All waterways or areas holding water are fenced to exclude stock with a buffer zone to help filter any run off of nutrients. Any drains are managed to avoid disturbance or damage to mahinga kai species or habitats.

Galaxia (native freshwater fish)

Develop Native Biodiversity

WATERWAYS & BIODIVERSITY

Tuna (freshwater eels)

Koura (native freshwater crayfish)

WATERWAYS & BIODIVERSITY

SHELTER

W5

There are a number of single rows mix exotic tree hedges present on the property. The well maintained and considered planted shelter belts slow down wind speed. This reduces moisture loss from soil and plants in summer and autumn and helps delay the effects of drought. Shelter is generally beneficial to livestock. Animals gather in shade during hot weather and take refuge from cold winds. Sheltered animals need less feed to maintain physical condition, and their winter growth rates improve.

TAIORA
NUTRIENT MANAGEMENT

N1 Nutrient Overview

N2 End of Season Nitrogen Report - Nitrogen Management

N3 Nitrogen Leaching Mitigations - Nitrogen Efficiency Improvements

NUTRIENT MANAGEMENT

GOOD FARMING PRACTICES

Soil phosphorus levels are monitored and maintained below or within the target ranges for the soil-type and crop	1 ACTION(S)
The amount and timing of fertiliser inputs, takes account of all sources of nitrogen and phosphorus, matches plant requirements and minimises losses to waterways and groundwater	1 ACTION(S)
Fertiliser spreading equipment is maintained and calibrated Practices: Fertiliser spreading equipment is maintained in accordance with the manufacturer's instructions Farm spreading equipment is calibrated regularly specific to the product being spread -- spreading width and volume checked Paddocks are checked for paddock stripes after spreading Contractors are Spreadmark accredited	ACHIEVED

*Additional GFP relevant to the dairy industry goals

NUTRIENT MANAGEMENT

NUTRIENT OVERVIEW

N1

IMPACT OF CONTAMINATION  +  LIKELIHOOD OF CONTAMINATION = MEDIUM RISK RATING

A nutrient loss risk assessment has been carried out using the Fonterra Nitrogen Risk Scorecard and by assessing the key drivers of phosphorus loss risk, being Olsen P, slope, waterway stock exclusion, stocking rate and cultivation/wintering. Results associated with the Nitrogen Risk Scorecard are contained under the Nitrogen Management section of this Plan.

The appropriate use of nutrients on the farm is determined by regular soil testing and advice from the farms fertiliser representative (Ballance). All farm soil testing is carried out every three years with a tailored fertiliser plan developed to increase Olsen P levels in lower fertility paddocks and reduce Olsen P levels where they exceed the agronomic optimum. All paddock testing is done every three years to give time for fertiliser changes to be reflected in the soil test results.

Olsen P levels being targeted moving forward are the top end of the recommended agronomic range (30).

Based on the 2021 soil test results Olsen P levels ranged between 21-66 (average 40). Olsen P levels greater than the agronomic optimum (30) are expensive to maintain when compared to the limited pasture production achieved. In addition to this, soil Olsen P levels above 30, especially in soils with low anion storage capacity increase the risk of phosphorus losses to water.

Other factors that increase the risk of phosphorus loss to water have been assessed as low risk on the property with all waterways being stock excluded, relatively flat topography (other than small sections of the farm where terraces are located), only 5% of the farm cultivated per year and no pasture based winter grazing occurring. Going forward it is proposed the farm will also only have a modest stocking rate of 2.5cows/ha.

No fertiliser is stored on farm, all fertiliser is brought in and applied by Transport Services Limited who are Spreadmark accredited and use proof of placement technology. Fertiliser applications are differentiated between effluent and non-effluent areas to ensure that nutrients are applied in dairy effluent are accounted for. All fertiliser is applied taking into account soil and weather conditions.

Applications of nitrogen fertiliser occur between August and April. In the 2023/24 season an average of 187kg/N/ha was applied. This is discussed further in the Nitrogen Management section of this Plan.

The National Environmental Standards for Freshwater Management limit the use of nitrogen fertiliser on pastoral land (including crops). No more than an average of 190kg/N/ha can be applied across your land holding with individual paddocks (excluding crop paddocks, which can have higher rates if this doesn't result in the average rate across the landholding exceeding 190kg/ha) receiving no more than 190kg/ha. All dairy farms must supply fertiliser purchase records and application records to Environment Southland by the 31st July each year.

NUTRIENT MANAGEMENT

ACTIONS | RECOMMENDATIONS

	Target Date
All LUs - Adjust P application rates so Olsen P is maintained within the Agronomic optimum - To Achieve GFP	26 Oct 2027

Current soil test Olsen P ranges from 21 to 66, the agronomic optimum for soils on the farm is a maximum of 30. Olsen P levels greater than 30 are expensive to maintain when compared to the limited pasture production that is achieved. Higher Olsen P levels also result in an increased risk of phosphorus loss to water.

NUTRIENT MANAGEMENT

NITROGEN MANAGEMENT

N2

IMPACT OF CONTAMINATION  +  LIKELIHOOD OF CONTAMINATION = MEDIUM RISK RATING

A Farm Insights Report and Nitrogen Loss Risk Scorecard has been produced for the property based on the information provided to Fonterra in your Farm Dairy Records. The data contained within your Farm Dairy Records has been checked to ensure there are no obvious errors. Your reports are attached to this Plan in Appendix 6.

Your Farm Insights Report shows the farm has a Purchased Nitrogen Surplus of 179kgN/ha for the 2023/24 season. Purchased Nitrogen Surplus reflects the relationship between the amount of nitrogen entering the farming system through fertiliser and feed, versus the amount leaving the farm in product. The higher your Purchased Nitrogen Surplus the greater the risk of nitrogen being lost to water and greater opportunities for efficiency gains by optimising your nitrogen fertiliser use. For farms in Southland producing above 1350kg/MS/ha the average nitrogen surplus (2023/24) was approximately 105kg/N/ha.

More nitrogen is being used to grow pasture (per kg/DM grown) than the average System 4 farm in Western Southland, by comparison you are growing approximately 75kg/DM for every kgN used versus a System 4 Western Southland benchmark group average of 116kg/DM for every kgN used. This indicates the potential to reduce the amount of nitrogen being brought into your farming system (and subsequent cost) without impacting your overall pasture and milk solids production.

When compared to last season (2022/23), fertiliser usage increased from 100kg/N/ha to 187kg/N/ha. It is noted there was a corresponding increase in production per cow and per hectare that could be attributed to the additional fertiliser (and imported feed) applied, however the estimated 14tDM/ha of pasture grown on farm was also produced by several farms surrounding you using an average of 140kg/N/ha (See Nitrogen Fertiliser Optimisation Section of your Insights Report).

The results from your Nitrogen Risk Scorecard have identified the following areas as having a high to very high risk of nitrogen loss to water and should be investigated further to minimise losses:

1. Stock Management (Very High Risk) – The key diver is the farms stocking rate of 3.0 cows/ha (medium risk) which is significantly increased by the amount of dry matter being consumed per ha (18.1tDM/ha) resulting in more nitrogen being ingested by the animal and retuned to pasture as dung and urine patches (highly vulnerable to be leached).

2. Nitrogen Fertiliser (High Risk) – The key driver is the amount of fertiliser applied (187kg/ha). The higher the amount of fertiliser applied, the greater the risk of nitrogen loss risk. Additional factors such as the efficiency with which a kgMS is produced per kgN applied and timing and application rates are additional factors considered.

3. Imported Feed (Very High Risk) – The key driver is the amount of feed imported combined with the average nitrogen content of the feed and the efficiency in which the feed is used to produce a kgMS per kgN imported.

It is recommended the Nitrogen Efficiency Improvements Section of this Plan is reviewed to further refine the use of nitrogen fertiliser usage to ensure it is being used as effectively as possible.

NUTRIENT MANAGEMENT

Records kept for nutrient budgeting	
Appendix Document	Appendix 6 - Farm Insights Report & Nitrogen Risk Scorecard

ACTIONS | RECOMMENDATIONS

Target Date

All LUs - Investigate & where practicable implement outlined nitrogen efficency strategies - To Achieve GFP

26 Oct 2026

Several strategies are outlined in the Nitrogen Efficiency Improvements Section of this Plan. These strategies focus on a more tactical use of nitrogen to fill feed deficits rather than relying on nitrogen all year round. It is strongly recommended that any strategies are trialed using a staged approach to avoid unforeseen impacts on your farming system. Most of the strategies also require a well-managed ryegrass/clover mix with good swards of clover present to promote nitrogen fixation.

NUTRIENT MANAGEMENT

NITROGEN EFFICIENCY IMPROVEMENTS

N3

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 trialed 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 milksolids per ha. This indicates there may be opportunities to use nitrogen inputs more efficiently without impacting on milk solids production.

Clover Content

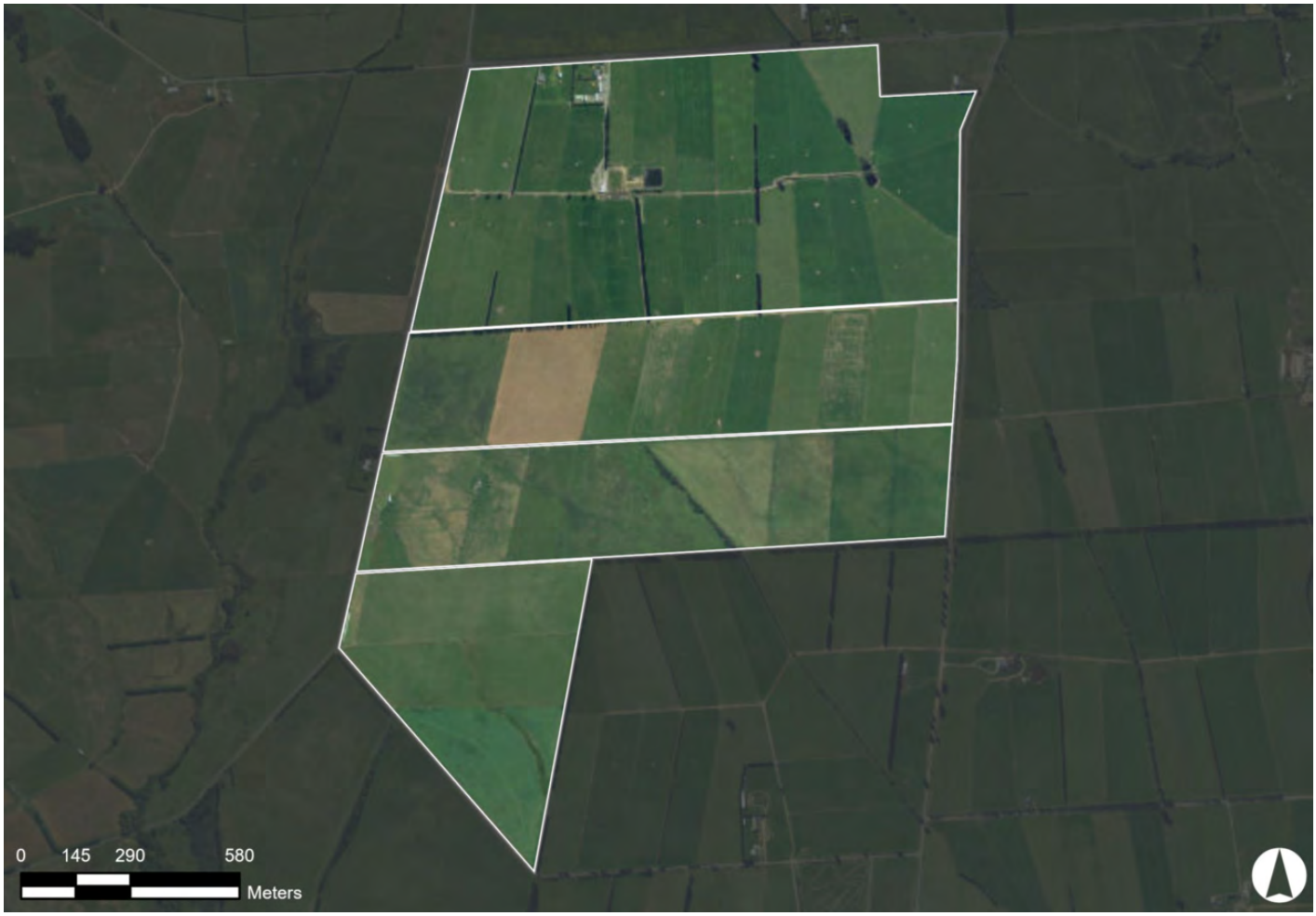
For most of the strategies outlined below paddocks must have a well-managed ryegrass/clover mix with good swards of clover present to promote nitrogen fixation. Care needs to be taken to avoid long-lasting shading of clover runners in spring by prolonged canopy closure (i.e. heavy silage cuts). Shading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

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.
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.
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 dont 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.
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.
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

NUTRIENT MANAGEMENT

loss through soil drainage.

TŪKUNGA HAU **KŌTUHI**
GREENHOUSE GAS EMISSIONS



G1 Greenhouse Gas Emissions Overview

G2 Pasture and Crop Production - Greenhouse Gas Mitigation Opportunities

GREENHOUSE GAS EMISSIONS

GOOD FARMING PRACTICES

Farm greenhouse gas emissions are known and a plan is in place to reduce or offset them, that also considers adaptation to climate change

ACHIEVED

Practices:
Greenhouse gas emissions are calculated each year for the farm

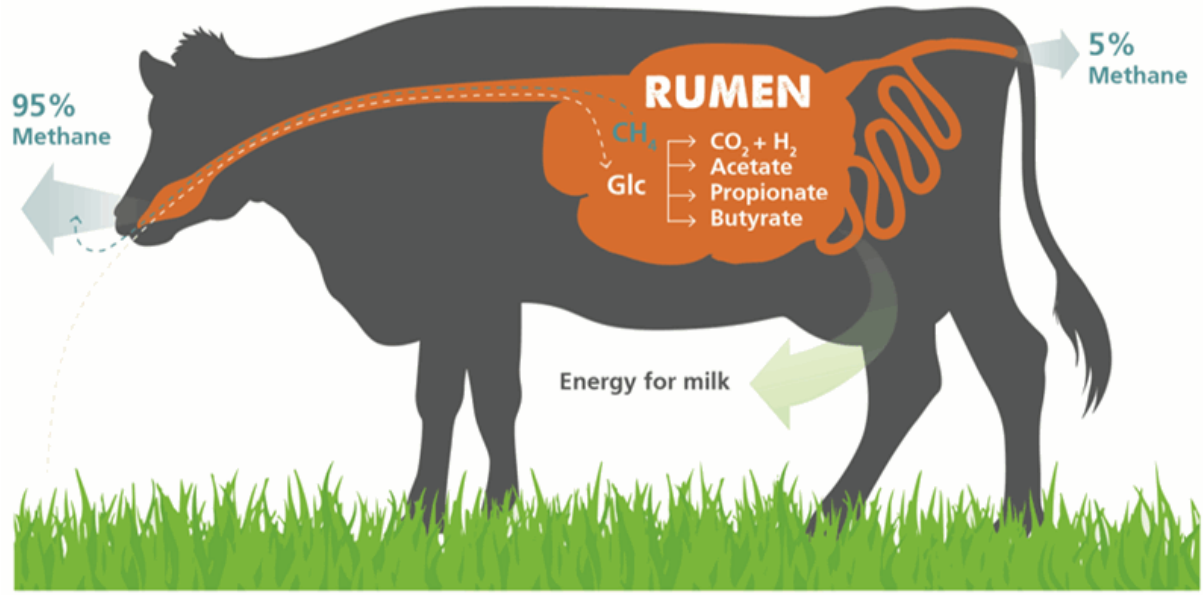
GREENHOUSE GAS EMISSIONS

WHAT ARE GREENHOUSE GAS EMISSIONS?

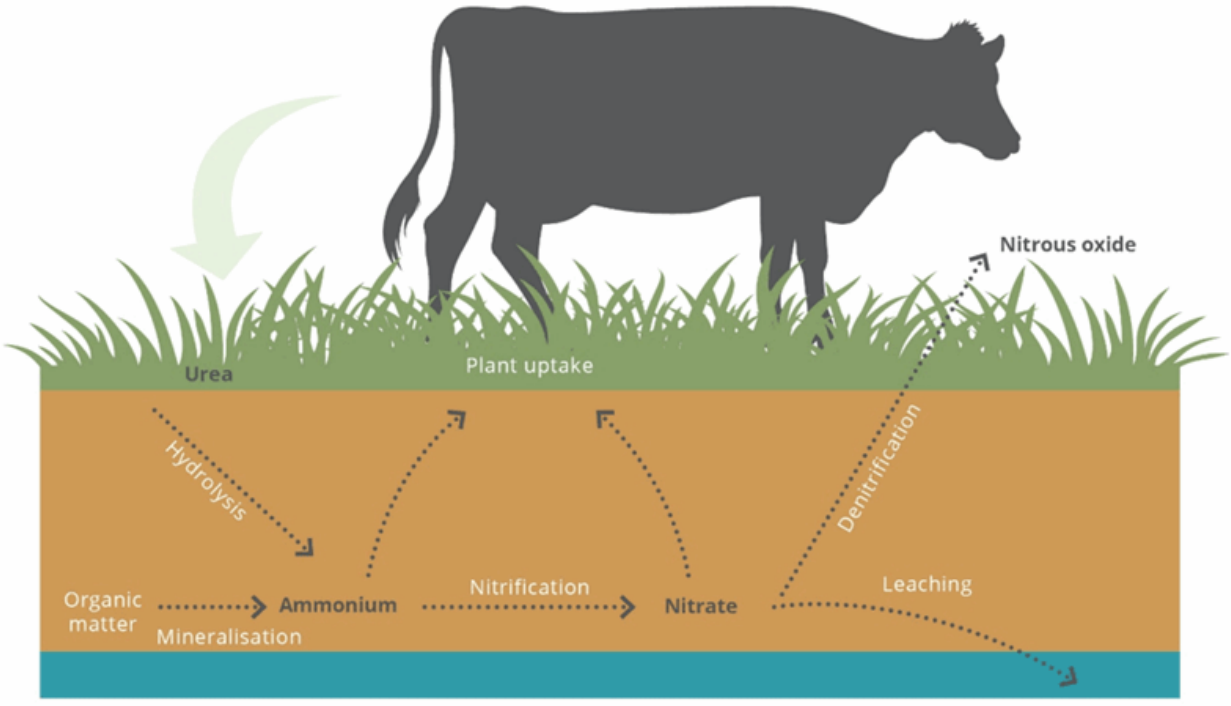
The main agricultural GHGs are methane (CH_4) and nitrous oxide (N_2O). Methane is produced by ruminants (e.g., cows and sheep) by methanogen microbes that are naturally present in the rumen. Most methane is emitted when cattle burp. The amount of methane produced for each farm is directly related to 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 (CH_4) is produced



How a nitrous oxide (N_2O) is produced



GREENHOUSE GAS EMISSIONS

GREENHOUSE GAS EMISSIONS OVERVIEW

Each farms greenhouse gas (GHG) emissions vary depending on farm size, inputs, outputs and management. This section of your Farm Environment Plan is to understand your farms individual Greenhouse Gas Emissions footprint and understand practices on your farm which impact your emissions.

Actions and recommendations in this section of the plan have been formulated from the discussion on-farm, and the information included in your Farm Insights Report. As discussed, there are some practices on-farm which have a significant impact on emissions. These practices are also covered in other sections of this plan and have co- benefits for reducing impacts on water quality reducing your GHG emissions. These are identified by a logo on the Good Farming Practice summary at the beginning of this plan in addition to being discussed in this section.

A Farm Insights Report has been produced based on the information provided to Fonterra in your 23/24 season Farm Dairy Records (FDR's), accounting for practices on your dairy farm effective area. This report is attached to this Farm Environment Plan in the Appendix.

The following section of this plan summarises the information in the Insights report, and discussion during the farm visit to identify the key practices on farm already demonstrating emissions efficiency, and some key opportunities to investigate, to further reduce emissions on your farm.

Your farm is achieving Good Farming Practice for GHG emissions by knowing what your emissions are and having this plan in place to reduce or offset them.

Recommendations for continuous improvement have been included in this plan.

Appendix Document	Appendix 6 - Farm Insights Report & Nitrogen Risk Scorecard

GREENHOUSE GAS EMISSIONS

GREENHOUSE GAS MITIGATION OPPORTUNITIES

Emissions Profile (per kgMS):

Your farms total emissions are 10.2 kgCO2e/kgMS. This is made up of 6.2 kgCO2e / kgMS from Methane, 1.4kgCO2e / kgMS from Nitrous Oxide and 2.6 kgCO2e from Carbon Dioxide. When compared to the benchmark group of other farms in Otago and Southland your farm's emissions (intensity) are slightly below the benchmark group average. Despite this, there are still opportunities to reduce your emission intensity through efficiency gains.

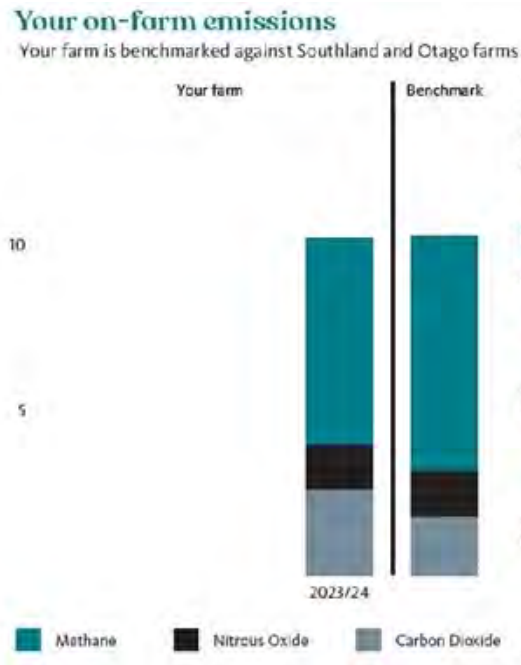
Farm Emission Reduction Plan

As outlined under the nitrogen management section of this plan, there are potential opportunities to grow similar amounts of pasture with less nitrogen fertiliser inputs (or more pasture with the same or slightly less nitrogen inputs). This will not only lower your costs of production in terms of fertiliser costs and imported feed but result in less nitrogen oxide emissions.

If more pasture can be produced on farm from the same or less inputs, this could enable imported feeds, such as PKE to be reduced. Imported feeds such as PKE have a high emissions footprint (carbon dioxide), thus reducing these will reduce your farms overall emissions.

Overall, any improvements that can be made to increase milk produced from the same or less inputs will reduce your emissions intensity (per kgMS produced). Maintaining or further lowering mastitis and lameness rates ensures cows are healthy, producing well and prevents milk having to be withheld while animals are treated.

A more detailed assessment of efficiency opportunities will be undertaken as part of a future 'Efficiency Plan' visit.



This data shows the emissions that are created from your farming activities. There are also other things that influence your farm's footprint - things like peat soil, land-use change and carbon removals. These aren't captured in the data below.

	Your Farm	Benchmark
Emissions ($kgCO_2e$)/ kgMs	10.2	10.30
Methane (biological)		
Dairy herd	5.00	5.50
Replacements	0.70	1.00
Effluent	0.50	0.60
Nitrous Oxide (biological)		
Livestock	0.90	1.00
Fertiliser	0.40	0.30
Manure and soil	0.10	0.10
Carbon Dioxide (non-biological)		
Imported feed	1.60	0.80
Fertiliser	0.50	0.40
Other	0.50	0.60

APPENDIX 1

AUTH-20211674-01-V1

Cnr North Road and Price Street
(Private Bag 90116
DX YX20175)
Invercargill

Telephone (03) 211 5115
Fax No. (03) 211 5252
Southland Freephone No. 0800 76 88 45

Discharge Permit

Under Section 104C of the Resource Management Act 1991, a resource consent is granted by the Southland Regional Council to **Paul Turner for Paul Turner Farm Trust** of **1633 Wreys Bush Mossburn Road, Dunrobin, 9689** from **24 November 2021.**

Please read this Consent carefully, and ensure that any staff or contractors carrying out activities under this Consent on your behalf are aware of all the conditions of the Consent.

Details of Permit

Purpose for which permit is granted:		To discharge agricultural effluent to land from up to 450 cows via low rate pod system, travelling irrigator, umbilical system and slurry tanker.
Location	- site locality	237 Sinclair Road, Opio
	- map reference	NZTM2000 1218900E 4900074N
	- physiographic zones	Gleyed and Central Plains
	- groundwater zones	Upper Aparima
	- catchment	Opio Stream, Aparima River and Kenny Creek
	- FMU	Aparima
Legal description of land at the site:		Section 152 Block V Wairio SD, Section 154 Block V Wairio SD, Part of Section 153 Block V Wairio SD.
Expiry date:		**31 May 2032**

History of Transfer and Change

- Consent varied on 18 April 2024
- Appendix 1 amended on 29 April 2024
- Consent amended on 1 August 2024

Schedule of Conditions

General conditions

1. This resource consent shall not be exercised until Discharge Permit AUTH-301198 is surrendered or has expired.

2. This consent authorises the discharge of dairy shed effluent ("agricultural effluent") and self-feeding silage pads (feed pads) effluent onto land, via a land disposal system consisting of a stone trap, weeping wall and sludge beds and an effluent storage pond to low rate pods, travelling irrigator, umbilical system and slurry tanker, as described in the applications (APP-20211674 & APP-20233661)[1] for resource consent dated 11 November 2021 and 14 December 2023. The activity shall be limited to:
   (a) The discharge to land of agricultural effluent generated from milking of up to 450 cows up to twice per day;
   (b) The discharge to land of agricultural effluent generated from the use of two self-feeding silage pads facilities holding a maximum of 200 cows per facility between 1 June and 30 September (inclusive) or up to 450 cows in adverse weather conditions;
   (c) The discharge to land of agricultural effluent via a low-rate pod system (or equivalent low-rate irrigation system) and travelling irrigator;
   (d) The discharge to land of agricultural effluent via a high-rate umbilical system and slurry tanker as contingency measures; and
   (e) The discharge of agricultural effluent to an area no more than 202 hectares as per the plan attached as Appendix 1.

   Advice Note: *Routine monitoring inspections of this consent may occur up 2 times a year. This number does not include any other required inspections.*

3. Notwithstanding these conditions, this permit shall be exercised in accordance with the Collected Agricultural Effluent Management Plan. Where there is inconsistency between the Collected Agricultural Effluent Management Plan and the conditions of this consent, the conditions of this consent shall prevail.

4.
   (a) The discharge shall not exceed: A depth of application of 10 millimetres for each individual application, and an instantaneous rate of 10 millimetres per hour via a low-rate pod system or travelling irrigator on Category C land;
   (b) A depth of application of 25 millimetres for each individual application, and an instantaneous rate of 10 millimetres per hour via a low-rate pod system or travelling irrigator;
   (c) A depth of application of 10 millimetres for each individual application via an umbilical system; and
   (d) A depth of application of 5 millimetres for each individual application via a slurry tanker.

5. If the Consent Holder installs an equivalent low-rate irrigation system as per Condition 2(b), the Consent Holder must, during the initial use of that low-rate irrigator:
   (a) measure the depth and instantaneous rate of application by the equivalent low-rate irrigator as installed; and
   (b) supply these measurements to the Consent Authority within 20 working days of the test being undertaken.

6. The minimum return period for the discharge of agricultural effluent to land shall be 28 days.

7. The discharge shall not occur when the moisture content of the soils is at or above field capacity.

[1] Environment Southland Document ID: A708586, A1022773

8. Nitrogen loading onto any land area as a result of the exercise of this consent shall not exceed 150 kilograms of nitrogen per hectare per year.

Exclusions

9. This consent does not authorise the discharge of:
   (a) dairy shed effluent (excluding self-feeding silage pads effluent) collected during 1 June to 31 July,
   (b) effluent collected by a winter barn or underpass.
   (c) effluent onto Category C land via high-rate umbilical system or slurry tanker.

10. No discharge shall occur within:
   (a) 20 metres of any surface watercourse;
   (b) 100 metres of any water abstraction point;
   (c) 200 metres of any place of assembly or dwelling not on the subject property; and
   (d) 20 metres from any property boundaries.

   Where there is inconsistency between the plan attached as Appendix 1 and the conditions of this consent, the conditions of this consent shall prevail.

11. The stored or discharged agricultural effluent shall not enter any surface watercourse in any way, including:
   (a) directly.
   (b) indirectly.
   (c) by overland flow.
   (d) via entrainment by stormwater or run-off; or
   (e) via a pipe.

12. The stored or discharged agricultural effluent shall not:
   (a) form ponds or flow on the land surface, or
   (b) cause contamination of water.

13. The stored or discharged agricultural effluent shall not cause any odour beyond the boundary of the site (see Appendix 1) that is offensive or objectionable in the opinion of the Council's Compliance Officer.

14. Spray drift beyond the boundary of the site shall not occur.

Effluent storage

15. The discharge shall occur via an agricultural effluent storage facility of between 5,563 cubic metres and 7,035 cubic metres capacity.

16. The Consent Holder must maintain at least 500mm of freeboard in the agricultural effluent storage facility at all times.

17. By the 1 January 2022 the Consent Holder shall obtain written confirmation from a suitably qualified person that the structure, referred to in the application as the north weeping wall, has no visible cracks, holes, or defects that would allow effluent to leak from the structure.

18. The certification required by Condition 17 shall be accompanied by photographs of the structure (date and time stamped) and be supplied to the Consent Authority within one month of receiving the certification.

System management

19. The Consent Holder shall notify the Consent Authority the identity of the Person in Charge of the agricultural effluent disposal system:
    (a) prior to the first exercise of this consent, and
    (b) no more than five working days following the appointment of any new Person in Charge.

20. The Consent Holder shall install and maintain:
    (a) an operational alarm that alerts the Person in Charge to any system failure that could cause the over-application, overflow or spilling of agricultural effluent (e.g., sudden pressure drop, irrigator stoppage); and / or
    (b) an operational automatic switch-off system that prevents any over-application or spilling of agricultural effluent.

21. Where the agricultural effluent reticulation system is installed in such a way that effluent can be siphoned when pumping ceases, the Consent Holder shall install and maintain an anti-siphon device in the agricultural effluent pipeline.

22. In the event of the failure or mismanagement of the agricultural effluent disposal system, or any other event that may result in a discharge of agricultural effluent that may have significant adverse effect on water quality, particularly in the region of the abstraction point of a registered drinking-water supply, the Consent Holder shall notify, as soon as reasonably practicable, the following:

    (a) the Consent Authority (ph. 03 211 5115 or 03 211 5225 after hours); and
    (b) Southland District Council (ph. 0800 732 732).

Collected Agricultural Effluent Management Plan

23. Within three months of the first exercise of this consent, the Consent Holder shall prepare and submit to the Consent Authority a Collected Agricultural Effluent Management Plan. The Collected Agricultural Effluent Management Plan shall:
    (a) provide concise and clear direction to the Person in Charge and other staff on the operation of the agricultural effluent system.
    (b) identify environmental risks of agricultural effluent discharges specific to the farm including, but not limited to, locations of drains, surface waterways, sub-surface drainage and critical source areas in the agricultural effluent disposal area.
    (c) identify how the above environmental risks are avoided.
    (d) describe how each component of the agricultural effluent system is maintained and have regard to the information provided in the pond storage calculations provided in the application.
    (e) describe how agricultural effluent in storage is managed.
    (f) describe how agricultural effluent is managed when soils are at or above field capacity and/or during adverse weather conditions; and
    (g) describe how the stormwater diversion on the system is set up and managed.

24. Annually or more frequently, the Collected Agricultural Effluent Management Plan shall be reviewed, and the outcome of the review provided to the Consent Authority within one month.

25. If amended at any time, the most recent version of the Collected Agricultural Effluent Management Plan shall be provided to the Consent Authority within one month of the amendment.

Advice notes: *The Collected Agricultural Effluent Management Plan required by Condition 23 may be incorporated into the Farm Environmental Management Plan required by Rule 20, and prepared in accordance with Appendix N, of the proposed Southland Water and Land Plan (Decisions Version) (or any updated version of the plan).*

Review of consent

26. The Consent Authority may, in accordance with Sections 128 and 129 of the Resource Management Act 1991, serve notice on the Consent Holder of its intention to review the conditions of this consent during the period 1 February to 30 September each year, or within two months of any enforcement action being taken by the Consent Authority in relation to the exercise of this consent, for the purposes of:
    (a) Determining whether the conditions of this permit are adequate to deal with any adverse effect on the environment, including cumulative effects, which may arise from the exercise of the permit, and which it is appropriate to deal with at a later stage, or which become evident after the date of commencement of the permit.
    (b) Eensuring the conditions of this consent are consistent with any National Environmental Standards Regulations, relevant plans and/or the Environment Southland Regional Policy Statement;
    (c) Amending the monitoring programme to be undertaken;
    (d) Adding or adjusting compliance limits;
    (e) Ensuring the Apurimac Freshwater Management Unit meets the freshwater objectives and freshwater quality limits set in an operative regional plan or National Policy Statement for Freshwater Management; and
    (f) Requiring the Consent Holder to adopt the best practicable option to remove or reduce any adverse effect on the environment arising as a result of the exercise of this permit.

Re-issued on 18 April 2024 after amendment on conditions 2, 4, 9, 13, and Appendix 1.
Re-issued on 29 April 2024 after correction on Appendix 1.
Re-issued on 1 August 2024 after amendment on condition 2(b)

for the **Southland Regional Council**

Ryan Hodgson
Senior Consents Officer

Notes:

1. *The Consent Holder shall pay an annual administration and monitoring charge to the Consent Authority, collected in accordance with Section 36 of the Resource Management Act, 1991, payable in advance on 1 July each year.*

2. *In accordance with Section 125(1)(a) of the Resource Management Act, this consent will lapse after a period of five years after the date of commencement unless it is given effect to or an application is made to extend the lapse period before the consent lapses.*

3. *In accordance with section 126 of the Resource Management Act, 1991, this consent may be cancelled by the Consent Authority if not exercised for a continuous period of 5 years or more.*

4. *The Consent Holder is reminded that they may apply at any time under Section 127 of the Act to have any condition of this consent changed except that which specifies the expiry date of this consent.*

5. *If you require a replacement permit upon the expiry date of this permit, any new application should be lodged at least 6 months prior to the expiry date of this permit. Applying at least 6 months before the expiry date may enable you to continue to exercise this permit until a decision is made, and any appeals are resolved, on the replacement application.*

6. *Dairy shed effluent should not be discharged onto any land area that has been grazed within the previous 5-10 days. Where there has been significant damage to soil during grazing, it is recommended that effluent not be applied until that damage has been repaired.*

7. *Measuring the moisture content of the soil to determine when the soils are at or above field capacity can be done by either actual monitoring on site or by reference to the appropriate Council monitoring site. The Council's soil moisture monitoring sites can be viewed at* http://gis.es.govt.nz/ *and following the "Soil Moisture Map" link.*

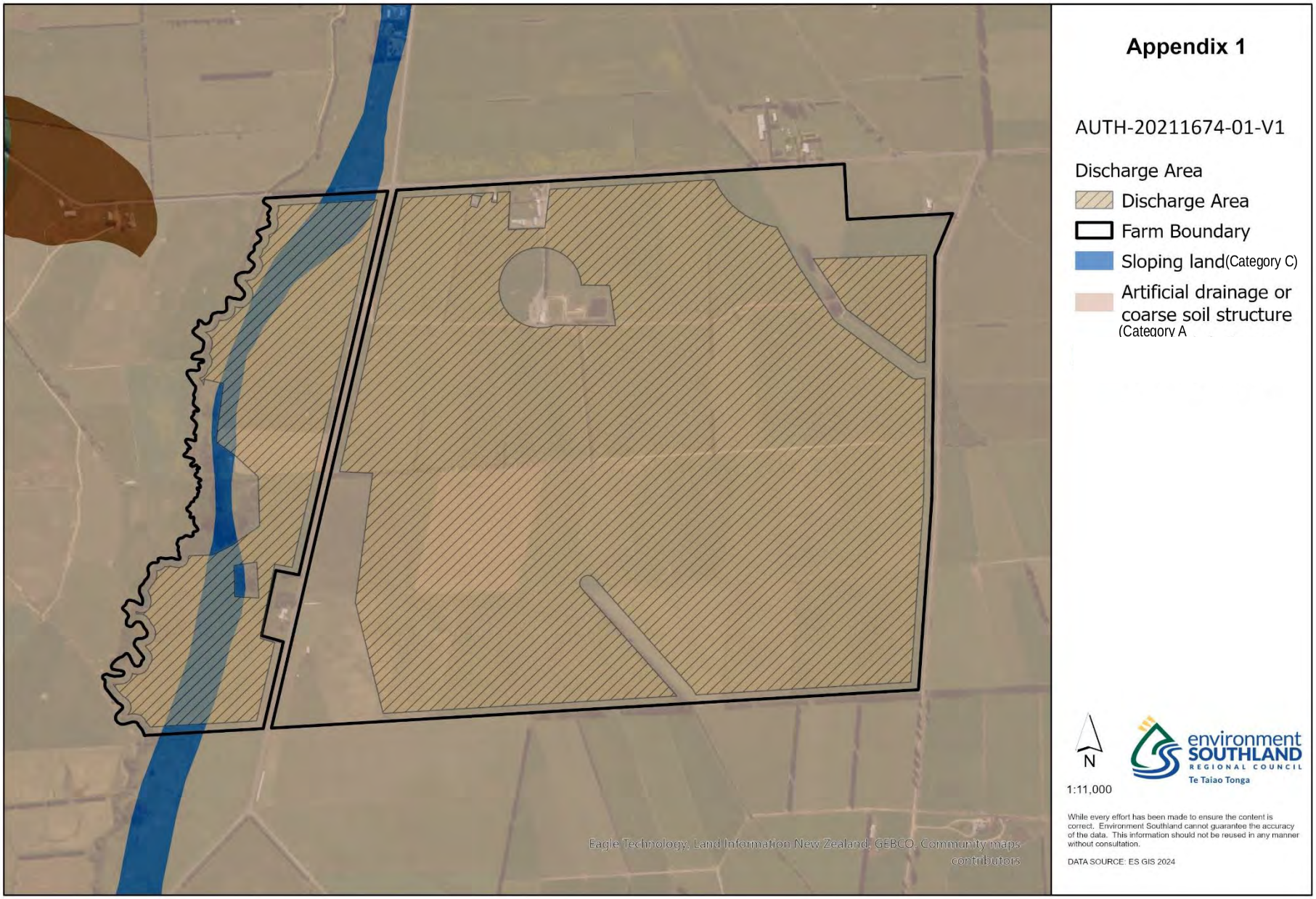
8. *Ponding is the accumulation of effluent on the soil surface resulting from the application of effluent to saturated soils, or the application of effluent inducing saturated soil conditions.*

9. *Extreme caution should be taken when applying nitrogen fertiliser to the effluent disposal area. It is recommended that a nutrient budget is used to check that nitrogen and potassium application rates to the effluent disposal area are not excessive.*

10. *The Consent Holder should display, in a prominent place in the dairy shed, a copy of the resource consent and relevant limits about the operation of the effluent disposal system that must be complied with.*

11. *Storage systems should be operated at low levels when conditions for effluent disposal are suitable in order to maintain storage for wet weather periods. In particular, storage systems should be emptied in late summer/early autumn to ensure sufficient storage capacity for the following late winter/early spring period.*

12. *The Proposed Southland Water and Land Plan (pawl) was notified by Environment Southland on the 3rd of June 2016. The Council's decision on the pawl was publicly notified on 4 April 2018. On and from that date the notified version of the pSWLP is replaced by the decisions version of the pSWLP. Rules within the pSWLP have immediate legal effect, including rules relating to the on-going use of land for dairy farming. Under Rule 20 of the pSWLP, a Management Plan will need to be prepared and developed in accordance with Appendix N of the pSWLP. This plan is to be provided to the Consent Authority upon request.*


Appendix 1
AUTH-20211674-01-V1
Discharge Area
Discharge Area
Farm Boundary
Sloping land(Category C)
Artificial drainage or coarse soil structure
(Category A
N
1:11,000
environment SOUTHLAND
REGIONAL COUNCIL
Te Taiao Tonga
While every effort has been made to ensure the content is correct. Environment Southland cannot guarantee the accuracy of the data. This information should not be reused in any manner without consultation.
DATA SOURCE: ES GIS 2024
Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors

AUTH-20233661

environment SOUTHLAND
REGIONAL COUNCIL
Te Taiao Tonga

Cnr North Road and Price Street
(Private Bag 90116
DX XY20175)
Invercargill

Telephone (03) 211 5115
Fax No. (03) 211 5252
Southland Freephone No. 0800 76 88 45

Land Use Consent

Under Section 104B of the Resource Management Act 1991, a resource consent is granted by the Southland Regional Council to **Paul Turner for Paul Turner Farm Trust of 1633 Wreys Bush Mossburn Road, Dunrobin, 9689** from **18 April 2024.**

Please read this Consent carefully, and ensure that any staff or contractors carrying out activities under this Consent on your behalf are aware of all the conditions of the Consent.

Details of Consent

Purpose for which permit is granted:		Use of land for two self-feeding silage pads (feed pads) including the built-in effluent storage facilities.
Location	- groundwater zone	Upper Aparima
	- FMU	Aparima
	- physiographic zone	Gleyed and Central Plains
	- catchment	Opio Stream, Aparima River and Kenny Creek
	- legal description	Section 152 Wairio SD

Expiry date: **31 May 2034**

History of Changes and Transfer

- **Consent conditions corrected on 1 August 2024**

Schedule of Conditions

1. This resource consent authorises the use of land for two self-feeding silage pads (feed pads) as described in the application for resource consent dated 14 December 2023[1]. The activity shall be limited to;
    (a) The use of land for two feed pads for up to 200 cows in each feed pad between 1 June and 30 September (inclusive); and
    (b) The use of the land for two feed pads for up to 450 cows during adverse weather conditions.

[1] Environment Southland document ID: A1022773

2. This consent shall be exercised in conjunction with Discharge Permit AUTH-20211674-01-V1 (or any subsequent variation versions).

3. The feed pads shall be located;

   (a) as described in the table below;

Feed pad 1:

Legal description	Section 152 Wairio SD
Map Reference of Feed Pad (NZTM 2000)	1218988E 4900013N
Property address	237 Sinclair Road, RD1, Otautau

Feed pad 2:

Legal description	Section 152 Wairio SD
Map Reference of Feed Pad (NZTM 2000)	1218991E 4899981N
Property address	237 Sinclair Road, RD1, Otautau

4. Both feed pads shall not be located within:
   (a) 50 metres of any surface watercourse;
   (b) 70 metres of any water abstraction point;
   (c) 200 metres of any place of assembly or dwelling not on the subject property;
   (d) 20 metres of any mapped tile drains; and
   (e) 20 metres from any property boundaries.

5.

5.1 Feed Pad 1 shall be:

   (a) No greater than 3,010 m² in area;
   (b) Constructed with a concrete effluent storage bunker to capture effluent generated on the feed pad.

5.2 Feed Pad 2 shall be:

   (a) No greater than 2,150 m² in area;
   (b) Constructed with a concrete effluent storage bunker to capture effluent generated on the feed pad.

6. Liquid effluent generated on the feed pads shall be captured and/or scraped into the effluent storage bunkers which are part of the main effluent system authorised by Discharge Permit AUTH-20211674-01-V1.

7. This consent does not authorise the discharge of any liquid effluent or animal and vegetative waste produced as a result of the activity authorised by this consent being undertaken.

Advice Note: *The Consent Holder shall discharge:*

(a) the feed pads sludge and associated vegetative matter in accordance with Rule 38 of the Proposed Southland Water and Land Plan (Decisions Version) or any subsequent versions; and

(b) the liquid effluent generated from the feed pads in accordance with the conditions of Discharge Permit AUTH-20211674-01-V1 (or any subsequent variation versions).

8. The Consent Authority may, in accordance with Sections 128 and 129 of the Resource Management Act 1991, serve notice on the consent holder of its intention to review the conditions of this consent during the period 1 February to 30 September each year, or within two months of any enforcement action being taken by the Consent Authority in relation to the exercise of this consent, or on receiving monitoring results, for the purposes of:

   (a) Determining whether the conditions of this permit are adequate to deal with any adverse effect on the environment, including cumulative effects, which may arise from the exercise of the permit, and which it is appropriate to deal with at a later stage, or which become evident after the date of commencement of the permit;
   (b) Ensuring the conditions of this consent are consistent with any National Environmental Standards Regulations, relevant plans and/or the Environment Southland Regional Policy Statement; or
   (c) Ensuring the Aparima Freshwater Management Unit meets the freshwater objectives and freshwater quality limits set in an operative regional plan or National Policy Statement for Freshwater Management.

Reissued on 1 August 2024 after amendment on condition 1(a)

for the **Southland Regional Council**

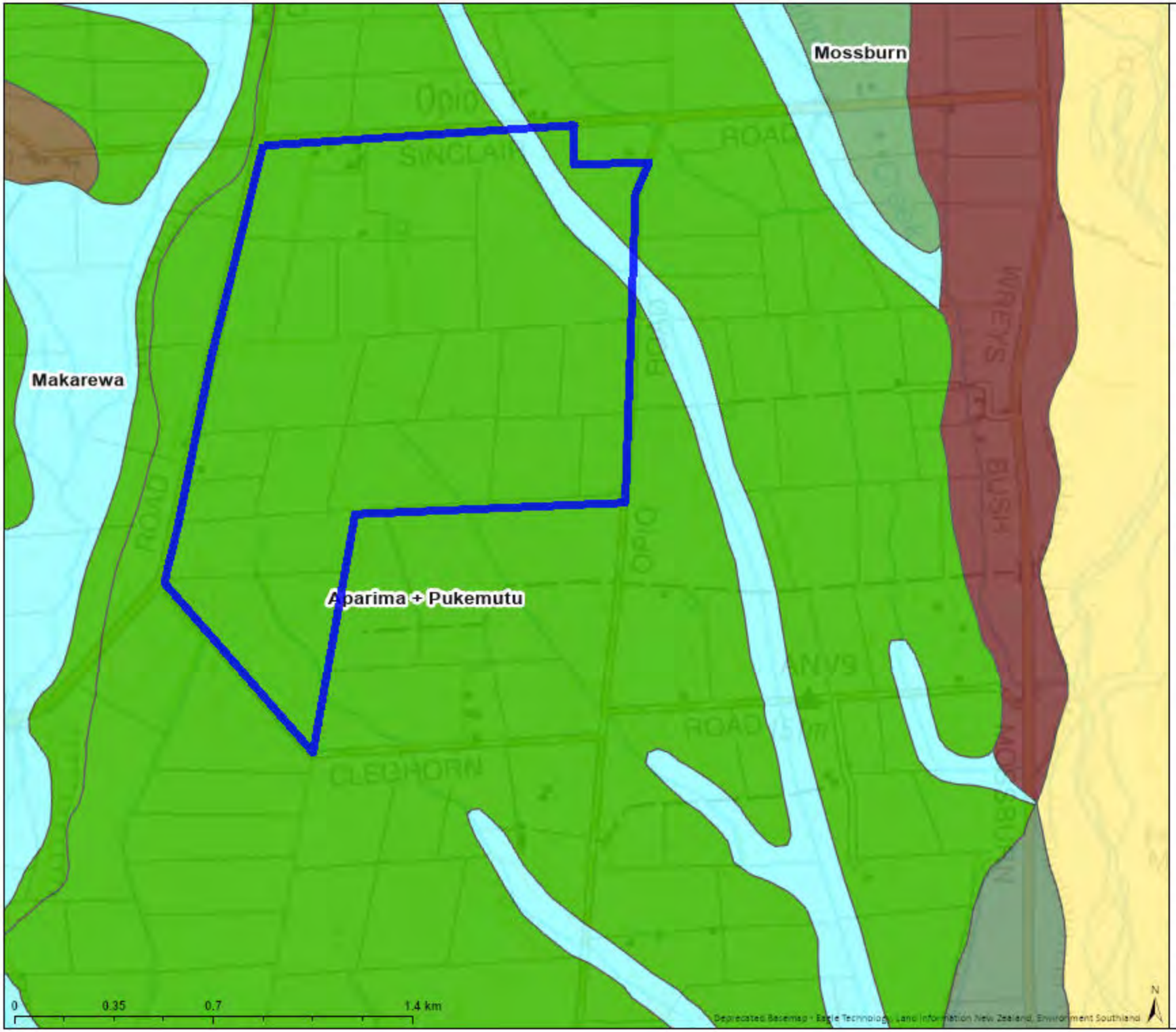
Ryan Hodgson
Senior Consents Officer

Notes

1. *In accordance with Section 125(1)(a) of the Resource Management Act, this consent shall lapse after a period of five years after the date of commencement unless it is given effect to or an application is made to extend the lapse period before the consent lapses.*

2. *The consent holder shall pay an annual administration and monitoring charge to the Consent Authority, collected in accordance with Section 36 of the Resource Management Act, 1991. This charge may include the costs of inspecting the site up to one time each year (or otherwise as set by the Consent Authority's Annual Plan).*

APPENDIX 2



environment SOUTHLAND REGIONAL COUNCIL
Te Taiao Tonga

Soil Map

Override 1

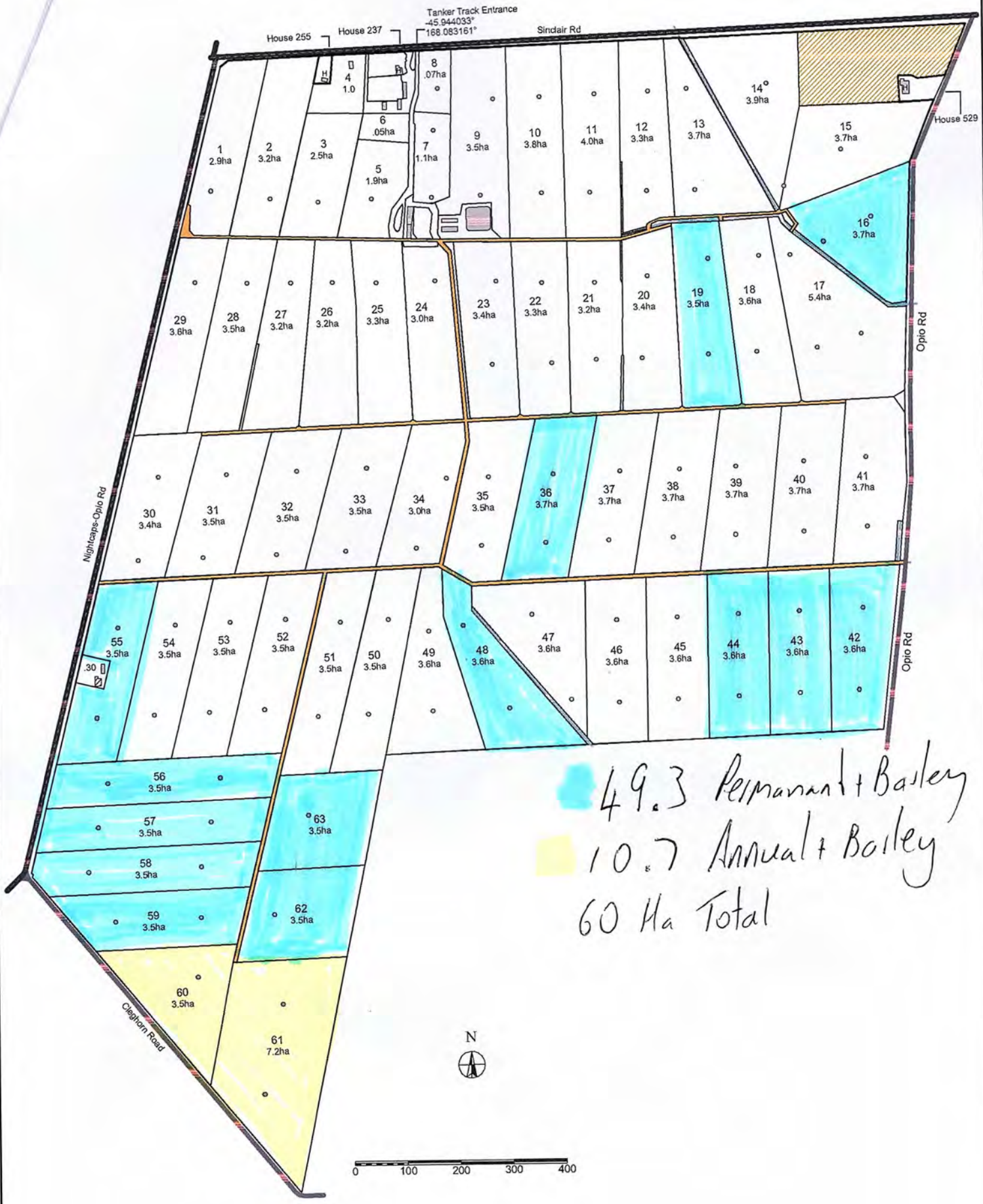
Soil Types

- Aparima
- Glenelg
- Makarewa
- Mossburn
- Oteramika
- Tuatapere
- Upukerora
- Waiau

Scale: 1:18,056
Map created: 29/08/2024

DATA SOURCE: ES GIS 2024

APPENDIX 3



49.3 Permanent + Barley

10.7 Annual + Barley

60 Ha Total

Etal Creek Opio Paul Turner 027 305 5843	Total Area: Effective Area: Paddock 1-63	220.69 ha 212.02 ha	**Farm Map**		Southland Farm Mapping Ltd GPS & Drone Surveying Chris Botha 021 134 7248
	237 Sinclair Road RD 1 Otautau Fonterra 35225	45°57'14.4"S 168°04'18.4"E		Surveyed : 26/09/2024 Drawn : 26/09/2024	

APPENDIX 4

Effluent Management Plan

Contact Details

Company Name:	***Paul Turner Farm Trust***	
RES Client Code: TUR20050-03	Dairy Supply Number (DSN): 35225	
Postal Address:	1633 Wreys Bush Mossburn Road RD1 Otautau 9689	
Current Consent details:	Discharge Permit: AUTH-20211674-01	Water permit: AUTH-20211674-02
Activity Location:	Address: 237 Sinclair Road Opio	Legal Description of land: Section 152 Block V Wairio Survey District, Section 154 Block V Wairio Survey District, Part of Section 153 Block V Wairio Survey District. (shown as 167.0728 ha)
Contact Details:	Paul Turner Farm Trust C/- Paul Turner 1633 Wreys Bush Mossburn Road RD1 Otautau 9689	Mobile: 027 305 5843 Landline: Email: paulandkayleen@farmside.co.nz
EMP Prepared By:	RES Rural Environmental Solutions Donna Corbin 42 Charlton Road Gore 9710	Mobile: 027 890 1234 Email: donna@res.kiwi.nz
On farm Contacts:	Farm Manager: Jordan Wiseman	Mobile: 027 384 6769 Email: jordan.wiseman95@gmail.com
	Person In charge of Effluent System: Jordan Wiseman	Mobile: 027 384 6769 Email: jordan.wiseman95@gmail.com

Table of Contents

Effluent Orientation and Training

Staff will be given a copy of this plan when they start working on the property. They will then be shown the effluent system and verbally trained on how it works, its components and they will be assigned a buddy to work alongside of while they learn each step.

Please refer to Appendix A for a copy of the DairyNZ "Effluent Orientation and Training Record" to be filled in for each staff member.

Overview of the Effluent System

We are consented to milk a maximum of 450 cows, twice a day, from the 1st of August till the 31st of May.

For effluent application from an all grass system, with no stock holding areas, a minimum area of approximately 4 ha/100 cows may be required, being 18 ha for 450 cows. The current effluent application area is approximately 140.5 ha (less any setbacks).

The following areas drain to the effluent system:

- shed pit
- tanker pad
- yard
- concrete entries
- stone trap
- twin weeping wall sludge bed
- old feed pad
- main effluent pond

The following areas do not drain to the effluent system:

- dairy shed roof

Figure 1 Overview of the effluent system.

Figure 2 Whole farm layout

Key Information about Effluent Disposal System

- Effluent is collected from:
  - 32 cup a side herringbone shed.
  - Tanker Pad, vats, pit, yard and concrete areas.
- Stormwater diversion
  - The dairy shed roof is permanently diverted.
  - The yard & entries, old feed pad are not diverted.
- Stone trap 1 (stone trap)
  - The stone trap is cleaned as required of a minimum of every 2-4 weeks.
  - Solids are spread directly to land as conditions allow, as per Rule 38 of the PSWLP (refer to Appendix C). They must not be spread deeper than 10mm depth.
  - Solids should not build up in any area of the stone trap enough to form a channel.
  - The stone trap drains into the twin weeping wall sludge bed.
- Approximately 31.5m³ of effluent is generated (on average) each day when the peak number of cows are being milked.
- Water use (from bore; D45/0037):
  - The yard is cleaned using fresh wash water and is scraped.
  - Up to 140 litres per cow, per day of water can be abstracted for shed wash down and stock drinking water.
    - Approximately 70 litres for shed wash down water.
    - Approximately 70 litres for stock drinking water.
  - 2 holding tanks are installed at the shed for fresh water for shed wash (being a volume of 60m³).
  - The more water that is used/caught, the more effluent is produced. Water use is reduced by:
    - Only wash side yards when necessary.
    - Being aware of the water use in the dairy shed at all times.
    - Work the hose water actively.
- Weeping Wall Sludge Bed - twin weeping wall sludge bed
  - The north sludge bed is approximately 36.5m long x 12m wide x 1.5m deep with an effective storage capacity of approximately 422m³, when the beds are empty.
  - The south sludge bed is approximately 36.5m long x 12m wide x 1.5m deep with an effective storage capacity of approximately 422m³, when the beds are empty.
  - Having a combined storage volume of approximately 845m³ in both beds.
  - Both sides should be spread over a minimum land area of 8.5ha (to provide an average depth of 10mm, as per rule 38 of the Proposed Southland Water and Land Plan).
  - No solids are to be spread to land during 1 May till 30 September, every year (as required by rule 38 of the Proposed Southland Water and land Plan).
- Main effluent storage (main effluent pond)
  - The pond has a synthetic liner, there is gas venting installed and a leak detection system is installed under the liner, it is approximately 51.7m long x 51.6m wide x 3.5m deep, with a 0.5m freeboard, having a storage volume of approximately 5,738m³ (including the sludge area at the bottom), when the pond is empty (The pond depth was taken from the Civil Tech pond drawings, with the opening dimensions being measured by RES on site).
  - Any day's effluent can be applied to land (any day there is a soil moisture deficit of greater than 3mm), effluent should be applied to land.
  - The main effluent storage pond level should be managed in accordance with Figure 5 Target Pond Levels.
  - A Pod Buddy Automatic Switch Off System automatic switch off system is installed at the pump, it does turn the pump off. A high/low pressure switch is installed.
- Effluent is applied to land from the main effluent storage pond, when soil and weather conditions allow.

- ❖ When soil or weather conditions are not suitable, effluent is stored in the main effluent storage pond.
- ❖ No effluent is applied when the soil moisture level is below 3mm deficit.
- ❖ The soil moisture deficit is determined before every application by referring to the ES Website for soil moisture (http://gis.es.govt.nz/index.aspx?app=soil-moisture), do not exceed the soil moisture deficit available- **Wairio Site**.
- ❖ No effluent is applied to land when the soil temperature is below 5 degrees.

➢ Effluent can be applied using the low-rate pods, umbilical cord and slurry tanker.

Figure 3 Consent Appendix 1 - Discharge area map.

Evaluating the Yard and Effluent System

This section is a simplified guide of how Environment Southland may look at your dairy shed, effluent system and effluent application. It should be used in conjunction with the DairyNZ resource, Dairy Farm Effluent- the rules for achieving compliance in Southland (refer to Appendix B for a copy of this document, or the DairyNZ website for the latest version).

What dilution is effluent considered to be by Environment Southland?

There is no definition that says effluent may be "this strength" or contain "this much" effluent to be considered for enforcement action. Just remember:

> "If it is effluent, if it has been in effluent, if it now contains effluent (no matter how small the effluent part is); if it contains any contaminants at all, it needs to be stored on a sealed and contained area until it can be applied to land at the right time and in the right way to be taken up by the grass"

Sealed and Contained

The Shed and Catchment Areas

From the shed, yard and other catchment areas; through to the pond, effluent lines and hydrants:

- Is the effluent on a sealed area?
    - Is it compressed material such as clay, lime rock or nap rock; or is it concrete; or does it have a suitable synthetic liner? AND
- Is the effluent contained?
    - Is the effluent contained in the sealed area? Is there any potential for effluent to run off the sealed area (either in the dry or in the wet, what would happen in a heavy rain fall event?).

Effluent Irrigation

When applying effluent to land by the irrigator:

- The application areas does not need to be sealed. BUT,
- The effluent must still be contained to:
    - The area you are applying to, at the depth you are applying it (including the spray drift, and not leaching into any tiles within this area). AND
    - The depth you are allowed to apply the effluent to in your consent. It must not be applied deeper than the consented individual application depth, or not exceeding 150kg N/ha/year (typically 30mm combined total per year).

Consented Rate and/or Depths for each type of Irrigation System.

The consented rate and depth for each type of irrigation system consented for use on the property is outlined in Discharge Permit AUTH-20211674-01. Before any other types of irrigator can be used the consent will need to be varied to allow the use of them (unless it is a low rate system, under condition 5 you can use a low rate system after an Application Rate test has been undertaken that demonstrates that the rate and depth requirements have been meet, and the test has been submitted to ES).

For a low-rate system this would be:

- Classification A soils- a rate of 10mm/hour at a depth not exceeding 25mm per application;
- Classification C soils- a rate of 10mm/hour at a depth not exceeding 10mm per application;

For a slurry tanker system, this would be:

- at a depth not exceeding 5mm per application;

For an umbilical cord system, this would be:

- at a depth not exceeding 10mm per application;

Potential Effect

Under the current Resource Management Act 1991 (RMA) the Regional Council can base their on farm assessment of effect on:

3 Meaning of effect
In this Act, unless the context otherwise requires, the term effect includes—
(a) any positive or adverse effect; and
(b) any temporary or permanent effect; and
(c) any past, present, or future effect; and
(d) any cumulative effect which arises over time or in combination with other effects—
regardless of the scale, intensity, duration, or frequency of the effect, and also includes—
(e) any potential effect of high probability; and
(f) any potential effect of low probability which has a high potential impact.
Section 3: amended, on 7 July 1993, by section 3 of the Resource Management Amendment Act 1993 (1993 No 65)

What Grading's can ES Give?

1- Fully Compliant.
2- Minor non-compliance. Usually given for paperwork related issues, or minor areas.
5- Marginal non-compliance. Usually given for small areas of possible effects. This is what will start showing a bad history for the farm. This could be one area of concern or made up of multiple concerns.
10- Significant non-compliance. Usually given for multiple small possible effects, medium to large possible effects and direct discharges, all 10's have a re-inspection and all 10's are possible prosecutions.

Effluent System Layout Summary

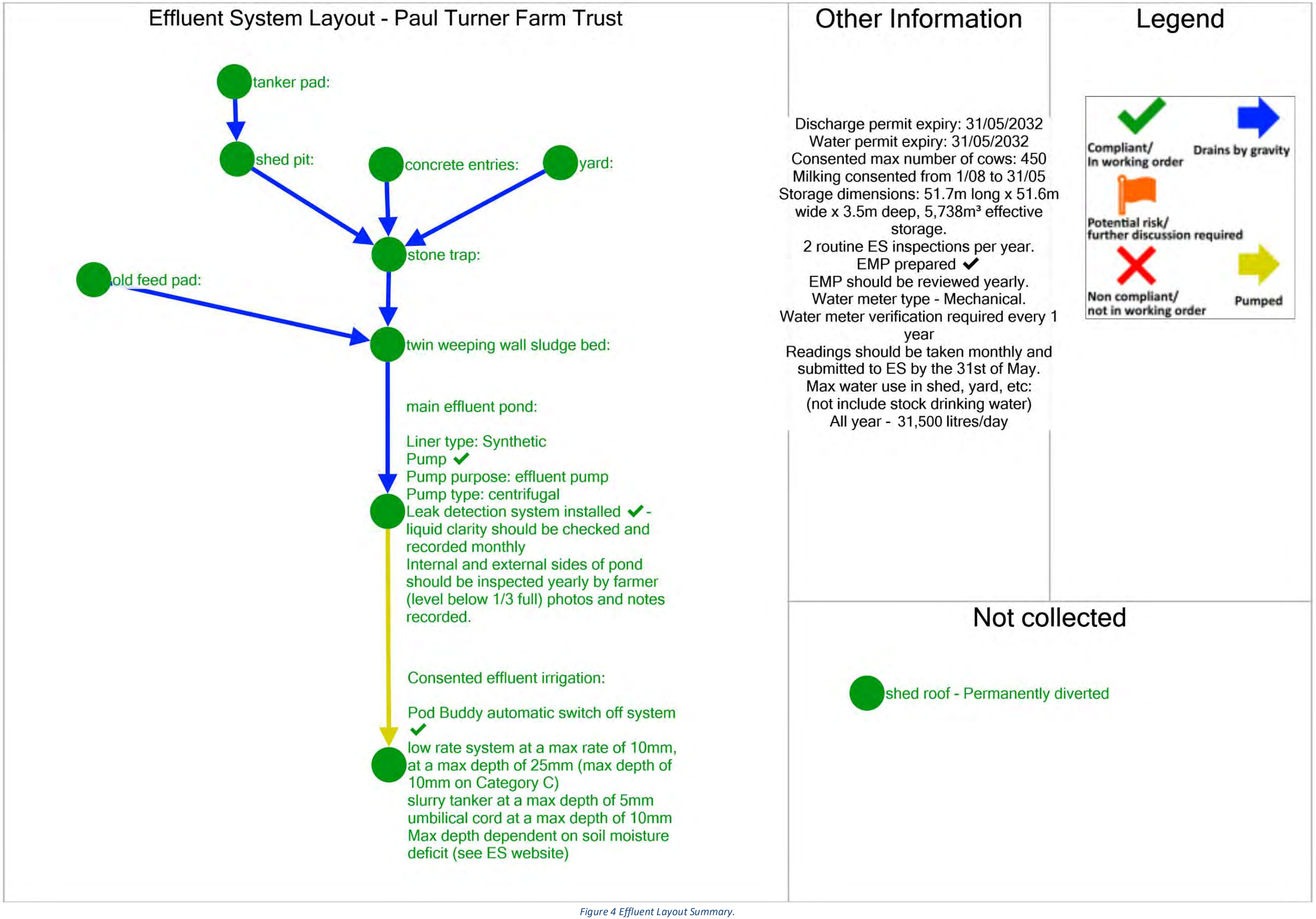


Figure 4 Effluent Layout Summary.

Set back Distances.

Effluent shall only be applied to the allowed discharge area.

The following set back distances will be adhered to at all times. The setback distance specified is measured from where the effluent lands.

On windy days the irrigator may need to be set back a lot further to ensure that all effluent lands outside of the setback zone.

Effluent shall not be discharged within:

(a) 20 metres of any surface watercourse;
(b) 100 metres of any water abstraction point;
(c) 200 metres of any place of assembly or dwelling not on the subject property; and
(d) 20 metres from any property boundaries.

Solids/Sludge Application.

All solids/sludges will be applied either:

- As per the Discharge permit requirements, or
- as per Rule 38 of the Proposed Southland Water and Land Plan. Refer to Appendix C for a copy of this rule.

Pond Size

The Dairy Effluent Storage Calculation for the farm is attached in Appendix D. The inputs should be checked yearly to ensure no changes have been made.

Effluent storage 1 - main effluent pond

The main effluent pond is approximately 51.7m long x 51.6m wide x 3.5m deep, excluding the pond freeboard there is approximately 5,738m³ of storage available for use when the pond is empty (The pond depth was taken from the Civil Tech pond drawings, with the opening dimensions being measured by RES on site).

Under the proposed management and infrastructure parameters described in this report and on the balance of probability, it is 90% likely that 5,563m³ of storage will be adequate for storage in any one year.

Target Pond Levels (assuming Pond is Sized Correctly)

Below is a guide for approximately when the pond should be at what level, during the year.

Aug/Sep/Oct

- If pond is more than 1/3 full going into this period strict management practices will be needed as it is likely you will have insufficent available storage.
- Discharge on any days that conditions are suitable.
- Soils are likely to have low infilltration rates.
- Expect approximately 2/3 of challenging rainfall, during Aug/Sept/Oct.
- Rain is coming.

Nov/Dec

- Empty Pond as soon as conditions are suitable.
- Ensure pond is empty before the Christmas holidays and heat comes (to help control odour).

Jan/Feb/Mar

- Empty the pond after the Christmas hoildays and keep empty.
- Discharge on any days conditions are suitable.
- Watch for cracking of soils.
- Do not irrigate on cracked soils.

Apr/May

- Pond should be empty going into April and at the end of April.
- Discharge on any days that conditions are suitable.
- Expect approximately 1/3 of challenging rainfall, from late April till end of May.

Jun/July

- Pond should be approximately 1/3 full going into June.
- Keep excess water out of pond during June and July, ie stormwater diversion.
- Only consider discharging during this time to keep pond level under 1/3 full, ready for August.
- Only apply on any days that conditions are suitable.
- Low nutrient uptake durign this time.
- Soils are likely to have low infilltration rates.

Figure 5 Target Pond Levels

Before applying Effluent to Land

- Check the ES Website for soil moisture, do not exceed the soil moisture deficit available.
    - The soil moisture deficit is determined before every application by referring to the ES Website for soil moisture (http://gis.es.govt.nz/index.aspx?app=soil-moisture) (**Wairio Site**). Do not exceed the soil moisture deficit available.
- Check the weather forecast, do not apply when rain is predicted within 4-6 hours.
- Check the location to be used is within the effluent application area of the consent.
- Check the irrigator is set on the fastest speed and is working correctly.
- Undertake a visual soils assessment before applying effluent.

Important Notes

- No effluent is to pond on the soil surface.
- No effluent is to get into waterways.
- The pond is not to overflow at any time.
- The pond is to be pumped out of anytime that soil moisture and weather conditions allow.
- Any days' effluent can be applied it should be applied.
- The pond is only to be used when soils moisture and weather conditions do not allow effluent to be applied.

Irrigator Set Up

The DairyNZ resource, A staff guide to operating your effluent irrigator system – Low Rate, will be used to train staff and techniques to setting up the irrigator for each run.

Visual Soils Assessment

Check paddocks manually - look and listen. Do not irrigate if:

There is already water puddling on the ground/worms on surface.

You can hear/see water or wet mud under foot when you walk.

It has been raining a lot, snowing or the ground is frozen.

The soil makes a 'worm' when rolled, sticks to your thumb when rolled or free water appears when squeezed.

Refer to pages 8-22 of The DairyNZ resource, A staff guide to operating your effluent irrigator system – Low Rate System (refer to Appendix E).

AND:

- Determine the soil moisture deficit (www.es.govt.nz).
  - The soil moisture deficit is determined before every application by referring to the ES Website for soil moisture (http://gis.es.govt.nz/index.aspx?app=soil-moisture) **(Wairio Site).** Do not exceed the soil moisture deficit available.
- Determine the weather forecast (https://www.yr.no/place/New_Zealand/).
- Determine location is within the allowed effluent application area of the Consent.
- Check application regularly for ponding, pooling or runoff.
- Observe:
  - Do not apply if puddles of water are already present.
  - Pugging in paddock.
  - Low areas.
  - Tiles/swales and critical source areas for runoff.
  - Slope.

Traffic Light Map

Figure 6 Traffic Light Map.

The traffic light map below (Figure 6) has been prepared by Paul Turner (on 5/4/2022) to reflect know levels of soil risk for effluent application. These areas should be reviewed yearly to ensure they still reflect the associated risk.

An assessment of the paddock, soil moisture and weather forecast should always be referred to before applying effluent. This map is an indication only and should be used as a guide only. It may change at different times of the year.

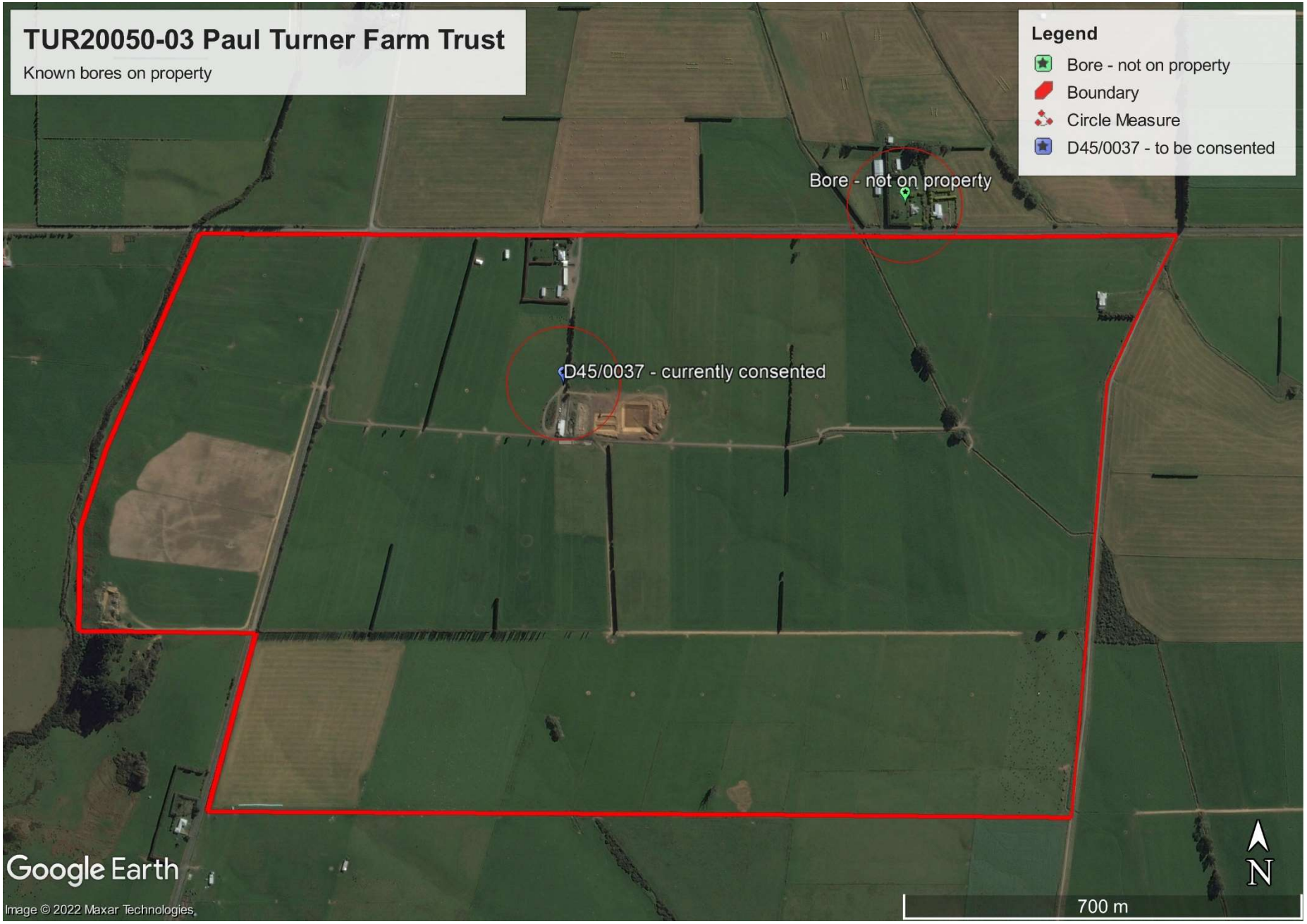
If the area is not suitable or safe to use for effluent application, or you cannot follow the recommendations below please contact the farm manager immediately for further advice.

Each land area should only be used for effluent irrigation once every 4 months (with at least 28 days between each application at all times).

The soil moisture deficit is determined before every application by referring to the ES Website for soil moisture (http://gis.es.govt.nz/index.aspx?app=soil-moisture), do not exceed the soil moisture deficit available- **Wairio Site**.

Traffic Light Map Coloured Areas	Description	Soil Moisture Deficit:	Recommended Area from the traffic light map to apply effluent:
		0-3mm	No effluent application through the pod system.
Green areas	Lowest risk areas (use mainly in the wetter times)	3-8mm	Green areas only.
Orange areas	Medium risk areas (use mainly in normal operating conditions)	8-15mm	Orange areas. (Green can be used if needed, but better to keep these areas for 3-8mm).
Red areas	Highest risk areas (use only in drier times)	15-25mm	Red and Orange areas.
		30mm+	Be very careful of any dry areas and potential cracking (visible or not) as these cracks can easily drain to a subsurface tile or harder pan. Which can easily flow directly to a waterway.
Purple areas	Areas within consented discharge area that have yet to be assessed for risk.	TBC	Can be used to apply effluent once risk has been determined and been added to the traffic light map.
Black areas	Voluntary no discharge areas		No effluent application unless authorised prior by the consent holder.
Clear non coloured areas	Not within consented discharge area.		No effluent application.

Known bores on property



Soil Classification Summary

Figure 7 Soil Classifications.

The soil classifications identified in the effluent discharge area are Classification A (approximately 135.2 ha) and Classification C (approximately 5.3 ha):

Soil Classification	Description	AgResearch Application Recommendations
A (pink area)	Artificial drainage or course soil structure.	High risk soils for effluent irrigation; only apply when a soil moisture deficit exists; only apply up to, or equal to the existing soil moisture deficit; maximum rate 10mm/hour, maximum depth using a low rate system 25mm; using a standard travelling irrigator, slurry tanker or umbilical cord, 10mm depth.
C (blue area)	Sloping land. Areas with greater than 7° of slope will not be irrigated on.	High risk soils for effluent irrigation; only apply when a soil moisture deficit exists; only apply up to, or equal to the existing soil moisture deficit; maximum rate 10mm/hour, maximum depth using a low rate system, 10mm; a standard travelling irrigator is not recommended on these soils, however slurry tankers and umbilical cords systems at low depths can be used to apply a 10mm depth or less.

Soil Type Summary

Figure 8 Soil Types.

There are 2 dominant soil types identified on the property Aparima (approximately 157.08ha) and Makarewa (approximately 10ha):

Soil Type	Soil Classification	Vulnerability Factors					
		Drainage	Structural Compaction	Nutrient Leaching	Topsoil Erodibility by water	Organic matter loss	Waterlogging
Aparima	A or C	Imperfectly drained	moderate	moderate	slight	slight	moderate
Makarewa	A	Poorly drained	moderate	slight	minimal	slight	Severe

Physiographic Zones

The dairy platform has 2 Physiographic zones identified, the predominant is Gleyed (no variant and overland flow variant approximately 161.63ha) and Central Plains (no variant approximately 5.44ha).

Figure 9 Physiographic Zones.

Effluent Application Records

Effluent application records are to be recorded for each run. This information is recorded in the dairy diary.

Contractor

If any contractors are used to apply effluent to the farm, the contractor must be provided with a map of the farm showing them the areas to be used (these areas should be assessed by the person in charge of the effluent system just before application occurs). The application rates and depths are to be recorded on the map.

A copy of the map will be kept by the person in charge of the effluent system and placed into the effluent application records.

The contractor should be able to tell you what rate and death will be applied and confirmed the volume of effluent applied to each area.

The contractor must provide a summary of the areas applied to, litres (m^3) and the rate/depth applied for each application. This record is kept in the effluent application records.

The contractor is provided with a map of the farm showing them the areas to be used. No more than 10mm per application is applied. The contractor works out the application depth by using the speed of the tractor and the flow rate.

Application Rate Test

An application rate test will be undertaken every two years to ensure compliance with the current Environment Southland Discharge Permit. It will be undertaken following the Dairy NZ guidelines(found in "A staff guide to operating your effluent irrigation system- Low Rate) and calculated using the calculation methods in the back of this resource.

Soil Temperature

Do not apply effluent when the soil temperature is below 5 degrees.

Environment Southland Consents

Discharge Permit – AUTH-20211674-01

Discharge Permit: AUTH-20211674-01 expires 31/05/2032

A copy of the Discharge Permit is attached to Appendix F. The conditions of the consent *will be adhered to at all times by all staff*.

Water Permit – AUTH-20211674-02

Water Permit: AUTH-20211674-02 expires 31/05/2032

A copy of the Water Permit is attached to Appendix G. The conditions of the consent *will be adhered to at all times by all staff*.

What if you can't follow the Standard Operating Guidelines in this Plan

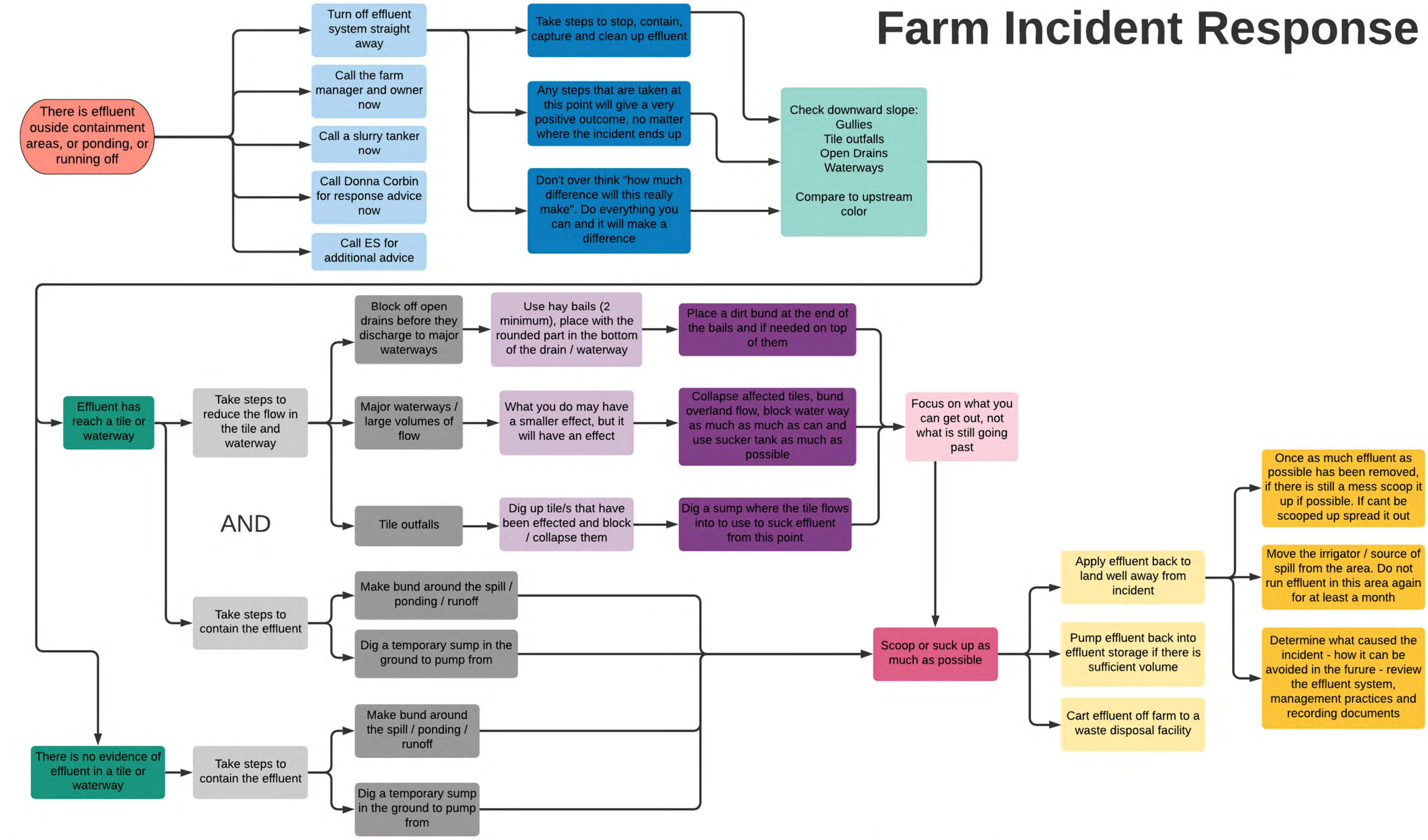
Do not run the effluent application system, ensure effluent is being stored in the main effluent pond and advise the manager immediately.

Follow their advice.

What to do if there is a Problem

Turn off the effluent system and advise Manger immediately. All possible steps to stop, reduce and clean up the incident are to be undertaken.

Incident Response



RES RURAL ENVIRONMENTAL SOLUTIONS
INDEPENDENT CONSULTANCY
DONNA CORBIN
027 890 1234 - donna@res.kiwi.nz - www.res.kiwi.nz

Emergency Numbers:

Donna Corbin	• 027 890 1234
DairyNZ	• 0800 4324 7969
Fonterra	• 0800 65 65 68
Open Country	• 0800 8255 6455
Environment Southland	• 03 211 5115
Slurry Tankers	• Caldwells: 027 436 4663
	• Thompsons: 027 439 2842

System Checks and Maintenance

Action	*Comments*	*Frequency (X= min recommended)*						
		daily	*weekly*	*Fortnightly*	*Monthly*	*6 monthly*	*Yearly*	*other*
Dairy Shed, Yard and Tanker Pad Areas								
Check dairy shed, yard and effluent system for compliance with regional rules and good practice.	Refer to the section above "Evaluating the yard and effluent system", to assess all areas as being sealed and contained.	X						
Check float switch and pump are operating correctly in the pit.	If installed.	X						
All pipe work is secure.			X					
Any leaking/dripping taps are fixed with a permanent solution.		X						
Any transfer pumps are greased (where relevant) and checked for wear and tear and odd noises.					X			
Stone Trap								
No blockages and are free of any obstacles.		X						
Clean/remove solids from stone trap.	Make sure no effluent/solids is outside the stone trap after cleaning.				X			
Emptied yearly, an internal inspection undertaken and photos saved.							X	
Weeping Wall Sludge Bed/s (twin weeping wall sludge bed***)***								
Is protection under incoming flow in place, any damage/cracks/holes/defects to internal embankments?			X					

Action	***Comments***	***Frequency (X= min recommended)***						
		daily	***weekly***	***Fortnightly***	***Monthly***	***6 monthly***	***Yearly***	***other***
Do the weeping wall beds need switched over or emptied?					X			
Emptied yearly, an internal inspection undertaken and photos saved.							X	
Any transfer pumps are greased (where relevant) and checked for wear and tear and odd noises.					X			
Main Storage Structure (main effluent pond)								
Check lines/pipes incoming and outgoing pipes for blockages and any damage under the incoming pipes and liquid flow areas.		X						
Monitor level.	If level is above 80% full check daily.		X					
	Report pond level to the consent holder weekly.		X					
Storage level is appropriate for the time of year (refer to Figure 5 for guidance).					X			
Pond level assessed and visual assessment of structure.	Including any damage above effluent line, soft spots, lush weed growth, etc.				X			
Check inspection chamber (located southeast of the pond).	If flow present then take a clear jar sample, try not to disturb bottom and sides. If no flow, assess the bottom and sides of flow area for effluent residue. Take lots of photos- record check in dairy diary.				X			

Action	***Comments***	***Frequency (X= min recommended)***						
		daily	***weekly***	***Fortnightly***	***Monthly***	***6 monthly***	***Yearly***	***other***
Effluent pump checked.	Greased (where relevant) and checked for wear and tear and odd noises.				X			
Alarms and control systems checked are in working order.					X			
Inspection Chamber water sample.	Send a sample to the lab for a yearly check. At minimum test for: Electrical Conductivity, Ammoniacal Nitrogen, E.Coli, pH, DRP and if sufficient volume BOD5.						X	
Check inputs for the Pond Storage Calculation have not changed.							X	
Storage practically emptied yearly (to within 300-500mm of very bottom) and lots of photos taken. Internal inspection undertaken.							X	
Pumps								
Check pumps and motors, grease if required, report strange noises- grease minimum of every 2 months.					X			
All pumps and stirrers are serviced yearly by Progressive Engineering.							X	
Spare pumps/motors.	Check/start any spare pumps monthly and service yearly.				X		X	
Irrigator (low rate pods***)***								
Check soil moisture deficit and weather report.	The soil moisture deficit is determined before every application by referring to the ES Website for soil moisture	X						

Action	Comments	Frequency (X= min recommended)						
		daily	weekly	Fortnightly	Monthly	6 monthly	Yearly	other
	(http://gis.es.govt.nz/index.aspx?app=soil-moisture), do not exceed the soil moisture deficit available (**Wairio Site**).							
Determine when, where and how much effluent is to be applied.		X						
Visual soils inspection is undertaken of area before setting up irrigator.		X						
Record application area, run time and gearing.	For every run.	X						
Irrigator set up correctly and check working order.	Ensure the pods are set up so that no overlapping of application occurs. All pods should have a 8-9mm nozzle (the same on each pod), the automatic switch off system should be in working order. Set application timing based on the soil moisture deficit available each run. Check set back distances from waterways, boundaries etc.	X						
Automatic switch off system is working correctly.		X						
Grease irrigator and pump moving parts (if required).					X			
Check irrigator nozzles are not worn or split (replace if they are).					X			
Add any newly identified tiles or drains to map.								X- as found

Action	*Comments*	*Frequency (X= min recommended)*						
		daily	*weekly*	*Fortnightly*	*Monthly*	*6 monthly*	*Yearly*	*other*
Assess hydrants and lines, repair or replace as necessary								X- as found
Effluent Application Rate Test (check depth effluent is being applied).	Typically, November through March is good for this.							X- every 2 years.
Consents								
Water meter readings.	From Bore Meter.				X			
Water readings sent in by 31 May (keep a copy for yourself).	Ensure any volume after the final reading (prior to 31 May) is included in the next years readings.						X- before the 31 May each year.	
Does the water meter need verified as required by consent?								X- every 5 years.
Review of Effluent Management Plan Undertaken.	Typically June/July is a good time for this, before the start of each season.						X	
Farm Environmental Management Plan reviewed yearly. Good Management Practices reviewed and updated, Crop/Wintering Plan reviewed and set.							X	
Staff Training								
New staff are to be given a copy of the EMP when they start and are trained in accordance with this plan.							X	
Existing staff review the EMP at the start of each season (June/July).							X	

Known Waterways / Open Drains and Tiles / Swales Map

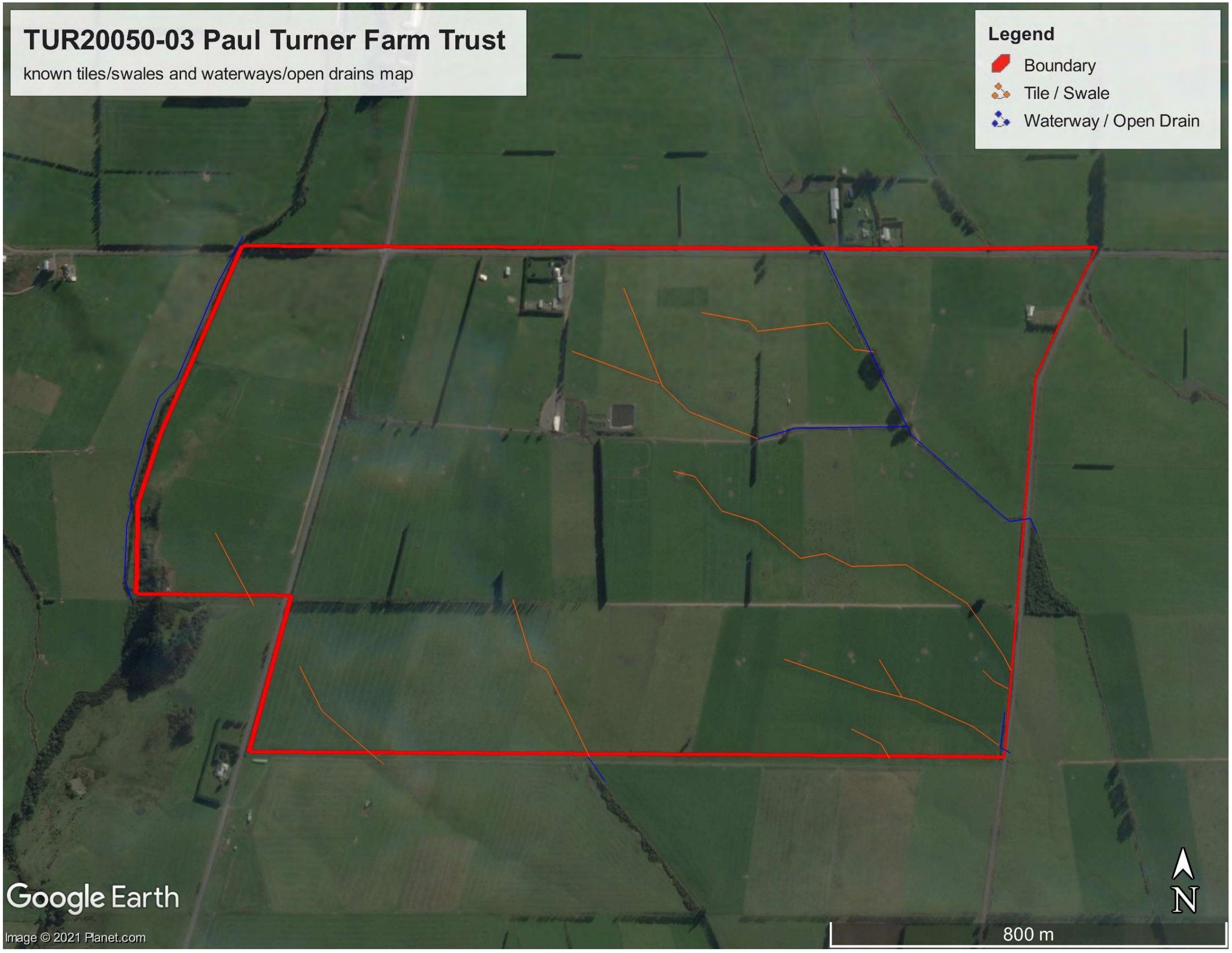


Figure 10 Known tiles and waterways.

Appendices

Appendix A

DairyNZ- Effluent Orientation and Training Record.

Effluent Orientation and Training Record

Season___/___

Effluent Competencies	Employee name	Employee name	Employee name
General			
Understands the regional council rules and farm policies for effluent management			
Understands health and safety around the effluent system			
Understands record keeping for irrigator runs and maintenance			
At the Dairy			
Use of stormwater diversion system			
Good hosing practice and water management			
Animal handling to minimise effluent volume			
Cleaning the stone trap			
Sump, pump & pond monitoring and management (including float switches)			
In the Paddock			
When to irrigate: assessing soil and weather conditions			
Where to irrigate: runs, paddock rotations, high risk vs low risk soils etc (mark on farm map)			
Where not to irrigate: near waterways, drains, boundaries, slopes etc (mark on farm map)			
How the irrigator works, how to use it, set up, hose layout and performance checks			
Measuring the depth of effluent application			
Irrigator, pump maintenance/cleaning			
Greasing and general maintenance requirements (how and when)			
How to check and replace rubber nozzles and seals (same time as dairy rubber ware)			
Tyre pressure and condition			
Pipe-work, hose and hydrant condition			
Wire-rope, cam and ratchet condition			
Other			

Trainer signature			
Employee signature			
Date			

Date when staff become competent in each skill. If all training provided in one day, tick and date at the bottom.

DairyNZ

Appendix B

DairyNZ- FDE- the rules for achieving compliance in Southland.

Dairy farm effluent

– the rules for achieving compliance in Southland

This checklist is a self audit to give farmers confidence they will pass an Environment Southland Compliance Assessment. The checklist is for your own information and you do not have to share it with any organisation.

We recommend you follow up any boxes that are not ticked as soon as possible. If you need assistance, please contact one of the organisations listed at the back of the checklist.

- Not all resource consents are the same. Some older consents will not list all the conditions in this checklist but will likely be in your next consent. It's a good idea to read this checklist in conjunction with your individual consent
- You must remain compliant with your consent requirements every day – regardless of the time of year, weather, breakdowns or staffing issues
- Ensure you have a plan in place to cope with all of the above scenarios
- Enforcement action is considered on a case-by-case basis, and specific factors, such as a breach during times of flood, will be taken into account during enforcement decision making
- Make sure all staff on your farm know the rules, are fully trained in the operation and maintenance of the effluent system, and know what to do and who to contact if the system breaks down
- Always aim for good practice rather than just achieving compliance
- Check the expiry date on your consent and make sure you submit new applications at least six months before the expiry date.

OpenCountry Partnership by Choice

Federated Farmers of New Zealand

environment SOUTHLAND Te Taiao Tonga

Fonterra Dairy for life

DairyNZ

Version 5, February 2015

Southland checklist

1. Get familiar with the conditions of your consent and actively seek compliance	
Much of the non-compliance reported in Southland is for minor issues that can easily be avoided. Take the time to go through your consent and make sure that all the administrative conditions have been fulfilled	
No significant farm system changes have been made since the effluent system was designed as covered by your consent (i.e. type of irrigator, underpass, wintering pad, new pond etc)	
Effluent is only applied to the area of land specified in your consent document	
The number of cows being milked is within the limit specified on the consent	
A copy of your effluent consent is displayed in a prominent place in the dairy shed[1]	
A copy of the effluent management plan has been provided to all employees	
Consent is current and previous consents that are no longer required have been surrendered	
All other requirements of the consent have been fulfilled	
If property has been bought/sold consent has been transferred to the new owner	
2. Have an effluent system that is capable of complying with your consent conditions, in terms of infrastructure and ongoing maintenance	
Good practice: • *Have effluent samples lab-tested for nutrient concentration* • *Optimise nutrient use efficiency by applying effluent over a sufficient area* • *Check actual effective area that will have effluent applied and allow a buffer for waterways/boundaries*	
There is sufficient effluent storage for times when soil moisture levels are high[2]	
All effluent is contained within structures (ponds or sumps) as specified in your consent, prior to application	
Sumps are sealed and designed so that any overflows are directed into a sealed holding pond	
The depth (mm) and rate (mm/hr) of effluent application has been measured and it satisfies the requirements of the consent	
The application area is large enough to meet the requirements of the consent for N loading[3]	
The pump pressure is sufficient to ensure compliant effluent application depths can be met over all of the effluent area	
A regular maintenance regime is in place for the effluent system – such as greasing, hosing-down, pond storage capacity, unblocking stirrer, nozzles, tyres, checking pipes, hydrants, stone traps	
Contingency measures are in place in the event of a system failure[4]	
Effluent solids, sludges and slurries (i.e. from ponds, feed pads and sand trap cleanings) are stored on a sealed surface which drains back into the effluent system. Solids are spread evenly (less than 7mm depth) on pasture to avoid over loading with nutrients in one area[5]	
Stand-off pads are designed so that all effluent is contained within a bedding layer, or collected in a sealed effluent system. When replacing the bedding layer, the old material is spread evenly on pasture to avoid over-loading of nutrients in one area[6]	
A fail-safe device is in place to reduce the risk of a discharge if anything goes wrong	
All areas used to store or transport effluent or sludge are sealed[5]	

3. Get the right amount of effluent on the soil at the right time and in the right place	
A good effluent system will apply effluent to soil:	
At an application rate (mm/hr) which does not result in ponding and effluent runoff. Generally no irrigation of effluent to pasture should occur when rainfall results in the soil becoming saturated (i.e. free water appears on the soil when squeezed).[7] Refer to the soil moisture information on www.es.govt.nz if you do not have your own	
At an appropriate depth (mm) for the soil and within the limit specified on your consent	
At least 20 metres between the edge of the application landing area and waterways and adjacent property boundaries, and within the area specified on consent[8] 100m from any existing potable water abstraction point 100m from any residential dwelling	
Effluent systems that can deliver these results will save you money through better nutrient utilisation and will help prevent environmental effects on water	
4. People and systems (these are not always requirements of your consent, but will help you and your staff comply on a daily basis)	
Everyone in the farming operation understands the importance of effluent management and the consequences of non-compliance	
Everyone knows what to do if something goes wrong	
A training schedule is maintained for staff with direct effluent management responsibilities	
An effluent management plan is in place that clearly defines responsibilities and procedures ***Good practice:*** Record effluent irrigator runs – where, date, number of returns etc	
External training courses are utilised to increase understanding of good practice	
5. Check for other sources of effluent outside of the dairy	
Ensure that runoff from other hard stand areas is directed into your effluent system, and that the volume is included as part of your effluent consent. ***Such areas might include:***	
Feed pad effluent	
Stand-off pad effluent	
Underpass effluent	
Bridges/culverts	
Laneways (entry and exit points)	

[1] Not all consents require this, but it's a good idea anyway. If you would like a copy of your consent, call Environment Southland

[2] Storage requirements are dependent on many factors

[3] Refer to your nutrient budget in order to determine your farm's N loading on your effluent application area

[4] Contingency measures include things like additional storage capacity, having a spare pump or irrigator, staff know who to call etc

[5] Sealed means does not leak, such as concrete, lined or compacted clay (where the soil type is suitable to do this)

[6] If your stand-off pad is unable to be designed to contain all effluent, you may need to apply for a resource consent to authorise it

[7] Topography, rainfall, soil moisture, soil type and drainage all influence the risk of runoff and ponding. A soil moisture probe can be used to check soil moisture

[8] Defined as surface water body, drainage canal, drain and bores

Other Environment Southland Rules

Remember there are regional plans for Southland that might have rules relating to activities on your farm. Of relevance are the Regional Water Plan, the Solid Waste Management Plan and the Effluent Land Application Plan.

Examples where resource consents may be required include the following:

6. Farm dumps	
Any solid waste generated from farming activities, that is disposed of into or onto land will require a resource consent if you are not able to meet the criteria listed below:	
The solid waste is generated on the farm, on which the disposal site is located	
No offal is placed in the dump	
No hazardous waste, sludge, oil or chemical containers with chemical residues are disposed of in the dump	
No solid waste is deposited into any water body	
No surface water runoff enters the farm landfill	
No waste is deposited within 50m of a watercourse, potable water supply or property boundary	
7. Offal holes	
Placing farm offal into an offal hole requires a resource consent if you are not able to meet the criteria listed below. The offal holes must be:	
Located more than 50m from any watercourse	
Excavated at least 24 hours before they are used	
In a location where water will not accumulate in the bottom of the hole, nor surface runoff able to flow into the hole	
No offal is deposited within 50m of a watercourse, potable water supply or property boundary	
8. Silage pits and stacks	
The location of silage pits and stacks can affect water quality in some circumstances. The movement of leachate onto or into farm land from silage pits requires resource consent unless you ensure you meet the following criteria:	
The silage storage facility is not located; • within 50 m of any surface water body or naturally occurring wetland, or any potable water abstraction point, *or* • within 100 m of any dwelling or place of assembly, on another landholding constructed or in use prior to the silage storage facility being lawfully established, *or* • on land that is contaminated, permanently or intermittently wet, unless the silage is stored on a sealed concrete pad with all leachate controlled.	
There is no discharge of any noxious, dangerous, offensive or objectionable effect beyond the boundary of the landholding or on waàhi tapu or archaeological sites	
There is no discharge of contaminants to any water or naturally occurring wetland	
There is no overland flow of stormwater into the silage storage facility	

9. Effluent sludge application to land	
Discharge of effluent sludge to land can cause an environmental impact if it is not carefully managed. Sludge application will be non compliant if you are not able to meet the following criteria:	
Applied at least 100m from any residential dwelling other than those on the property	
At least 20m from any waterbody, wetland or coastal marine area	
Lane way scrapings are stockpiled on a sealed surface that does not leak, such as concrete, lined or compacted clay	
10. New dairy conversions	
All new dairy conversions in Southland have to apply for four resource consents before converting:	
1. Discharge Consent for the discharge of dairy shed effluent 2. Water Consent to take ground or surface water for stock watering and dairy shed wash down. 3. Land use Consent to convert the property to a dairy farm. Includes profiling the soil to determine its suitability for intensive farming, and an environmental management plan to mitigate environmental risks 4. Land use Consent to install an effluent pond Additional consents may be required for the use of water bores or gravel extraction for example.	

Contacts

You can check out the rules in the regional plans at: www.es.govt.nz. If you are not sure of any of the questions in this checklist, or need further assistance contact:

DairyNZ	Sustainability team 0800 4 DairyNZ (0800 4 324 7969)
Fonterra	Sustainable Dairying Team 0800 65 65 68
Open Country Dairy	0508 Our Milk (0508 687 6455)
Environment Southland	0800 76 88 45
Federated Farmers	0800 Farming (0800 327 6464)
Primary ITO	0800 80 20 80

Appendix H - Management Plan Review Log

This plan is to be reviewed every 12 months to check it still accurately reflects on-site activities and whether any improvements to management procedures need to be made. The results of the review are to be reported to ES within 1 month of the review being undertaken (even if no changes to the existing plan are made).

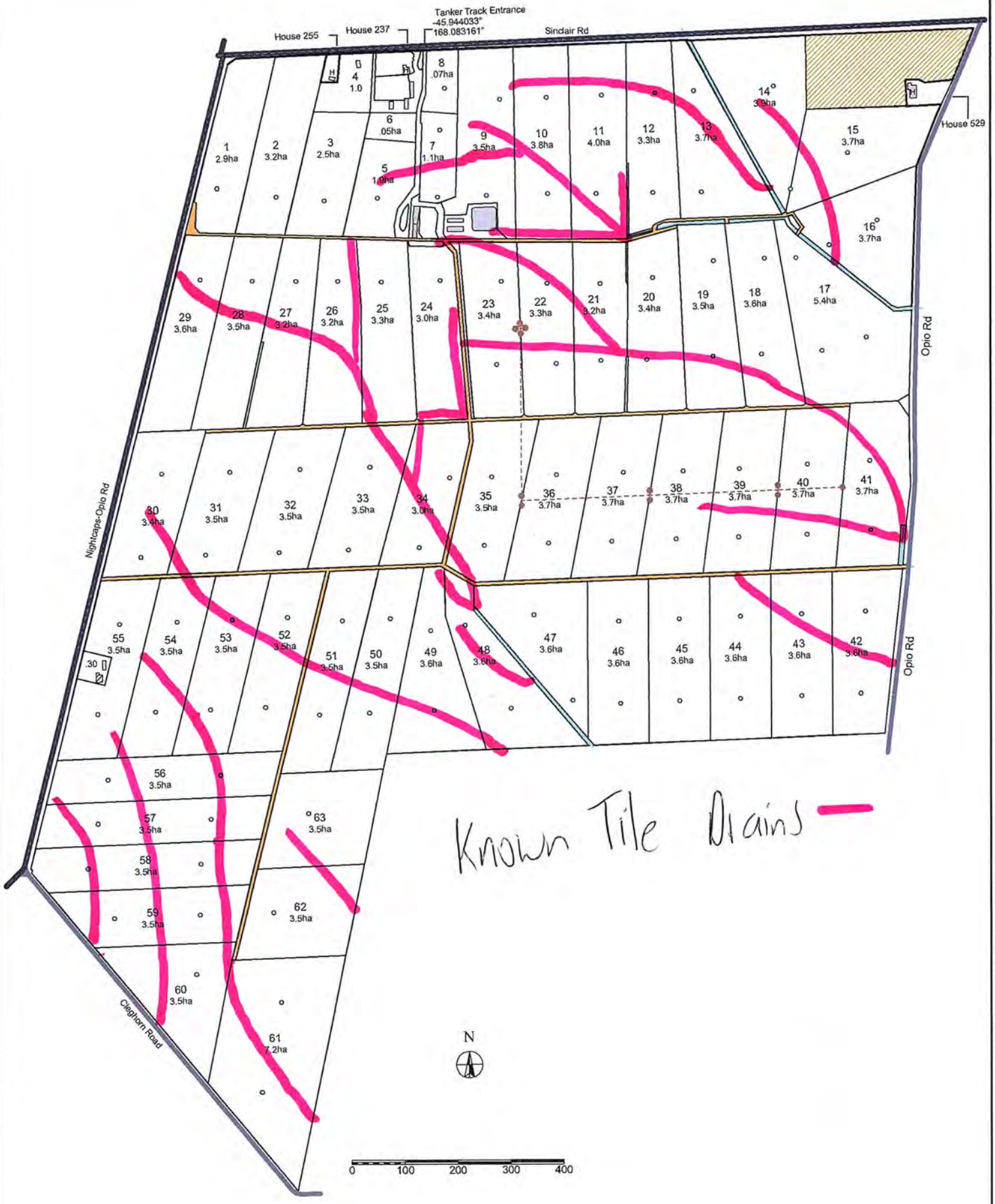
Date Reviewed:	Reviewed By:	Changes Made:	Updated Copy Sent to ES? (date)
----------	Created By: RES Rural Environmental Solutions	New Plan developed and sent to farm manager.	PDF of new plan sent to ES _____.

This plan represents Donna Corbin TA RES Rural Environmental Solutions, assessment of whether the effluent system on your farm may meet the Regional requirements, best industry practice guidelines, as at the date of the assessment.

This plan is based upon the data collected onsite and/or provided by the client, staff, the visual and audio assessment of the system and management systems. While all 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 plan, 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 plan. 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 plan is not a warranty or confirmation that the effluent 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.

APPENDIX 5



Etal Creek Opio Paul Turner 027 305 5843	Total Area: Effective Area: Paddock 1-63	220.69 ha 212.02 ha	**Farm Map**		Southland Farm Mapping Ltd GPS & Drone Surveying Chris Botha 021 134 7248
	237 Sinclair Road RD 1 Otautau Fonterra 35225	45°57'14.4"S 168°04'18.4"E		Surveyed : 4/10/2024 Drawn : 4/10/2024	

APPENDIX 6

2023/2024

Fonterra™

Dairy for life

WELCOME TO YOUR

Farm Insights Report

SUPPLY NUMBER: 35225

Where your milk went last season

Your milk helps to feed people all around the world – thanks for all your hard work to make this happen.

Milk processed at Southland and Otago sites was used by customers to make products like:

Supplements, pizza, pasta, bakery items, dairy desserts

And the quality of your milk was key – you achieved:

245 Excellence Days

Great work, you're in the top 20% of farms for:

Feed converted to milk

How to use this report

Using information to guide decisions is nothing new to farmers. For years you've used grass growth, herd condition and so much more to guide your choices on-farm. This information alone is useful, but it becomes a powerful decision-making tool when comparing your farm to similar farms, and trends over time.

That's what this Farm Insights Report is for. It gives you a view of your farm's performance in context – so you can identify what could help you get more out of the work you're putting in, now and into the future.

Spot an issue with your data?

We've used your Farm Dairy Records and other data we hold for you.
Please check your farm's information for accuracy and note the limitations of this report, both on page 12.
You can adjust the data we have by resubmitting your Farm Dairy Records at **nzfarmsource.co.nz/farmdairyrecords**

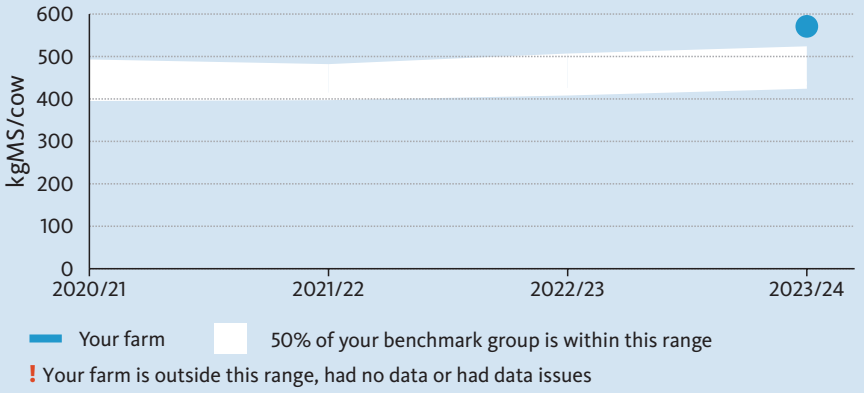
Your farm's big picture view

Success looks different to everyone. By looking at key trends over time, you can start to build a bigger picture of sustainability on your farm.

Production per cow

Your farm is benchmarked against other Southland and Otago System 4 farms.

Higher production per cow with the same inputs, like feed, can mean emissions produced are spread across extra milk solids. That's good for lowering emissions intensity.



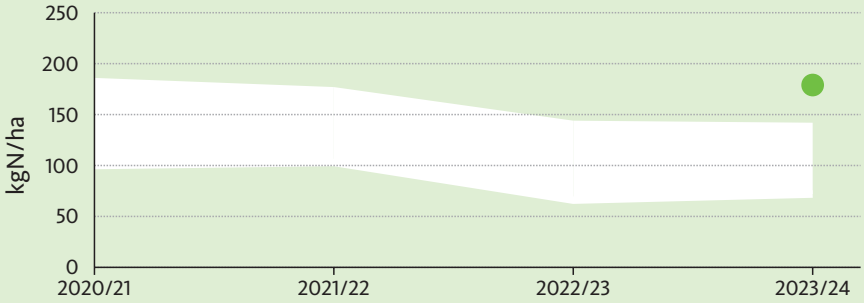
Your farm | 50% of your benchmark group is within this range

! Your farm is outside this range, had no data or had data issues

Purchased Nitrogen Surplus

Your farm is benchmarked against farms in the Southland and Otago region with milk production above 1350 kgMS/ha.

Surplus Nitrogen in your system is at risk of being lost to the environment. See more on page 10.



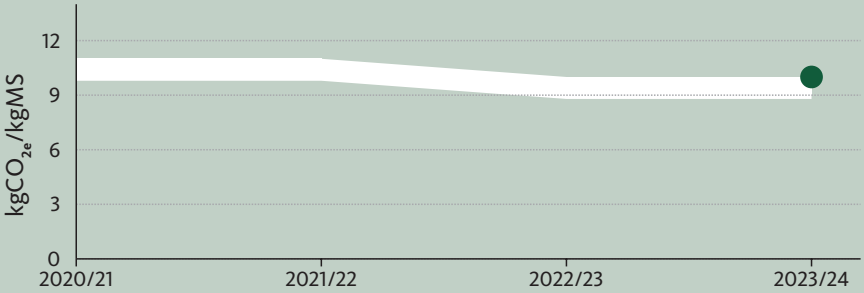
Your farm | 50% of your benchmark group is within this range

! Your farm is outside this range, had no data or had data issues

Greenhouse Gas Emissions per kgMS

Your farm is benchmarked against others in the Southland and Otago region.

You can find a more detailed breakdown of your emissions on page 9.

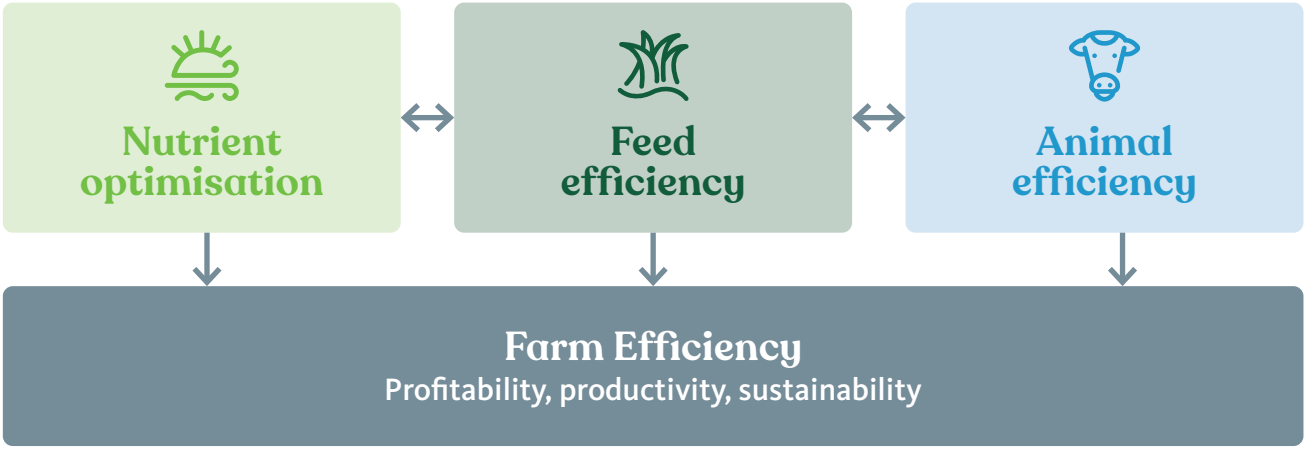


Your farm | 50% of your benchmark group is within this range

! Your farm is outside this range, had no data or had data issues

The farm efficiency opportunity

Operating an efficient farm is about getting the most out of everything you're putting into your system.



What are the options for your farm?

Every farm is different, depending on your system, goals, and unique way of farming. Based on your insights, here's a snapshot of how your farm compares to others.

	Further info (pg)	Benchmark group average	Your farm 23/24 season	High opportunity ›››››››› High performer
Nitrogen fertiliser efficiency (kgDM/kgN)	5	97	75	
Homegrown feed (tDM/ha)	5,6	13.5	14.0	
Feed converted to milk (%)	6	57	63	
Production per kg liveweight (%)	6	101	124	
6-week in-calf rate (%)	7	70	-	
Not in-calf rate (%)	7	14	-	
Somatic cell count (cells/ml)	8	144,539	119,877	
Mastitis (%)	8	12	8	
Lameness (%)	8	6	4	

** the benchmark group for Homegrown feed is the same as that used on page 5 of the report*

Nutrient optimisation

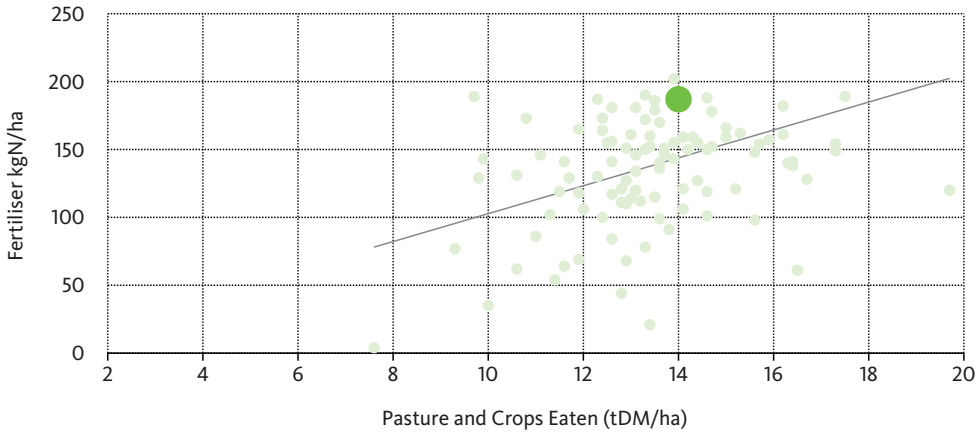
Are you getting the best growth response to the fertiliser you're using? Optimised use can save costs, and reduce loss and wastage.

Your farm's nitrogen fertiliser conversion efficiency

This data shows how efficiently the nitrogen you're applying is converted into feed.

How does your farm compare?

- Your farm (actual)
- Closest 100 farms to your location (radius 15km)
- Local average



Your farm's N-fertiliser efficiency

Your farm is eating
14.0
tDM/ha

Your farm is applying
187
kgN/ha

Your nitrogen fertiliser efficiency is
75
kgDM/kgN

Efficiency opportunity

The top 20% of farms in your region are achieving fertiliser efficiency of
126.0
kgDM/kgN

If you could increase your efficiency by 10%, you could harvest
15.4
tDM/ha

Opportunity: If you grew more feed from the same nitrogen fertiliser

By lifting homegrown feed by 0.5tDM/ha you could achieve the following::

↑ **21** kgMS/cow

↓ **2.3%** $kgCO_2e/kgMS$

↑ **$77,752**

What's the next step?

- Consider factors like fertiliser management, effluent, pasture, cropping, soil and irrigation.
- Scan this QR code for DairyNZ's nitrogen resources to learn more.
- Consult your Sustainable Dairying Advisor, or a farm advisor, for personalised advice.

Feed efficiency

How are you maximising yield and quality of homegrown feed, and using supplementary feed? With the right balance you can manage costs and ensure feed is converted efficiently into milk.

Your feed sources

Your farm's feed sources (tDM/ha)

Your region's feed sources (tDM/ha)

Benchmark group is farms with similar milk production by hectare in your region.

Feed sources	Your farm	Your region
Pasture and crops (grown on farm)	14.0 (77%)	14.4 (79%)
Pasture and crops (imported to farm)	0.0 (0%)	0.8 (4%)
Grazing off (incl. wintering)	1.1 (6%)	1.1 (6%)
All other feeds	3.0 (17%)	2.0 (11%)

How much of your feed eaten is converted into milk?

Benchmark group is farm system by region. Your farm's average herd liveweight is assumed as 460kg based on your breed mix.

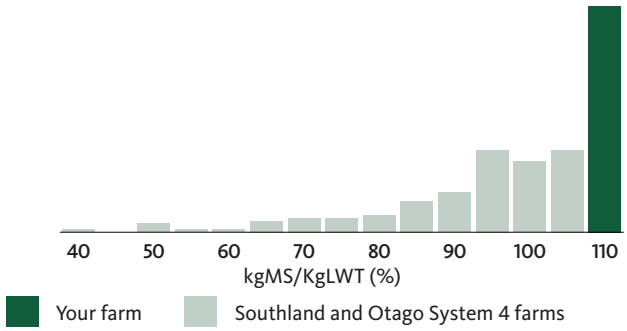
From your records, we estimate that the proportion of feed eaten and converted into milk on your farm is:

63%

Benchmark average
57%

Benchmark top 20%
60%

Your farm's milk production per kilogram of liveweight



Great job – you are in the top 20% regionally

Based on these insights, your conversion of feed-eaten-to-milk is in the top 20% of similar farms in your region. Improving this even further could help improve your overall production and could help reduce your GHG/kgMS.

What's the next step?

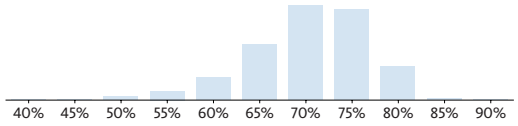
- Consider factors like cow health and quality (page 7 and 8 of this report), or feed type and quality.
- Scan this QR code for DairyNZ's feed utilisation resources.
- Consult your Technical Sales Rep, farm consultant, or nutritionist for personalised advice.

Animal efficiency

Reproductive performance is key in a seasonal calving system. Cows that cycle earlier will have more opportunities to conceive, and more days in milk the following season.

Reproductive performance

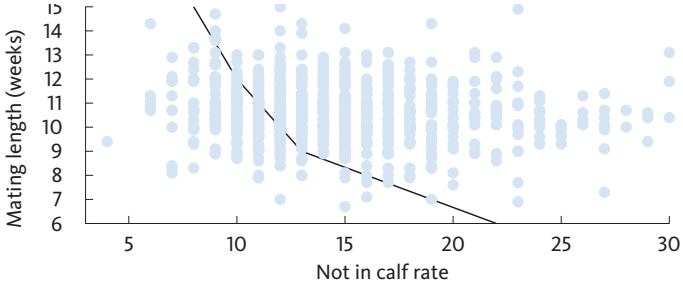
Regional 6-week in-calf rate



Fonterra farms in the Southland and Otago

! Your farm is outside this range, had no data or had data issues

Regional not in-calf rate, and mating length

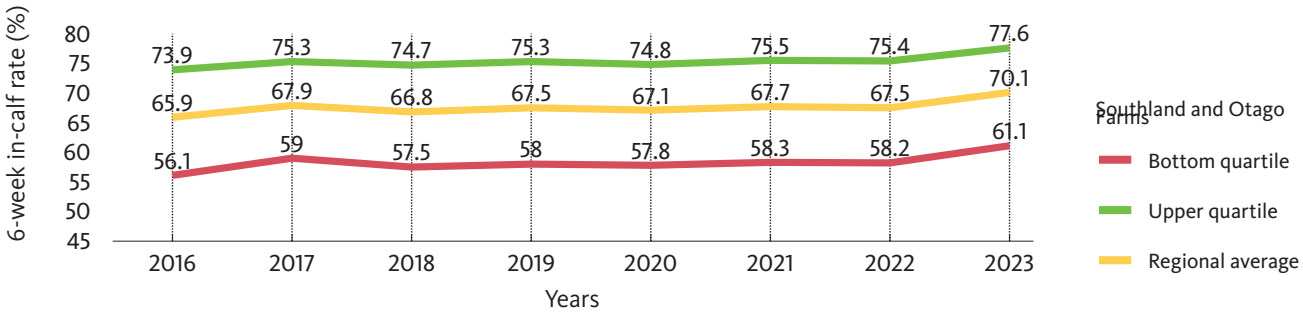


Fonterra farms in the Southland and Otago

Expected not in-calf rate

! Your farm is outside this range, had no data or had data issues

Reproductive performance over time



If your in-calf rate reached 78%

For a herd your size achieving the national average 6-week in-calf rate of 69.3%, an increase to 78% could mean the following:

↑ 8 kgMS/cow

↓ 0.9% kgCO2/kgMS

↑ $28,810

What's the next step?

- Consider early/dated pregnancy testing which is needed to properly assess your farm's reproductive performance.
- Scan this QR code for DairyNZ's InCalf resource.
- Consult your breeding company or vet for personalised advice.

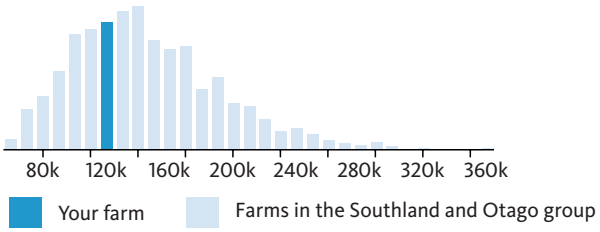
Animal efficiency

Your herd's health and condition are key to the overall efficiency picture on your farm. Factors like infection and lameness can cost time, money and cow productivity.

Somatic cell count

Bulk somatic cell counts (SCC) over 100,000 cells/ml indicate some cases of sub-clinical infection are present in the herd. Animal energy is then diverted from milk production to fight off the infection – research has shown there's a 2.1% loss in production for every doubling of somatic cell count over 100,000 cells/ml.

Your farm's annual average somatic cell count 2023/2024



Opportunity: If you reach 100,000 cells per ml

↑ 3 kgMS/cow

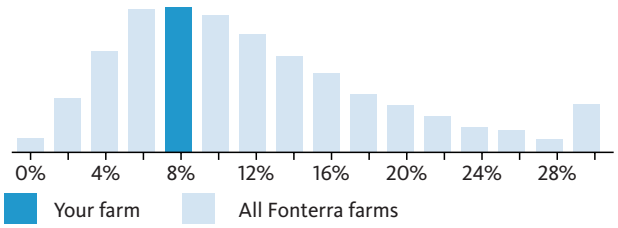
↓ 0.3% $kgCO_2e$/kgMS

↑ $11,500

Mastitis & lameness

Mastitis and lameness are both painful for affected cows, and can impact production and performance.

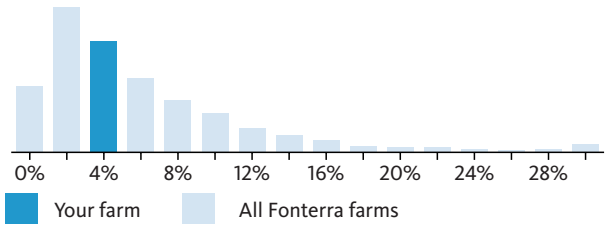
Your farm's mastitis cases as % of peak cows 2023/2024



Estimated cost of mastitis for your farm ($150/case)

$6,000

Your farm's lameness cases as % of peak cows 2023/2024



Estimated cost of lameness for your farm ($250/case)

$5,000

What's the next step?

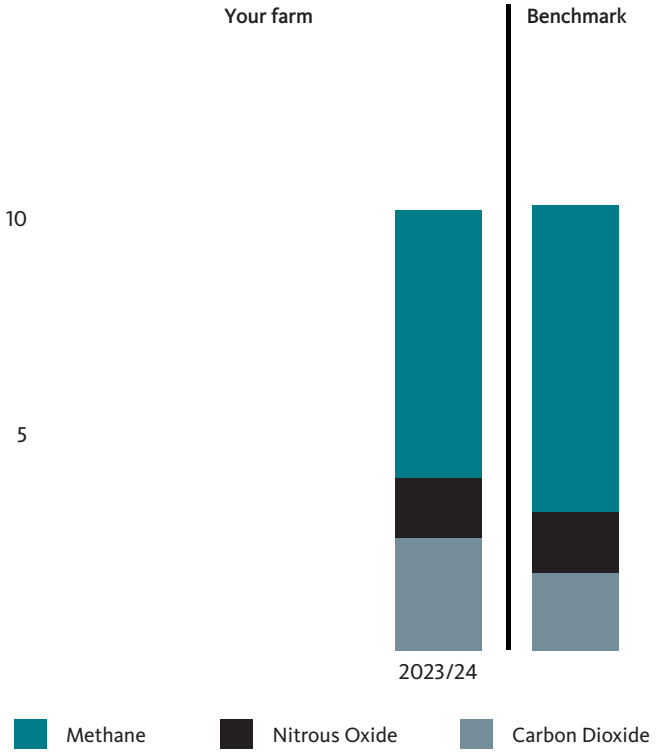
- Consider working with a vet to investigate lameness or mastitis issues.
- Refer to the SmartSAMM guidelines on the DairyNZ website for more information on managing mastitis.
- Scan this QR code to book a Fonterra Milk Quality Improvement visit for advice.

Emissions

Even the smallest on-farm efficiency gains can boost profitability and productivity. But they're also good for reducing emissions per kgMS. Each farm has a unique opportunity - it's up to you and your focus.

Your on-farm emissions

Your farm is benchmarked against Southland and Otago farms



This data shows the emissions that are created from your farming activities. There are also other things that influence your farm's footprint - things like peat soil, land-use change and carbon removals. These aren't captured in the data below.

	Your Farm	Benchmark
Emissions ($kgCO_2e$)/ kgMs	**10.2**	**10.30**
Methane (biological)		
Dairy herd	5.00	5.50
Replacements	0.70	1.00
Effluent	0.50	0.60
Nitrous Oxide (biological)		
Livestock	0.90	1.00
Fertiliser	0.40	0.30
Manure and soil	0.10	0.10
Carbon Dioxide (non-biological)		
Imported feed	1.60	0.80
Fertiliser	0.50	0.40
Other	0.50	0.60

Where can I find more information?

Methane

- Animals, pages 7-8 of this report
- Emissions booklet, pages 20-26

Nitrous Oxide

- Nutrients, page 5 of this report
- Emissions booklet, pages 27-34

Carbon Dioxide

- Nutrients, page 5 of this report
- Feed, page 6 of this report
- Emissions booklet, pages 35-40

We've shifted to a more accurate GHG model

Your emissions are now calculated using a model from AgResearch called the Agricultural Lifecycle Assessment (Ag:LCA). This is based on more detailed information about your farm from your Farm Dairy Records. You can find out more about this switch by scanning this QR code:

What's the next step?

- Scan this QR code for the emissions booklet to read more.
- Consider exploring the reading outlined under each gas type to understand where there are opportunities for your farm.
- Consult your Sustainable Dairying Advisor for more personalised advice.

Water quality

Potential water quality risks are well-known by the dairy farming community in New Zealand. Farmers have taken several actions from fencing off waterways to carrying out riparian planting to help manage water quality.

Your farm's Nitrogen Risk Scorecard

This data summarises risks for nitrogen loss on your farm. Your farm's full Nitrogen Risk Scorecard can be found online using the QR code here:

Stock Management	VERY HIGH	Cropping & Cultivation	LOW
Nitrogen Fertiliser	HIGH	Effluent Management	VERY LOW
Imported Feed	VERY HIGH	Irrigation	VERY LOW

Purchased Nitrogen Surplus

23/24 season

Nitrogen Fertiliser		Imported Feed		Exported Product		Purchased Nitrogen Surplus
187 kgN/ha	+	112 kgN/ha	–	120 kgN/ha	=	179 kgN/ha

Refer to page 3 for your PNS trend over time.

What's the next step?

A Fonterra **Farm Environment Plan** is tailored to the risks and practices on your farm. You can review or complete actions in your Digital Dairy Diary or contact your Sustainable Dairying Advisor for more support.

Biosecurity

New Zealand is naturally free of many pests and diseases that exist in other parts of the world. But that means new and invasive species could threaten our unique biodiversity - just take mycoplasma bovis and fall armyworm for example.

Good disease management on-farm is essential for protecting your herd. Flow-on benefits can include reduced treatment inputs, maximised genetic investment, better milk production and lower feed inputs.

Biosecurity measures that protect against Bovine ViaralDiarrhea (BVD) can also protect your herd against other harmful diseases.

BVD management opportunity

The estimated cost of BVD in a negative herd: $22.22 x peak cow numbers/year.

The cost of BVD in a positive herd is much higher with negative impacts on conception as well as reduced production.

$10,466

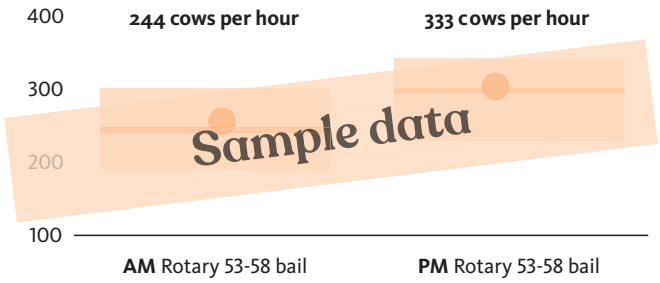
What's the next step?

Consult your local vet about disease management, include BVD in your Animal Wellbeing Plan, and scan this QR code to read more about biosecurity on our website.

Milking efficiency

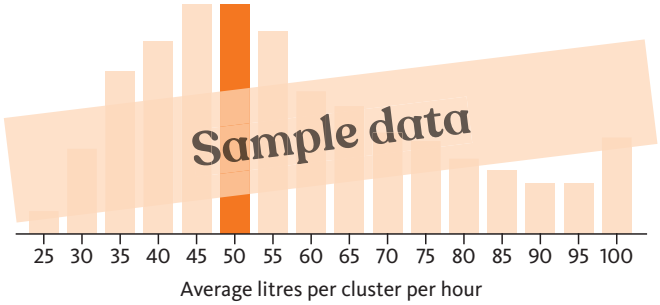
Saving time in the shed can be a great way to free up time to focus on other important farm priorities. These insights use milk vat monitoring data and DairyNZ's research to estimate the time that could be saved on your farm at milking time.

Average cows per hour



Your farm — Your benchmark's average — 50% of your benchmark group are within this range

Litres per cluster per hour



Your farm — All Fonterra farms

We estimate you could save

7–16 hours per week

Sample data

This estimate is based on your farm reaching 80-100% of its potential milking efficiency using the maximum milking time (MaxT) strategy.

What's the next step?

Fonterra offers milking efficiency support as part of the Milk Quality Improvement Visits. Scan this QR code for more information.

Your farm's key information

	Units	21/22	22/23	23/24
Dairy farm effective area	Ha	-	-	157
Peak cows (maximum numbers)	Cows	-	-	471
Stocking rate (dairy cows)	Cows/ha	-	-	3.0
Production	kgMS	-	-	268,876
Production per ha	kgMS/ha	-	-	1,713
Average somatic cell count	Cells/ml	-	-	119,877
Nitrogen fertiliser applied per ha	kgN/ha	-	-	187
Nitrogen fertiliser conversion efficiency	kgDM/kgN	-	-	75
Pasture & crop eaten (homegrown feed)	tDM/ha	-	-	14.0
Feed converted to milk	%	-	-	63
Production per kg liveweight	%	-		124
Imported feed fed	tDM	-	-	551
Imported supplement per cow	tDM/cow	-	-	1.2
Production per cow	kgMS/cow	-	-	571
Purchased Nitrogen Surplus	KgN/ha	-	-	179
Greenhouse Gas Emissions per kgMS	$kgCO_2e$/kgMS	-	-	10.2
Mastitis cases	Cows	-	-	40
Lameness cases	Cows	-	-	20
6-week in-calf rate	%	-	-	-
Not in-calf rate	%	-	-	-
Mating length	Weeks	-	-	-
Total biological methane	kg/ha	-		419
Total biological nitrous oxide	kg/ha	-		8

What is your total biological kg emissions

This number shows an estimate of your farm's biological GHG emission for your dairy farm effective area. This is an indication of the emissions which may be included in any future emission pricing regulations.

Spot an issue?

If your numbers don't seem quite right, you can resubmit your data anytime at nzfarmsource.co.nz/farmdairyrecords

Purchased Nitrogen Surplus

Purchased Nitrogen Surplus is the difference between the nitrogen inputs (fertiliser and imported feeds) and the nitrogen outputs (milk, meat, crop, supplementary feed or exported effluent) on your dairy farm effective area. A high number means more nitrogen is at risk of being lost from your farm to the receiving environment.

Your Farm's Purchased Nitrogen Surplus Per Hectare

Nitrogen Fertiliser
187
kgN/ha

+

Imported Feed
112
kgN/ha

−

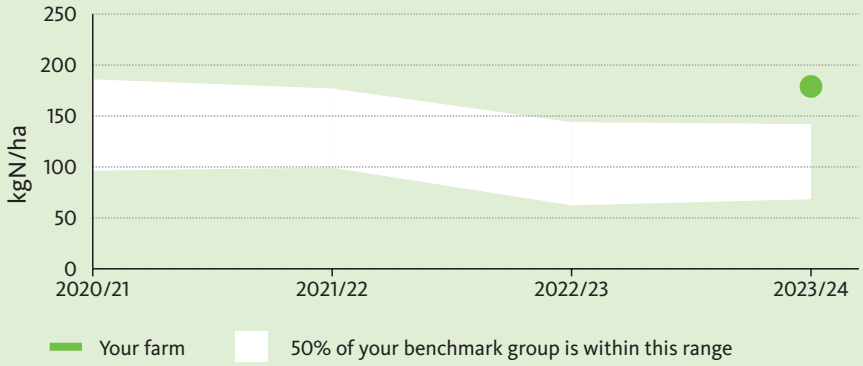
Exported Product
120
kgN/ha

=

Purchased Nitrogen Surplus
179
kgN/ha

Purchased Nitrogen Surplus

Your farm is benchmarked against farms in the Southland and Otago region with milk production above 1350 kgMS/ha.



Your farm's Nitrogen Risk Scorecard

Stock Management	VERY HIGH	Cropping & Cultivation	LOW
Nitrogen Fertiliser	HIGH	Effluent Management	VERY LOW
Imported Feed	VERY HIGH	Irrigation	VERY LOW

Your Farm's Nitrogen Risks

Stock Management

Stocking Rate

The higher the stocking rate[1] (peak), the greater the nitrogen loss.

Total	**22.7 su/ha**
Milking herd 3.0 cows/ha	22.2 su/ha
Replacement/ other animals	0.5 su/ha

Dry Matter Eaten

The more dry matter eaten[2] per hectare, the more nitrogen ingested by the animal and returned to pasture as dung and urine.

Total	**18.1 tDM/ha**
Grown on this farm	
Pasture and crops	14.0 tDM/ha
Imported to this farm	
Pasture and crops	1.1 tDM/ha
All other feeds	3.0 tDM/ha

Wintering Off/Culling

Reducing the number of animals on farm (from peak numbers) by culling and/or wintering off (May-Aug) will reduce the nitrogen loss risk on your dairy farm effective area.

46% OFF PLATFORM

Winter Practices

Reducing the amount of time cows spend on pasture and/or crops over winter will reduce the nitrogen loss risk.

Off pasture facility	0%
On pasture	**100%**
Break fed fodder crop	0%

Nitrogen Fertiliser

Fertiliser Applications

The more nitrogen fertiliser applied, the higher the nitrogen loss risk.

187 kgN/ha

Milk Solids per kg Nitrogen Used

Using less Nitrogen fertiliser (all other inputs being equal) whilst maintaining production, will lower purchased nitrogen surplus.

9 kgMS/kgN

Timing of Application

Fertiliser applied during the winter months can increase the chance of nitrogen being lost.

Sep - Apr

Jul - Aug

May - Jun

Highest Application Rate

Lower application rates reduce the nitrogen loss risk.

Below 25 kgN/ha

Above 25 kgN/ha

Feed Budget

Using a feed budget or wedge to help plan strategic fertiliser applications is a good farming practice.

No feed budget used

Feed budget used

Imported Feed

Nitrogen Imported From Feed

The greater the amount of imported feed, the more nitrogen that enters the system.

112 kgN/ha imported

Nitrogen Content

The greater the average nitrogen content, the higher the amount of nitrogen that enters the system.

Average N content of 3.18%

Nitrogen Use Efficiency of Imported Supplements

The greater the conversion efficiency, the lower the nitrogen surplus available to be lost.

15 kgMS/kgN

[1] *Stock Units (su) are a means of calculating stock numbers between species, breeds, and age groups based on relative feed demand. As an example 23.9su is equivalent to approximately 3 cows/ha (Friesian/Jersey cross) or 1500kg liveweight per hectare.*

[2] *Energy model calculations based upon the DairyBase model developed by DairyNZ.*

[3] *Includes feed fed to stock grazed off the dairy farm effective area.*

Key driver of Nitrogen loss risk.

Your Farm's Nitrogen Risks (cont)

Cropping and Cultivation

Conventional

This is the greatest risk method for sowing a crop and the risk increases as the cultivated area increases.

5% of farm cultivated annually

Minimum Tillage

This is a lower risk activity than conventional cultivation, however the risk increases with the total area cultivated.

Not Applicable

Direct Drill

This is a lower risk activity than both full cultivation and minimum tillage for establishing a crop.

Not Applicable

Season of Harvest/Grazing

Crops harvested/grazed during winter pose a higher risk to nitrogen leaching.

Not Applicable

Timing of Fertiliser Application

There is greater risk if fertiliser is applied to crops during high risk months of May, June, July and August.

No fertiliser applied during winter

Fertiliser applied during winter

Effluent Management

Effluent Discharge Method

Discharging treated effluent to land is the lowest risk.

Irrigate to pasture

Irrigate to pasture (low storage)

Discharge to water

Discharge to water and pasture

Effluent Irrigation Area

An undersized effluent area can result in the average amount of nitrogen per hectare applied exceeding local rules and regulations.

10ha/100 cows

Application Depth

Low rates will ensure greater flexibility of management with more irrigation days available and increase the chance of the plant utilising the nutrients within the effluent rather than it being lost.

< 12mm application depth

Irrigation

Irrigation Method

Irrigation generally increases the nitrogen loss risk due to the potential for over irrigating to induce drainage events. Some systems are inherently riskier than others irrespective of management.

No fresh water irrigation

Irrigation Scheduling

Deciding when to start or stop irrigation is important as poor management of an irrigation event can lead to induced drainage.

Not Applicable

Irrigation Application Method

Having control over the amount and how often water is applied can greatly influence nitrogen loss risk with poor management of irrigation events leading to induced drainage.

Not Applicable

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.