ATTACHMENT E – Conversion Environmental Management Plan

LANDPRO

Make the most of your land

Conversion Environmental Management Plan

For Schrader Mains Limited

Version No.	Date
1	June 2015
Prepared by:	**Position:**
Landpro Limited	-
Approved by:	**Position:**
Hank and Sandra Schrader	Landowner

Approvers signature:

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Winners Central Otago Business Excellence Awards 2013

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Document Control Statement:

To ensure this Conversion Environmental Management Plan (CEMP) is kept up-to-date and that the most recent version is used, its distribution and revision will be controlled. The farm owner will:

- manage the master copy and any other paper or electronic copies of the CEMP
- keep a summary of updates, versions and dates and distribution lists
- ensure CEMP updates are distributed to all relevant staff
- ensure any out-of-date copies are discarded when updates are distributed

Contents

1. Introduction

Hank and Sandra Schrader, on behalf of Schrader Mains Limited, wish to establish a new dairy farm. The property currently operates as a dairying grazing (young stock and cow wintering) and beef unit. The conversion is to occur within five years of granting of consent with the dairy farm milking a maximum herd size of 306 cows.

1.1 Scope of Conversion Environmental Management Plan

This plan has been developed to assist with achieving compliance with the relevant rules and objectives detailed in the Regional Water Plan for Southland (RWPS) in association with the conversion of the land to dairying. This plan also seeks to set out how compliance with conditions of resource consents is to be achieved.

The following aspects of the operation are covered by this CEMP:

- Description of Site, Climate & Topography
- Description of Farming Operations & Systems
- Nutrient Management
- Effluent Management
- Water Quality
- Biodiversity
- Soil Management
- Consent Compliance

This document is a 'living' document and will be subject to annual review and ongoing changes by the farm owners to ensure that it is up to date and reflects both on farm and best farm practice.

2. Site and Environment

The property is located at 514 Rimu Seaward Downs Road, Waituna, as shown in Figure 1 below.

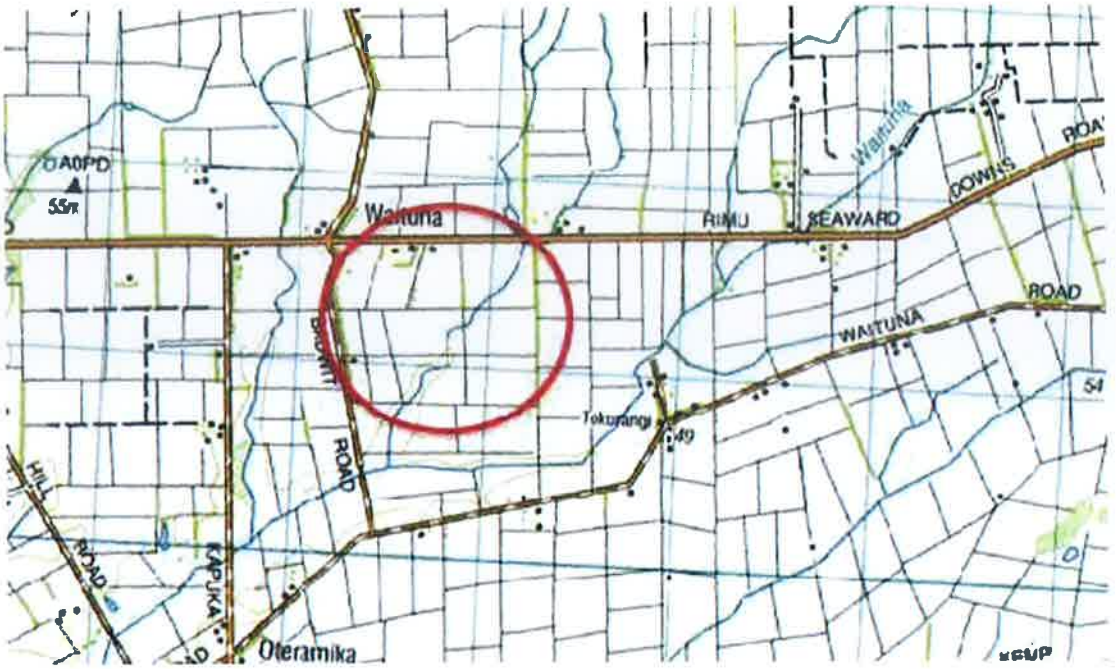

Figure 1: *Location of property (Source: LINZ Topo 50 Series)*

Property Owner:	Schrader Mains Limited
Phone:	(03) 239 5528
Email:	027 408 0962
Milking Platform Area:	110 hectares
Effective Area:	103 hectares
Wintering:	No more than 90 cows will remain on the property and the remainder will be wintered off
Climate	- Average annual rainfall – 1152 mm/year - Mean annual temperature – 10.1°C - Daily rainfall pattern setting of 731 to 1450mm, none to weak - Mean annual PET of 775mm (moderate variation)
Topography	Flat contour
Description of waterways on property	The main waterway that flows through the property is an unnamed tributary of the Waituna Creek. The property is

	located within the Waituna Creek catchment, which drains directly into the Waituna Lagoon.
Existing vegetation (introduced and native)	Exotic and native plantings are present on the property.
Soil types	Majority of the soils found on the property are Woodland soils, with Dacre soils being located around the stream flowing through the property.
Groundwater Resource	Waihopai Groundwater Zone

3. Dairying Operation

Stocking Regime

Mixed Aged Cows:	306
R2's:	25% replacement rate
Calves:	25% replacement rate. From 1st August to 1st December
Other stock:	Not Applicable
Stocking rate:	2.97 cows/ha (effective area)

Feeding System

Supplementary Feed Bought:	23t DM baleage (fed on kale) and 50t DM bealeage (fed across pastoral blocks)
Crops:	4 ha kale (yield 12t DM/ha) grazed by cows June to September
Typical Grazing Programme:	Year round rotational, use of restricted grazing practices during high risk periods.

4. Required Consents

The following consents are required to facilitate the conversion of the property to dairying:

Table 1. *Resource consents sought and classifications.*

Consent	Plan	Rule	Activity Status
Land use consent to convert land to dairying.	Water	Transitional rule 17A relating to the change of land use for new dairy farming.	Discretionary
Discharge consent to discharge farm dairy effluent to land.	Water	50	Restricted Discretionary
Water Permit to abstract and use groundwater for stock and shed purposes.	Water	23 (d)	Discretionary Activity

Land use consent to construct an effluent pond	Water	49 Agricultural Effluent Ponds	Restricted Discretionary
Land use consent to construct a bore	Water	22(a)	Controlled Activity

5. Agricultural Good Practices

As part of converting the property to dairying there are a number of 'Agricultural Good Practices', which where relevant are already being utilised on the property and will continue to be utilised or implemented across the farm to minimise potential effects associated with the conversion of the land to dairying. Good practices will include;

- Fertilisers applied according to code of practice for fertiliser use.
- Use of a fertiliser management system and account for all sources of nutrients including applied effluent (nutrient budgeting).
- Fertiliser evenly applied.
- Effluent applied evenly.
- Crop, cultivation, nutrient inputs, yield record kept.
- Supplement and feeding out management.
- Winter grazing management.

Tier 1 and 2 AgResearch mitigation practices will also be implemented on the property. These are discussed throughout the management plan and included in the table attached below for ease of recognition.

AgResearch Tier 1 and 2 Management Practices

Environment Southland requires that Tier 1 and 2 Management Practices as outlined in the AgResearch report, *Potential Nitrogen and Phosphorous Losses from example farms in the Waituna Catchment: Sources and Mitigation. Robson. M Monaghan. R McDowell* are incorporated into the Conversion Environmental Plan for dairy conversions. To make it easier for consent processing staff to identify the farm management practices, the table below outlines those Tier 1 and 2 Practices to be implemented on the farm.

Table 2: *Tier 1 and Tier 2 Management Practices*

Management Practice	Tier	Implemented Y/N	Explanation
Nutrient Management Plans	1	✓	A Nutrient Management Plan has been prepared for the property which includes all nutrient inputs and outputs. This nutrient management plan will guide decision making with regard to fertiliser applications and will be aided by regular soil testing.
Optimum soil test P	1	✓	Soil testing will be undertaken regularly. This will provide information on the nutrient status of the soils. An Optimum soil P test will ensure knowledge of the P status of the soils which is a good indicator of soil health and environmental impacts as well as aiding good management decisions with respect to fertilizer use.
Stock exclusion from streams and wetlands	1	✓	Waterways will be fenced. This will prevent point source pollution and stock damage to the banks of waterways. Riparian planting will be undertaken which will further mitigate the effects of overland flow, stabilise the banks of the waterways and provide shading. The riparian planting will take place in three stages over a five year period, see riparian management plan attached as Appendix E.
Tracks and lanes sited away from streams and lane runoff diverted to land	1	✓	Tracks and lanes will be sited away from waterways where possible with the camber directing runoff to land to ensure no overland flow of effluent into waterways.
Sediment traps	1	×	Not considered suitable for this property.
Facilitating the development of natural wetlands	1	N/A	No wetland area is associated with this property.

Management Practice	Tier	Implemented Y/N	Explanation
Wintering cows in herd shelters	2	×	No herd home is proposed.
Wintering in herd shelter + Restricted grazing of pastures in autumn	2	N/A	No herd home is proposed, although restrictive grazing will be undertaken.
Limiting N Fertiliser use	2	✓	Fertiliser use will be limited to that required to achieve production without having adverse environmental effects. The Nutrient Management Plan will guide the use of Nitrogenous fertilisers.
Substituting N fertilised pasture with low N feeds	2	×	The farm will be run as a predominantly pasture based system.
Tile drain amendments	2	×	No tile drain amendments are required. A tile drain map is included in the CEMP, Appendix A.
Use of Nitrogen inhibitors	2	×	The use of nitrogen inhibitors may be investigated in future. At this stage N inhibitors are not available for use due to food safety and market concerns.
Grass buffer strips	2	✓	Grass buffer strips will be utilised prior to any planting of riparian margins that may occur that have not already been planted. Grass buffer strips are known to perform stabilisation and erosion mitigation functions as well as overland flow mitigation.
Constructed wetlands	2	N/A	Not applicable
Wintering off stock	2	×	Majority of stock are to be wintered off the property, although approximately 90 cows may remain on the property over this period.
Alum to pasture	2	×	This mitigation practice is still in research stages and therefore not viewed as appropriate or cost effective at this stage. May be investigated in future.
Alum to grazed cropland	2	×	This mitigation practice is still in research stages and therefore not viewed as appropriate or cost effective at this stage. May be investigated in future.
Strategic winter grazing of forage crops	2	✓	Stock that remain on the property over the winter months will be restricted grazed.
Restricted grazing of cropland	2	✓	Stock will be restrictively grazed using temporary electric fences sections of cropland. Grazing will occur in accordance with best practice, grazing will be undertaken towards waterways and swales.

Management Practice	Tier	Implemented Y/N	Explanation
Restricted grazing of pasture	2	✓	Stock will be restrictively grazed using temporary electric fencing of sections of pasture when appropriate.
Low solubility P fertiliser	2	x	Fertilizer use will be guided by the nutrient management plan with advice from a nutrient management advisor and farm consultant.

In addition to these mitigation practices proposed in the above table water is to be recycled to reduce the volume of water taken and effluent.

6. Nutrient Management

Nutrient management is a key component to ensuring good on farm environmental practice. The farm will operate under industry best practice guidelines and in accordance with the Nutrient Budget and Nutrient Management Plan, attached as Appendix B. The Nutrient Management Plan and Budget will be reviewed and updated on an as required basis, but not less than an annual basis guided by a fertiliser representative and nutrient management advisor. The nutrient budget has been prepared using OVERSEER® 6.2.0 which is the latest version of the model.

Nutrient management requires knowledge of the nutrient status of the soil resource and pasture requirements to be effective, and to achieve the desired environmental and production outcomes.

Regular soil tests will be undertaken to establish the nutrient status of the soils. Soils should be at nutrient levels which avoid any adverse effects on the environment but maintain good pasture production and animal health, by ensuring that the soils are suitable for optimal plant nutrient uptake.

Areas which are receiving FDE will be carefully managed to ensure nitrogen loadings are at acceptable levels and are compliant with any conditions imposed by resource consents. The annual effluent nitrogen loading rate shall not exceed 150kg/N/ha. Effluent will be applied utilising low rate application. Effluent management is discussed in the next section of the CEMP.

Levels of potassium will also be monitored to ensure good animal health outcomes, particularly with respect to the effluent block. For more information regarding the nutrients associated with the subject property please refer to Appendix B of the CEMP for the Nutrient Budget which has been prepared by Miranda Hunter of Roslin Consulting Limited.

7. Effluent Management

The effluent management section of the CEMP is designed to be a working document where consent conditions and changes to best management practice can be added or amended over time.

Effluent management will be critical to ensure that effects on the environment are no more than minor particularly considering the soil types on the farm which have vulnerabilities to

waterlogging and slow subsoil permeability. Active management of effluent and nutrient budgeting aided by up to date soil moisture monitoring technology will ensure that the risks of leaching and overland flow are managed and mitigated appropriately. The discharge of FDE to land requires resource consent from Environment Southland, therefore any discharge will be governed by conditions, which must be met at all times.

Being a new conversion, the effluent disposal system will be designed for purpose and will be a new installation. In this case the effluent will be disposed via a low rate Larral Smart Hydrant irrigation system. Areas for discharge will be set up to ensure that effluent is only applied to the paddocks intended and ensure that buffer setbacks from waterways and exclusion of laneway areas are observed.

One of the most critical components of effluent management is staff knowledge and training which shall include an understanding and working knowledge of the conditions of consent for effluent discharge and best practice guidelines for effluent management. A 'Staff Training Guide' has been included in this CEMP and should be introduced to staff at the beginning of each season to inform new staff and provide opportunities for revision.

FDE will be collected and stored in an above ground tank. Effluent will then be pumped and irrigated onto land in accordance with industry best practice and according to conditions of consent. The volume of effluent produced from 306 cows based on the Environment Southland guideline of 50 litres/cow/day is 15,720 litres/day.

The total FDE disposal area is 93 ha available to receive effluent from the intended future herd size of 306 cows. The following buffer zones will apply to the effluent disposal area:

- 20 m from any surface waterbody or artificial watercourse;
- 20 m from any neighbouring property boundary;
- 200 m from any residential dwellings not located on the property; and
- 100 m from any water abstraction point.

7.1 Storage Specifications

The effluent storage pond size has been calculated according to the Massey University pond calculator and will total 834m^3, however a storage pond with an operational capacity of 930m^3 is to be installed. The Massey University Effluent Pond Storage calculator takes into account a

number of variables including thirty years of climate data, catchment areas, application rates, number of cows, and the suitability of soils to apply effluent. The use of the Massey Calculator is considered industry best practice and forms part of the Dairy NZ Effluent Design Code of Practice.

The pond size includes capacity for a potential increase in rainfall, and a maximum herd size of 320 cows, which is greater than the peak milking herd of 306 cows. The reason for the additional storage is to allow the discharge of effluent when there is a soil moisture deficit and when the receiving environment is appropriate. The effluent storage pond will be located near the dairy shed in a location recommended by the engineering designer to fit in with shed construction, ensure maximum efficiency of pumping and that food safety regulations are met.

7.2 Effluent Specifications

Discharge from the effluent pond is designed to discharge year round, depending on underlying ground conditions. The tank has been designed to have sufficient storage to allow deferred irrigation which ensures that effluent irrigation only occurs when there is a soil moisture deficit.

Effluent will be applied to the paddocks via the irrigation system at a minimum rate of 2mm by a low rate Larral Smart Hydrant system. The effluent system will be managed according to conditions. Low rate systems are preferred as they are known to have better environmental outcomes than high application systems.

The irrigation system will be controlled by the farm manager and staff to suit the conditions and visual inspection will occur over the proposed application area both before and during application to ensure conditions are suitable for discharge. Under no circumstances will FDE be applied when surface water is ponding, or during and post (12 hours) heavy rainfall intensities of greater than 5 mm/hour.

During unsuitable conditions the irrigation system will be inactive with daily FDE stored in the pond for discharge at a more suitable time. Irrigation will occur on every available day until the nutrient limit for the soil is reached or the maximum depth of application is reached. Prior to the application of effluent to land a soil moisture monitor will be used to determine soil moisture levels. The closest Environment Southland monitoring station is located on Lawson Road, Waituna. This will determine the appropriate application rate and depth for the irrigation system to be used. Effluent will be applied as follows:

- At a maximum depth of each individual application of effluent to land will be not more than **20 mm**;
- The maximum rate of application will be not more than **2 mm/ hour**;
- The maximum loading rate is consistent with the standard nutrient loading limit of not more than 150 kg N/Ha/yr;
- Application of FDE will be delayed until soil moisture conditions are suitable and does not occur when the risk of surface runoff is elevated (i.e. during rainfall events);
- Effluent application will not occur on soils that are at or above field capacity.

7.3 Effluent Treatment

The treatment of effluent is not proposed or considered necessary.

7.4 Reducing Effluent

All practicable steps will be taken to reduce FDE generation on the property. The following general guidelines as outlined by Dairy NZ will be adopted;

- Minimise water use – the applicant will utilise a green wash system.
- Clean stone trap regularly
- Maintain and Service all parts of the effluent system
- Ensure application conditions are acceptable prior to beginning application.

By reducing the amount of effluent and sludge at the source, i.e. the dairy shed; it can be expected that less effluent will require disposal in the long run. Effluent can be minimised as follows;

- Treat the herd gently to avoid upset
- Reduction of cow stress levels by being quiet and even tempered
- Reduction of the potential for loud and or unusual noises
- Reduction of situations cows are not accustomed to
- Keep use of hoses to a minimum and ensure efficient use of water
- Repair leaks immediately and maintain storm water drains
- Recycle water where possible.

7.5 Effluent System Maintenance

Maintenance of the effluent system is essential to ensure that the system is working as intended. Monthly maintenance checks will be undertaken to ensure that all parts involved in the catchment, storage and disposal of effluent are functioning correctly.

The following checks will be undertaken on a regular basis and details recorded:

- Clean stone traps;
- Check the sump is clear of solid material. If necessary arrange to clean out the sump;
- Regularly clear the tank of solids when required (expected to be once every two years);
- Check nozzles are clear and in good working order; and
- Check effluent pipe is in good working order and does not have any leaks.

Any matters requiring follow up shall be followed up immediately. A monthly check sheet is attached as Appendix C.

7.6 Effluent System Operation

Prior to the operation of the effluent system, the following steps shall be undertaken;

- Check soil moisture levels. Effluent **MUST NOT** be discharged when the soil is at field capacity. Soil Moisture will be tested prior to the application of effluent.
- Check wind conditions to ensure that effluent can be discharged without resulting in spray drift and odour beyond the boundary of the property.
- Set timer clock on the effluent pump for required duration i.e. One hour.
- Check that the effluent pump has come up to optimum operating pressure.
- Check all of the nozzles are unblocked.
- Check the effluent line for any leaks.
- During operation perform regular checks to ensure that the discharge is not resulting in ponding or surface run-off. If surface ponding is occurring, switch the effluent system off, and re-check soil moisture levels.
- Record details of the effluent disposal duration and location and keep records for future reference (record these details on the form attached as Appendix D).

7.7 Effluent System Monitoring

Once the effluent system is operational and the steps outlined in Section 6.6 have been carried out the effluent system shall be monitored during and after application to ensure that there are no leaks, and there is no surface ponding or run-off.

The effluent storage pond shall also be checked regularly.

Monitoring shall also occur as detailed in the conditions of resource consent and as discussed in Section 9.

7.8 Effluent System Training

The efficient operation of the effluent system in accordance with the conditions of consent requires staff to be informed and aware of the conditions of consent (including this CEMP), and the steps required to be undertaken when operating the system.

The manager will be responsible for ensuring that all staff are trained in the operation and maintenance of the effluent discharge system, and for training new employees. A guide to staff training requirements is detailed in Appendix E, and shall be completed once training has been provided. Effluent training should be revisited or recapped at the beginning of each season to ensure all staff, new and existing, are aware of consent requirements and responsibilities.

Opportunities for further training to improve effluent management will also be identified and undertaken as appropriate.

8. Water Quality Management

8.1 Description of Surface Waterways

The farm is situated to the northeast of the Waituna Catchment and is made up of mainly flat land, with some sloping land along the waterway that flows diagonally through the centre of the property. The waterway is an unnamed tributary of the Waituna Creek which flows into the Waituna Lagoon. Every three years Environment Southland will clear this stream of weeds and sediment that have built up. The last clearing was in February 2015. This waterway has been fenced and riparian margins have been planted.

Stock crossings are designed in a manner that will ensure no effluent discharges to the stream via overland flows. A silage pad is planned to be installed and will be located a minimum of 50 metres from any surface water body to ensure no overland run off occurs. This pad area is also to be used to stand stock off paddocks and for feeding the cattle.

Silage leachate will be captured and directed through the FDE system. Stormwater will be directed into an appropriate water course.

8.2 Surface Water Quality

Water quality within the Waituna Creek reduces as it travels through the catchment and into the Waituna Lagoon. Land use in the catchment is causing elevated levels of nitrogen and phosphorus in waterways.

The fencing and ongoing planting of riparian margins will have a positive effect on the water quality of the surface waterbodies as stock will be excluded and riparian margins will reduce overland flow as well as the provision of shading and habitat for any flora and fauna species present. There are no surface waterbodies with public recreational values located on the property.

Due to the sensitivity of the Waituna catchment management practices which prevent effluent from waterways is very important. Management practices include but not limited to:

- Application of effluent at a low rate;
- Effluent irrigation only to occur when soil moisture deficit occurs;
- Buffer zone of at least 20m from surface water bodies on the property;
- Deferred storage;
- Large effluent disposal area;
- Wintering majority of stock off the property.

All of the above management practices will ensure that the activities undertaken on this property do not contribute to the further degradation of water quality within the Waituna Catchment.

8.3 Groundwater Quality

The property is located within the Waihopai Groundwater Management Zone, which is considered to be susceptible to nutrient enrichment. Groundwater that is sourced from the tertiary aquifers can contain high iron concentrations due to the mudstone and lignite geology[1].

Environment Southland have broadly categorised groundwater resources in the Waituna catchment into three zones[2]: The property is located within the Northern Waituna Zone Zone which covers the northern section of the Waituna Creek catchment (north of Mokotua) and is characterised by thick, stoneless brown soils which buffer groundwater quality from the effects of land use due to cation exchange and chemical sorption processes which are aided by longer mean

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[1] Source: Environment Southland Groundwater Zone Information Sheet http://gis.es.govt.nz/groundwater/zones/waihopai.pdf

[2] Rissmann, C., Wilson, K., and Hughes, B., 2012. Waituna catchment groundwater resource technical report. Environment Southland publication 2012-04, Invercargill. 93p.

residence times (months). Shallow groundwater quality in this area shows little impact from land use with the main risk to water quality being from artificial drainage.

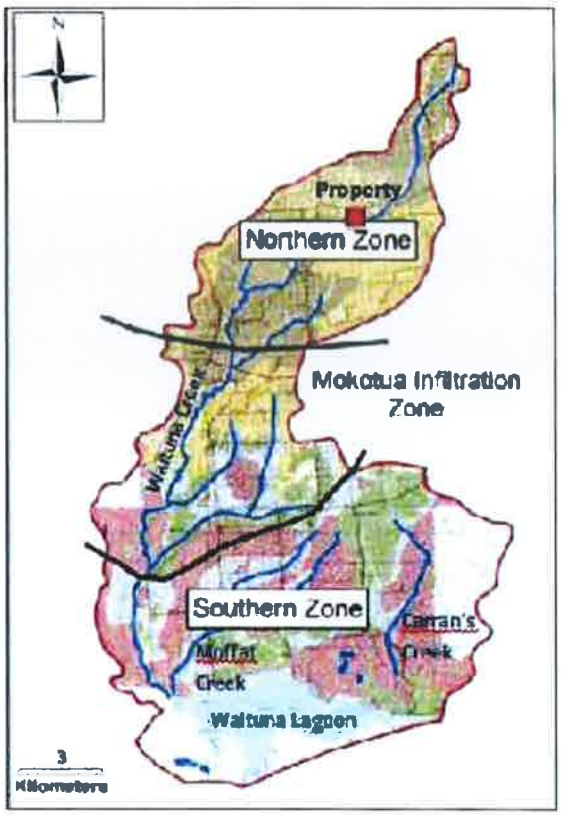

Figure 2: *Groundwater quality zones of the Waituna catchment as defined by natural variation in hydrological and hydrogeological properties, soil and aquifer types and hydrochemical variation [Adapted from: Environment Southland, 2012[7]]*

Due to the sensitivity of the Waituna catchment to the leaching of nutrients resulting in the degradation of water quality the following management practices are recommended, but not limited to:

- Low rate application of effluent;
- Effluent irrigation only to occur when soil moisture deficit occurs;
- Buffer zone of at least 20m from groundwater bores on the property;
- Deferred storage;
- Large effluent disposal area;
- Stock to be wintered off;
- Feed pad for feeding of silage.

All of the above management practices will ensure that the activities undertaken on this property do not contribute to the further degradation of water quality within the Waituna Catchment.

8.4 Riparian Management

Fencing and Planting

The main waterway that flows through the property is an unnamed tributary of the Waituna Creek. This waterway has been fenced and riparian margins have been planted. Environment Southland's Sustainability Officer Katrina Robertson has been onsite and concluded that the current riparian planting is considered to be sufficient, not further planting is required.

Fences have been constructed to ensure no stock access to waterways on the property. This will ensure that stock cannot enter the waterways and cause point source pollution or contribute to bank collapse. Fences are constructed allowing a minimum of 3m buffer zone from the waterway to ensure a riparian buffer remains between grazing pasture and the waterway.

Temporary Fencing

Any ephemeral waterways which run through the property will be temporarily fenced off from stock to prevent any point source discharges or bed disturbance occurring in these small drains.

Crossing of Waterways

At this stage there are no intentions to construct any new bridges or culverts on the property. If a new bridge and/or a culvert is required it will be done in a manner to ensure that minimal harm to waterways or riparian margins occurs. Stock crossings will be constructed to ensure that no overland flow of effluent occurs into the waterway. Where culverts are installed they should be maintained to ensure they do not block with debris, especially following flood events.

8.5 Water Use Efficiency

The water to be utilised for the dairying activities is sourced from groundwater. At all times water must be used in the most efficient manner possible. Strategies for minimising water use include;

General

- Check stock water troughs regularly to ensure they are refilling correctly.
- Check water pressure regularly, if pressure is low investigate and eliminate the possibility of water leaks.

At the shed

- Ensure all hoses and taps are turned off properly when not in use.

- When washing down the shed, conserve water where possible while still maintaining cleanliness of the farm dairy.
- Installation of a greenwash system.

Water will be metered to ensure that usage is accurately recorded. Water meter records should be checked regularly to ensure usage volumes are known and within the consented allocation. Records will be available to council if requested.

9. Biodiversity Management

9.1 Pest Management

Regular pest plants and animal species which are to be expected on Southland landholdings are present on the property. Pest management strategies are listed below. There are no known significant indigenous species found on the property.

Table 3: *Pest Plant Management*

Pest Plant	Management Strategy
Thistles, Gorse, Broom	Continuation of the current spraying and grubbing programme. Sprays are not to be used near waterways to prevent chemical pollution of water.

Table 4: *Pest Animal Management*

Pest Animal	Management Strategy
Magpies	Trapping or shooting will be used to control the magpie population.
Hares & Rabbits	Night shooting as required to keep numbers under control.

The above table outlines pest management strategies for the pests which have been identified as being on farm. Other pests which are identified in the general district include Opossums, Ragwort

and various species of thistles. Ducks and Spur-winged plovers can also be problematic and while ducks are able to be shot during the duck shooting season only, plovers are not a wildlife species that is protected under the Wildlife Act 1953 and can be captured or killed at any time for any reason.

The Environment Southland Pest Management Strategy outlines a number of pest plants and animals which are to be controlled or eradicated from the region. The farm shall be operated in accordance with the Regional Pest Management Strategy to ensure that all pests are managed or eradicated from the farm. The Regional Pest Management Strategy can be found on the Environment Southland Website.

10. Soil Management

Good soil management is not only beneficial to the soil resource itself, but also to production. The silty soils on the property are known to have vulnerabilities to waterlogging and therefore must be managed accordingly to reduce pugging and overland flow. Winter is a critical time of year for vulnerable soils and the implementation of practices such as standing off and wintering off-farm will ensure the mitigation of any adverse effects which may arise as a result of the continuation of dairying on the property.

The following soil management methods will be implemented:

Table 5: *Soils Management Problem and Management Strategy*

Problem	Management Strategy
Compaction- pugging	Stand cows off on concrete pad or the dairy shed yard where possible in exceptionally wet conditions. Use of back fence breaks as appropriate. Use of heavy machinery to be avoided in very wet conditions. Minimum tillage to be used where appropriate.
Wintering	All stock is to be wintered off farm.

Overflow of contaminants/ Nutrients	Soil nutrients will be managed according to the nutrient management plan. Fertiliser and effluent will only be applied when ground conditions are appropriate utilising visual inspection and the onsite soil moisture monitoring prior to any irrigation.
Cropping	Any cropping or re-grassing undertaken on farm should be undertaken according to industry best practice. Dairy NZ is a useful resource for matters relating to crop paddock selections and management.

11. Consent Compliance

The main consent conditions are to be set out in the resource consents area listed below. Full copies of the resource consents are attached as Appendix G.

Table 6: *Consent Compliance*

Consent Condition	Method of Compliance

ATTACHMENTS

ATTACHMENT A	EFFLUENT DISPOSAL PLAN
ATTACHMENT B	NUTRIENT MANAGEMENT PLAN AND NUTRIENT BUDGET
ATTACHMENT C	MONTHLY CHECK SHEET
ATTACHMENT D	EFFLUENT DISPOSAL RECORD
ATTACHMENT E	STAFF TRAINING GUIDE
ATTACHMENT F	RESOURCE CONSENTS

ATTACHMENT A EFFLUENT DISPOSAL PLAN


BADWIT ROAD
BADWIT ROAD
COW SHED, EFFLUENT POND & NEW BORE
LEGEND
EFF
PRO
Note.
Buff
Wat
Buff
and


BADWIT ROAD
BADWIT ROAD
COW SHED, EFFLUENT POND & NEW BORE
LEGEND
PROPERT
TILES/NC
WATERW
NOTE: PROPERT
FROM DC
ACCURAT

ATTACHMENT B NUTRIENT MANAGEMENT PLAN

Nutrient Management Plan

Owner:
Hank and Sandra Schrader

Postal Address:
R D 1
Invercargill 9871

Phone: 0-3-239 5528
E-mail address: schrader@woosh.co.nz

Purpose of Plan:

Clearly set out the plan under which the Schraders will operate to achieve farm performance and environmental objectives under a dairying operation

Plan Objectives:

- Comply with all legal requirements related to nutrient management activities.
- Take all practicable steps to maintain or enhance the quality of the property's water resources.
- Take all practicable steps to ensure that there is an adequate supply of soil nutrients to meet plant needs.
- To take all practicable steps to contain nutrients within the property boundaries.
- Take all practicable steps to minimise the risk of nutrient contamination of any areas of significant vegetation and/or wildlife habitat.
- Undertake a nutrient budget.

Prepared by:
Miranda Hunter, Roslin Consultancy Limited
Bachelor of Agricultural Science
Certified Nutrient Management Adviser

Date completed: 26th June 2015

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Property Management Objectives:

Production:
- Achieve 123,600 kg ms, under a predominately grass based system

Financial:
- To operate a low cost, simple and profitable farm system that achieves financial returns in the top quartile

Environmental:
- Minimise nutrient loss to ground and surface water bodies

Personal:
- A simple farm system that is sustainable for people, animals and the environment

Property Details:

Property Area (ha):	109.52
Effective Area (ha):	103
Area under irrigation (ha):	0
Effluent area (ha):	26
Effluent method:	Low rate application
Enterprise Type:	Dairy

Farm Production Summary

Stock	Peak cows milked	306
Production (kg ms)	123,600	
Pasture (kg DM / ha / year)	14.1	
Imported supplementary feed (Tonnes DM per year)	130	

Soils and Block Details:

We have identified the following soils / management units on this property:

Block name	Soil order	Contour	Effective area (ha)
Pastoral Woodlands	Brown	Flat	61
Effluent Woodlands	Brown	Flat	26
Pastoral Dacre	Gley	Flat	16
Stock excluded			7.0
		Effective farm area	103
		Total farm area	110
Swedes (rotating)			4

Soils

Key points of note on the soils on the property are;

Woodlands

- Imperfectly drained with a moderate vulnerability to water logging during wet periods
- Moderate vulnerability to structural compaction reflecting moderate topsoil clay and P- retention values, but offset by imperfect drainage
- Top soil erodibility is slight
- Slight vulnerability of leaching to ground water reflecting imperfect drainage high water holding capacity and slow subsoil permeability

Dacre

- Poorly drained with severe vulnerability to water logging during wet periods
- Moderate vulnerability to structural compaction reflecting the poor drainage, that is offset by the moderate topsoil organic matter and P-retention levels
- Top soil erodibility is slight, due to medium clay and organic matter content
- Slight vulnerability to leaching to ground water reflecting the high water holding capacity and a low sub soil permeability

Potential Environmental Risks

Contamination of surface and ground water

Undesired change in soil nutrient status

Nutrient application to non target land

Accumulation of non-nutrient impurities in the soil profile

Excess stocking rate

Pugging and compaction

Poor cultivation methods

Management Practices to Minimise / Mitigate Environmental Risk

(Tier 1 and Tier 2)

1. Nutrient Management Plan completed
2. Optimum soil test P – soil fertility is monitored.
3. Stock exclusion from streams, with grass buffer strips
4. Tracks and lanes sited from stream and lane run off diverted to land
5. Active management of farm dairy effluent (storage, low rate and depth)
6. Wintering off of majority of stock
7. Strategic application of N

Soil Fertility

Soil Test	Optimum soil test values
Olsen P (ug/ml)	30
QT SO4	10
Calcium (MAF QT)	8
Magnesium (MAF QT)	10
Potassium (MAF QT)	7
Sodium (MAF QT)	10

Soil testing programme is being undertaken, predicted values have been used in the above table, with an optimum soil test value that will be targeted in the medium to long term.

Nitrogen Loss

To maximise plant uptake of nitrogen applications and minimise N loss the following strategies will be implemented;

- Total N usage is conservative
- Nitrogen is applied to maximise plant uptake – when plants are actively growing (soil temperature and moisture conditions)
- Nitrogen is applied in split dressings with the "little and often" strategy to maximise plant uptake
- Nitrogen applications are recorded
- Nitrogen is not applied when soils are saturated and within 20m of a waterways
- Nitrogen is applied using best management practices

For a copy of the nitrogen fertiliser best management practices refer to "Code of Practice for nutrient management"

http://www.fertiliser.org.nz/Site/code_of_practice/default.aspx

Refer appendices – for additional factsheets

Nitrogen Summary

Block Nitrogen

OVERSEER

Block name	Total N lost (kg N/yr)	N lost to water (kg N/ha/yr)	N in drainage * (ppm)	N surplus (kg N/ha/yr)	Added N ** (kg N/ha/yr)
Pastoral - Woodlands ##	1649	28	6.6	280	157
Pastoral - Dacre ##	267	17	4.1	274	152
Kale	330	82	14.4	453	106
Non productive	21	3	N/A		
Effluent - Woodlands ##	791	32	7.4	325	188
Other farm sources	176				
Whole farm	3233	29			
Less N removed in wetlands	0				
Farm output	3233	29			

= Has fodder crop rotating through, results for pastoral block component only

Comments:

The total Nitrate – N leaching losses for this farm is predicted at 29 kg/N/year which is within the average range for NZ Dairy Farms (24-42 kg N/ha/year)

The Nitrate-N concentration in drainage water for pastoral blocks range from 4.1 to 7.4 ppm which is below the drinking water standards of 11.3 ppm. At 14.4 ppm for the kale block is predicted to be above the drinking water standard

Phosphorus Loss

Minimising P loss is important in any farming system.

Best management practices for P fertiliser use include:

- Apply in line with soil test requirements (and not above targeted optimum)
- Timing of applications (apply during summer period) and when soil conditions are not wet (and heavy rain is not forecast)
- Apply at least 20 m from waterways
- Record all applications

For a copy of the phosphate fertiliser best management practices refer to "Code of Practice for nutrient management"

http://www.fertiliser.org.nz/Site/code_of_practice/default.aspx

Refer appendices – for additional factsheets

Phosphorous Summary

Block Phosphorus

OVERSEER

Block name	Total P (kg P/yr)	P lost (kg P/ha/yr)	P loss categories		
			Soil	Fertiliser	Effluent
Pastoral - Woodlands ##	15	0.3	Low	Low	Low
Pastoral - Dacre ##	8	0.5	Low	Low	n/a
Kale	2	0.4	n/a	n/a	n/a
Non productive	1	0.1	n/a	n/a	n/a
Effluent - Woodlands ##	7	0.3	Low	Low	Low
Other farm sources	39				
Whole farm	71	0.6			

= Has fodder crop rotating through, results for pastoral block component only

Comments:

Potential P loss predicted to be low across the property.

Overall potential P loss is low at a predicted 0.6 kg/h/ha

Nutrient Budget

Whole Farm

Farm Nutrient Budget - Whole farm **OVERSEER**

	N	P	K	S	Ca	Mg	Na
	(kg/ha/yr)						
Nutrients added							
Fertiliser, lime & other	129	18	1	21	43	0	0
Rain/clover N fixation	103	0	3	6	4	8	44
Irrigation	0	0	0	0	0	0	0
Supplements imported	14	2	13	2	3	1	1
Nutrients removed							
As products	0	0	0	0	0	0	0
Exported effluent	0	0	0	0	0	0	0
As supplements	0	0	0	0	0	0	0
To atmospheric	89	0	0	0	0	0	0
To water	29	0.6	10	21	45	12	30
Change in internal pools							
Plant material	1	0	-4	1	0	0	0
Organic pool	121	6	-1	6	-1	0	0
Inorganic mineral	0	10	-25	0	-2	-3	-3
Inorganic soil pool	6	3	36	0	8	2	18

Comments:

In general the nutrient budget shows inputs and outputs to be well balanced; indicating soil fertility in the long-term is likely to be achieved

The total Nitrate – N leaching losses for this farm is predicted at 29 kg/N/year which is within the average range for NZ Dairy Farms (24-42 kg N/ha/year)

Nutrient Management Policy

All applications of effluent and fertiliser to land should be in accordance with the following:

Regional Water Plan for Southland

http://es.govt.nz/media/18462/regional_water_plan_-_may_2013.pdf

Code of practice for nutrient Management (with emphasis on fertiliser use)

http://www.fertiliser.org.nz/Site/code_of_practice/default.aspx

Farm consent conditions

Review

The nutrient management plan should be reviewed on an annual basis in line with the soil testing regime

Report

This report has been developed using Overseer 6.2.0 with the following assumptions;

Near equilibrium conditions
Annual average inputs
Best Management Practices

This report has been developed in conjunction with the property Owner, implementation and decisions based on this report are the responsibility of the Owner.

Appendices;

Fact Sheet 6 – Fertiliser Use

Fact Sheet 9 - Fertiliser Use – Potential Impact on Surface and Ground Water

Fact Sheet 13 – Phosphate Fertiliser Considerations

Fertiliser Use

Introduction

Achieving the best result from fertiliser starts with good storage, transport and handling. Absorption of atmospheric moisture will shorten the acceptable storage period and also impact on handling, flow and spreading characteristics.

Fertiliser storage

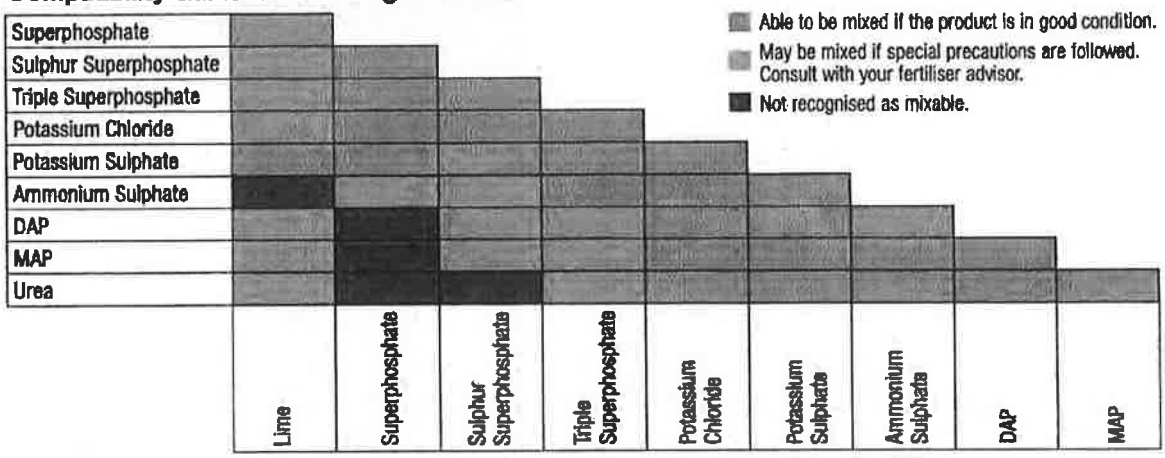
- Keep it dry and free from contamination
- Use an impermeable (moisture proof) concrete floor
- Wrap stored fertiliser e.g. bags (include a layer under the bags)

Compatibility for mixing

- Check chemical and physical compatibility using the guide below
- Mixing fertilisers will generally make them more prone to moisture absorption
- Wherever possible, mix immediately prior to use
- Ensure particle size of blended fertilisers are similar
- More than 10% difference in particle size can lead to separation during transport and handling
- Seek qualified and appropriate advice before blending fertilisers

NB: Do not blend herbicides or other agrichemicals with fertiliser, as it may result in unpredictable responses, reduced effectiveness or even hazardous chemical reactions.

Compatibility Guide for Blending Fertilisers



Timing of application

Correct timing can be critical for an economic response and value for money.

Nitrogen (N) – If the plant can't take up and respond to applied nitrogen, then the nitrogen is at risk of being lost through leaching or atmospheric losses. Timing for nitrogen application must match appropriate growing conditions and plant health.

The following factors influence recommendations for the amount and timing of nitrogen applications because they affect the potential for optimum plant growth:

- Soil temperature (>6°C at 10cm and 9am)
- Soil moisture (avoid the extremes of either being too wet or too dry)
- Soil compaction
- Plant species/cultivar
- Field history
- Plant disease levels

If more than 50 kg N/ha/yr is required, then split applications are recommended.

Potassium (K) – With a high rainfall (>1500mm year) spring applications are preferred to autumn.

For ash or pumice soils with lower rainfall, then spring and autumn applications are equally effective.

If more than 50 kg K/ha/yr is required, then split applications are recommended.

Avoid application of K immediately before calving/lambing.

Superphosphate and Lime – Timing is considered less critical for these products. However, timing for the sulphur content of superphosphate can be important on sedimentary, peat or pumice soils – particularly under higher rainfall. Using a mixture of sulphate sulphur and elemental sulphur can reduce the requirement of split applications for sulphur. Care should be taken to ensure superphosphate particles are not washed into waterways.

Applications of greater than 100 kg P/ha (1 tonne of superphosphate/ha) should be split.

Reactive Rock Phosphate (RPR) – Phosphorus is only slowly released from RPR and the rate of dissolution is influenced by RPR properties (i.e. particle size, chemical make-up of the RPR used) and farm properties (i.e. soil pH, rainfall, drainage and exchangeable magnesium). It is recommended soil pH is below 6.0 and that there is at least 800mm annual rainfall for RPR to be most effective. RPR will reduce the potential for runoff losses of phosphorus from applied fertiliser during the first 0–50 days after application, however, over the longer term losses from RPR and more soluble fertilisers are similar. Care should be taken to ensure RPR particles are not washed into waterways.

To avoid "acute fluorosis" it is recommended that stock are not grazed on pastures which have received phosphate fertilisers for 21 days or until 25mm rain has fallen.

Product selection

Choice of fertiliser may be influenced by many factors including:

- Cost per tonne/cost per nutrient
- Nutrient analysis (% N, P, K, S, Ca, Mg + trace elements)
- Fertmark assurance
- Anticipated plant response and economic return on investment
- Particle size
- Dissolution rate
- Effects on pH
- Blending and handling characteristics
- Soil nutrient test results
- Physical structure of soil
- Animal health requirements
- Potential for off farm impacts
- Presence of contaminants
- Spreading characteristics
- Flowability from aircraft

Environmental considerations:

- Risk of surface runoff to waterways
- Risk of leaching to sub-surface drains or groundwater
- Risk of high rainfall/no rainfall
- Neighbouring properties (schools, homes, etc)

Your fertiliser sales representative or a Certified Nutrient Management Adviser can help match the correct requirements for farming goals and farming system.

For more information see: A local Certified Nutrient Management Adviser (www.nmacertification.org.nz)
Your Fertiliser Sales Representative
Fertiliser Association of New Zealand (www.fertiliser.org.nz)
Ballance Agri-Nutrients Ltd (www.ballance.co.nz)
Ravensdown Fertiliser Co-operative (www.ravensdown.co.nz)

Fertiliser Use – Potential Impact on Surface and Ground Water

Introduction

Nutrients come from a wide range of sources, not just from fertiliser.

Excess nutrient can cause health risks with drinking water and eutrophication of fresh waterways and lakes. The World Health Organization recommends drinking water should contain no more than 11.3mg of nitrate nitrogen per litre.

(For livestock; the recommended maximum is 40mg of nitrate nitrogen/litre of water for cattle and 60mg/litre of water for sheep.)

However, to promote algal growth in freshwater streams and lakes, it only takes around 0.015–0.030mg of dissolved reactive phosphate and 0.040–0.1mg ammonium and nitrate nitrogen per litre of water.

Just like crops, algae and other water plants require nutrients. With increased nitrogen and phosphorus in waterways they can respond quickly to favourable growing conditions and choke streams and reduce water quality – sometimes with the potential for serious consequences to livestock and natural fauna and flora.

Safe drinking water and reduction in algal blooms and choking weed growth can be avoided or mitigated with sensible practices in the application of nutrients in farming systems.

Preventing nutrients from reaching surface water

Nitrogen and phosphate nutrients:

- Avoid direct applications to waterways (make allowances for wind or runoff on steep terrain near waterways)
- Avoid surface runoff due to spreading nutrients before heavy irrigation or anticipated high rainfall events
- Carefully match nutrient application to crop requirements
- Prevent soil erosion or soil pugging by livestock (particulate matter washed into streams can be a source of nutrient contamination, especially for phosphorus)
- Avoid discharge of effluent near waterways or onto mole and tile drain areas at times when soils are near saturation or when drains are flowing
- Where possible, drain to wetlands or riparian/filter strips, not to open water
- Keep livestock out of streams and waterways to reduce nutrient and faecal contamination
- Control runoff from stock races, directing it away from open water
- Place fertiliser storage and loading sites more than 50 metres from open water

Preventing nutrients from reaching ground water

Nitrogen and phosphorus nutrients:

- Carefully match nitrogen applications to plant requirements (account for all sources of nitrogen e.g. effluent, mineralised organic matter from a newly ploughed field or nitrogen fixed by legumes)
- Avoid nutrient applications prior to heavy irrigation or anticipated high rainfall events (the more water flowing through the soil profile the greater the leaching potential)
- Carefully schedule irrigation to meet plant requirements (excessive irrigation will leach valuable nutrients)
- Avoid effluent or fertiliser applications to saturated soils
- Increasing stocking rates increases excreta and therefore nitrogen deposited as urine and dung. To manage this:
  - Take account of effluent as a nutrient source
  - Use nutrient budgets to estimate nutrient inputs (from all sources)
- Use cover crops in winter (a newly ploughed field will release nitrogen as organic matter is mineralised – if there is no crop to utilise released nitrogen it is at risk of leaching under winter rainfall)
- For horticultural applications, band fertiliser close to plant roots, carefully matching plant requirements (this reduces nutrient leaching losses between rows, prior to root development into the inter-row space)
- Split applications – little and often will more closely match plant requirements
- For broadcast application, ensure good calibration and even application of nutrients at rates matching plant requirements
- Use Fertmark and Spreadmark accreditation to ensure consistent products and reliable applications
- Use nutrient budgets and nutrient management plans to fine-tune your farming systems, minimise waste and maximise response to nutrients

Usually nitrogen is far more soluble than phosphorus and is the more likely of the two nutrients to contaminate groundwater.

The exception: phosphorus from soluble P fertiliser or dairy effluent is most mobile soon after it is applied, prior to it being taken up by plants or bound to soil particles and organic matter. This is an important consideration – especially in coarse, sandy soils with low organic matter content.

For more information see: A local Certified Nutrient Management Adviser (www.nmacertification.org.nz)
Your Fertiliser Sales Representative
Your regional council Land Management Officer
DairyNZ (www.dairynz.co.nz)
Fertiliser Association of New Zealand (www.fertiliser.org.nz)
Ballance Agri-Nutrients Ltd (www.ballance.co.nz)
Ravensdown Fertiliser Co-operative (www.ravensdown.co.nz)

Phosphate Fertiliser Considerations

Introduction

Almost all of New Zealand's soils are naturally deficient in phosphorus and it remains an essential ingredient for successful farming.

To achieve optimum profitability and to avoid or minimise any adverse effects, it is important to give careful consideration to product choice and conditions surrounding the application of phosphorus fertiliser.

Production considerations

Different enterprises require a different balance between an immediate boost in available phosphorus and steady long term availability through maintaining optimum soil levels.

Soil reserves can be built up – traditionally this is considered as being like "money in the bank" – except that excessive levels of soil phosphorus are fiscally wasteful, offer no benefits and can contribute to environmental problems.

The current farming enterprise and soil history will determine the balance required between long term slowly available phosphorus and rapidly available soluble phosphorus which is required to meet immediate plant growth demands.

Animal health considerations

Phosphate rock in its natural state contains fluoride. Therefore, fertilisers such as superphosphate and RPR also contain fluoride. If ingested directly by livestock, livestock can suffer from what is known as "phosphate poisoning" which in severe cases can cause death. This is actually fluoride poisoning.

To avoid "acute fluorosis" it is recommended that stock are not grazed on pastures that have received phosphate fertilisers for 21 days or until 25mm rain has fallen.

Environmental considerations

Phosphorus in waterways – even at very low concentrations – is a major contributing cause of eutrophication of streams and the resulting algal blooms.

Following applications of superphosphate, it can be up to 50–100 days before applied phosphorus appears to reach an equilibrium in adsorption to soil particles. In most soils, phosphorus is strongly bound to soil particles and organic matter, particularly in the surface layers.

Eroded soil particles carrying phosphorus and also runoff carrying soluble forms of phosphorus which are released after recent application of fertiliser (or effluent application) can pose an environmental risk leading to eutrophication of waterways.

Fertilisers derived from phosphate rock will contain naturally occurring impurities such as cadmium. Consider if a cadmium minimisation strategy is required for your particular soil cadmium levels and land use.

The choice of fertiliser and circumstances of fertiliser applications can affect production response, animal health and level of environmental risk.

Choosing the correct phosphate product

Advantages of readily soluble forms:

- Immediate availability for plant uptake and rapid growth response (e.g. establishment of vegetable seedlings)
- After 50–100 days even soluble phosphorus becomes 'bound' to soil and organic matter and then is not readily lost through leaching
- Do not require soil pH <6 and 800mm annual rainfall to ensure solubility

Examples of the more common forms of soluble phosphorus fertilisers include; superphosphate, triple superphosphate, sulphur super, MAP, DAP and compound fertiliser formulations.

Advantages of slower release forms:

- Rate of nutrient release is determined by both RPR properties and soil factors
- Reduced risk of phosphorus losses through runoff and/or leaching during the first 0–50 days after application

Examples of common phosphate fertilisers with lower solubility include; Reactive Phosphate Rock and partially acidulated Reactive Phosphate Rock.

Environmental considerations during application

- Target appropriate soil P levels for your soil type and land use.
- Avoid build-up of excessive soil phosphorus levels. It has a negative impact on the environment when high P levels in eroded soil sediment reach waterways.
- Avoid soluble P application near streams or onto saturated soil – where soluble P can be carried in runoff or leachate – especially where tile or mole drains operate.
- Do not allow fertiliser particles to be applied directly to water or to subsequently wash into open waterways.
- Provide riparian strips adjacent to waterways – the correct width will depend on soil type and topography (wider on steep terrain) to reduce the risk of fertiliser and soil particles being carried into waterways.
- Use wetlands to trap sediment and nutrient.

For more information see: A local Certified Nutrient Management Adviser (www.nmacertification.org.nz)
Your Fertiliser Sales Representative
Your regional council Land Management Officer
Fertiliser Association of New Zealand (www.fertiliser.org.nz)
Ballance Agri-Nutrients Ltd (www.ballance.co.nz)
Ravensdown Fertiliser Co-operative (www.ravensdown.co.nz)

Version 6.2.0, on 2015-06-09 02:41:22

Miranda Hunter
Roslin Consultancy

Client reference:

Farm name: Schrader - Conversion Proposal - Version 6.2 - FINAL

Parameters

OVERSEER

Farm details

Type	Farm type	Full range
Assessment	Assessment year	Not entered
Region	Region	Invercargill

Farm blocks

Pastoral - Woodlands	Pastoral	58.6
Pastoral - Dacre	Pastoral	15.4
Effluent - Woodlands	Pastoral	25
Kale	Fodder Crop	
Non productive	Trees and Scrub	7
Total farm area declared in blocks	ha	110
Total farm area	ha	110
Non-productive area	ha	0

Farm animals

Stock numbers

Stock reconciliation - Dairy

Production

Milk solids	kg/yr	123600
Milk volume yield	l/yr	Not entered
Fat yield	kg/yr	Not entered
Lactation length	days	Not entered
Average weight	kg/animal	Not entered

Calving times

Median calving date	24 August
Drying off	20 May
Percent of herd	0

Stock numbers

Mob name	Class	Breed	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
MilkingHerd	MilkingHerd	F x J cross	90	320	315	306	306	306	306	300	300	270	240	90

Max weight (kg)	LW start (kg)	LW end (kg)	CW (kg)	Age (months)	Source	Fate	Sex	Mated
0	0	0	0	0			Female	

Animal excreta distribution

Relative productivity assessment method		No difference between blocks
All blocks have a relative productivity value of 1		
Ratio of stock types on pastoral blocks is the same as the farm stock ratios		

Farm dairy effluent management system

Effluent management method		Holding pond
Pond solids management method		Spread on selected blocks
Solid separation and disposal	False	Spread on selected blocks
Liquid management method		Spray regularly

Animal health supplements

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Farm name: Schrader - Conversion Proposal - Version 6.2 - FINAL

Parameters

OVERSEER

Animal - Dairy
No animal supplementation has been entered

Animal - Dairy replacements
No animal supplementation has been entered

Left over feeding

No left over feeding specified
No supplements from storage added to this farm

Imported supplements

Supplement information		
Conservation type		Silage
Name		Baleage
Pasture type		
Supplement amount		
Dry weight basis	T	23
Silage cutting method		
Fed on blocks: Kale,		
No feeding destinations found		
Supplement information		
Conservation type		Silage
Name		Pasture average quality silage
Pasture type		
Supplement amount		
Dry weight basis	T	50
Silage cutting method		
Supplements are distributed evenly across all pastoral blocks		
No feeding destinations found		

Block Information

Block - Pastoral - Woodlands

Block name		Pastoral - Woodlands
Block type		Pastoral
Area	ha	61
Relative productivity		1
Pasture block type		Yes
Topography		Flat
Distance from coast	km	18
Cultivated in last 5 years		False
Climate		
Annual average rainfall	mm/yr	1152
Mean annual temperature		10.1
Seasonal variation in rainfall		731-1450 mm, None to weak

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Client reference:

Farm name: Schrader - Conversion Proposal - Version 6.2 - FINAL

Parameters

OVERSEER®

Annual potential evapotranspiration		651-800 mm/yr
Seasonal variation in PET		Moderate
Soil description		
Soil order (default)		Sedimentary
Soil order (default)		Brown
SMaps	Sibling	Wood_291.1
Wilting point	0 - 30cm	21
	30 - 60cm	24
	> 60	24
Field capacity	0 - 30cm	41
	30 - 60cm	39
	> 60	41
Saturation	0 - 30cm	57
	30 - 60cm	50
	> 60	47
Depth to impeded layer	cm	0
Top soil horizon chemical and physical parameters		
ASC/PR		43
Sand	%	13
Natural drainage class		Imperfect
Bulk density	kg/m^3	1090
Clay	%	28
Sub soil clay	%	29
Top soil texture		
Stony top soil		False
Compacted top soil		False
Sub-soil textural group		Light
Depth to impeded drainage layer		0
Maximum rooting depth		0
Soil drainage		
Profile drainage class		Imperfect
Hydrophobic condition		Use default
Drainage method		
Method		Mole/tile system
Percent of paddock drained		30
Occurence of pugging damage		Occasional
Soil settings		
K leaching (%s)		Medium
N immobilisation status		Standard

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
30	7	8	10	8

QT SO4 10

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Farm name: Schrader - Conversion Proposal - Version 6.2 - FINAL

Parameters

QT 3Ot	10
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - December

Category	Ballance super
Product	Superten
Amount	225

Fertiliser products - September

Category	Ballance other
Product	N-rich urea
Amount	55

Fertiliser products - October

Category	Ballance other
Product	N-rich urea
Amount	55

Fertiliser products - March

Category	Ballance other
Product	N-rich urea
Amount	55

Fertiliser products - January

Category	Ballance other
Product	N-rich urea
Amount	55

Fertiliser products - August

Category	Ballance other
Product	N-rich urea
Amount	55

Fertiliser products - February

Category	Ballance other
Product	N-rich urea
Amount	55

Irrigation

No irrigation entered

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Client reference:

Farm name: Schrader - Conversion Proposal - Version 6.2 - FINAL

Parameters

OVERSEER

Irrigation concentrations

N	P	K	S	Ca	Mg	Na	H
0	0	0	0	0	0	0	0

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Dairy	%	0
Water connectivity		
Direct access to streams		False
Animal grazing		
January		True
February		True
March		True
April		True
May		True
August		True
September		True
October		True
November		True
December		True

Effluent application

Solid effluents		
Effluent type added	December	Pond solids/sludge

Block - Pastoral - Dacre

Block name		Pastoral - Dacre
Block type		Pastoral
Area	ha	16
Relative productivity		1
Pasture block type		Yes
Topography		Flat
Distance from coast	km	18
Cultivated in last 5 years		False
Climate		
Annual average rainfall	mm/yr	1152
Mean annual temperature		10.1
Seasonal variation in rainfall		731-1450 mm, None to weak
Annual potential evapotranspiration		651-800 mm/yr
Seasonal variation in PET		Moderate
Soil description		
Soil order (default)		Sedimentary
Soil order (default)		Gley

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Client reference:

Farm name: Schrader - Conversion Proposal - Version 6.2 - FINAL

Parameters

OVERSEER

SMaps	Sibling	Paro_4a.1
Wilting point	0 - 30cm	14
	30 - 60cm	16
	> 60	17
Field capacity	0 - 30cm	47
	30 - 60cm	43
	> 60	46
Saturation	0 - 30cm	63
	30 - 60cm	52
	> 60	53
Depth to impeded layer	cm	0
Top soil horizon chemical and physical parameters		
ASC/PR		35
Sand	%	9
Natural drainage class		Poor
Bulk density	kg/m³	940
Clay	%	25
Sub soil clay	%	26
Top soil texture		
Stony top soil		False
Compacted top soil		False
Depth to impeded drainage layer		0
Maximum rooting depth		0
Soil drainage		
Profile drainage class		Poor
Hydrophobic condition		Use default
Drainage method		
Method		Mole/tile system
Percent of paddock drained		60
Occurence of pugging damage		Occasional
Soil settings		
K leaching (%s)		Medium
N immobilisation status		Standard

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
30	7	8	10	8

QT SO4	10
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default
Pasture	
Pasture type	Ryegrass/white clover

Supplements removed

Miranda Hunter
Roslin Consultancy

Client reference:

Farm name: Schrader - Conversion Proposal - Version 6.2 - FINAL

Parameters

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - December

Category	Ballance super
Product	Superten
Amount	225

Fertiliser products - September

Category	Ballance other
Product	N-rich urea
Amount	55

Fertiliser products - October

Category	Ballance other
Product	N-rich urea
Amount	55

Fertiliser products - March

Category	Ballance other
Product	N-rich urea
Amount	55

Fertiliser products - January

Category	Ballance other
Product	N-rich urea
Amount	55

Fertiliser products - February

Category	Ballance other
Product	N-rich urea
Amount	55

Fertiliser products - August

Category	Ballance other
Product	N-rich urea
Amount	55

Irrigation

No irrigation entered

Irrigation concentrations

N	P	K	S	Ca	Mg	Na	H
0	0	0	0	0	0	0	0

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

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Client reference:

Farm name: Schrader - Conversion Proposal - Version 6.2 - FINAL

Parameters

OVERSEER

Animals grazing		
Dairy	%	0
Water connectivity		
Direct access to streams		False
Animal grazing		
January		True
February		True
March		True
April		True
May		True
August		True
September		True
October		True
November		True
December		True
Effluent application		
Receives no liquid or solid effluents		
Block - Effluent - Woodlands		
Block name		Effluent - Woodlands
Block type		Pastoral
Area	ha	26
Relative productivity		1
Pasture block type		Yes
Topography		Flat
Distance from coast	km	18
Cultivated in last 5 years		False
Climate		
Annual average rainfall	mm/yr	1152
Mean annual temperature		10.1
Seasonal variation in rainfall		731-1450 mm, None to weak
Annual potential evapotranspiration		651-800 mm/yr
Seasonal variation in PET		Moderate
Soil description		
Soil order (default)		Sedimentary
Soil order (default)		Brown
SMaps	Sibling	Wood_29a.1
Wilting point	0 - 30cm	21
	30 - 60cm	24
	> 60	24
Field capacity	0 - 30cm	41
	30 - 60cm	39
	> 60	41
Saturation	0 - 30cm	57
	30 - 60cm	50
	> 60	47

Miranda Hunter
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Client reference:

Farm name: Schrader - Conversion Proposal - Version 6.2 - FINAL

Parameters

OVERSEER®

Depth to impeded layer	cm	0
Top soil horizon chemical and physical parameters		
ASC/PR		43
Sand	%	13
Natural drainage class		Imperfect
Bulk density	kg/m^3	1090
Clay	%	28
Sub soil clay	%	29
Top soil texture		
Stony top soil		False
Compacted top soil		False
Sub-soil textural group		Light
Depth to impeded drainage layer		0
Maximum rooting depth		0
Soil drainage		
Profile drainage class		Imperfect
Hydrophobic condition		Use default
Drainage method		
Method		Mole/tile system
Percent of paddock drained		30
Occurence of pugging damage		Occasional
Soil settings		
K leaching (%s)		Medium
N immobilisation status		Standard

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
30	7	8	10	8

QT SO4	10
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default
Pasture	
Pasture type	Ryegrass/white clover
Supplements removed	
No supplements removed from this block	
Fertiliser application	
Fertiliser products - February	
Category	Ballance super
Product	Superten
Amount	175

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Client reference:

Farm name: Schrader - Conversion Proposal - Version 6.2 - FINAL

Parameters

OVERSEER

Amount 173

Fertiliser products - September
- Category: Ballance other
- Product: N-rich urea
- Amount: 55

Fertiliser products - October
- Category: Ballance other
- Product: N-rich urea
- Amount: 55

Fertiliser products - January
- Category: Ballance other
- Product: N-rich urea
- Amount: 55

Fertiliser products - February
- Category: Ballance other
- Product: N-rich urea
- Amount: 55

Irrigation
No irrigation entered

Irrigation concentrations

N	P	K	S	Ca	Mg	Na	H
0	0	0	0	0	0	0	0

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing
- Dairy: % 0

Water connectivity
- Direct access to streams: False

Animal grazing
- January: True
- February: True
- March: True
- April: True
- May: True
- August: True
- September: True
- October: True
- November: True
- December: True

Effluent application

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Client reference:

Farm name: Schrader - Conversion Proposal - Version 6.2 - FINAL

Parameters

OVERSEER®

Liquid effluents		
Receives farm dairy effluent		Low application method
Effluent application depth	%	100
Percentage of block effluent applied to		
Block - Kale		
Block name		Kale
Block type		Fodder Crop
Area	ha	4
Cultivated area	% of area	0
Headland area	% of area	0
Other area	% of area	0
Distance from coast	km	18
Final grid month		November
Irrigation system		No Irrigation
Climate		
Annual average rainfall	mm/yr	1152
Mean annual temperature		10.1
Seasonal variation in rainfall		731-1450 mm, Low
Annual potential evapotranspiration		651-800 mm/yr
Seasonal variation in PET		Moderate
Soil description		
Soil order (default)		Sedimentary
Soil order (default)		Brown
SMaps	Sibling	Fodder Block Average
Wilting point	0 - 30cm	20
	30 - 60cm	23
	> 60	0
Field capacity	0 - 30cm	42
	30 - 60cm	40
	> 60	0
Saturation	0 - 30cm	58
	30 - 60cm	50
	> 60	0
Depth to impeded layer	cm	0
Top soil horizon chemical and physical parameters		
ASC/PR		Not entered
Sand	%	Not entered
Natural drainage class		Use default
Bulk density	kg/m^3	Not entered
Clay	%	Not entered
Sub soil clay	%	Not entered
Top soil texture		
Stony top soil		False
Compacted top soil		False
Sub-soil textural group		Medium

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Client reference:

Farm name: Schrader - Conversion Proposal - Version 6.2 - FINAL

Parameters

Sub-soil textural group	Medium
Depth to impeded drainage layer	0
Maximum rooting depth	0

Soil settings

K leaching (%s)	Medium

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
33.416666666 6667	7	8.8333333333 3333	17.333333333 3333	8

Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Crop block history

Years in pasture	0
Prior history	Pasture

Source of animal information

Animal source

Crop information

Previous assesment year

December	Grazed pasture
January	Grazed pasture
February	Grazed pasture
March	Grazed pasture
April	Grazed pasture
May	Grazed pasture
June	Grazed pasture
July	Grazed pasture
August	Grazed pasture
September	Grazed pasture

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Client reference:
Farm name: Schrader - Conversion Proposal - Version 6.2 - FINAL

Parameters

September	Grazed pasture	
October	Grazed pasture	
November	Grazed pasture	

Current assessment year

December	Kale	
Crop management	See details below	Crop sown
January	Kale	
February	Kale	
Fertiliser or lime added - details are listed below		
March	Kale	
April	Kale	
May	Kale	
June	Kale	
Crop management	See details below	Defoliation
July	Kale	
Crop management	See details below	Defoliation
August	Kale	
Crop management	See details below	Defoliation
September	Kale	
Crop management	See details below	Defoliation
October	Bare ground	
November	Grazed	
Crop management	See details below	Crop sown

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Client reference:

Farm name: Schrader - Conversion Proposal - Version 6.2 - FINAL

Parameters

Crop management	See details below	Crop sown
Crop sowing information - December of the Current assessment year		
Crop category		Fodder
Crop type		Kale
Product yield	tonnes/ha 5	12
Cultivation practice at sowing		Conventional
Defoliation information - June of the Current assessment year		
Defoliation method		Grazed in-situ
Source of animal		Farm stock - see Enterprise numbers panes
Generalised animal type		
Defoliation information - July of the Current assessment year		
Defoliation method		Grazed in-situ
Source of animal		Farm stock - see Enterprise numbers panes
Generalised animal type		
Defoliation information - August of the Current assessment year		
Defoliation method		Grazed in-situ
Source of animal		Farm stock - see Enterprise numbers panes
Generalised animal type		
Defoliation information - September of the Current assessment year		
Defoliation method		Grazed in-situ
Source of animal		Farm stock - see Enterprise numbers panes
Generalised animal type		
Crop sowing information - November of the Current assessment year		
Crop category		Permanent pasture
Crop type		Grazed
Source of animals		
Fertiliser application		
Fertiliser products - Previous assessment - December		
Category		Ballance cropping
Product		Cropzeal brassica base
Amount		250
Fertiliser products - Previous assessment - December		
Category		Ballance other
Product		N-rich urea
Amount		100

Version 6.2.0, on 2015-06-09 02:41:26

Miranda Hunter
Roslin Consultancy

Client reference:

Farm name: Schrader - Conversion Proposal - Version 6.2 - FINAL

Parameters

Fertiliser products - Current assessment - February		
Category		Ballance other
Product		N-rich urea
Amount		100
Effluent application		
Receives no liquid or solid effluents		
Block - Non productive		
Block name		Non productive
Block type		Trees and Scrub
Area	ha	7
Rainfall	mm/yr	1152
Distance from coast	km	18
Bush type		Native
Report settings		
Greenhouse gas emission report units: Use default		
Target N application rate as effluent: kg N/ha/yr		

Version 6.2.0, on 2015-06-09 02:39:58

Miranda Hunter
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Client reference:

Farm name: Schrader - Conversion Proposal - Version 6.2 - FINAL

Farm Nutrient Budget - Whole farm

OVERSEER®

	N	P	K	S	Ca	Mg	Na
	(kg/ha/yr)						
Nutrients added							
Fertiliser, lime & other	129	18	1	21	43	0	0
Rain/clover N fixation	103	0	3	6	4	8	44
Irrigation	0	0	0	0	0	0	0
Supplements imported	14	2	13	2	3	1	1
Nutrients removed							
As products	0	0	0	0	0	0	0
Exported effluent	0	0	0	0	0	0	0
As supplements	0	0	0	0	0	0	0
To atmospheric	89	0	0	0	0	0	0
To water	29	0.6	10	21	45	12	30
Change in internal pools							
Plant material	1	0	-4	1	0	0	0
Organic pool	121	6	-1	6	-1	0	0
Inorganic mineral	0	10	-25	0	-2	-3	-3
Inorganic soil pool	6	3	36	0	8	2	18

Version 6.2.0, on 2015-06-09 02:40:50

Miranda Hunter
Roslin Consultancy

Client reference:

Farm name: Schrader - Conversion Proposal - Version 6.2 - FINAL

Block Phosphorus

OVERSEER®

Block name	Total P (kg P/yr)	P lost (kg P/ha/yr)	P loss categories		
			Soil	Fertiliser	Effluent
Pastoral - Woodlands ##	15	0.3	Low	Low	Low
Pastoral - Dacre ##	8	0.5	Low	Low	n/a
Kale	2	0.4	n/a	n/a	n/a
Non productive	1	0.1	n/a	n/a	n/a
Effluent - Woodlands ##	7	0.3	Low	Low	Low
Other farm sources	39				
Whole farm	71	0.6			

Has a fodder crop rotating though, results for pastoral block component only

Version 6.2.0, on 2015-06-09 02:40:26

Miranda Hunter
Roslin Consultancy

Client reference:

Farm name: Schrader - Conversion Proposal - Version 6.2 - FINAL

Block Nitrogen

Block name	Total N lost (kg N/yr)	N lost to water (kg N/ha/yr)	N in drainage * (ppm)	N surplus (kg N/ha/yr)	Added N ** (kg N/ha/yr)
Pastoral - Woodlands ##	1649	28	6.6	280	157
Pastoral - Dacre ##	267	17	4.1	274	152
Kale	330	82	14.4	453	106
Non productive	21	3	N/A		
Effluent - Woodlands ##	791	32	7.4	325	188
Other farm sources	176				
Whole farm	3233	29			
Less N removed in wetlands	0				
Farm output	3233	29			

* Estimated N concentration in drainage water at the bottom of the root zone. Maximum recommended level for drinking water is 11.3 ppm (note that this is not an environmental water quality standard).

** Sum of fertiliser and external factory effluent inputs.

N/A: N in drainage not calculated for easy and steep pastoral blocks, or for tree and shrubs, riparian, wetland or house blocks.

Has a fodder crop rotating though, results for pastoral block component only

Version 6.2.0, on 2015-06-09 02:39:15

Miranda Hunter
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Client reference:

Farm name: Schrader - Current Farm - version 6.2 - FINAL

Parameters

Farm details

Type	Farm type	Full range
Assessment	Assessment year	Not entered
Region	Region	Invercargill

Farm blocks

Pastoral - Woodlands	Pastoral	72.6
Pastoral - Dacre	Pastoral	13.4
Kale	Fodder Crop	
Non productive	Trees and Scrub	7
Total farm area declared in blocks	ha	110
Total farm area	ha	110
Non-productive area	ha	0

Farm animals

Stock numbers

Stock reconciliation - Beef / dairy grazing

Stock production

Calving percentage	%	94
Percent replacements	%	23
Mean calving date		10 September
Mean weaning date		31 December
Weaning weight	kg	120

Stock numbers

Mob name	Class	Breed	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
DairyReplacements	DairyReplacements	Friesian X jersey	0	0	0	0	50	253	253	253	253	253	253	253
	Max weight (kg) 0	LW start (kg) 90	LW end (kg) 210	CW (kg) 0	Age (months) 4		Source Brought		Fate Remain on-farm	Sex Female		Mated		
DairyReplacements	DairyReplacements	Friesian X jersey	253	253	253	253	253	253	253	229	229	229	129	0
	Max weight (kg) 0	LW start (kg) 210	LW end (kg) 420	CW (kg) 0	Age (months) 11		Source On-farm		Fate Sold to store	Sex Female		Mated		
DairyMilking	DairyMilking	Friesian X jersey	250	120	20	0	0	0	0	0	0	0	0	250
	Max weight (kg) 480	LW start (kg) 0	LW end (kg) 0	CW (kg) 0	Age (months) 0		Source		Fate	Sex Female		Mated		
Bulls	Bulls	Friesian X jersey	25	25	25	25	25	25	25	25	25	25	25	25
	Max weight (kg) 0	LW start (kg) 500	LW end (kg) 500	CW (kg) 0	Age (months) 23		Source Brought		Fate Sold to store	Sex Male		Mated		
CowsBreeding	CowsBreeding	Beef Type	12	12	12	12	12	12	12	12	12	12	12	12
	Max weight (kg) 500	LW start (kg) 450	LW end (kg) 450	CW (kg) 0	Age (months) 23		Source		Fate	Sex Female		Mated No mating		

Animal excreta distribution

Relative productivity assessment method — No difference between blocks

All blocks have a relative productivity value of 1

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Client reference:

Farm name: Schrader - Current Farm - version 6.2 - FINAL

Parameters

All blocks have a relative productivity value of 1
Ratio of stock types on pastoral blocks is the same as the farm stock ratios

Animal health supplements

Animal - Beef / dairy grazing
No animal supplementation has been entered

Left over feeding
No left over feeding specified
No supplements from storage added to this farm

Imported supplements

Supplement information		
Conservation type		Silage
Name		Baleage
Pasture type		
Supplement amount		
Dry weight basis	T	63
Silage cutting method		
Fed on blocks: Kale,		
No feeding destinations found		
Supplement information		
Conservation type		Silage
Name		Baleage
Pasture type		
Supplement amount		
Dry weight basis	T	19
Silage cutting method		
Supplements are distributed evenly across all pastoral blocks		
No feeding destinations found		

Block Information

Block - Pastoral - Woodlands

Block name		Pastoral - Woodlands
Block type		Pastoral
Area	ha	87
Relative productivity		1
Pasture block type		Yes
Topography		Flat
Distance from coast	km	18
Cultivated in last 5 years		False
Climate		
Annual average rainfall	mm/yr	1152
Mean annual temperature		10.1
Seasonal variation in rainfall		731-1450 mm. None to weak

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Client reference:

Farm name: Schrader - Current Farm - version 6.2 - FINAL

Parameters

Seasonal variation in rainfall		751-1450 mm, None to weak
Annual potential evapotranspiration		651-800 mm/yr
Seasonal variation in PET		Moderate
Soil description		
Soil order (default)		Sedimentary
Soil order (default)		Brown
SMaps	Sibling	Wood_29a.1
Wilting point	0 - 30cm	21
	30 - 60cm	24
	> 60	24
Field capacity	0 - 30cm	41
	30 - 60cm	39
	> 60	41
Saturation	0 - 30cm	57
	30 - 60cm	50
	> 60	47
Depth to impeded layer	cm	0
Top soil horizon chemical and physical parameters		
ASC/PR		43
Sand	%	13
Natural drainage class		Imperfect
Bulk density	kg/m^3	1090
Clay	%	28
Sub soil clay	%	29
Top soil texture		
Stony top soil		False
Compacted top soil		False
Sub-soil textural group		Light
Depth to impeded drainage layer		0
Maximum rooting depth		0
Soil drainage		
Profile drainage class		Imperfect
Hydrophobic condition		Use default
Drainage method		
Method		Mole/tile system
Percent of paddock drained		30
Occurence of pugging damage		Occasional
Soil settings		
K leaching (%s)		Medium
N immobilisation status		Standard

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
30	7	8	10	8

QT SO4 10

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Client reference:

Farm name: Schrader - Current Farm - version 6.2 - FINAL

Parameters

QT SO4	10
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - February

Category	Ballance super
Product	Superten
Amount	250

Fertiliser products - September

Category	Ballance other
Product	N-rich urea
Amount	60

Fertiliser products - October

Category	Ballance other
Product	N-rich urea
Amount	50

Fertiliser products - March

Category	Ballance other
Product	N-rich urea
Amount	60

Fertiliser products - April

Category	Ballance other
Product	N-rich urea
Amount	60

Fertiliser products - February

Category	Ballance other
Product	N-rich urea
Amount	60

Fertiliser products - November

Category	Ballance other
Product	N-rich urea
Amount	60

Fertiliser products - May

Category	Ballance other
Product	N-rich urea

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Client reference:

Farm name: Schrader - Current Farm - version 6.2 - FINAL

Parameters

Product		N-rich urea
Amount		30

Irrigation
No irrigation entered

Irrigation concentrations

N	P	K	S	Ca	Mg	Na	H
0	0	0	0	0	0	0	0

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False

Animal grazing
Beef / dairy grazing graze block all year round

Effluent application

Receives no liquid or solid effluents

Block - Pastoral - Dacre

Block name		Pastoral - Dacre
Block type		Pastoral
Area	ha	16
Relative productivity		1
Pasture block type		Yes
Topography		Flat
Distance from coast	km	18
Cultivated in last 5 years		False
Climate		
Annual average rainfall	mm/yr	1152
Mean annual temperature		10.1
Seasonal variation in rainfall		731-1450 mm, None to weak
Annual potential evapotranspiration		651-800 mm/yr
Seasonal variation in PET		Moderate
Soil description		
Soil order (default)		Sedimentary
Soil order (default)		Gley
SMaps	Sibling	Paro_4a.1
Wilting point	0 - 30cm	14
	30 - 60cm	16

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Client reference:

Farm name: Schrader - Current Farm - version 6.2 - FINAL

Parameters

OVERSEER®

	30 - 60cm	16
	> 60	17
Field capacity	0 - 30cm	47
	30 - 60cm	43
	> 60	46
Saturation	0 - 30cm	63
	30 - 60cm	52
	> 60	53
Depth to impeded layer	cm	0

Top soil horizon chemical and physical parameters

ASC/PR		35
Sand	%	9
Natural drainage class		Poor
Bulk density	kg/m³	940
Clay	%	25
Sub soil clay	%	26

Top soil texture

Stony top soil	False
Compacted top soil	False
Depth to impeded drainage layer	0
Maximum rooting depth	0

Soil drainage

Profile drainage class	Poor
Hydrophobic condition	Use default

Drainage method

Method	Mole/tile system
Percent of paddock drained	60
Occurence of pugging damage	Occasional

Soil settings

K leaching (%s)	Medium
N immobilisation status	Standard

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
30	7	8	10	8

QT SO4	10
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

Pasture type	Ryegrass/white clover

Supplements removed

No supplements removed from this block

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Client reference:
Farm name: Schrader - Current Farm - version 6.2 - FINAL

Parameters

OVERSEER®

Fertiliser application

Fertiliser products - February	
Category	Ballance super
Product	Superten
Amount	250
Fertiliser products - September	
Category	Ballance other
Product	N-rich urea
Amount	60
Fertiliser products - October	
Category	Ballance other
Product	N-rich urea
Amount	50
Fertiliser products - March	
Category	Ballance other
Product	N-rich urea
Amount	60
Fertiliser products - April	
Category	Ballance other
Product	N-rich urea
Amount	60
Fertiliser products - February	
Category	Ballance other
Product	N-rich urea
Amount	60
Fertiliser products - November	
Category	Ballance other
Product	N-rich urea
Amount	60
Fertiliser products - May	
Category	Ballance other
Product	N-rich urea
Amount	30

Irrigation
No irrigation entered

Irrigation concentrations

N	P	K	S	Ca	Mg	Na	H
0	0	0	0	0	0	0	0

Miranda Hunter
Roslin Consultancy

Client reference:

Farm name: Schrader - Current Farm - version 6.2 - FINAL

Parameters

Animals on block

Ratio and type of stock based on whole farm values due to this option being selected on block set up

Animals grazing		
Beef / dairy grazing	%	0
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False

Animal grazing

Beef / dairy grazing graze block all year round

Effluent application

Receives no liquid or solid effluents

Block - Kale

Block name		Kale
Block type		Fodder Crop
Area	ha	17
Cultivated area	% of area	0
Headland area	% of area	0
Other area	% of area	0
Distance from coast	km	18
Final grid month		November
Irrigation system		No Irrigation
Climate		
Annual average rainfall	mm/yr	1152
Mean annual temperature		10.1
Seasonal variation in rainfall		731-1450 mm, Low
Annual potential evapotranspiration		651-800 mm/yr
Seasonal variation in PET		Moderate
Soil description		
Soil order (default)		Sedimentary
Soil order (default)		Brown
SMaps	Sibling	Fodder Block Average
Wilting point	0 - 30cm	20
	30 - 60cm	23
	> 60	0
Field capacity	0 - 30cm	42
	30 - 60cm	40
	> 60	0
Saturation	0 - 30cm	58
	30 - 60cm	50
	> 60	0
Depth to impeded layer	cm	0

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Client reference:

Farm name: Schrader - Current Farm - version 6.2 - FINAL

Parameters

OVERSEER

Top soil horizon chemical and physical parameters		
ASC/PR		Not entered
Sand	%	Not entered
Natural drainage class		Use default
Bulk density	kg/m³	Not entered
Clay	%	Not entered
Sub soil clay	%	Not entered
Top soil texture		
Stony top soil		False
Compacted top soil		False
Sub-soil textural group		Medium
Depth to impeded drainage layer		0
Maximum rooting depth		0
Soil settings		
K leaching (%s)		Medium

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
33.416666666 6667	7	8.8333333333 3333	17.333333333 3333	8

Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default
Crop block history	
Years in pasture	0
Prior history	Pasture
Source of animal information	
Animal source	

Crop information

Previous assesment year	
December	Grazed pasture
January	Grazed pasture
February	Grazed pasture
March	Grazed pasture
April	Grazed pasture

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Client reference:
Farm name: Schrader - Current Farm - version 6.2 - FINAL

Parameters

May	Grazed pasture	
June	Grazed pasture	
July	Grazed pasture	
August	Grazed pasture	
September	Grazed pasture	
October	Grazed pasture	
November	Grazed pasture	

Current assessment year

December	Kale	
Crop management	See details below	Crop sown
January	Kale	
February	Kale	
Fertiliser or lime added - details are listed below		
March	Kale	
April	Kale	
May	Kale	
June	Kale	
Crop management	See details below	Defoliation
July	Kale	
Crop management	See details below	Defoliation
August	Kale	

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Parameters

Crop management	See details below	Defoliation
September	Bare ground	
October	Bare ground	
November	Grazed	
Crop management	See details below	Crop sown
Crop sowing information - December of the Current assessment year		
Crop category		Fodder
Crop type		Kale
Product yield	tonnes/ha 5	12
Cultivation practice at sowing		Conventional
Defoliation information - June of the Current assessment year		
Defoliation method		Grazed in-situ
Source of animal		Farm stock - see Enterprise numbers panes
Generalised animal type		
Defoliation information - July of the Current assessment year		
Defoliation method		Grazed in-situ
Source of animal		Farm stock - see Enterprise numbers panes
Generalised animal type		
Defoliation information - August of the Current assessment year		
Defoliation method		Grazed in-situ
Source of animal		Farm stock - see Enterprise numbers panes
Generalised animal type		
Crop sowing information - November of the Current assessment year		
Crop category		Permanent pasture
Crop type		Grazed
Source of animals		
Fertiliser application		
Fertiliser products - Previous assessment - December		
Category		Ballance cropping
Product		Cropzeal brassica base
Amount		250

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Parameters

OVERSEER®

Fertiliser products - Previous assessment - December

Category		Ballance other
Product		N-rich urea
Amount		100

Fertiliser products - Current assessment - February

Category		Ballance other
Product		N-rich urea
Amount		100

Effluent application

Receives no liquid or solid effluents

Block - Non productive

Block name		Non productive
Block type		Trees and Scrub
Area	ha	7
Rainfall	mm/yr	1152
Distance from coast	km	18
Bush type		Native

Report settings

Greenhouse gas emission report units: Use default
Target N application rate as effluent: kg N/ha/yr

Version 6.2.0, on 2015-06-09 02:37:51

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Client reference:

Farm name: Schrader - Current Farm - version 6.2 - FINAL

Farm Nutrient Budget - Whole farm

OVERSEER®

	N	P	K	S	Ca	Mg	Na
	(kg/ha/yr)						
Nutrients added							
Fertiliser, lime & other	153	19	3	23	48	1	0
Rain/clover N fixation	61	0	3	6	4	8	44
Irrigation	0	0	0	0	0	0	0
Supplements imported	12	2	15	2	4	1	1
Nutrients removed							
As products	35	9	2	4	18	0	1
Exported effluent	0	0	0	0	0	0	0
As supplements	0	0	0	0	0	0	0
To atmospheric	79	0	0	0	0	0	0
To water	35	0.4	8	19	49	11	30
Change in internal pools							
Plant material	0	0	-19	4	-1	-1	-1
Organic pool	57	4	0	3	0	0	0
Inorganic mineral	0	10	-19	0	-2	-3	-3
Inorganic soil pool	20	-1	49	0	-9	3	18

Version 6.2.0, on 2015-06-09 02:38:51

Miranda Hunter
Roslin Consultancy

Client reference:

Farm name: Schrader - Current Farm - version 6.2 - FINAL

Block Phosphorus

Block name	Total P (kg P/yr)	P lost (kg P/ha/yr)	P loss categories		
			Soil	Fertiliser	Effluent
Pastoral - Woodlands ##	19	0.3	Low	Low	n/a
Pastoral - Dacre ##	7	0.5	Low	Low	n/a
Kale	7	0.4	n/a	n/a	n/a
Non productive	1	0.1	n/a	n/a	n/a
Other farm sources	11				
Whole farm	44	0.4			

Has a fodder crop rotating though, results for pastoral block component only

Version 6.2.0, on 2015-06-09 02:38:33

Miranda Hunter
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Client reference:

Farm name: Schrader - Current Farm - version 6.2 - FINAL

Block Nitrogen

OVERSEER®

Block name	Total N lost (kg N/yr)	N lost to water (kg N/ha/yr)	N in drainage * (ppm)	N surplus (kg N/ha/yr)	Added N ** (kg N/ha/yr)
Pastoral - Woodlands ##	1899	26	6.1	218	175
Pastoral - Dacre ##	223	17	3.9	217	175
Kale	1609	95	**16.3**	325	106
Non productive	21	3	N/A		
Other farm sources	45				
Whole farm	3798	35			
Less N removed in wetlands	0				
Farm output	3798	35			

* Estimated N concentration in drainage water at the bottom of the root zone. Maximum recommended level for drinking water is 11.3 ppm (note that this is not an environmental water quality standard).

** Sum of fertiliser and external factory effluent inputs.

N/A: N in drainage not calculated for easy and steep pastoral blocks, or for tree and shrubs, riparian, wetland or house blocks.

Has a fodder crop rotating though, results for pastoral block component only