

# ENVIRONMENTAL FARM PLAN FOR IRRIGATED LAND USE

## *FARM PLAN EXAMPLE: DAIRY FARM*

This farm plan example has been prepared as part of  
'An Environmental Management System for Irrigation Schemes in New Zealand'

The Ritso Society Inc.  
June 2009



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### **ENVIRONMENTAL FARM PLAN FOR IRRIGATED LAND USE: FARM PLAN EXAMPLE – DAIRY FARM**

is part of

#### ***An Environmental Management System for Irrigation Schemes in New Zealand***

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This Environmental Management System (EMS) for Irrigation Schemes has a number of components.

The templates, manuals and worked examples included in “An Environmental Management System for Irrigation Schemes in New Zealand” are listed below, and are all available on [www.ritso.org.nz](http://www.ritso.org.nz). They may be copied or adapted for specific schemes.

#### **Scheme Sustainability Protocol**

**Preparing Your Farm Plan for Irrigated Land Use: Workshop Manual**  
**Environmental Farm Plan for Irrigated Land Use: Audit Manual (includes audit template)**

**Environmental Farm Plan for Irrigated Land Use: dairy farm template**  
**Environmental Farm Plan for Irrigated Land Use: cropping farm template**

**Environmental Farm Plan for Irrigated Land Use: example of a dairy farm plan**  
**Environmental Farm Plan for Irrigated Land Use: example of a mixed cropping & sheep plan**

**Farm Plan Audit: example of a dairy farm plan audit report**  
**Farm Plan Audit: example of a mixed cropping & sheep farm audit report**

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## DAIRY

### EXAMPLE FARM PLAN

# Best Water Irrigation Scheme<sup>1</sup>

## Environmental Farm Plan for Irrigated Land Use

### Lincoln University Dairy Farm

#### Technical approval

I have considered this plan and believe it to be:

- |  |   |                             |
|--|---|-----------------------------|
| 1. Technically sound and feasible                  | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 2. Addressing the cause of the environmental issue | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 3. Having a good chance of success                 | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |

#### Comments:

**Name:** (Please print) James Smith

**Signature:** *(for the Best Water Irrigation Scheme)*

**Date:** 30 / 05 / 2008

<sup>1</sup> 'Best Water Irrigation Scheme' is an imaginary irrigation scheme



## Environmental Farm Plan for Irrigated Land Use for Lincoln University Dairy Farm

I confirm that the information provided in this plan is correct:

Name *Ron Pellow* .....

Position (e.g. owner/manager) .....

Signature *R Pellow*.....

Date 30 / 03 / 09

<b>Property name</b>	Lincoln University Dairy Farm				
<b>Owner name</b>	Lincoln University under the management by South Island Dairying Development Centre				
<b>Postal address</b>	c/- South Island Dairying Centre				
	PO Box 160, Lincoln University				
<b>Phone no.</b>	03325 3629	<b>Mobile no.</b>		<b>Fax no.</b>	
<b>Email address</b>					
<b>Contact name (if different)</b>	Ron Pellow		<b>Position (e.g. manager, tenant)</b>		
<b>Postal address</b>	As above				
<b>Phone No.</b>		<b>Mobile no.</b>		<b>Fax no.</b>	
<b>Email address</b>					
<b>Property area (ha)</b>	185ha main block, 18ha East block, 33ha Heifer block				
<b>Effective area (ha)</b>	161.5ha (Platform), 18ha East block, 30ha Heifer block				
<b>Area under irrigation (ha)</b>	<b>water</b>	179ha		<b>effluent</b>	28ha
<b>Irrigation type/s</b>	<b>water</b>	Centre Pivot – 127ha Long laterals – 24ha k-lines – 10ha Southern cross gun – 18ha		<b>effluent</b>	3 spans on North Centre Pivot
<b>Enterprise type</b>	<b>Dairy</b>	<b>Dairy grazing</b>	<b>Other (describe)</b>		
	683 max cows milked	East Block Calves, heifers & silage	0		

For further inventory of system – refer to Focus Day material 19 February 2009.

## **Our Environmental Commitment**

***As owners of the Lincoln University Dairy Farm we are committed to supporting the growth and development of New Zealand's dairy industry and its markets throughout the world.***

***We strongly believe that for a sustainable long term industry to exist it is imperative to protect and enhance the environment through modifying dairying management practices.***

***As shareholders in the Best Water Irrigation Scheme we are committed to meeting all scheme environmental requirements, and as a business we are committed to ensuring that all activities undertaken on our property are undertaken in an environmentally sustainable manner.***

***In addition, we are committed to not only managing the impacts of our farming activities but also improving the environment so that the property is in a good condition for future generations.***

***We will monitor our performance against our environmental objectives and targets and take appropriate action where necessary to address those areas where an improvement in performance is required.***

-

**Signature (Owner)**

**Ron Pellow**

**Date:**

**30 / 03 / 2009**

### **Purpose of plan**

Each water user in the Best Water Irrigation Scheme is required to prepare and implement an Environmental Farm Plan for Irrigated Land Use to demonstrate how they are actively managing their use of natural resources in order to achieve high standards of environmental management and optimise production from irrigation. The plan provides a risk management approach to environmental protection and enhancement on irrigated farms and is designed so that it can be adapted for each farm business. The plan requirements often have both economic and environmental benefits.

### **Monitor/Review/Revise**

The farm plans are dynamic in nature and need to be updated over time as information, technology, and best practice change.

### **Audit and Compliance**

Appropriate records must be kept and produced on request. Environmental performance will be audited by an external auditor regularly. For the first 3 years of receiving scheme water the plan will be audited annually. If excellent performance is achieved, then ...(add scheme audit and compliance requirements)

### **Other Obligations**

Preparation of and compliance with a Best Water Irrigation Scheme Environmental Farm Plan will not exempt farmers from:

- their own industry quality assurance programmes, codes of practice etc.
- meeting specific regulatory/legal requirements (e.g. consent conditions for discharge of waste)

### **Industry Codes of Practice and Guidelines**

Where industry standards and codes have been developed water users are expected to adopt these, unless due to local or scheme requirements BWIS adopts different standards.

### **Where applicable, water users will meet the requirements of:**

- “Code of Practice for Nutrient Management (With Emphasis on Fertiliser Use)” (NZFMRA, 2007) (Provides practical and specific guidance for safe, responsible and effective nutrient management)
- Standards New Zealand: NZS8409:2004 “Management of Agrichemicals”, which underpins the GROWSAFE® Training Programme for agrichemical users and suppliers.
- The Spreadmark Code of Practice for the Placement of Fertiliser in New Zealand  
Spreadmark is a fertiliser spreading accreditation scheme that registers fertiliser-spreading companies with certified spreading machinery, trained operators and audited quality management systems.
- Local and Regional Council guidelines e.g. Environment Canterbury: “A guide to managing waterways on Canterbury farms”
- Irrigation NZ – Irrigation Code of Practice and Design Standards
- Irrigation NZ – Irrigation Evaluation Code of Practice
- Dairying and Clean Streams Accord (2003)

### **References**

Two resources that are particularly relevant to NZ irrigation are:

- The Irrigation Guide and Environmental Checklist for Irrigated Farmers – A guide to decision-making when going irrigating
- The New Zealand IRRIGATION MANUAL (developed by the Malvern Landcare Group) – A practical guide to profitable and sustainable irrigation

Both are available from Irrigation New Zealand ([www.irrigationnz.co.nz](http://www.irrigationnz.co.nz); phone : 03 379 3820 email: [admin@irrigationnz.co.nz](mailto:admin@irrigationnz.co.nz))

## **Farm Management Blocks**

We recognise that understanding differences in the way parts of our property respond to different management practices is an important step in achieving our production goals, as well as recognising and understanding the environmental risks associated with these practices.

**Dairy Farming Ltd** is made up of the following Farm Management Blocks <sup>2</sup> (See Map)

### ***Farm Management Block A description – North Block***

81.2 hectares, mix of free draining shallow stony Eyre soils, and deep sandy Paparua and Templeton soils

Centre pivot, long lateral and K-line irrigation

### ***Farm Management Block B description – South block***

80.5 hectares, mix of imperfectly drained Wakanui soils, and heavy poorly drained Temuka soils.

Centre pivot plus k-line irrigation

### ***Farm Management Block C description – East block***

18.7 hectares, mix of soils

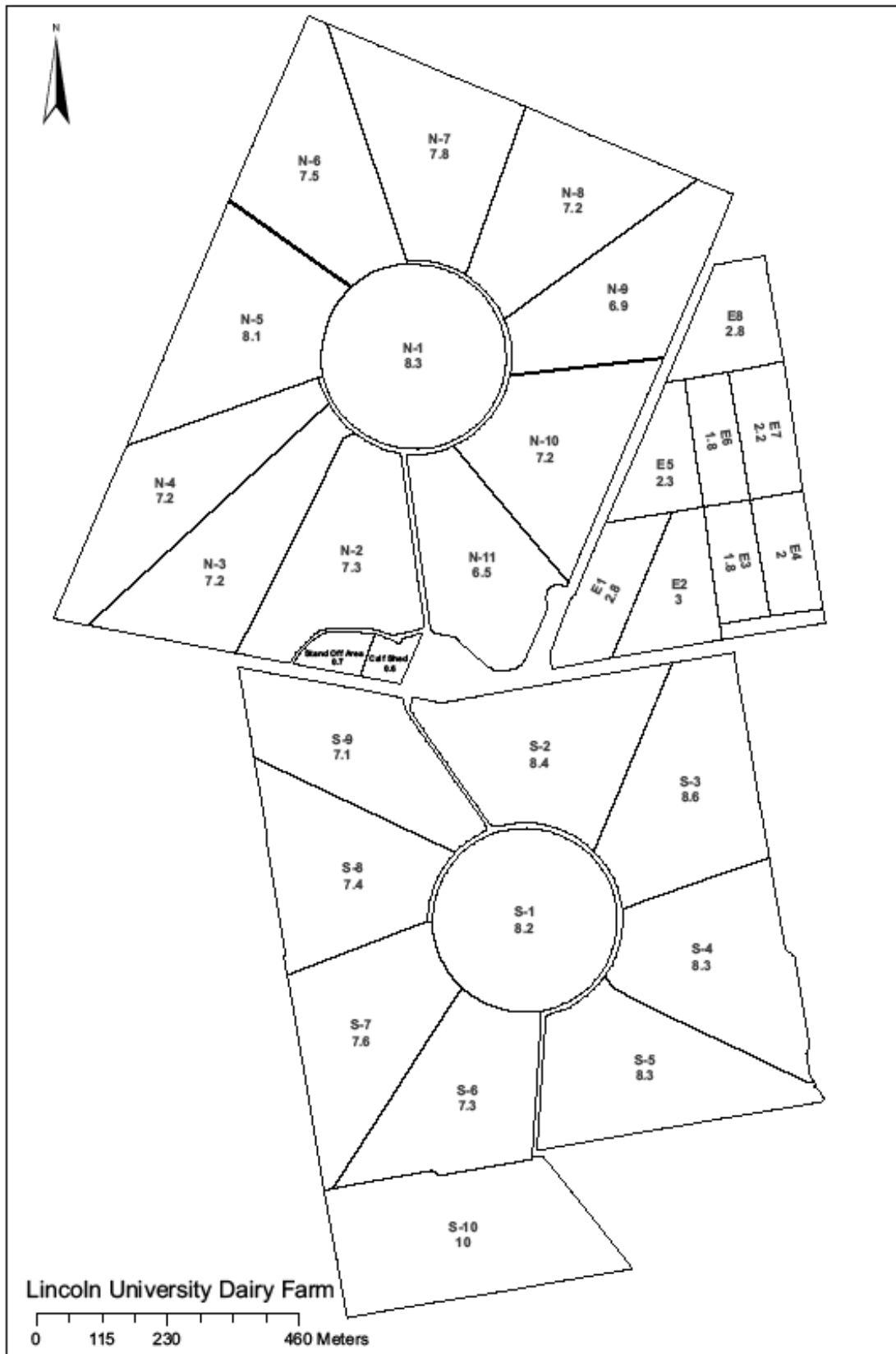
Southern cross gun irrigation.

Block used for dairy support activities. (i.e. calves, heifers and silage)

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<sup>2</sup> A Farm Management Block is a homogeneous block of land that responds in a similar way under similar management.

Farm Map showing Farm Management Block

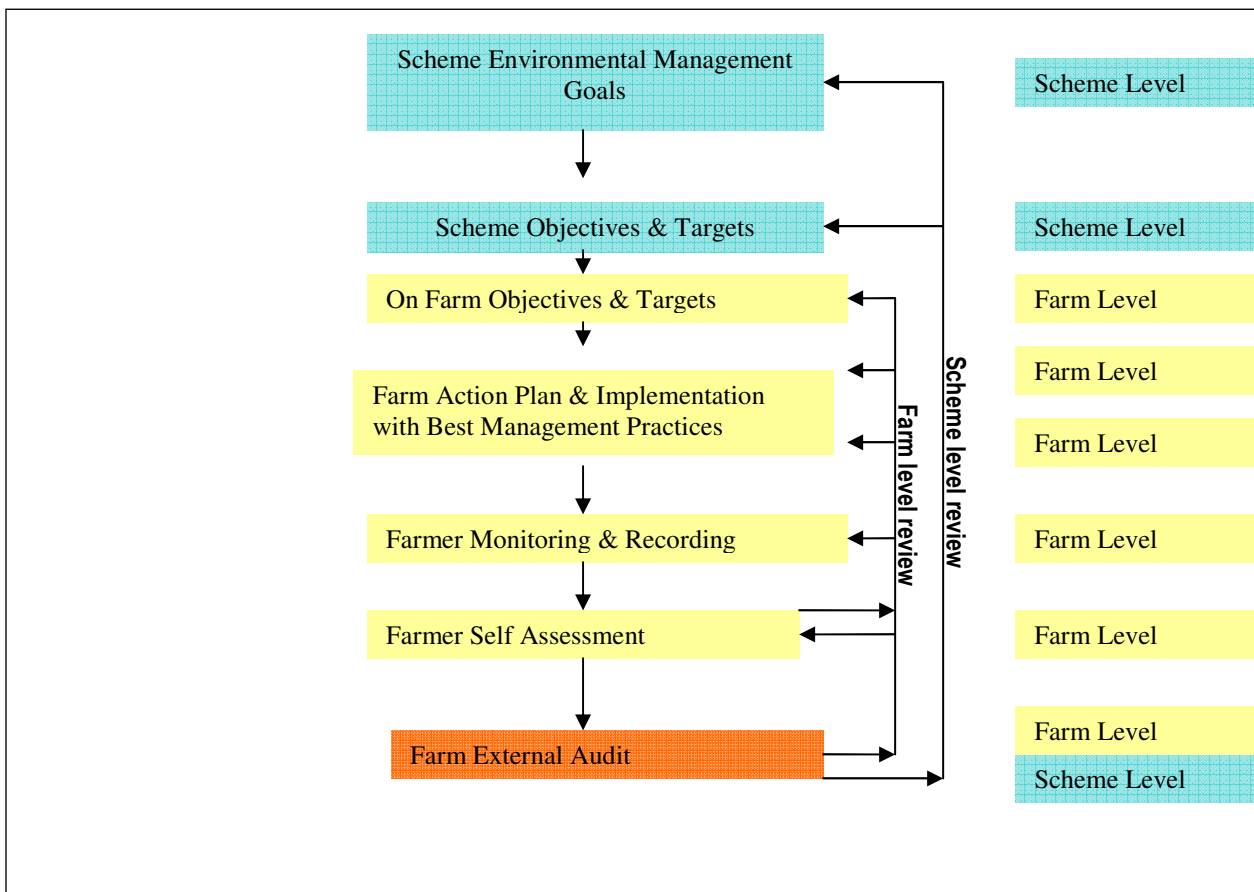


## Management areas covered by this plan

The following management areas are covered by this plan.

- ✓ Irrigation management
- ✓ Soils management
- ✓ Nutrient management
- ✓ Collected animal effluent management
- ✓ Biodiversity & ecosystem management
- ✓ Waterway and riparian management

The steps followed in each of the management areas are shown in the Farm Plan Roadmap shown below.



## A. Irrigation Management

**Our goal for best practice irrigation management is to use water efficiently, minimising runoff and drainage so as we avoid, remedy or mitigate:**

- Inefficient application,
- Ponding of irrigation water
- Excessive runoff of irrigation water
- Excessive losses to groundwater
- Drainage to other properties

### IRRIGATION, MANAGEMENT PLAN

Objectives	Targets	Significance			Best management practices	Records to be kept
		L	M	H		
<p><b>Objective 1:</b> To comply with all resource consent requirements relating to the supply of irrigation water including:</p>	Full compliance with consent requirements			✓	<p>Specific resource consent requirements.</p> <p>Flows are metered and annual take recorded and kept as printout</p>	<p>Records as required through consent conditions.</p> <p>Regional Council compliance notification.</p>
<p><b>Objective 2:</b> To ensure that all irrigation systems on the property are capable of operating to meet industry &amp; scheme standards for best practice irrigation</p>	<p><b>Existing systems</b> - System evaluation undertaken by 31 March 2010</p> <p>All upgrades will be completed no later than 24 months after receipt of the evaluation report.</p>			✓	<p><b>Existing systems</b></p> <p>The system will be evaluated by an Irrigation NZ accredited evaluator. The report must set out the system performance, including well test and the timelines for upgrades, if required.</p>	<p>System evaluation report</p> <p>Upgrade plan with actions taken.</p>
<p><b>Objective 3:</b> To ensure all key staff members are fully trained in the operation &amp; maintenance of those aspects of the irrigation system for which they are responsible.</p>	<p>All key staff reach irrigation training standard.</p> <p>No major and no more than 5 minor staff related irrigation incidents per year.</p>			✓	<p>Identify key staff members who manage and maintain the irrigation system on a daily basis. Involve these staff members in a comprehensive on-farm training programme covering all aspects of irrigation management including:</p> <ul style="list-style-type: none"> <li>- The key benefits of irrigation</li> <li>- Management to ensure the avoidance of runoff and ponding</li> <li>- Correct application rates</li> <li>- System maintenance</li> <li>- System monitoring for problem identification</li> <li>- Individual responsibilities and accountability.</li> </ul>	<p>Staff training records</p> <p>Records of staff induced irrigation incidents.</p>

<p><b>Objective 4:</b> To maximise water application effectiveness while minimising excess drainage and runoff.</p>	<p>Soil moisture levels between field capacity and recharge level 85% of time.</p> <p>Regular distribution efficiency of 80% or better achieved.</p>			<p>✓</p> <p><b>Centre pivots and long lateral systems</b></p> <ul style="list-style-type: none"> <li>- Monthly check measuring application rates with rain gauge</li> <li>- Adjust pivot speeds according to ET, rainfall and soil moisture status</li> <li>- Monitor pasture/crop growth and development</li> <li>- Check for excessive runoff and adjust system if necessary</li> <li>- Close down system if excessive runoff and/or ponding occurs.</li> </ul> <p><b>Low pressure systems</b></p> <ul style="list-style-type: none"> <li>- Ensure K line movement patterns are consistent run to run and paddock to paddock. (GPS on bike)</li> <li>- Adjust rotation according to ET, soil moisture status and rainfall</li> <li>- Close down system if excess runoff and/or ponding occur.</li> </ul> <p>Follow sprinkler line movement patterns map for paddock to paddock rotations</p> <ul style="list-style-type: none"> <li>- Move sprinkler lines to cover any dry patches that may occur</li> <li>- Shut down sprinkler lines where effluent spreader irrigation is being applied.</li> </ul> <p><b>Travelling irrigators</b></p>	<p>Soil moisture monitoring records.</p> <p>Application rate testing records</p> <p>Rainfall records.</p> <p>Irrigation run-off records</p>
<p><b>Objective 5:</b> To implement a robust irrigation equipment and machinery maintenance system</p>	<p>No major and no more than 5 minor mechanical failures each year caused through inadequate maintenance.</p>		<p>✓</p>	<p>The system must be fully maintained at all times and all potential problems identified, recorded, and rectified ASAP.</p> <ul style="list-style-type: none"> <li>- Regular checks on centre pivot wheels and drive units and fittings and maintain as required</li> <li>- Check and maintain main pipes and sprinklers hoses on Centre Pivot</li> <li>- Maintain all sprinkler lines, nozzles and saddles in good working order and replace where necessary.</li> </ul>	<p>Records of mechanical failure</p> <p>Machinery maintenance records</p>

**PROGRESS ASSESSMENT AND RESPONSE PLAN**

**Management area:** Irrigation management

**Undertaken by:** Peter & Ron

**Assessment date** 10 / 03 / 2009

Objectives	Progress made towards achieving objectives and targets.	Actions still required	Person responsible	Timeframe for completion	Completed (include date)
<p><b>Objective 1:</b> To comply with all resource consent requirements relating to the supply of irrigation water.</p>	<p>Consider selves fully compliant with consent conditions.</p>				
<p><b>Objective 2:</b> To ensure that all irrigation systems on the property are capable of operating to industry &amp; scheme standards</p>	<p>North Block – Evaluation completed by Page Bloomer, 22 Jan 06, see Nth Blk Rpt (Irrig Focus Day File) – LUDF is on waiting list with Page Bloomer for follow-up evaluation South Block - Evaluation completed by Bloomer &amp; Daveron, 5 Oct 04, see paper file Irrigation file (Pellow office)</p>	<p>Evaluations only undertaken on centre pivot system. Evaluations on long laterals, k-lines and southern cross gun still to be actioned.</p>	<p>Ron Pellow</p>	<p>By 28 February 2010</p>	
<p><b>Objective 3:</b> To ensure all key staff members are fully trained in the operation &amp; maintenance of those aspects of the irrigation system for which they are responsible.</p>	<p>Staff trained to use the GPS and aquaflex soil moisture monitoring equipment.</p>	<p>System to be extended to cover all aspects of irrigation management.  System for staff training documentation to be developed.</p>	<p>Peter Hancox</p>	<p>By 30 September 2009</p>	
<p><b>Objective 4:</b> To maximise water application effectiveness while minimising excess drainage and runoff.</p>	<p>Four Aquaflex lines set up in paddocks N2, N7, S6 and S9 corresponding with the main soil types on the property and used as integral part of irrigation decision making.  Soil moisture deficit trigger points (25% below field capacity) have been established to commence irrigation during summer. Going into Autumn the trigger point is set at 50% below field capacity.  Forecast predictions of rainfall are used to modify scheduling of irrigation  Improvements have been made to the distribution uniformity in corners by GPSing</p>	<p>Nil</p>			

	everything and adding more sprinklers.				
<b>Objective 5: To implement a robust irrigation equipment and machinery maintenance system</b>	Routine maintenance undertaken on all machinery each winter.  Winter maintenance programme  Notes recorded on aquaflex of events and changes	Equipment and machinery maintenance schedule and documentation system to be developed.	Peter Hancox	30 May 2009	

## B. Soils Management

**Our goal for best practice soils management is to maintain or improve the physical & biological condition of our soil so as we avoid, remedy or mitigate:**

- loss of topsoil by wind or water erosion
- movement of soil & contaminants into waterways
- damage to soil structure and health
- contamination of soil

### SOILS, MANAGEMENT PLAN

Objectives	Targets	Significance			Best Management Practices	Records to be kept
		L	M	H		
<p><b>Objective 1:</b> To minimise the incidence of wind and/or water erosion caused as a result of farming practices.</p>	<p>No major and no more than 2 minor erosion incidents each year.</p>	✓			<p><b>Wind erosion</b></p> <ul style="list-style-type: none"> <li>- use appropriate seedbed preparation particularly avoiding the creation of small aggregates on exposed sites.</li> <li>- minimising the length of time that soils are exposed during soil cultivation</li> <li>- maintain soil moisture at times of high wind erosion risk.</li> <li>- use direct drilling in preference to conventional cultivation.</li> </ul> <p><b>Water erosion</b></p> <ul style="list-style-type: none"> <li>- use direct drilling or minimum tillage techniques in preference to conventional cultivation.</li> <li>- regularly check for erosion from channeled runoff, (i.e. from wheel ruts, tracks etc), and if found immediately take appropriate remedial action.</li> </ul>	<p>Records of management induced erosion events.</p>
<p><b>Objective 2:</b> To optimise soil structure and soil biological activity</p>	<p>Maintain or improve soil health index results each year.</p>		✓		<p>Recognise differences in soil types and soil properties and manage accordingly to minimise soil compaction damage :</p> <ul style="list-style-type: none"> <li>- Minimise compaction by stock when soils are wet by:                             <ul style="list-style-type: none"> <li>using safe areas for stock (show on map)</li> <li>using stand-off and/or wintering pads</li> </ul> </li> <li>- Use soil aerator as appropriate when soil compaction diagnosed.</li> </ul> <p>Improve soil biological activity by:</p> <ul style="list-style-type: none"> <li>-Conserving soil organic matter by using direct drilling techniques in preference to conventional cultivation.</li> <li>- Maintaining healthy pastures</li> <li>- minimising the use of agrichemicals harmful to beneficial soil organisms.</li> </ul>	<p>Soil health index testing results</p>

<p><b>Objective 3:</b> To minimise the risk of soil contamination from fertiliser inputs.</p>	<p>100% Fertmark compliant products used</p>		<p>✓</p>	<p>Use fertilisers that are 'Fertmark' compliant and/or those that can be demonstrated not to contain contaminants.</p> <p>Only use phosphate fertilisers which comply with the industry limit of 280mg of Cadmium per kg of P are used.</p>	<p>Fertmark certificate</p>
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**PROGRESS ASSESSMENT AND ACTION PLAN**

Management area: Soils Management

Undertaken by: Peter

Assessment date 10 / 03 / 2009

Objectives	Progress made towards achieving objectives and targets.	Actions still required	Person responsible	Timeframe for completion	Completed (include date)
<p><b>Objective 1:</b> To minimise the incidence of wind and/or water erosion caused as a result of farming practices.</p>	<p>There is a very low risk of wind and/or water erosion on this property. No specific action required</p>	<p>Nil</p>			
<p><b>Objective 2:</b> To optimise soil structure and soil biological activity</p>	<p>Strong pastures with high clover content maintained. Pastures renewed as required.</p> <p>Compaction minimised by use of safe areas, on-off grazing when wet in spring. Cows off in winter Compacted areas are promptly repaired.</p>	<p>Nil</p>			
<p><b>Objective 3:</b> To minimise the risk of soil contamination from fertiliser inputs.</p>	<p>Only Fertmark registered products are used on the property. All fertiliser is supplied by Ravensdown.</p>	<p>Nil</p>			

### C. Nutrient management

**Our goal for nutrient management is to minimise nutrient losses to water while managing soil fertility to optimise pasture and crop productivity so as we avoid, remedy or mitigate:**

- N & P losses from fertiliser & stock into groundwater and surface water
- Runoff, leaching

#### NUTRIENT MANAGEMENT, MANAGEMENT PLAN

Objectives	Targets	Significance			Best Management Practices	Records to be kept
		L	M	H		
<p><b>Objective 1:</b> To minimise nutrient losses to surface and ground water through the use of nutrient budgeting.</p>	<p>Initial nutrient budget/s prepared for effluent and non-effluent areas of farm by June 2008</p> <p>Nutrient budgets reviewed and revised every two years.</p> <p>Nitrate leaching losses not to exceed 22 kgN/ha on average over the season</p>			✓	<p>Separate nutrient budgets prepared for effluent and non effluent areas.</p> <p>Budgets to take into account all nutrient inputs and outputs.</p>	<p>Nutrient budget, soil test results, and recommended fertiliser programme.</p> <p>Supplements records</p> <p>Verification that nutrient budget completed by accredited advisor.</p>
<p><b>Objective 2:</b> To minimise nitrate leaching and/or run-off losses to surface and ground water through careful fertiliser management.</p>	<p>Rate of nitrogen applied not to exceed 200 kgN/ha/year</p> <p>Maximum rate per application – 40 kg/ha</p> <p>Close adherence to listed best management practices. Significant variations noted together with reasons for variations.</p>			✓	<p><b>Rate of fertiliser applications</b> -Not to exceed 200kgN/ha/year.</p> <p><i>Rate determined by:</i></p> <ul style="list-style-type: none"> <li>- soil testing and plant analysis</li> <li>- nutrient budget results</li> <li>- assessment of pasture quality</li> <li>- matching nitrogen applications in proportion to other nutrients</li> <li>- need for capital or maintenance fertiliser</li> </ul> <p><b>Frequency of fertiliser applications</b> - lower rates of nitrogen (not exceeding 50 kgN/ha/application) applied to match growth cycle of pasture and soil moisture conditions.</p> <p><b>Timing of fertiliser applications</b> - Nitrogen application is matched to times of high plant growth</p>	<p>Nutrient budget, soil test results and recommended fertiliser programme.</p> <p>Nitrogen application records</p> <p>Best management practice variation records</p>

					<ul style="list-style-type: none"> <li>- Pasture is at least 25mm high (approx 1000kg DM/Ha) before nitrogen is applied.</li> <li>- Nitrogen is not applied when the 10cm soil temperature at 9am is less than 6°C</li> <li>- nitrogen fertiliser is not applied when the ground is saturated</li> </ul> <p><b>Fertiliser use and management measures</b></p> <ul style="list-style-type: none"> <li>- Nitrogen fertiliser is not applied to severely compacted soils</li> <li>- nitrification inhibitors used to reduce nitrate losses</li> </ul>	
<p><b>Objective 3:</b> To minimise phosphate run-off losses to surface water through careful fertiliser management.</p>	<p>Close adherence to listed best management practices. Significant variations noted together with reasons for variations.</p>		✓	<p><b>Rate of application</b> determined by:</p> <ul style="list-style-type: none"> <li>- soil testing and plant analysis</li> <li>- nutrient budget results</li> <li>- assessment of pasture quality</li> <li>- matching phosphate applications in proportion to other nutrients</li> <li>- need for capital or maintenance fertiliser</li> </ul> <p><b>Frequency of application</b></p> <ul style="list-style-type: none"> <li>- split applications are used where the single application rate would exceed 100kgP/ha</li> </ul> <p><b>Timing of application</b></p> <ul style="list-style-type: none"> <li>- Pasture is at least 25mm high (approx 1000kg DM/ha) before P fertiliser is applied</li> <li>- P fertiliser is not applied when the soil is saturated.</li> </ul> <p><b>Fertiliser use and management measures</b></p> <ul style="list-style-type: none"> <li>- P fertiliser is not applied to severely compacted soils.</li> <li>- Vegetation buffer strips of sufficient width (Leave a riparian margin of at least 1-2m to filter any runoff).</li> </ul>	<p>Nutrient budget, soil test results and recommended fertiliser programme.</p> <p>Fertiliser application records</p> <p>Best management practice variation records</p>	
<p><b>Objective 4:</b> To apply nutrients where needed to maximise impact and minimise losses to non target areas.</p>	<p>Close adherence to listed best management practices. Significant variations noted together with reasons for variations.</p>		✓	<p>Application equipment used is suitable for the conditions and fertiliser type.</p> <p>Use only 'Spreadmark' accredited spreading companies when using contractors and apply to 'Spreadmark' standards when self application.</p> <p>GPS technology is used for precise application and for a digital record of fertiliser application locations.</p>	<p>Record of contractors Spreadmark accreditation.</p> <p>Best management practice variation records</p> <p>GPS application records</p>	

**PROGRESS ASSESSMENT AND ACTION PLAN**

**Management area:** Nutrient management

**Undertaken by:** Peter

**Assessment date** 10 / 03 / 2009

Scheme requirements and objectives	Progress made	Actions required	Person responsible	Timeframe for completion	Completed (include date)
<b>Objective 1:</b> To minimise nutrient losses to surface and ground water through the use of nutrient budgeting.	Completed annually by accredited Ravensdown Senior Field Officer, Chris Irvine in 2008	Nil			
<b>Objective 2:</b> To minimise nitrate leaching and/or run-off losses to surface and ground water through careful fertiliser management.	All fertiliser applied according to recommendations from nutrient budget and nutrient management plan. Nitrate losses limited to less than 22kgN/ha averaged over the season. N fertiliser not applied on effluent area Self imposed N limit of 200kg/ha adhered to. Strict monitoring of supplements brought onto the farm. N is not applied when the aquaflex readings indicate drainage from the soil profile.	Nil			
<b>Objective 3:</b> To minimise phosphate run-off losses to surface water through careful fertiliser management.	Best management practices as indicated adhered to.	Nil			
<b>Objective 4:</b> To apply nutrients where needed to maximise impact and minimise losses to non target areas.	Using Central Canterbury Groundspreaders as local operator They regularly test machinery and spread pattern tests are available. Staff are experienced. However they have not completed all Spreadmark modules and are not certified as a company. They also are now providing a GPS map of where each load of fertiliser is applied. Will continue to encourage to join programme.	Nil			

## D. Collected animal effluent management

**Our goal for effluent management is to manage the effluent system to optimise the productive benefits of animal effluent while taking all practical steps to avoid contamination of ground and surface water so as we avoid, remedy or mitigate:**

- Contamination of groundwater and surface water, especially faecal, N, P

### COLLECTED ANIMAL EFFLUENT – MANAGEMENT PLAN

Objectives	Targets	Significance			Best management practices	Records to be kept
		L	M	H		
<b>Objective 1: To comply with all Regional Council requirements relating to effluent management and disposal</b>	Full compliance with consent and/or permitted activity requirements			✓	Specific resource consent and/or permitted activity requirements.	Records as required through consent conditions.  Regional Council compliance notification.
<b>Objective 2: To ensure all key staff members are fully trained in the operation and maintenance of the effluent application system</b>	All key staff pass effluent management training course with merit.  No major and no more than 2 minor staff related effluent management incidents per year.			✓	Identify key staff members to manage and maintain the irrigation system on a daily basis as and when required.  Involve individual key staff members in a comprehensive on-farm training programme covering all aspects of dairy effluent management and equipment maintenance including: - The key benefits of effluent - Management to ensure the avoidance of runoff - Correct application rates - System maintenance - System monitoring for problem identification - Individual responsibilities and accountability.	Staff training records  Records of staff induced effluent management incidents.
<b>Objective 3: To implement a robust equipment and machinery maintenance programme.</b>	No major and no more than 2 minor breakdowns caused as a result of inadequate system maintenance			✓	The system must be fully maintained at all times as per the attached maintenance schedule, and all potential problems identified, recorded, and rectified ASAP.  Ensure that contingency plans in place to deal with breakdowns of the disposal system. Plans must be understood by all staff	System maintenance records  Effluent management incident records.
<b>Objective 4: To minimise the volume of effluent produced</b>	Close adherence to listed best management practices. Significant variations noted		✓		Reduce the amount of effluent on the shed floors, platform and yard by careful management of herd temperament and stress influence.	Farm observations  Best management practice

	together with reasons for variations.				<ul style="list-style-type: none"> <li>- Allow time for adequate paddock muster and yarding.</li> <li>- Be even tempered and quiet in handling on farm and in the yard.</li> <li>- Avoid or reduce situations that upset the cows.</li> <li>- Minimise slippery surfaces.</li> <li>- Avoid stray electricity.</li> </ul> <p>Reduce total volume of effluent</p> <ul style="list-style-type: none"> <li>- Divert roof water away from shed</li> <li>- Eliminate unnecessary water overflow around shed</li> <li>- Maintain pipes and hoses.</li> <li>- Pre-wet yard and rails around yard</li> <li>- Use a scrapper to remove solids from platform.</li> <li>- Recycle cooler water to wash down storage.</li> </ul>	variation records
<b>Objective 5:</b> To ensure that the effluent system is set up to minimise the risks associated with effluent disposal.	<p>System evaluation undertaken by August 2009.</p> <p>All upgrades completed no later than six months after receipt of the system evaluation report.</p>			✓	<p>The system will be evaluated by a suitably qualified person. The evaluation will take into account:</p> <ul style="list-style-type: none"> <li>- Soil types</li> <li>- Storage requirements</li> <li>- System layout</li> <li>- Application methods</li> <li>- Local hazards (e.g. proximity to waterways, etc)</li> </ul>	<p>System report</p> <p>Upgrade plan</p>
<b>Objective 6:</b> To avoid contamination of groundwater and surface water	<p>Close adherence to listed best management practices. Significant variations noted together with reasons for variations.</p> <p>Designated disposal area marked on map.</p> <p>Return period of at least 24 days (Centre Pivot)</p>			✓	<p>Using only designated disposal area for effluent irrigation</p> <ul style="list-style-type: none"> <li>- Ensure an even spread of effluent over the whole of the designated area.</li> <li>- Modify daily application routine to allow for wet weather.</li> </ul> <p>Ensure that effluent disposal does not occur:</p> <ul style="list-style-type: none"> <li>- Within 20m of any surface waterway (including open drains)</li> <li>- Within 30 m of any bore or spring</li> </ul> <p>Avoid any ponding or runoff of effluent</p>	<p>Effluent map</p> <p>Effluent diary</p> <p>Best management practice variation records</p> <p>GPS application records</p>
<b>Objective 7:</b> To implement specific procedures for dealing with leakage or spillage from any part of the disposal system.	100% adherence to the procedures			✓	<p>Prepare and regularly review effluent incident procedures</p> <p>Take immediate action if incident occurs including:</p> <ul style="list-style-type: none"> <li>- notify the Regional Council</li> <li>- rectify the problem</li> </ul>	Incident record

					- clean up if possible - take action to minimise the risk of the incident occurring again	
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**PROGRESS ASSESSMENT AND ACTION PLAN**

**Management area:** Effluent management

**Undertaken by:** Peter & Ron

**Assessment date** 10 / 03 / 2009

Scheme requirements and objectives	Progress made	Actions required	Person responsible	Timeframe for completion	Completed (include date)
<b>Objective 1:</b> To comply with all Regional Council requirements relating to effluent management and disposal	Annual inspection undertaken in March 2009. Fully compliant				
<b>Objective 2:</b> To ensure all key staff members are fully trained in the operation and maintenance of the effluent application system	Routine staff training is undertaken as required but there is not a standardized staff training system in place.	Specific dairy effluent management staff training programme to be implemented. System will include provision for the keeping of training records.	Peter	30 September 2009	
<b>Objective 3:</b> To implement a robust equipment and machinery maintenance programme.	Routine maintenance is undertaken as required but there is not a standardized maintenance system in place.	Specific dairy effluent equipment and maintenance schedule to be implemented. System will include provision for the keeping of maintenance records.	Peter	30 September 2009	
<b>Objective 4:</b> To minimise the volume of effluent produced	Close adherence to the listed BMPs	Nil			
<b>Objective 5:</b> To ensure that the effluent system is set up to minimise the risks associated with effluent disposal.	The options for system upgrade are currently being considered.	Complete review of system evaluation options and implement evaluation programme	Ron Pellow	30 September	
<b>Objective 6:</b>	Effluent spread over 28ha under spans 5-6-7 on	Investigate options for spreading effluent over a	Ron Pellow		

<p><b>To avoid contamination of groundwater and surface water</b></p>	<p>North Block centre pivot.</p>	<p>larger area.</p>			
<p><b>Objective 7: To Implement specific procedures for dealing with leakage or spillage from any part of the disposal system.</b></p>	<p>Spillages and breakages dealt with as required.  Pivot has alarm system</p>	<p>Develop a system for recording leakages and spillages.</p>	<p>Peter</p>		

## E. Waterway & Riparian management

**Our goal is to protect the waterways on our farm so as we avoid, remedy, or mitigate:**

- Stock damage to banks, causing sedimentation
- Contamination of water by stock or agrichemicals
- Soil loss causing sedimentation of waterways
- Poor water quality and stream life

### WATERWAY AND RIPARIAN PROTECTION

Objectives	Targets	Significance			Best management practices	Records to be kept
		L	M	H		
<b>Objective 1: To exclude all cattle from waterways.</b>	100% cattle exclusion from waterways <sup>3</sup>	✓			Exclude cattle from all waterways on property including farm drains. Leave a riparian margin of at least 1-2m on flat land and 5m or more on sloping land depending on the slope.	No records required.  Field observation.
<b>Objective 2: To minimise soil loss and contamination of waterways.</b>	Close adherence to listed best management practices. Significant variations noted together with reasons for variations.	✓			Use a wide riparian buffer to provide a filter at low points where there is a risk of runoff from paddocks.  When cultivating a paddock, leave a buffer uncultivated beside the drains to filter any runoff.	Field observation.  Best management practice variation records
<b>Objective 3: To enhance water quality and stream life</b>	10% of riparian margins on the main waterways on property planted by 2010.		✓		Plant suitable trees and shrubs on waterway margins,	No records required.  Field observation.

<sup>3</sup> For the purposes of this plan a waterway includes all streams, creeks and rivers, farm drains, and significant wetlands.

**PROGRESS ASSESSMENT AND ACTION PLAN**

**Management area:** Waterway and riparian management

**Undertaken by:** Peter

**Assessment date** 10 / 03 / 2009

Scheme requirements and objectives	Progress made	Actions required	Person responsible	Timeframe for completion	Completed (include date)
<b>Objective 1:</b> To exclude all cattle from waterways.	There are no natural waterways on the property. Cattle are excluded from the drains that follow the south block boundary and the main road. (see map)	Nil			
<b>Objective 2:</b> To minimise soil loss and contamination of waterways.	Listed best practices are closely adhered to.	Nil			
<b>Objective 3:</b> To enhance water quality and stream life	16000 native plants have been planted along road boundaries and next to the drains.	Nil			

## F. Biodiversity and ecosystem management

**Our goal is to include biodiversity and ecosystem management as an integral part of our farm management so as we avoid, remedy, or mitigate:**

- Loss of native plants and native animals and their habitats;
- Loss of ecosystem diversity
- Loss of habitat for pollinators, beneficial birds, insects etc
- Loss of shelter for stock, crops and soil conservation

### BIODIVERSITY AND ECOSYSTEM MANAGEMENT

Objectives	Targets	Significance			Best management practices	Records to be kept
		L	M	H		
<b>Objective 1: Maintain native plants and animals and their habitats</b>	100% protection of moderate and high value biodiversity sites. Where this is not practical an equivalent offset area will be established.		✓		The farm will be assessed for biodiversity values prior to development and where practical any sites of high biodiversity value will be protected.	Biodiversity assessment report.  Record of protection works undertaken
<b>Objective 2: To enhance/minimise loss of shelter and habitat</b>	At least x100 m of habitat or shelter planting per year		✓		Planting suitable perennial plants to provide shelter and habitat for pollinators, beneficial birds, insects etc, especially where shelter belts, hedges, trees etc are removed as part of irrigation development	No records required.  Field observation.

### PROGRESS ASSESSMENT AND ACTION PLAN

Management area:

Undertaken by: Peter

Assessment date 10 / 03 / 2009

Scheme requirements and objectives	Progress made	Actions required	Person responsible	Timeframe for completion	Completed (include date)
<b>Objective 1: Maintain native plants and animals and their habitats</b>	16000 native plants planted on road boundaries and next to the drains. Planting is according to a plan prepared by Steve Wratten and Colin Meurk.	Stage 2 plantings	Peter		
<b>Objective 2: To enhance/minimise loss of shelter and habitat</b>	16000 native plants planted on road boundaries and next to the drains. Planting is according to a plan prepared by Steve Wratten and Colin Meurk.	Stage 2 plantings	Peter		

