



Environmental  
Management  
**Complementary  
Reference**



# Characteristics of the Land Holdings

Complementary reference document  
characterising Silver Fern Farms Takapau  
land holdings



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## Table of Contents

<b>1</b>	<b>Introduction .....</b>	<b>3</b>
1.1	Location .....	3
1.2	Physical address.....	3
1.3	Ownership and Tenure .....	3
1.3.1	Ownership.....	3
1.3.2	Area.....	3
1.3.3	Tenure.....	3
<b>2</b>	<b>Land Resource .....</b>	<b>5</b>
2.1	Topography.....	5
2.2	Vegetation.....	5
2.3	Soils .....	5
2.3.1	Soil Types .....	5
2.4	Land holdings.....	7
2.5	Land Use Capability.....	13
2.6	Land Classification.....	15
2.7	Key Land Features.....	19
2.8	Land Use.....	21
2.8.1	Irrigated land holdings.....	21
2.9	Risk Management.....	22
	<b>Appendix 1 – Irrigator specifications .....</b>	<b>24</b>

## **1 Introduction**

This document outlines the characteristics of the land holdings at Silver Fern Farms Takapau, the practices in place to maintain and enhance the resource, and the measures to avoid or remedy potential risk associated with land based treatment of processing wastewater.

The Characteristics of Land Use are reviewed and amended where necessary annually.

### **1.1 Location**

The processing site is located between State Highway 2 and Oruawharo Road; approximately 3.5 kilometres west of the Takapau Township (see Map 1 – Indicative Land Holdings, page 4).

### **1.2 Physical address**

Fraser Road, RD 2, Takapau

### **1.3 Ownership and Tenure**

#### **1.3.1 Ownership**

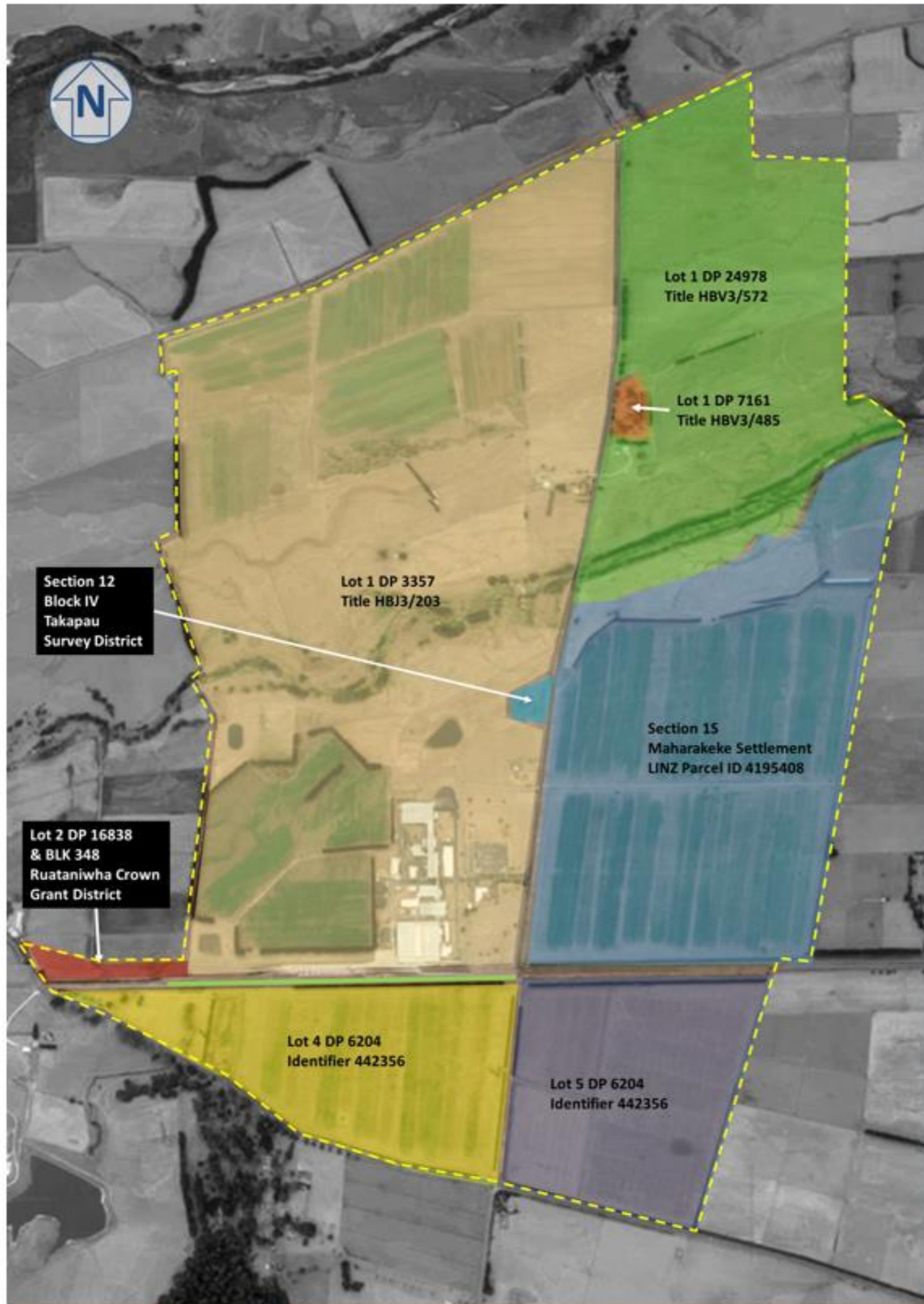
Silver Fern Farms

#### **1.3.2 Area**

482.5881 hectares

#### **1.3.3 Tenure**

Freehold, - (see Map 1 for legal descriptions, page 4)



**Legend:**

Titles Consented Blocks	Legal Description	Identifier
A Block	Part Section 15 Maharakeke Settlement	LINZ Parcel ID 4195408
B, E, S1&2, Domestic Blocks	Lot 1 DP3357	HBJ3/203
C Block	Lot 5 DP6204	Parcel ID 442356
D Block	Lot 4 DP6204	Parcel ID 442356

Titles Non Consented Blocks	Legal Description	Identifier
F, Domestic, Dam, Wells and non-potable, Riparian & wetland Blocks	Lot 1 DP3357	HBJ3/203
Old homestead	Lot 1 DP7161	LINZ Parcel ID 4206763
River South	Part Section 15 Maharakeke Settlement	LINZ Parcel ID 4195408
Old Dam/Top Block	Lot 4 DP6204	Parcel ID 442356
G Block	Lot 1 DP24978	HBV3/572
Leased	Lot 2 DP16838	442356 114/264
Dam	Lot 2 DP 16838 & Block 348 Ruataniwha Crown Grant District	

Leased from KiwiRail

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CHARACTERISTICS OF LAND HOLDINGS



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## **2 Land Resource**

### **2.1 Topography**

Silver Fern farms Takapau is located in rural surroundings principally characterised by flat land dissected through the central part of the property by a minor escarpment either side of the Porangahau stream.

The property is approximately 200m metres above mean sea level.

### **2.2 Vegetation**

The vegetation on the property is predominantly pastoral grazing species, a constructed wetland, and associated stream margin and riparian edge plantings.

The wetland, and stream riparian edge plantings consist of flaxes and associated native plantings to intercept any nutrient in runoff water.

Shelter plantings have been established along all the external boundaries of the irrigation fields.

The property is substantially free of noxious weeds.

### **2.3 Soils**

#### **2.3.1 Soil Types**

The distribution of soils at the site are largely related to the underlying landform and can be classified into three broad groups.

The Takapau land holdings are comprised of three soil orders: Allophanic and Orthic Brown soils, Perch-gley Pallic soils and Fluvial Raw soils, identified as six soil types as defined by S-maps (see Map 2A – Indicative Soil Boundaries, pages 9 & 10).

Soil correlation	Soil characteristics
<b>Soil order:</b> Allophanic and Orthic Brown soils <b>Soil series name</b> Takapau shallow silt loam <b>S-map Family name</b> Tararu	Moderately deep (45-65cm) well drained silt loam with no significant rooting barrier. High topsoil phosphate retention. Low risk of surface run-off, and low vulnerability to drought.
<b>Soil order:</b> Allophanic and Orthic Brown soils <b>Soil series name</b> Takapau shallow silt loam <b>S-map Family name</b> Bushgate	Soil depth of 20-40cm, well-drained soil with no limitation to rooting depth. High topsoil phosphate retention and low risk of surface run-off. Moderately prone to drought.
<b>Soil order:</b> Perch-gley Pallic soil <b>Soil series name</b> Poporangi silt loam <b>S-map Family name</b> Ruataniwha	Moderately deep (56-72cm), poorly drained silt loam due to a silicia pan, that limits rooting depth. The soil have a high vulnerability to waterlogging. Moderately prone to drought.
<b>Soil order:</b> Allophanic and Orthic Brown soils <b>Soil series name</b> Tikokino shallow silt loam <b>S-map Family name</b> Oronoko	Well-developed silt loam with moderately deep A & B horizons (45-60cm) that enable healthy deep root development. Well soil The soil has medium phosphate retention.
<b>Soil series name</b> Tikokino shallow silt loam <b>S-map Family name</b> Mandamus	A shallow silt loam soil (30-55cm) with good drainage and no limitation to rooting depth. The soil has medium phosphate retention. There is a very low risk of surface run-off.
<b>Soil order:</b> Fluvial Raw soils <b>Soil series name</b> Tukituki shallow and very shallow sandy loam <b>S-map Family name</b> Ashburton	Free draining very shallow sandy loam. The soil has a low topsoil phosphate retention and is prone to drought.

*Table 2.3 – Soil types at Silver Fern Farms Takapau.*

## 2.4 Land holdings

The land holdings at Takapau are comprised of 482 hectares.

The following table sets out the Block names, respective areas and current usage for the land holdings

Block name	Area in hectares	Current usage
A	75.84	Wastewater irrigation
B	24.90	Wastewater irrigation
C	36.67	Wastewater irrigation
D	31.02	Wastewater irrigation
E	74.63	Wastewater irrigation
F	51.69	Dryland - Stock grazing & equestrian events
G	75.80	Dryland - Stock grazing & Solids spreading
River South 1	7.72	Dryland – Stock grazing
River South 2	13.30	Dryland – Stock grazing
Wells and non-potable	19.21	Dryland – Stock grazing
Domestic	3.25	Land disposal of domestic waste
S1	6.56	Solids spreading &/or grazing
S2	5.35	Solids spreading &/or grazing
Wetland	6.33	Filter sediment
Riparian (12.58 LHS & 6.08 RHS)	21.06	Filter sediment and protect Water Quality
Dam	3.10	Dryland – Stock grazing (part leased)

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Characteristics of the Land Holdings  
Complementary Reference**

Block name	Area in hectares	Current usage
Old Dam/Top Block	6.32	Dryland – stock grazing
Processing Plant	13.30	Processing
Lease	2.024	Leased out

*Table 2.4 – Indicative block areas at Takapau, (see Map 3 Indicative Block Areas, page 11).*

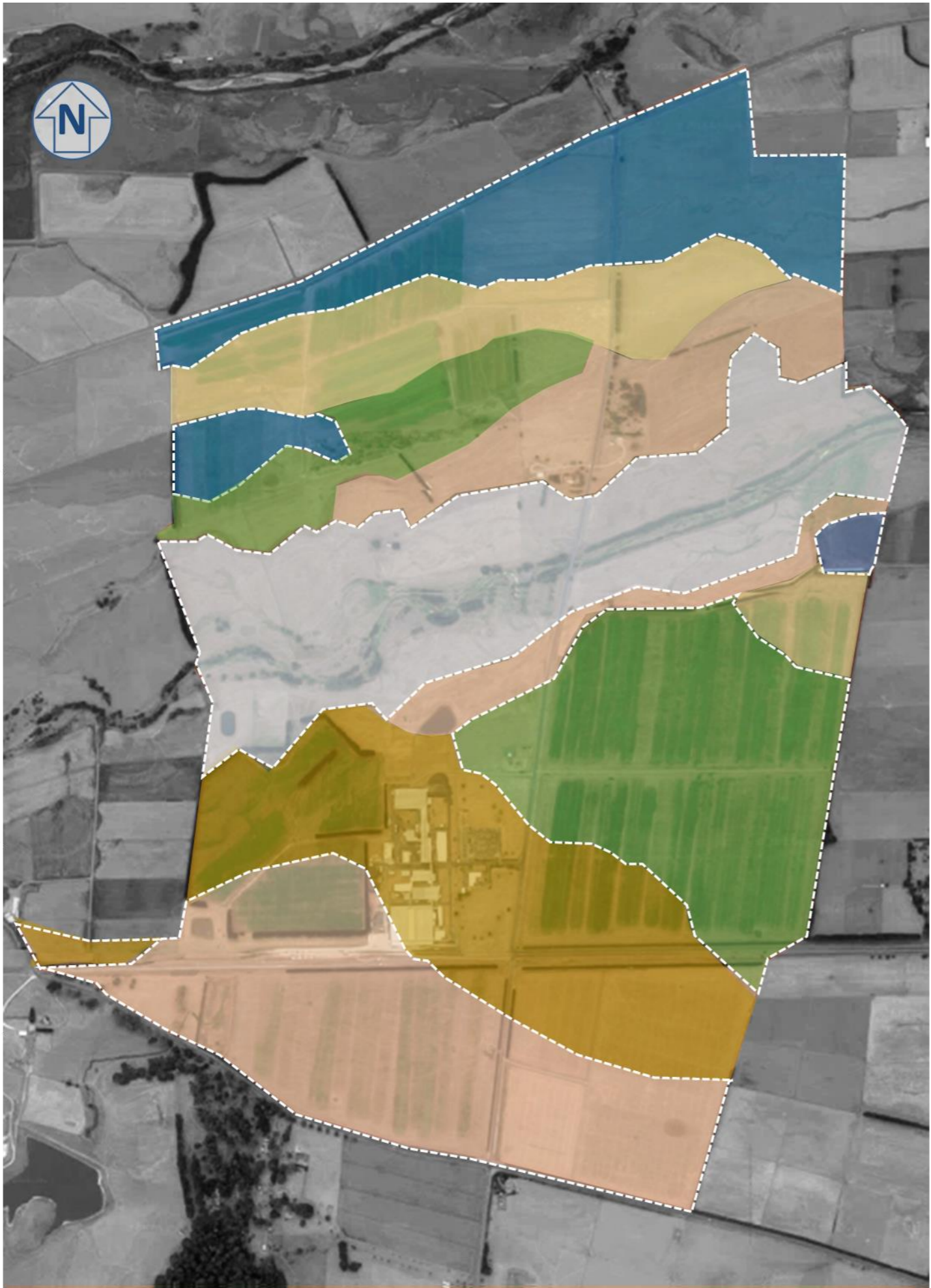
Blocks A – E are consented for the discharge of meat processing wastewater.

Blocks S1 and S2 are consented for the spreading of stockyard solids

Blocks E and F are consented for the spreading of stockyard solids through a certificate of compliance.



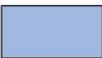



See map 4, page 12.





**Legend:**

SOIL TYPES: Adopted from S-Map

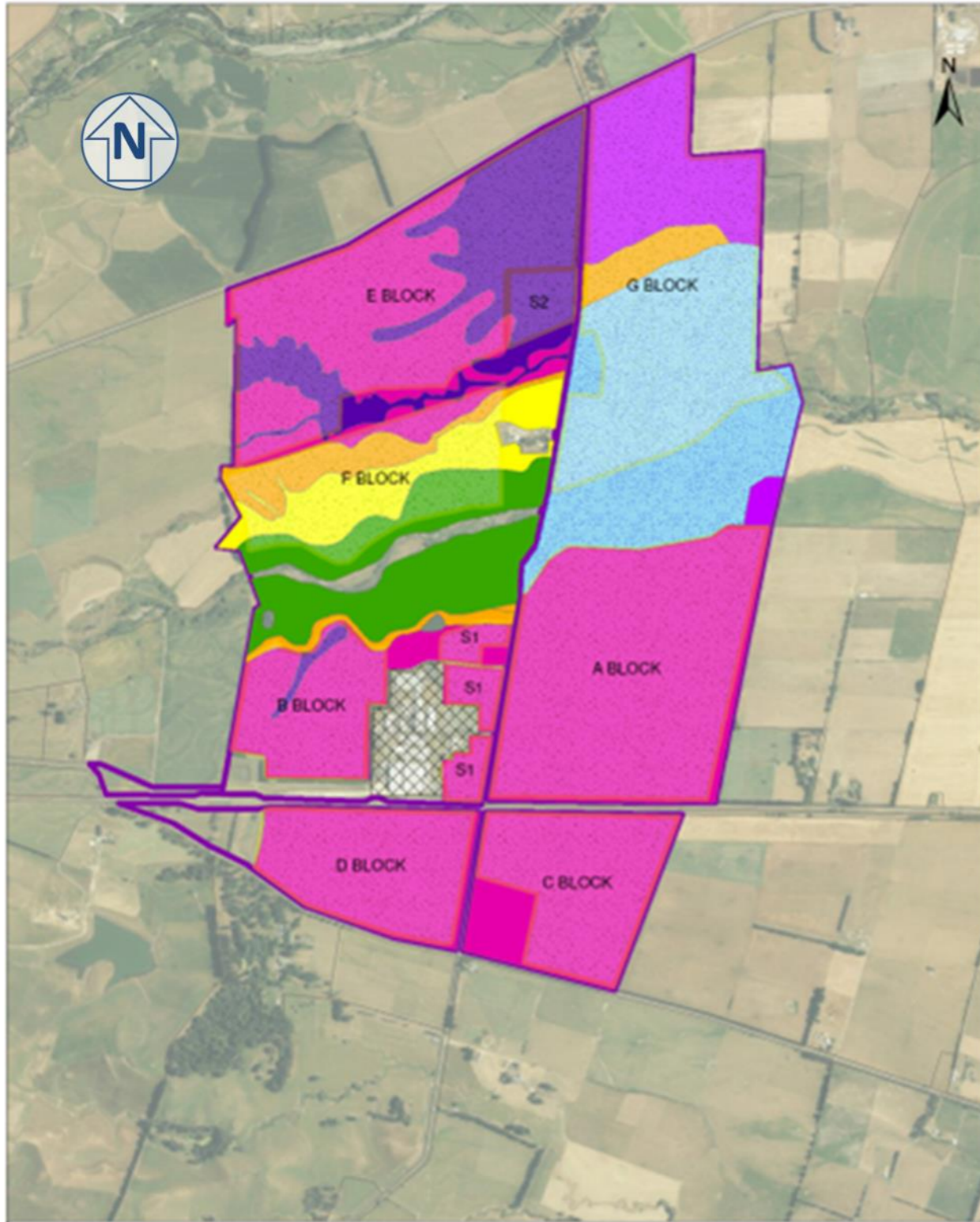
-  Tararu shallow silt loam
-  Bushgate shallow silt loam
-  Ruataniwha silt loam
-  Oronoko shallow silt loam
-  Mandamus shallow silt loam
-  Ashburton shallow and very shallow sandy loam

SILVER FERN FARMS TAKAPAU  
 INTEGRATED LAND  
 MANAGEMENT MAPS



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**MAP 2A – S Map Indicative Soil Boundaries**



KEY		
	LEGAL TITLE BOUNDARIES	
	SILVER FERN FARMS TAKAPAU LAND PARCELS	
	TAKAPAU MEAT PROCESSING PLANT	
Site Survey		
	Alltophanic	
	Alltophanic & Pallic	
	Pallic & Clay	
	Recent - Alluvial Steepland	
Regional Survey		
	Pallic	
	Recent - Alluvial Steepland	
	Recent - Alluvial Steepland & Alltophanic	

SOURCE:  
 1. Aerial imagery sourced from LINZ DATA SERVICE AND LICENSED FOR REUSE UNDER THE CREATIVE COMMONS ATTRIBUTION 4.0 LICENCE.

SCALE : 1:20,000 (A4)  
 0 100 200 400 600 800 1,000  
 METRES

**Legend:**

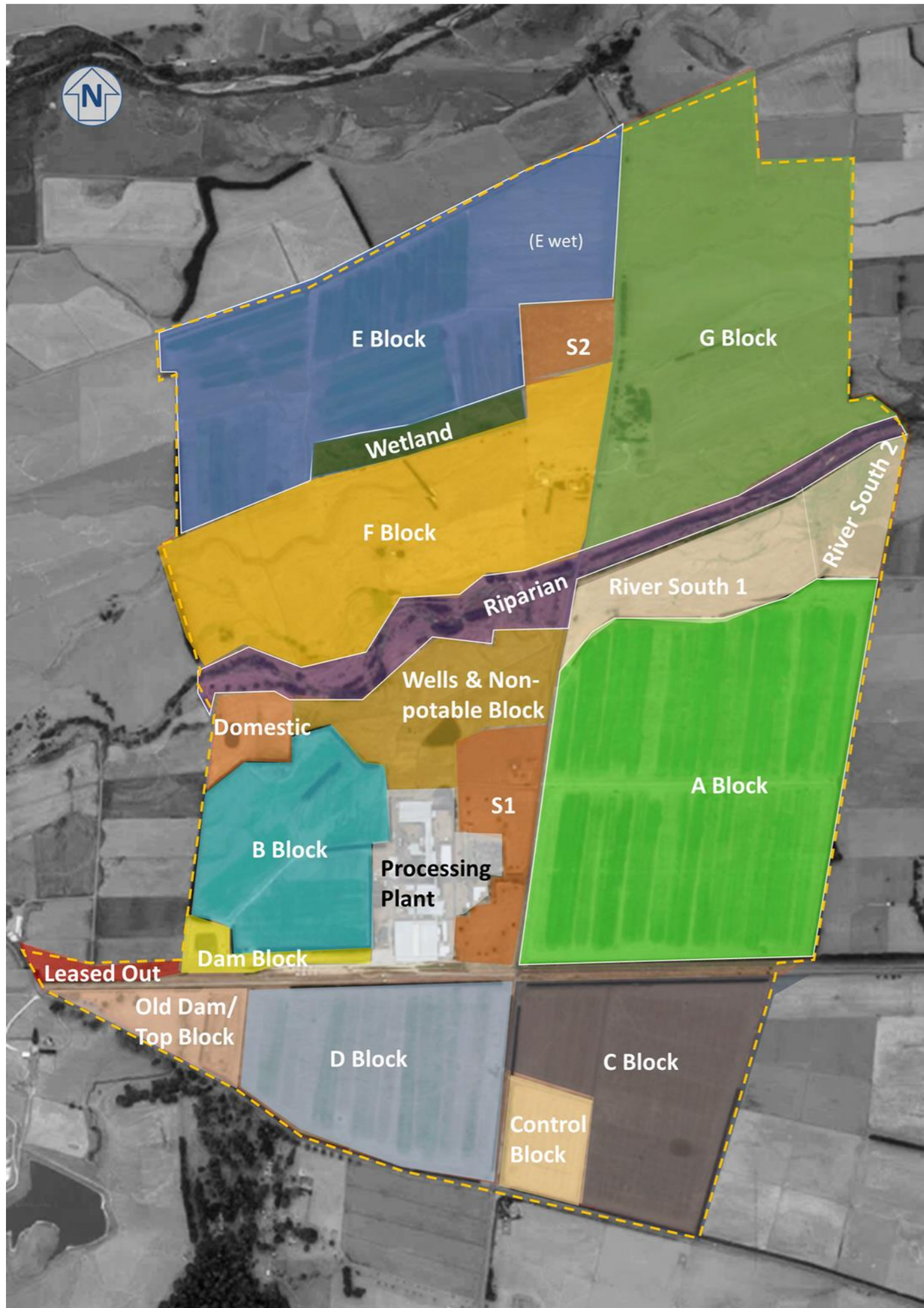
SOIL TYPES: see legend below map

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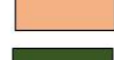




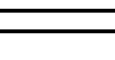
MAP 2B – PdP on-site confirmed map



**Legend:**

 Silver Fern Farms Freehold

**BLOCKS:**

 A Block	 B Block
 C Block	 D Block
 E Block	 F Block
 G Block	 S1 & S2 Block
 Dam Block	 Control Block
 River South Block 1 & 2	
 Wells & Non-potable Block	
 Domestic Block	
 Wetland Block	
 Riparian Area	
 Old Dam/Top Block	
 Processing Plant	
 Owned - Leased Out	

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**MAP 3 – Indicative Block Areas**







**Legend:**



**LAND FEATURES:**

-  Consented areas

**KEY FEATURES:**

-  Weather Station
-  Groundwater monitoring bores
-  Groundwater production wells
-  Stream monitoring sites

**BOUNDARY:**

-  Consented areas
-  Existing certificate of compliance area

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**MAP 4 – Consented Areas & Monitoring Sites**

## 2.5 Land Use Capability

The Land Use Capability Classification system, which classifies all rural land into one of eight classes based on an assessment of the land's physical characteristics and attributes.

The Land Use Capability Classification is being used to set an average leaching allowance per property in the Hawkes Bay.

The allocated leaching allowance assigned to each class is set out below in table 2.5.

LUC Class	I	II	III	IV	V	VI	VII	VIII
Rate (kgN/ha/yr)	30.1	27.1	24.8	20.7	20	17	11.6	3

*Table 2.5*

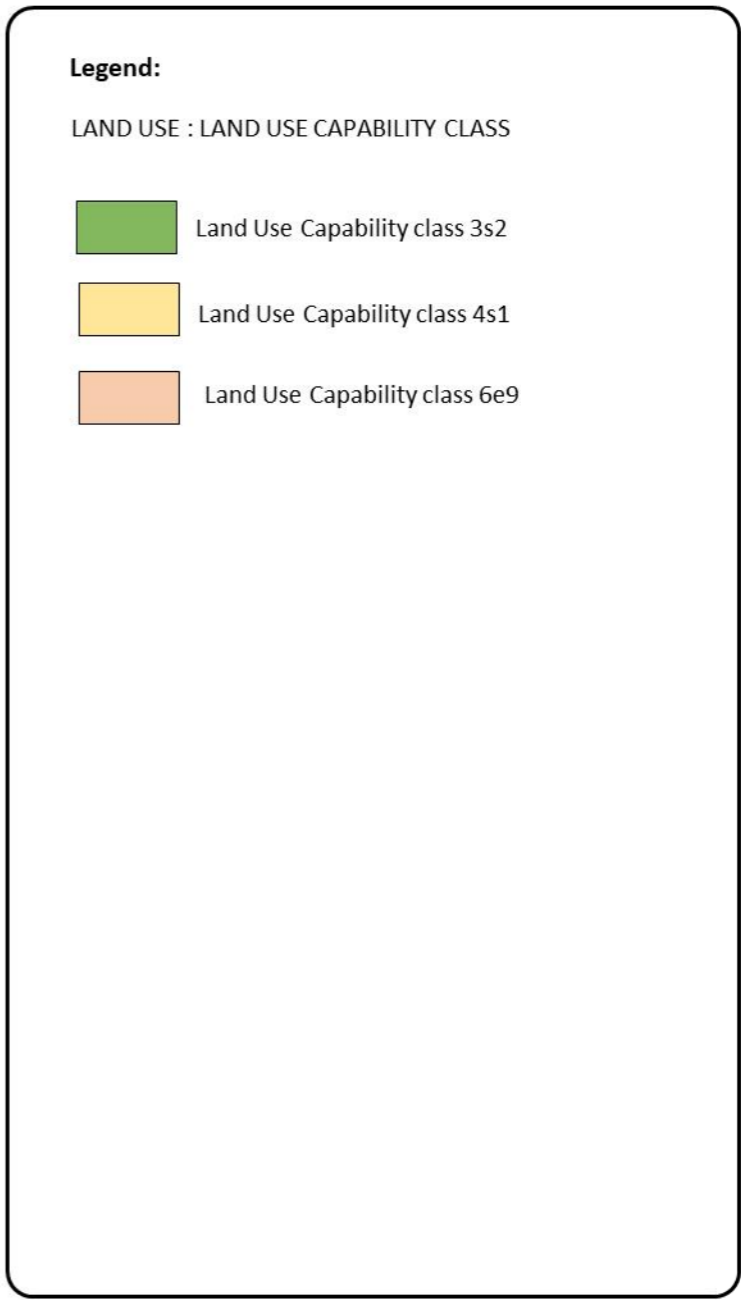
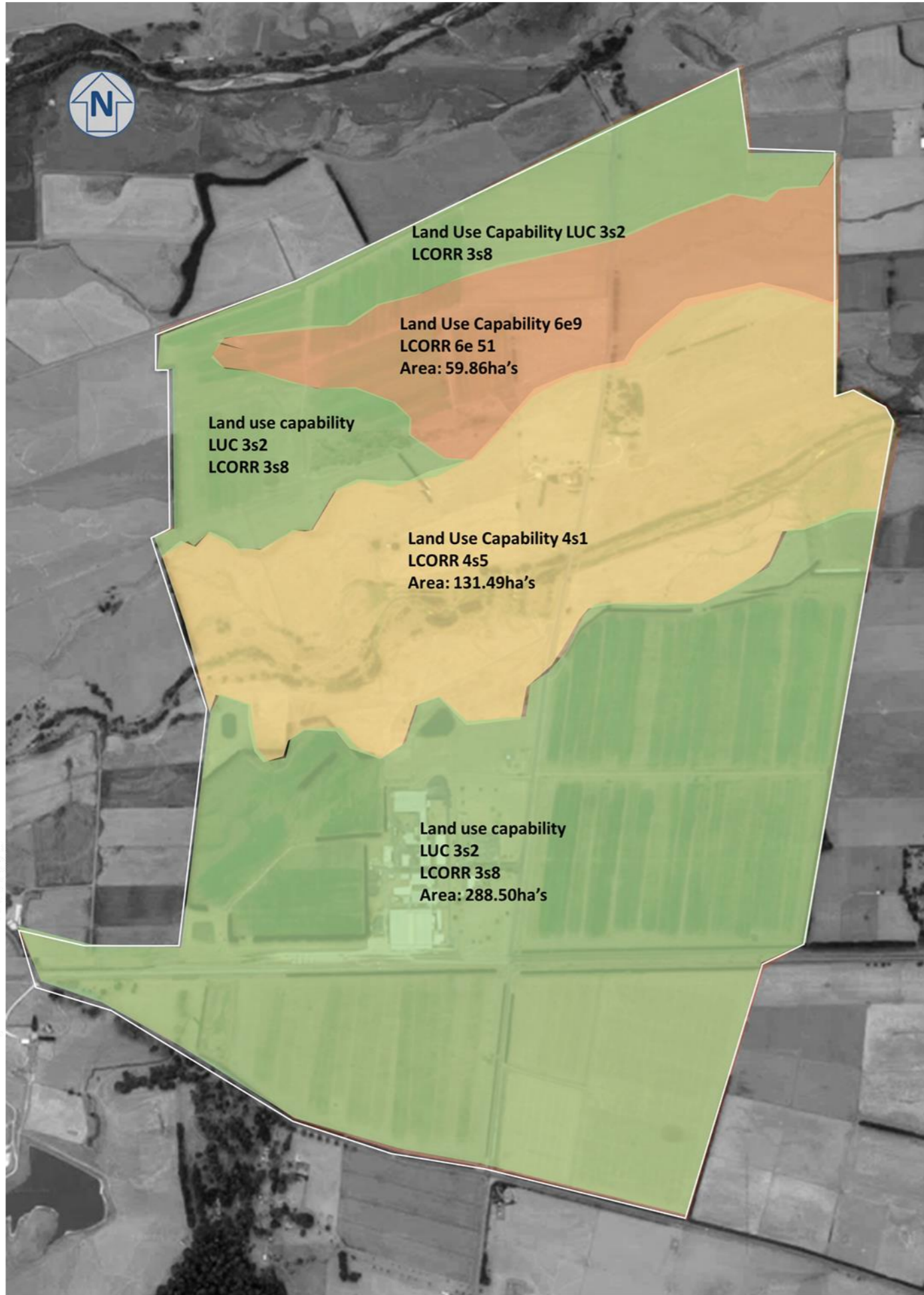
The Land holdings at Takapau fall into three Land Use Capability classes - Classes III, IV and VI.

The land area, and the leaching allowance per hectare and total for each class are shown in table 2.5.1

LUC Class	Area in hectares	Leaching allowance KgN/ha/yr	Total leaching allowance per class
III	288.5	24.8	7,154.8
IV	131.49	20.7	2,721.8
VI	59.86	17	1,017.62
Total allowance for land holdings			10,894.22 KgN/yr
Average leaching allowance per hectare			22.70 KgN/ha/yr

*Table 2.5.1*

See map 5, page 14



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**MAP 5 – Indicative Land Use Capability**

## 2.6 Land Classification

Silver Fern Farms has classified the land holdings into eleven land management units (LMU's) [see Map 6 – Land Management Units, page 18]. Each management unit is unique, reflecting the geology, soils, relief, physical limitations, associated risks and use.

The following table sets out the identified land management units, the current use, limitations and risk profile.

Land Management Unit	Characteristics
LMU 1a	<p>Flat land.</p> <p>Ruataniwha silt loam soil and Tararu shallow silt loam.</p> <p>Imperfectly drained, characterised by a silica pan at 350m - 450mm, and prone to summer drought and winter wetness.</p> <p>Suitable for summer irrigation and limited cropping.</p> <p>Managed for wastewater irrigation and subsequent crop removal under 'cut-n-carry' predominately during the summer months.</p>
LMU 1b	<p>Flat land.</p> <p>Ruataniwha silt loam soil.</p> <p>Imperfectly drained, characterised by a silica pan at 350m - 450mm. Extremely wet in winter.</p> <p>Suitable for summer grazing, limited cropping, and summer irrigation.</p> <p>Managed for silage and grazing.</p>
LMU 2a	<p>Flat to slightly undulating land.</p> <p>Mix of Bushgate, Oronoko and Ashburton silt and shallow silt loams.</p> <p>Excellent soil drainage, slight to moderate risk wind erosion when cultivated.</p> <p>Suitable for grazing, green feed crops and potential irrigation.</p> <p>Managed for the disposal of stock yard solids, as conservation grazing (holding livestock prior to processing) and in part, periodically for equestrian events.</p>
LMU 2b	<p>Flat land.</p> <p>Mandamus shallow silt loam soil.</p> <p>Prone to summer drought.</p>

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Characteristics of the Land Holdings  
Complementary Reference**

Land Management Unit	Characteristics
	<p>Suitable for grazing and cropping.</p> <p>Managed primarily as a grazing block (holding of livestock prior to processing) and periodically for the disposal of stock yards solids.</p>
LMU 3	<p>Predominately flat land and associated escarpment along the southern boundary of the unit.</p> <p>Mixture of Ashburton and Oronoko shallow silt loam soils.</p> <p>Excellent soil drainage, slight to moderate risk wind erosion when cultivated.</p> <p>Escarpment prone to minor sheet erosion.</p> <p>Suitable for grazing, green feed crops and potential irrigation. Escarpment suitable for forestry.</p> <p>Managed primarily as a grazing block (holding of livestock prior to processing) during the summer/autumn and making supplementary feed in spring.</p>
LMU 4	<p>Flat land.</p> <p>Ashburton shallow silt loam.</p> <p>Free draining soil.</p> <p>Managed as a domestic disposal field.</p>
LMU 5	<p>Flat land.</p> <p>Mix of Bushgate, Tarau and Mandamus shallow silt loam soils.</p> <p>Free draining soils.</p> <p>Slight to moderate risk wind erosion when cultivated.</p> <p>Suitable for cropping, grazing and irrigation.</p> <p>Managed for wastewater irrigation and subsequent product removal under 'cut-n-carry'.</p>
LMU 6	<p>Flat land.</p> <p>Tararu shallow silt loam.</p> <p>Free draining soil.</p> <p>Slight to moderate risk wind erosion when cultivated.</p> <p>Suitable for cropping, grazing and irrigation.</p> <p>Prone to summer drought, without irrigation.</p> <p>Managed as the control block for wastewater applications and making supplementary feed.</p>
LMU 7	<p>Flat land.</p>



**Environmental Management  
Characteristics of the Land Holdings  
Complementary Reference**

Land Management Unit	Characteristics
	<p>Mandamus shallow silt loam.</p> <p>Free draining soil.</p> <p>Suitable for grazing and cropping.</p> <p>Land is Leased out.</p>
LMU 8	<p>Constructed freshwater wetland and stream riparian margin.</p> <p>Managed for further nutrient removal and conservation purposes – stock exclusion.</p>
LMU 9	<p>Flat land.</p> <p>Comprises low lying areas of depleted wetland vegetation.</p> <p>Managed for conservation grazing during summer.</p>

*Table 2.6 – Land Management Units (LMU) at Silver Fern Farms Takapau.*



**Legend:**

LAND MANAGEMENT UNIT [LMU]:

-  1a – Irrigation/ Crop [E Block]
-  1b – Grazing / Crop / Potential Irrigation
-  2 – Solids spreading / grazing
-  3 – Grazing
-  4 – Domestic field
-  5 – Irrigation / Crop ['A – D Blocks]
-  6 – Crop [Control Block]
-  7 – Leased out
-  8 – Wetland / Riparian
-  9 – Conservation grazing

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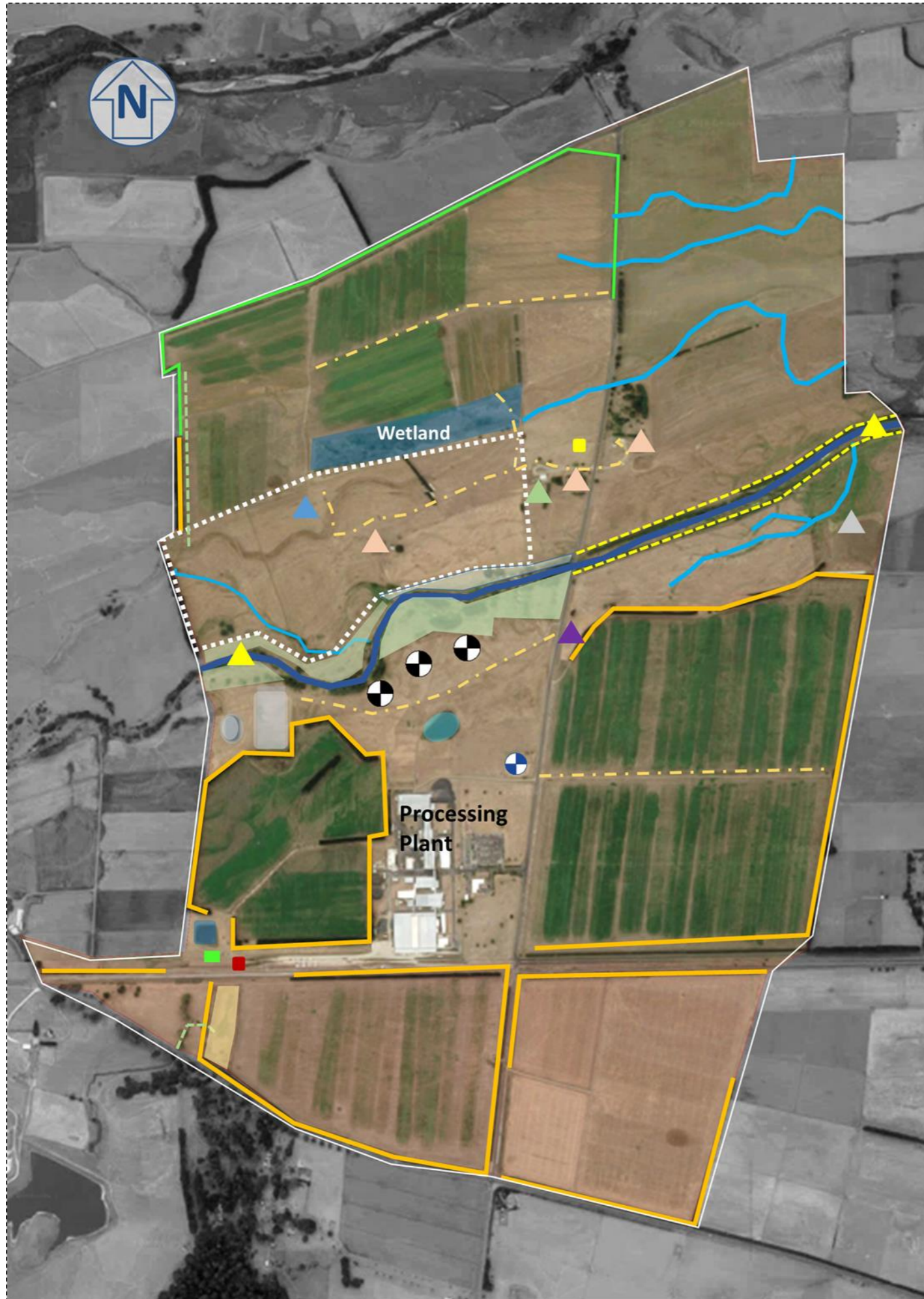
MAP 6 – Indicative Land Management Unit

## 2.7 Key Land Features

The key land features on the property include:

- Four ephemeral channels; three to the north and one to the south of the Porangahau stream.
- A freshwater wetland to the north of the Porangahau stream.
- A standard range of auxiliary buildings.
- A booster pump shed.
- A number of permanent equestrian horse jumps
- Riparian plantings either side of the Porangahau stream, west of Fraser road.
- River control plantings either side of the Porangahau stream, east of Fraser road.
- Travelling irrigators and associated infrastructure.
- Shelterbelts and buffer plantings around the boundary.
- A domestic dam and disposal field.
- A non-potable dam.
- A calibrated weather station.
- Several access tracks.
- A number of groundwater monitoring bores.
- Several groundwater wells.
- A dam for holding wastewater.
- A disused storage dam.

(See Map 1 - Land Titles page 4, and Map 7 – Indicative Land Features, page 20).



**Legend:**

**LANDFEATURES:**

	Ephemeral channel		Former Farm Sheep dip
	Porangahau stream		Former Farm Silage pit
	Riparian planting		Former Farm Offal pits
	Native buffer planting		Gravel reserves
	Exotic buffer planting		Land holding Buildings
	Wetland		
	Former Oruawharo Dam overflow		

**SERVICES:**

	River flood protection		Pump Shed
	Domestic dam and field		Weather Station
	Non potable dam		Production bores
	Booster pump shed		
	Sub-Station		
	Wastewater dam		
	Access track		
	Disused dam		

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**MAP 7 – Indicative Land Features**

## 2.8 Land Use

The primary use of the land at Takapau is for land based treatment of meat processing wastewater, and as a support base to the processing operation.

### 2.8.1 Irrigated land holdings

Silver Fern Farms Takapau currently utilises approximately 214 hectares of the consented total land holdings, for land-based treatment of processing wastewater.

The wastewater irrigation system and network has been designed specifically for land based treatment of meat processing wastewater (see Appendix 1 for irrigator specifications, page 24)

Table 2.8.1 details the areas and irrigation methods on the five irrigation Blocks.

Block	Irrigation Method	Area (ha)
A	Travelling Irrigator Briggs Model 25	71.2
B	Travelling Irrigator Briggs Model 25	20.7
C	Travelling Irrigator Briggs Model 25	29
D	Travelling Irrigator Briggs Model 25	29.1
E	Travelling Irrigator Briggs Model 25	79.3

*Table 2.8.1 – Irrigation method per Block at Silver Fern Farms Takapau.*

## 2.9 Risk Management

The generic risks associated with the land resource and associated use, and the measures in place to avoid or remedy the risks are set out in table 2.9.

RISK	REMEDIAL ACTIONS
Access to waterways	<ul style="list-style-type: none"> <li>• <i>All permanently flowing waterways are fenced to exclude stock.</i></li> </ul>
Environmental incident	<ul style="list-style-type: none"> <li>• <i>Notify affected parties, both internal and external, of the incident and corrective preventative actions taken.</i></li> <li>• <i>Conduct an incident investigation.</i></li> <li>• <i>Generate a "Flash report" within 24 hours of the incident occurring.</i></li> </ul>
Flooding	<ul style="list-style-type: none"> <li>• <i>Maintain permanent pasture</i></li> </ul>
Infrastructure	<ul style="list-style-type: none"> <li>• <i>All buildings, hay sheds are located beyond flood levels.</i></li> <li>• <i>Access tracks are located so as to avoid waterway crossings.</i></li> <li>• <i>The Porangahau stream is crossed using public road bridge</i></li> <li>• <i>Gateways &amp; water-troughs are located, as practical, a distance away from any waterbody.</i></li> </ul>
Ponding and run-off	<ul style="list-style-type: none"> <li>• <i>Daily visual inspections</i></li> <li>• <i>Aquaflex soil moisture monitoring</i></li> <li>• <i>Irrigator rotation.</i></li> <li>• <i>Aeration of soil.</i></li> <li>• <i>Riparian plantings</i></li> <li>• <i>Natural wetland.</i></li> </ul>
Pump, pipe or pivot failure	<ul style="list-style-type: none"> <li>• <i>Alarm on the SCADA network is activated notifying staff who will take remedial action</i></li> </ul>
Riparian margins	<ul style="list-style-type: none"> <li>• <i>Maintain fence lines.</i></li> <li>• <i>Control noxious weeds</i></li> <li>• <i>Undertake pest control</i></li> </ul>

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Characteristics of the Land Holdings  
Complementary Reference**

RISK	REMEDIAL ACTIONS
Soil saturation	<ul style="list-style-type: none"> <li>• <i>Soil moisture monitoring</i></li> </ul>
Soil compaction/imperfect drainage	<ul style="list-style-type: none"> <li>• <i>Aeration of the soil</i></li> </ul>
Soil erosion (wind)	<ul style="list-style-type: none"> <li>• <i>Pasture maintenance</i></li> <li>• <i>Direct drilling or minimum tillage</i></li> </ul>
Soil saturation	<ul style="list-style-type: none"> <li>• <i>Soil moisture monitoring</i></li> </ul>
Spray drift and odour	<ul style="list-style-type: none"> <li>• <i>Avoidance of material turning anaerobic.</i></li> <li>• <i>Irrigator nozzle size</i></li> <li>• <i>On-site weather station</i></li> <li>• <i>Boundary shelterbelts.</i></li> <li>• <i>Fixed irrigator points from property boundaries.</i></li> </ul>

*Table 2.9 – Risk and mitigation measures at Silver Fern Farms Takapau.*

**Appendix 1 – Irrigator specifications**

Irrigator	Type	Length irrigator metres	Rotation	Flowrate Litres/sec	Speed metres/hour	Nozzle sizes mm *	Application rate in mm
Travelling Irrigator	Briggs 25 (lengthened to accommodate flow meters)	7.2 metres	360	50cubes	Varies on run placement	12mm	30-65mm
Travelling Irrigator	Briggs 25 (lengthened to accommodate flow meters, electronics and GPS locating)	7.2 metres	360	28 cubes	10m/hr	12mm	30-65mm

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**END**

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# Environmental Management Operational Controls



## Takapau - Land Based Activities

Overarching operational controls  
for Silver Fern Farms  
Takapau - Land Based Activities



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Operational Controls**

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Site(s): Takapau

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**Table of Contents**

1	INTENT .....	4
2	SCOPE .....	4
3	ENVIRONMENTAL AWARENESS .....	4
4	DEFINITIONS .....	5
5	STAFF RESPONSIBILITIES .....	5
6	ENVIRONMENTAL CONTROLS .....	6
7	LAND BASED OPERATIONAL CONTROLS.....	8
8	IRRIGATOR SPECIFICATIONS .....	13



**1 INTENT**

To correctly run and maintain the land holdings to meet company requirements to ensure regulatory compliance; and, minimise environmental impact. To generate awareness of environmental obligations.

**2 SCOPE**

These controls apply to all operations related to the land based treatment of meat processing wastewater, and livestock activities associated with the processing operation that have potential to impact upon the soil, waterways and the environment.

**3 ENVIRONMENTAL AWARENESS**

*All Silver Fern Farms land based staff need to be aware of environmental obligations and potential environmental impacts from onsite activities.*

Silver Fern Farms Takapau land based staff conduct numerous activities that have the potential to impact upon the environment. These activities are regulated by conditions set out in resource consents issued by Hawkes Bay Regional Council. It is important that these conditions are adhered to, to avoid any environmental degradation.

## 4 DEFINITIONS

For the purposes of this document, the following terms and definitions apply.

Controls	Controls are rules put in place to avoid, remedy or mitigate potential end effects. The controls for substances differ depending on their hazard classification. Controls include; inventory of all chemicals, hazard assessments, worker training, signage, secondary containment, Approved Handlers, Location Test Certificate, etc.
Must	Mandatory
Shall	Obligated

## 5 STAFF RESPONSIBILITIES

Responsibility for land management is delegated as follows:


Position	Responsibility
<b>Plant Manager</b>	<ul style="list-style-type: none"> <li>Has overall responsibility for the management of onsite operations, delegation of responsibilities and environmental compliance.</li> </ul>
<b>Farm Manager</b>	<ul style="list-style-type: none"> <li>Has responsibility for the day-to-day management of the land resources, appropriate resource consent compliance, and compliance with the requirements of this operational standard.</li> </ul>
<b>Farm staff</b>	<ul style="list-style-type: none"> <li>Responsible for day-to-day management of irrigator operations and performance, and livestock activities associated with the processing operation.</li> </ul>

## 6 ENVIRONMENTAL CONTROLS

In order to maintain compliance there are a number of key tasks and associated controls that can directly impact on the performance of irrigating the wastewater to land. These key steps are highlighted in task instructions with the environmental symbol:



**Environmental Controls – Quick Guide**

Process	 <b>Environmental Controls</b>	Task Instructions
<b>Irrigator Scheduling</b>	<ul style="list-style-type: none"> <li>• Ten Commandments of Wastewater Management</li> </ul>	FAR 19 FAR 20
<b>Operating the irrigators</b>	<ul style="list-style-type: none"> <li>• Operating Travelling Irrigators</li> <li>• Opening &amp; Closing pipeline valves</li> <li>• Corrective Actions for Pipeline failures</li> </ul>	FAR 21 FAR 51 FAR 52 FAR 53 FAR 54 FAR 40
<b>Irrigator maintenance</b>	<ul style="list-style-type: none"> <li>• Performance Assessment - Travelling Irrigators</li> <li>• Irrigator Maintenance –</li> <li>• Pipeline Flushing</li> <li>• Preventative Maintenance Scheduling</li> </ul>	FAR 48 FAR 21 FAR 32
<b>Spray Drift and Odours</b>	<ul style="list-style-type: none"> <li>• Odour Complaint Form and Process</li> <li>• Weather Station data</li> <li>• Set Borders &amp; Boundaries</li> <li>• Adaptive design features</li> </ul>	FAR 44
<b>Ponding and Runoff</b>	<ul style="list-style-type: none"> <li>• Utilise a sub-soiler (panerator) over areas that have become water compacted.</li> <li>• Weather Station data</li> <li>• Soil Moisture Monitoring (Manual &amp; Aquaflex)</li> </ul>	FAR 43 FAR 22
<b>Sampling</b>	<ul style="list-style-type: none"> <li>• Sampling Lysimeters</li> </ul>	FAR 33
<b>Emergency</b>	<ul style="list-style-type: none"> <li>• Follow emergency procedure</li> <li>• Accident/Incident Reporting</li> <li>• PLC Alert if 'Fault' condition</li> </ul>	FAR 40 FAR 45 Alert SCADA & cell

## 7 LAND BASED OPERATIONAL CONTROLS

Element	Requirement	Explanation	Control Measures
<b>Animal Feed</b>	<ul style="list-style-type: none"> <li>All product held for the site's use is stored well away from any waterway, and distributed to minimise wastage, and soil damage through compaction.</li> </ul>	To prevent silage leachate entering waterways, and stock pugging the ground.	
<b>Burning</b>	<ul style="list-style-type: none"> <li>Restricted under hot work permit to dry green waste only.</li> </ul>	Silver Fern Farms maintains a blanket ban on burning, apart from, but within operational standards and parameters, the outdoor burning of dry green waste only.	Environmental Guidance. Note– Outdoor Burning.  Hot work permit.
<b>Chemicals</b>	<ul style="list-style-type: none"> <li>Growsafe accreditation for handling and application of chemicals.</li> <li>All chemicals recorded and labelled and list readily available in event of an emergency.</li> <li>All chemicals stored in a secure facility with appropriate bunding.</li> </ul>	To ensure only those with the appropriate training and accreditation are permitted to handle or apply chemical.	
<b>Cultivation</b>	<ul style="list-style-type: none"> <li>Minimum cultivation techniques to be used for all pasture renewal, unless soil conditions dictate otherwise.</li> </ul>	These best practice techniques help to minimise soil organic matter loss, and maintain soil bacteria and biota.	Accredited/registered Agricultural Contractor
<b>Fencing</b>	<ul style="list-style-type: none"> <li>Boundary fences must comply with the Fencing Act and any stock control measures in the relevant regulations and bylaws of Central Hawkes Bay District Council.</li> <li>Fences must be constructed of wooden posts, high tensile wire and droppers. Where necessary netting may be used but must incorporate a top &amp; bottom high tensile wire.</li> </ul>	The Fencing Act and bylaws hold significance to roadside fences where a higher standard of care is now expected.	



Element	Requirement	Explanation	Control Measures
<b>Fertilisers</b>	<ul style="list-style-type: none"> <li>Nutrient inputs are based on soil test results from an accredited laboratory</li> <li>Applications of phosphate fertiliser are avoided between June and August.</li> <li>Only Fertmark compliant fertilisers are used.</li> <li>Applications of nutrients are from accredited spreadmark contractors.</li> <li>No fertiliser is stored or mixed on-site.</li> <li>A 3 metre wide non-nutrient buffer strip is maintained from any permanent or intermittent flowing waterway to avoid direct nutrient input into water.</li> </ul>	These best practices are designed to ensure the effective and efficient use of nutrients and mitigate environmental effects.	
<b>Health &amp; Safety</b>	<ul style="list-style-type: none"> <li>Staff and visitors adhere to the Plant's health and safety requirements at all times.</li> <li>Personal protective clothing is worn at all times when working on the land.</li> <li>Personal protective clothing is worn at all times when working with wastewater.</li> <li>Forbidden to use quad bikes on-site.</li> <li>An approved helmet is worn when using a gator farm bike</li> </ul>	Health and Safety is a cornerstone of all land based operations on Silver Fern Farms owned or leased land.	
<b>Harvesting</b>	<ul style="list-style-type: none"> <li>All harvesting to be conducted under the Silver Fern Farms General Harvesting Agreement for Takapau.</li> </ul>	To ensure the roles and responsibility of the parties are adhered to and systems and procedures are followed.	General Harvesting Agreement.
	<ul style="list-style-type: none"> <li>All harvesting on land receiving applications of wastewater must meet the statutory requirements under Biosecurity (Ruminant Protein) Regulations.</li> </ul>	It is a legal requirement that no observable debris be present on any product sold off land receiving applications of meat processing wastewater.	
	<ul style="list-style-type: none"> <li>All crops are to be sold standing.</li> </ul>	Cost of harvesting and transportation is to be borne by the harvesting contractor.	

**Environmental Management**  
**Takapau - Land Based Activities**  
**Operational Controls**

Element	Requirement	Explanation	Control Measures
	<ul style="list-style-type: none"> <li>A minimum 14 day with-holding period must be adhered to between final application of wastewater and harvesting.</li> </ul>	To ensure any hazardous material has time to infiltrate the soil for biological treatment.	
	<ul style="list-style-type: none"> <li>The crop must be inspected prior to harvest for presence of observable debris.</li> </ul>	To ensure no hazardous material is present on the foliage at harvest.	
	<ul style="list-style-type: none"> <li>An assessment of crop yield shall be undertaken prior to a harvest.</li> </ul>	The assessment is a check and balance against expected to actual crop yield.	
	<ul style="list-style-type: none"> <li>The sale price must be agreed to by the Plant Manager, unless the appropriate delegations are in place.</li> </ul>	A check and balance to ensure the company receives the going market rate.	
	<ul style="list-style-type: none"> <li>A minimum residual post-harvest height of 40mm must be maintained.</li> </ul>	To reduce further any risk of debris being on the foliage and contaminating product.	
	<ul style="list-style-type: none"> <li>A Feed Consignment Note must be supplied to the harvesting contractor for each harvest undertaken.</li> </ul>	To make available details of the crop to the feed broker for their potential clients.	Feed Transfer Consignment Note
<b>Infrastructure</b>	<ul style="list-style-type: none"> <li>All buildings are maintained fit for purpose, and reflect Brand colours.</li> <li>All vehicles and plant are regularly maintained in an operational state and comply with all legal requirements.</li> </ul>	Maintaining infrastructure and farm machinery is important to operational efficiency, staff safety, animal welfare, and extending the economic life of an asset.	
<b>Irrigation</b>	All irrigation events must be undertaken in accordance with the site's systems, procedures and controls.	The irrigation network has been specifically designed for land based treatment of meat processing wastewater.	

Element	Requirement	Explanation	Control Measures
	Three monthly pot tests shall be undertaken to evaluate irrigator performance.	The engineered systems, procedures and controls are designed to avoid any potential for odours, spray drift, and excessive irrigation events. Pot tests provide the check and balance of that.	
<b>Livestock</b>	To adopt a proactive animal health programme with adherence at all times to the Animal Welfare Code.	<p>The welfare of stock is paramount to any management decisions with the guiding principles based on five basic freedoms:</p> <ul style="list-style-type: none"> <li>• Freedom from thirst, hunger &amp; malnutrition</li> <li>• Provision of appropriate comfort and shelter</li> <li>• Prevention or rapid diagnosis and treatment of injury, disease or infection</li> <li>• Freedom from distress</li> <li>• The ability to display normal patterns of behaviour.</li> </ul>	
<b>Pasture mixes</b>	<ul style="list-style-type: none"> <li>• To maximise nutrient uptake from the wastewater to meet specified nutrient allowances.</li> <li>• Seed mixtures must contain a mix of tetraploids and diploid grasses, sown at a rate of no less than 22kg/ha.</li> <li>• Lucerne sown at 15 kg/ha.</li> </ul>	To maximise product yield and uptake of wastewater nutrients; sugar content for saleability; and resilience to drought and pasture pests.	Accredited/registered Agricultural Contractor
	<ul style="list-style-type: none"> <li>• For dryland Blocks seed mixtures containing diploid grasses including fescues, cocksfoot &amp; clovers sown at 22-25kg/ha. Lucerne sown at 15kg/ha.</li> </ul>	To ensure the longevity of the pastures.	

**Environmental Management**  
**Takapau - Land Based Activities**  
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<b>Records</b>	<ul style="list-style-type: none"> <li>All applications of wastewater discharges to land must be recorded on the SCADA system.</li> </ul>	To ensure compliance with statutory resource consent requirements.	PLC/SCADA Monitoring
	<ul style="list-style-type: none"> <li>Accurate records must be made of all chemical/pesticide/insecticide applied to land; recording dates, application rates, area and paddock number.</li> </ul>	To ensure that any product sold is fit for purpose, and any withholding periods adhered to.	
	<ul style="list-style-type: none"> <li>A daily diary (preferably electronic) shall be made recording all land based events.</li> </ul>	To ensure that there is an historical record of paddock history, purchases and a timeline of land based activities.	
<b>Soil health</b>	<ul style="list-style-type: none"> <li>To maintain or improve the physical and biological conditions of the soils</li> <li>Soils to be managed in the optimum range of pH5.8 to pH6.0</li> <li>Annually soil test all land receiving applications of wastewater.</li> </ul>	To optimise soil health, ensuring maximise plant growth and uptake of nutrients in the wastewater and avoid the movement of sediment, and associated phosphorus to a waterbody.	
<b>Waterways</b>	<ul style="list-style-type: none"> <li>Any ephemeral streams is to be temporary fenced out with a 4 metre buffer should the paddock be grazed by cattle.</li> <li>Maintain Riparian areas.</li> </ul>	To prevent cattle access to the waterway at any time.	
<b>Waste Management</b>	<ul style="list-style-type: none"> <li>Adherence with Silver Fern Farms environmental policy.</li> </ul>	Silver Fern Farms policy encourages efforts to Reduce the amount of waste generated, Reuse materials where practical, Recycle and Recover as much of the waste material as possible.	Company Policy

8 IRRIGATOR SPECIFICATIONS

Irrigator	Type	Length irrigator metres	Rotation	Flowrate Litres/sec	Speed metres/hour	Nozzle sizes mm *	Application rate in mm
Travelling Irrigator	Briggs 25 (lengthened to accommodate flow meters)	7.2 metres	360	50cubes	Varies on run placement	12mm	30-65mm
Travelling Irrigator	Briggs 25 (lengthened to accommodate flow meters and electronics & GPS control)	7.2 metres	360	28 cubes	10m/hr	12mm	30-65mm