



Land Application of Meatworks Effluent Sludge Lindsay Property

Consent Application and Assessment of Environmental Effects

Prepared for

South Pacific Meats

Prepared by

L E W E
Environmental
I m p a c t

June 2018



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Appendix A	Figure 1 Farm Map
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Appendix B	Location Map of Neighbouring Properties
Appendix C	Farm Dairy Effluent and Nitrogen Load Calculation



1 EXECUTIVE SUMMARY

South Pacific Meats Ltd ("SPM") operates an export meat processing plant at Awarua. It has a requirement to remove meatworks effluent sludge ("MES") from its wastewater treatment pond in order to maintain its treatment performance. There is an ongoing and recurring requirement to remove up to 4,000 m³ of MES every year.

The Lindsays wish to take some or all of this MES to apply as a fertiliser and soil conditioner to suitable land on two of their Gladvale Farms Limited (Gladvale) properties at Oreti Plains Road near Winton. The properties have a total combined area of 627 ha that is flat to very gently sloping land, of this, 346 ha is proposed to be authorised to receive MES applications.

It is proposed to transfer the MES by road from Awarua to the property, and to apply it to land by means of a tractor-hauled slurry wagon. The MES will be partly applied to land which is to be cropped, and partly as a topdressing to pasture.

The potential environmental effects of the proposed discharge are assessed on the receiving environment; soil and plants, surface water and groundwater, habitats, air, and amenity values. In each instance the effects are assessed as less than minor. The cumulative effects of applying FDE, whey and MES are discussed. The air effects potentially include spray drift and odours from the actual application, but the low pressure distribution system involved will largely prevent the generation of aerosols. There will also be exclusion margins between the application site and the property boundaries involved, so the off-site effects are expected to be negligible.

At a hydraulic application rate not exceeding 10 mm per application, and with a nitrogen (N) application rate not exceeding 150 kg N/ha/y, the effects of the proposed activity are comparable with those of land application of farm dairy effluent or whey. The proposed activity is able to meet the requirements of the Regional Effluent Plan as a Discretionary Activity.

Draft conditions for the grant of a resource consent to SPM are proposed and are consistent with conditions applied to other similar consents for the same MES.

It is concluded that the consent as applied for may safely be granted on a non-notified basis.



2 INTRODUCTION

2.1 Purpose

This report provides a resource consent application and assessment of environmental effects to Environment Southland ("ES") to authorise the proposed land application of meatworks effluent sludge ("MES") sourced from South Pacific Meats Ltd.'s ("SPM") Awarua meat processing plant, to land within Gladvale Farms property of Mr D Lindsay situated at Oreti Plains.

2.2 Background

SPM operates an export meat processing plant at Awarua, 9 km south of central Invercargill. SPM has an ongoing requirement to remove about 4,000 m³ of treatment plant solids from its plant's wastewater pond system each year.

Applying the solids to farmland as a fertiliser/soil amendment has been selected by SPM as its preferred MES management option. Gladvale Farms wishes to apply some or all of the available solids material as fertiliser to its farm land.

2.3 Scope

This report describes the receiving environment for the planned MES application to land and describes the planned application itself. It assesses the available alternatives, and the potential effects of the activity on the receiving environment. The report evaluates the potential effects against the provisions of the relevant statutory planning documents and includes a Contingency Plan to address possible difficulties that may arise in carrying out the planned activity. Mitigation and Monitoring measures are described, as is the consultation that has been carried out in relation to the planned activity.



3 RECEIVING ENVIRONMENT

3.1 Location

The property comprising Gladvale Farms of Mr D Lindsay and Mr N Lindsay lies between McFetridge Road to the south and Oreti Plains Road to the north, some 8 km north west of Winton and some 35 km north of Invercargill. The property is approximately 4.5 km long on a north-west to south-east axis, and about 2 km wide. The property location and boundaries are shown in Figure 3.1.

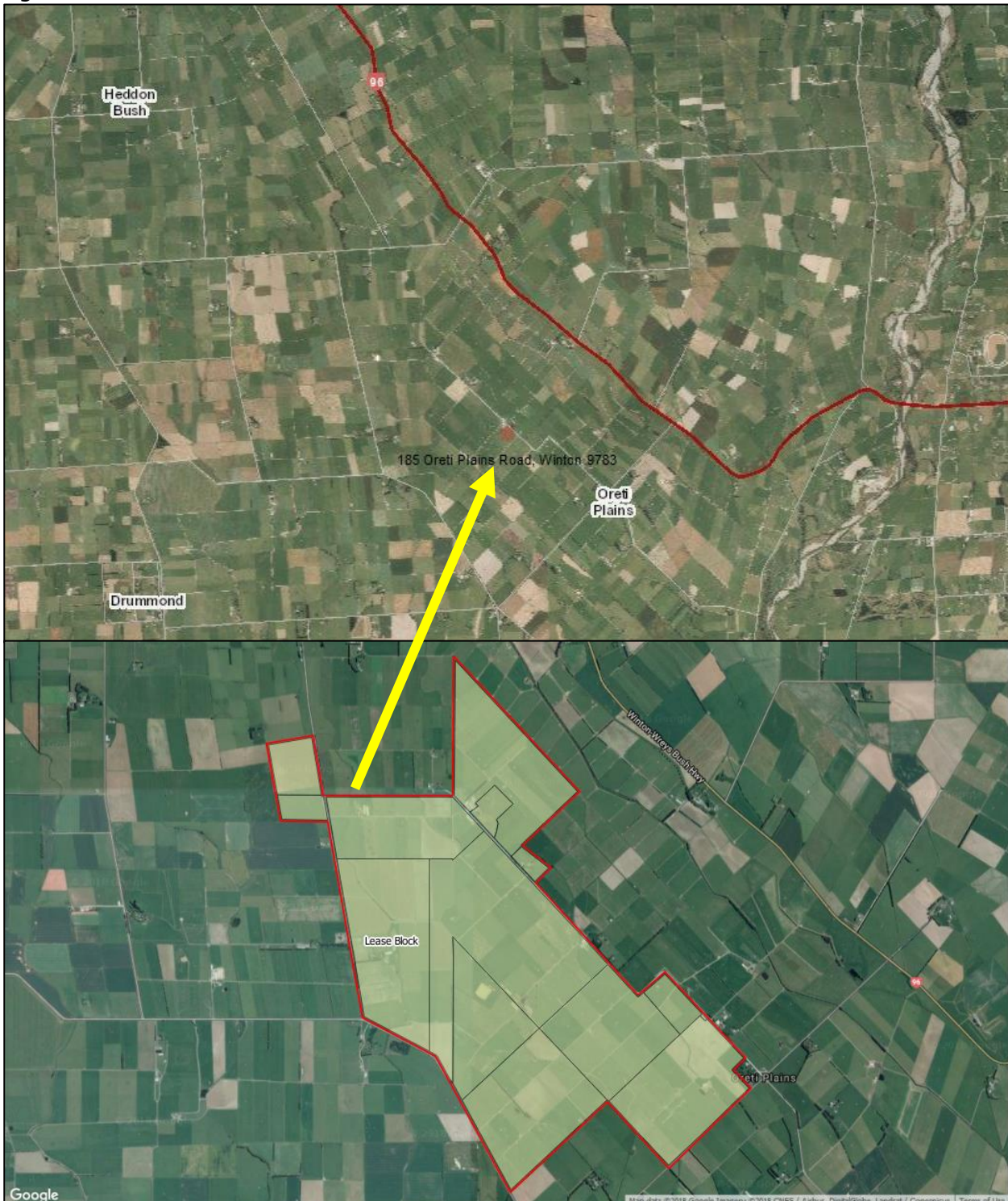


Figure 3.1: Property Location and Boundaries



Gladvale Farms includes the following titles in Valuation Number 2966004210, known as GV2 with a total area of 447 ha (429 ha effective):

- Lot 1 Deposited Plan 11672
- Lot 2 Deposited Plan 478232 and Part Section 128 Block VIII Oreti Hundred and Section 126 Block VIII Oreti Hundred
- Lot 8 Block II Deposited Plan 208
- Lot 9 Block II Deposited Plan 208
- Part Section 124 Block VIII Oreti Hundred
- Lot 1 Deposited Plan 14141
- Lot 1 Deposited Plan 14140

This property also has 89 ha of leasehold land under Valuation Number 2966004224. No MES is proposed to be applied to this leasehold land.

Gladvale Farms also includes Valuation Number 2966004212, known as GV3 with a total area of 180 ha (173 ha effective), comprising the following titles;

- Part Section 129 Block VIII Oreti Hundred, Part Lot 5 Block II Deposited Plan 209 and Part Lot 1 Deposited Plan 10524
- Lot 25A Deposited Plan 203
- Part Lot 1 Deposited Plan 2143
- Lot 1 Deposited Plan 13563

Gladvale Farms lies within the Southland District.

Figure 1 of Appendix A shows the farm map, outlining paddocks and areas where farm dairy effluent (FDE) is currently applied. It is proposed that MES will be applied across the property, including existing whey and FDE areas, subject to prior application history, while excluding the lease block and high groundwater nitrates area (Appendix A, Figure 2).

The area within Gladvale Farms to which MES is proposed to be applied is limited to within 20 m of the farm boundary and water courses and 100 m to any bore, 200 m to residential properties and 100 m from the south western section of the property where groundwater nitrate levels are $>8.5 \text{ g/m}^3$. With these buffers included, this results in a total land area for MES application of 346 ha out of a total of 627 ha. The property application area is over predominantly flat land with a gentle slope towards the Oreti River.

3.2 Topography

The topography of the property is dominated by the flat to gently undulating, Oreti Plains. This area dips slightly towards the Oreti River. The north end of the property lies approximately 70 m amsl and the south end of the property being approx. 55 m amsl.

Drainage from the property is all via an artificial drainage network (Figure 3, Appendix A) to open drains that are directed to the Oreti River, approximately 4.5 km east of Gladvale Farms. Terrace Creek runs to the NE of the property, however, no drainage from Gladvale Farms is identified from topography maps to run into this waterway.

3.3 Neighbourhood

Details of the properties adjoining Gladvale Farms are tabulated in Table 3.1 below, and their positions in relation to Gladvale Farms boundaries are shown in Appendix B.



Table 3.1: Properties Adjoining Gladvale Farms

Property No	Legal Description	Owner	Certificate of Title	Contact
1	PT SEC 124 BLK VIII ORETI HD	Geoffrey Kidd & Charles Kidd	SL/128/218	15 Oreti Plains Road, Oreti Plains
2	Lot 1 Deposited Plan 365856	Geoffrey Kidd & Charles Kidd	267020	9 Oreti Plains Road, Oreti Plains
3	Lot 2 Deposited Plan 365856	Geoffrey Kidd & Charles Kidd	267021	154 Drummond Oreti Road, Oreti Plains
4	Part Lot 10 BLK II Deposited Plan 208	Geoffrey & Marianne Pamela Sutton	SL 9C/525	310 Drummond Oreti Road, Oreti Plains
5	Lot 1 Deposited Plan 479232	Diane & John Macdonald (Used as lease land)	667465	46 Hamilton Road, Drummond
6	Lot 4 Deposited Plan 203	Douglas Sixtus & George Sixtus	SL8C/456	379 Oreti Plains Road, Oreti Plains
7	Lot 1 Deposited Plan 427211	Russell & Ellen Laughton	507096	149 Hamilton Road, Drummond
8	Lot 2 Deposited Plan 427211	Russell & Ellen Laughton	507097	135 Hamilton Road, Drummond
9	Part Lot 1 Deposited Plan 2143	Ribbonwood Grazing Ltd	SL 191/258	91 Reid Road, Drummond
10	Section 134 Oreti HD	Ribbonwood Grazing Ltd	SL 7D/258	91 Reid Road, Drummond
11	Lot 2 Deposited Plan 503356	Richard & Catina-Marie Breen	755691	315 Hamilton Road, Drummond
12	Lot 3 Deposited Plan 203	Roger & Patricia Preston	SLB3/ 1356	125 Mayfield Road, Oreti Plains
13	Section 225 BLK VIII Oreti HD and Part Lot 5 Deposited Plan 49	Roger William Preston & Kirstine Jan Preston	SL9C/594	975 Winton Wreys Bush Highway, Oreti Plains
14	Lot 4A and Lot 4B Deposited Plan Red218	Preston Family Trust	SL 159/116	825 a & 825 b Winton Wreys Bush Highway, Oreti Plains
15	Part Section 127 BLK VIII Oreti HD and Part Lot 2 Deposited Plan 10524	Moonlight Farms Trust Partnership & Dennis John Woods & Lynelle Woods	SL 9C/3	208 Oreti Plains Road, Oreti Plains

Besides Gladvale Farms' own dwellings on the property, the nearest dwellings on neighbouring properties are located at 379 Oreti Plains Road. This property is approx. 60 m from the Gladvale Farms boundary at the north end of the property. Houses at 15 Oreti Plains Road and 154 Drummond Oreti Road are approx. 40 m and 15 m respectively from the farm boundary at the SE corner of the property. Other neighbouring properties are located either more than 200 m from the boundary or are on the other side of the road to Gladvale Farms and are not direct bordering neighbours.

The closest school is located in Heddon Bush, 4.5 km North of the property. There are no known marae or churches within 500 m of the property. There is a community hall located on the corner



of Drummond Oreti Road and Oreti Plains Road (138 Drummond Oreti Road), this is approx. 170 m SE of the property.

3.4 Climate

Rain and Evapotranspiration

Daily rainfall data and daily potential evapotranspiration (PET) data is presented in Table 3.2 below. The nearest climate station with a complete record that covers up-to-date data over a sufficient time span (1997 to 2017) is at Winton 2 (NIWA/5768). Winton 2 climate station is situated approximately 9 km south east of Gladvale Farms with the Oreti River running between these two points. This data is considered the best available to represent the climate at Gladvale Farms.

The total rainfall for the area is an average 959 mm per year. The rainfall per month is relatively consistent ranging between 58 mm in August to 98 mm in May. The dryer months occur from July to September. Evapotranspiration exceeds rainfall November to February.

Rainfall that has been monitored at the property has averaged 1000 mm to 1100 mm.

Table 3.2: Monthly Average Climate Data for Winton 1997 -2017

Month	Average Rainfall Total (mm)	Average PET (mm) (Total Penman)
January	91	106
February	72	83
March	77	63
April	78	33
May	98	15
June	82	8
July	66	11
August	58	24
September	74	45
October	86	72
November	86	91
December	82	103
Annual	959	653

Wind

A windrose is shown in Figure 3.2 from Invercargill Aero climate station approximately 33 km south from Oreti Plains. This windrose is prepared from extensive data collected since 1959. It is assumed that Oreti Plains will have similar wind activity to Invercargill. The strongest winds are recorded from the WSW direction. Winds up to 20 km/hr are generally from the north and west. Average winds are relatively light at 17.4 km/hr (4.8 m/s) however Figure 3.2 indicates that gusts can be much stronger.

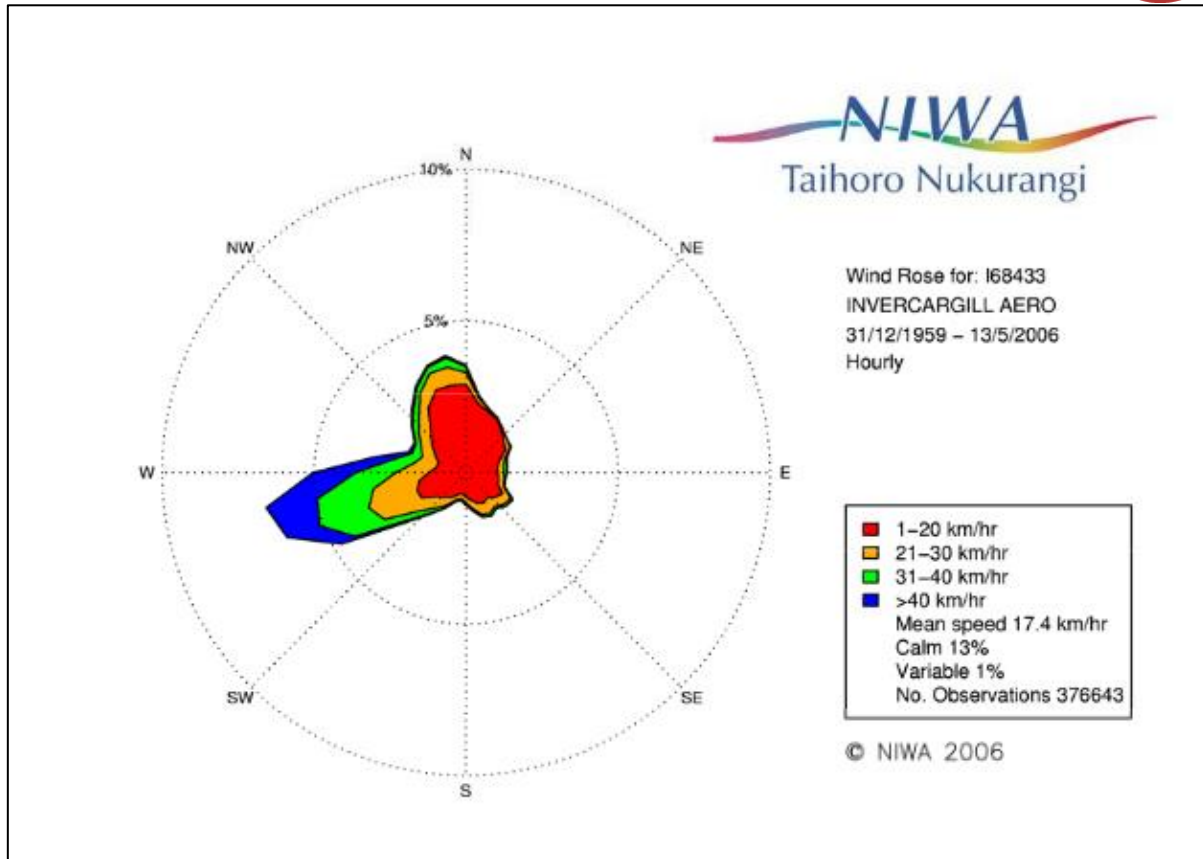


Figure 3.2: Windrose for Invercargill Aero from 1959 – 2006 (NIWA, 2006)

Figure 3.3 depicts the Southland region and indicates that Oreti Plains just west of Winton is in the same wind gust speed category of 120 to 160 km/hr as the Invercargill Aero climate station. This map provides contours of wind gust speeds expected at average intervals of 50 years.

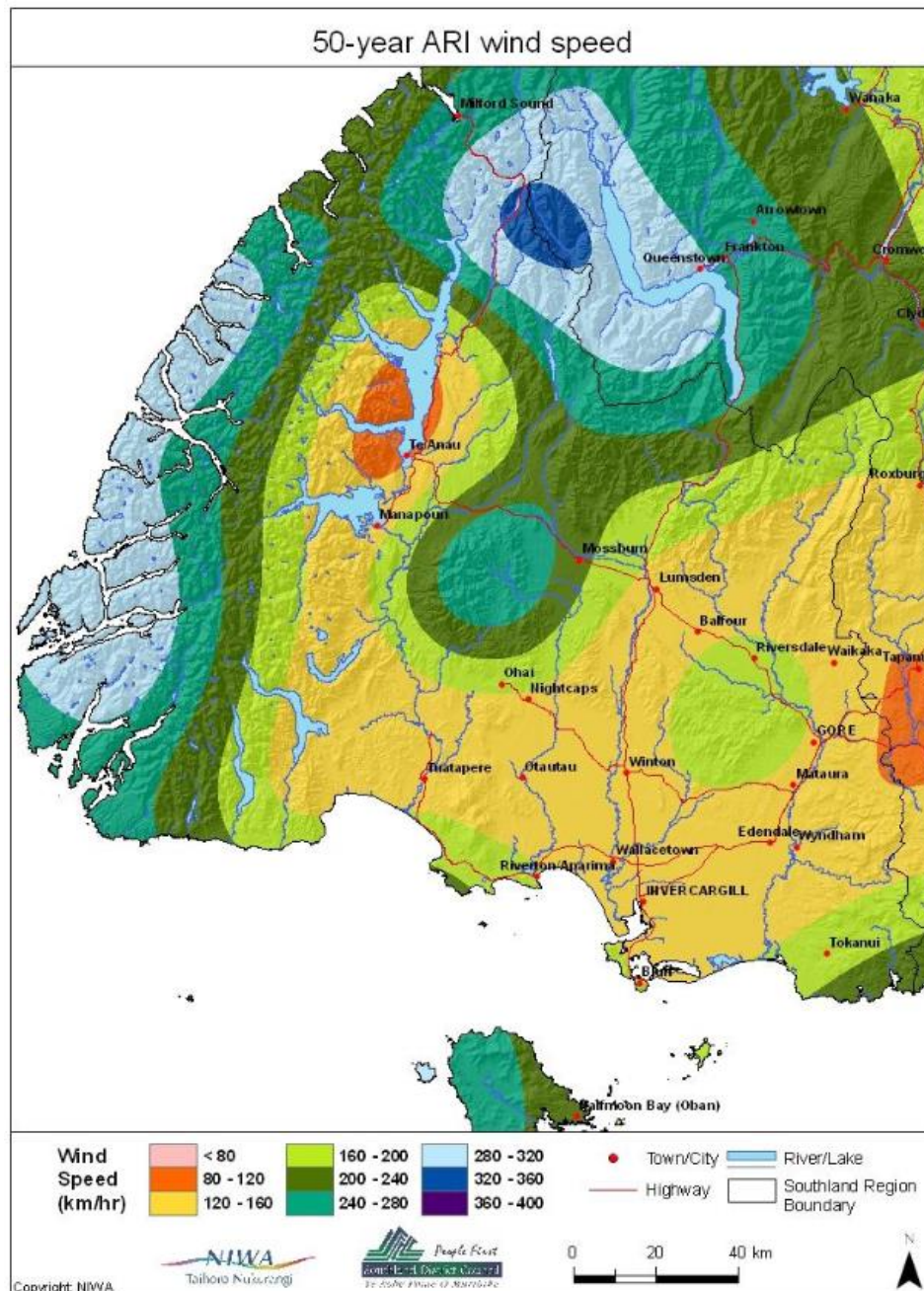


Figure 3.3: Wind Gust Speed (km/hr) for Southland Region (NIWA, 2006)

3.5 Geology and Hydrogeology

Gladvale Farms lies on the terraces of the Oreti Plains, formed by the previous courses of the Aparima River. The Oreti Plains are comprised of slightly weathered alluvial gravel and sand in intermediate terraces with a silt and clay matrix.

Much of the northern section of the Central Plains groundwater zone, where Gladvale Farms is located, is comprised of surficial gravel deposits. At depth, these gravel deposits retain the characteristic weathered clay silt matrix, similar to the older terrace surface. Gravel thickness varies across this groundwater zone from 20 m at Waianiwa (south of Gladvale Farms) to in excess of 50 m near Hundred Line Road (north of Gladvale Farms). Tertiary sediments are generally recorded as mudstone and sandstone with some lignite. Some limestone is also found at Dunearn and could be present in other areas of the groundwater zone.



3.6 Soils

The soils of the property have been assessed using S-Map. There are four main families of soil comprising of either a silty loam over clay, silty loam, or clay over silty loam soil texture (Table 3.3). Soil drainage is shown in Figure 3.4. The majority of the property is poorly drained with a portion of the western side of the farm being well drained.

Soils of the western half of Gladvale Farms are comprised of the Glenelg (Glen_4a.1) and Drummond (Drum_2a.1) soil families, these are well-drained soils with low profile available water in the Glenelg soil and moderate to high profile available water in the Drummond soil. A discontinuous pan restricts rooting in the Glenelg soil, but the Drummond soil has no significant rooting barrier. The eastern side of the property comprises mainly of the Pukemara family soils (Pukem_6a.1 and Pukem_8a.1), these soils are poorly drained with a moderate profile available water and rooting barriers up to 80 cm due to pans being present. Other soil families located over the property consist of the Braxton and Glenelg families (Table 3.3).

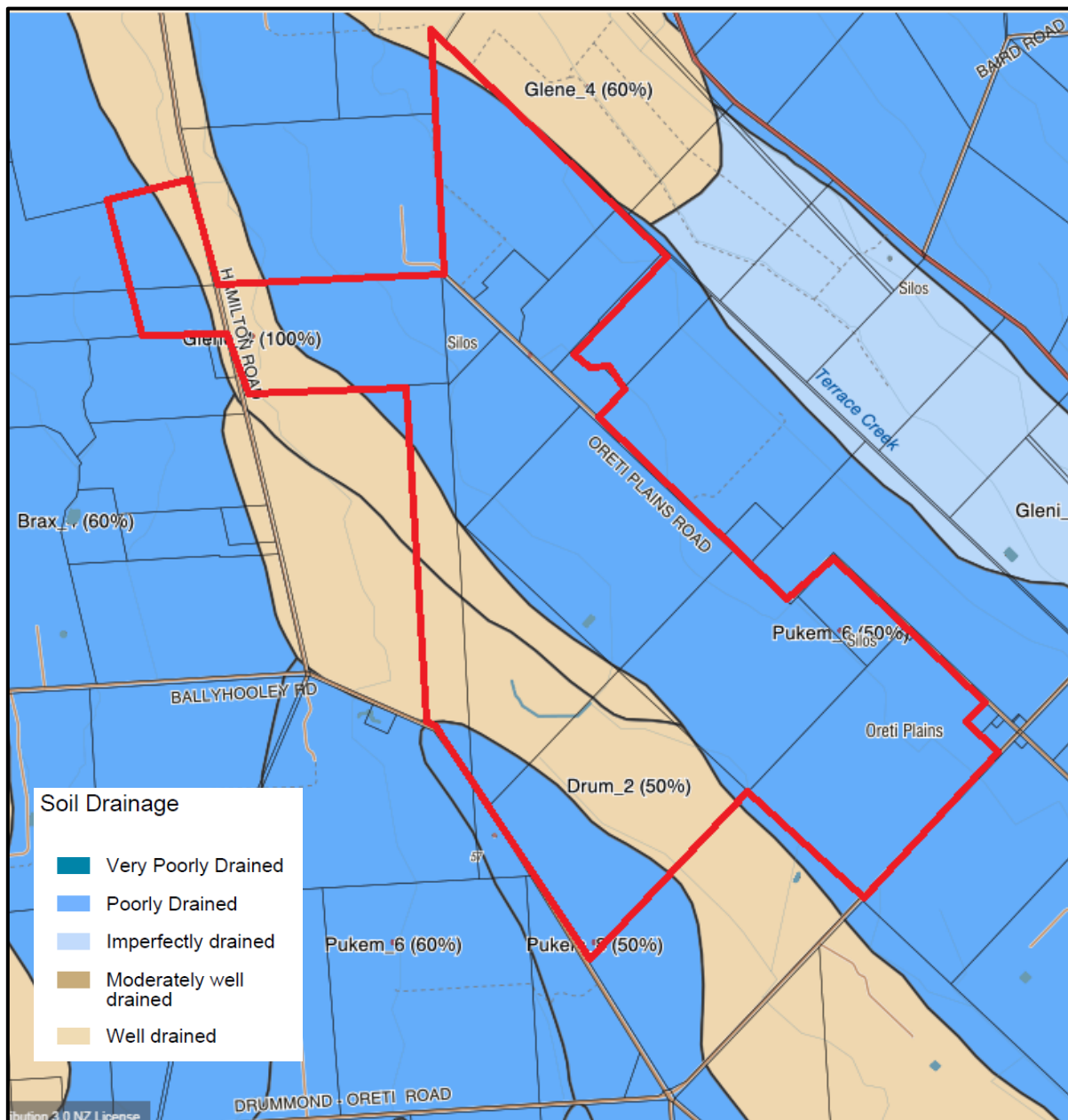


Figure 3.4: Soil Types and Drainage Class of Gladvale Farms



Table 3.3: S Map Families Located Over the Gladvale Farms Property (S Map, 2018)

SMap Soil	Pukem_ 6a. 1	Brax_ 5a. 1	Pukem_ 8a.1	Glen_ 4a. 1	Drum_ 2a. 1
% of Property	37%	21%	16%	13%	6%
Soil Classification	Argillic-fragic Perch-gley Pallic soil	Typic Orthic Gley soil	Argillic-fragic Perch-gley Pallic soil	Cemented firm brown soil	Acidic Mafic Brown soil
Texture	Silty loam over clay	Silty loam over clay	Silty loam over clay	Silty loam	Clay over silty loam
Potential Rooting Depth	40 – 80 cm	Unlimited	46 – 60 cm	20 – 50 cm	Unlimited
Rooting Barrier	Pan	Anoxic conditions	Low penetration soil material	Pan – discontinuous	No significant barrier within 1 m
Drainage Class	Poorly drained	Poorly drained	Poorly drained	Well drained	Well drained
Profile Available Water	Moderate (96 mm)	High (202 mm)	Moderate to low (86 mm)	Low (53 mm)	Moderate to high
P Retention	Low (22%)	Medium (38%)	Low (22%)	Medium (43%)	Medium
Structural Vulnerability	High	Moderate	High	Low	Very low
Water Logging Vulnerability	High	High	High	Very low	Very low
Drought Vulnerability	Moderate	Low	Moderate	High	Low
N Leaching Vulnerability	Medium	Very low	Medium	Very high	Medium
Relative Runoff Potential	High	Medium	High	Low	Very low

This property includes two land use capability (LUC) classes (Figure 3.5). LUC 3s3 covers the western half of the property. This class is favourable for cropping but has a soil limitation due to a lower rooting depth and a discontinuous pan throughout the Genelg soils. The eastern half of the property is classed as LUC 2e2, this soil is also favourable for cropping practices but is affected by an erosion limitation. This is most likely from wind erosion when any cultivated land is left fallow for some time.

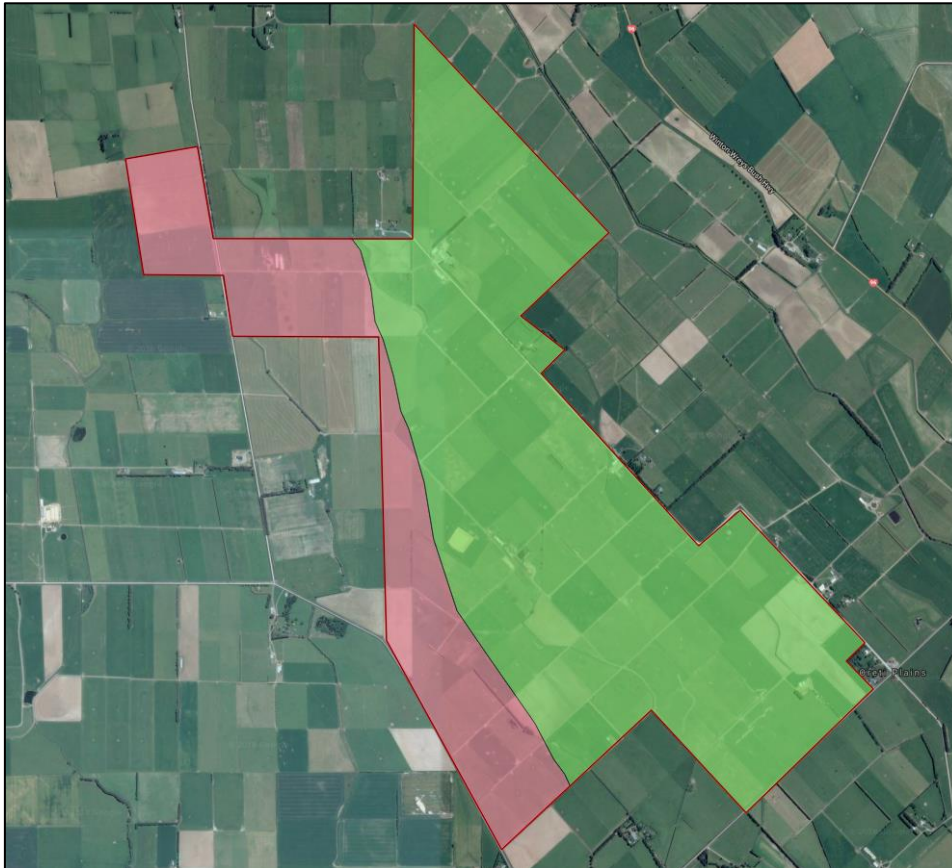


Figure 3.5: LUC Class (Pink, LUC 3s3; Green, LUC 2e2)

3.7 Surface Water

Gladvale Farms is located within the lower plains of the Oreti River Catchment. Terrace Creek is located to the north of the property. A number of open water drains line the property and drain to the Oreti River some 4.5 km east of Gladvale Farms and approximately 10 km downstream of the Winton Wreys Bush Highway road bridge.

Water quality has been monitored by ES in the Oreti River at three locations as recorded on the LAWA database. The only downstream site is the Wallacetown site located approximately 22 km downstream from the property. A number of parameters have been recorded since 2007. In that time 47 records have been taken for nutrient analysis, showing water quality for N to be classified as A and B bands as shown in Figure 3.6.

Features of the surface water quality record include the following:

- Black Disk Clarity has shown a mean value of 0.79 m;
- Turbidity has shown a mean value of 9.42 NTU;
- *E. coli* counts have shown a mean value of 678 n/100 mL;
- Total Nitrogen concentration has shown a mean value of 1.35 g N/m³;
- Total Oxidised Nitrogen concentration has a median value of 1.08 g N/m³ and
- Total Phosphorus concentration has shown a mean value of 0.030 g P/m³.



Figure 3.6: Nitrogen Water Quality Data (Source: LAWA, 2018)

In-stream ecological health has been monitored at the Wallacetown site and is summarised in Figure 3.7. The macroinvertebrate community index (MCI) has a median score of fair for the last five years, this indicates a score between 80 and 99 (an excellent score = 119 or higher). MCI has shown fluctuations over the previous 10 years and is currently on an improving trend. Taxonomic richness measures the number of different taxa present in an ecological community. The Wallacetown site is showing a marked increasing trend in the number of taxa present. EPT richness measures those fauna that are sensitive to water pollution (i.e. mayfly, stonefly and caddisfly). EPT is showing an increasing trend and there is a 40 % EPT richness at this site currently.

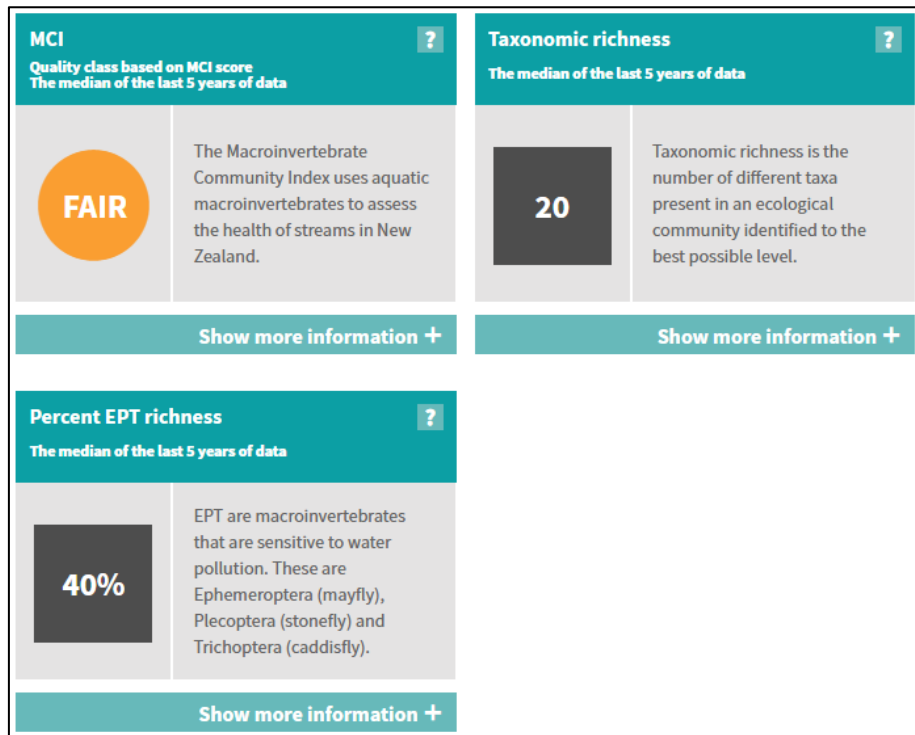


Figure 3.7: Ecology data at Wallacetown, Oreti River (Source: LAWA, 2018)

Flows in the Oreti River have also been monitored by ES at the same site as water quality has been monitored; key flow parameters are as follows:

- Mean flow is 40.6 cumecs;
- Median flow is 28.2 cumecs; and
- 7-day mean annual low flow is 7.8 cumecs.

3.8 Groundwater Level and Quality

The groundwater zone that Gladvale Farms occupies is the Central Plains Aquifer. The Central Plains covers 26,256 ha and has a low allocation status (Environment Southland, Not dated).

Groundwater is generally shallow in the Central Plains aquifer. Groundwater levels are measured in one location in the aquifer at Heddon Bush in monitoring bore E45/0330. The level ranged between 86 and 88 m above sea level for the period February 2017 to February 2018 (Figure 3.7). The bores elevation is estimated to be 89 m above sea level. On initial drilling on 18 March 2005, the depth to groundwater from the surface was 1.5 m.

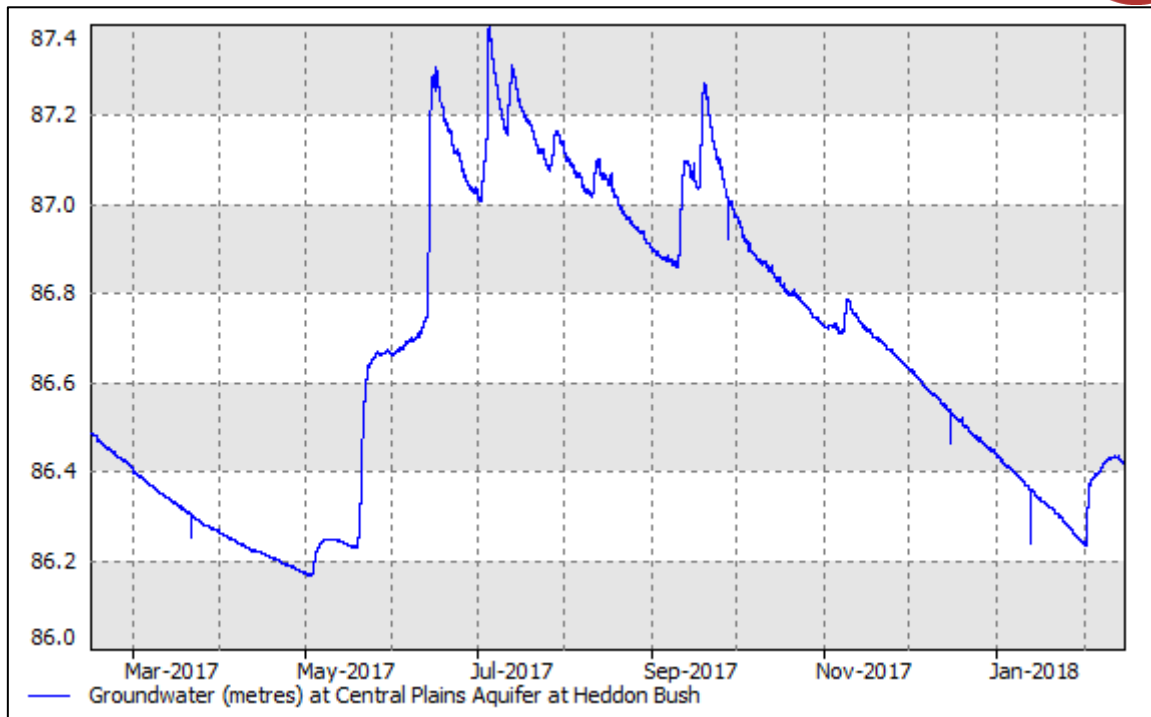


Figure 3.8: Groundwater level of the Central Plains Aquifer at Heddon Bush from 14 Feb 2017 to 14 Feb 2018 (Source: Environment Southland, 2018).

Groundwater quality is generally good in the Central Plains groundwater zone although there are 'hot spot' areas where nitrate values are particularly high (Environment Southland, Not dated). Groundwater quality is shown to be affected by minor to high land use impacts, as can be seen in the top image of Figure 3.8. Part of this increased nitrate level encompasses the southern and eastern end of the property. The groundwater directly below paddocks 1 – 9, 11, 204, 206, 208, 210, and 212 have Nitrate-N values in excess of 11.3 mg/l (Ministry of Health, 2008). The groundwater beneath paddocks 35 – 47, 10, 12 – 17, 200 – 203, 205 and 207 have shown nitrate-N values of 8.5 – 11.3 mg/L with the remainder of the property, including the lease blocks in the moderate to high use impacts (3.5 – 8.5 mg/L).

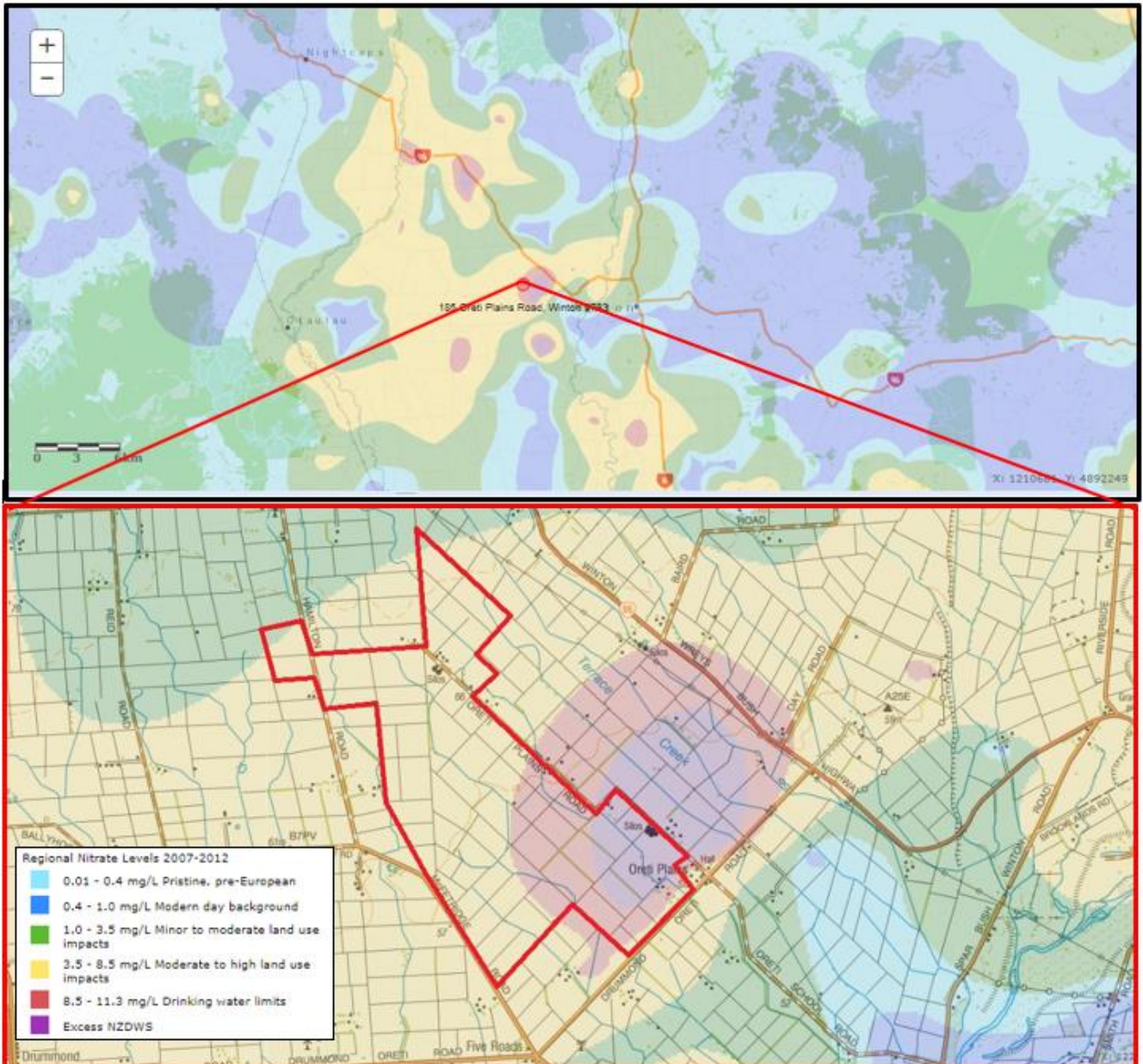


Figure 3.9: ES Regional Groundwater Nitrate Levels 2007 – 2012 in relation to the farm boundary (red).

Recharge of the aquifer is via rainfall recharge with some infiltration along the lower slopes of the Taringatura Hills. The estimated land surface recharge is 470 mm/year (Environment Southland, Not dated). Groundwater drains through numerous small streams and the extensive mole and tile drainage systems.

3.9 Artificial Drainage

Artificial drainage networks have been added to the Gladvale property since approximately 1980. These tile drained systems are between 4 to 6 inches in diameter and meander through the paddocks to connect to the farms open drainage system. These systems are generally focused on the eastern half of the farm where additional drainage has been added, with the most recent being completed in 2013 through paddock 205 (Figure 3, Appendix A).



3.10 Vegetation and Land Use

Gladvale Farms GV2 and GV3 properties are managed as an intensive dairy farming operation of high producing grassland. Approx. 50 ha of fodder beet is rotationally sown annually across these two properties.

GV2 Farm is 447 ha of flat land (428 ha effective) plus 89 ha of leasehold flat land located at 46 Hamilton Road. Land is subdivided into 108 paddocks with bore water supplied to all paddocks. Milking is through a centrally located 54 bail rotary system. Approximately 1,500 cows are milked from August – May and 400 cows are winter milked (June-July). Milk production for the 2015/16 season was targeted at 665,000 kg/MS.

GV3 Farm is 247 ha of flat land (238 ha effective). Land is subdivided into 56 paddocks with bore water supplying all paddocks. Approximately 800 cows are milked through a 46 aside herringbone cowshed. Milk production for the 2017/2018 season is targeted at 280,000 kg MS.

3.11 Existing Consents

The ES Beacon database show there are five consented activities at the properties. The consent details are provided in Table 3.4.

Table 3.4: Resource Consents Associated with Gladvale Farms

IRIS ID:	AUTH - 300897	AUTH-20157685-02	AUTH-20157685-01-V1	AUTH-300896-V4	AUTH-207222A
Contact:	Gladvale Farms Ltd	Gladvale Farms Ltd	Gladvale Farms Limited	Gladvale Farms Limited	Gladvale Farms Ltd
Type:	Water Permit	Water Permit	Dairy Consent	Dairy Consent	Land Use Permit
Subtype:	Groundwater Take (Consumptive)	Groundwater Take (Consumptive)	To Land	To Land	Effluent Storage
Status:	Current	Current	Current	Current	Current (Database)
Start Date:	16/7/2012	3/09/2015	3/09/2015	16/07/2012	7/05/2010
Expiry Date:	16/7/2022	3/09/2020	3/09/2020	16/07/2022	7/05/2015

The effluent discharge consents are the main consents of interest with respect to cumulative nutrient application to the land. GV2 Farm has 447 ha of consented effluent area. This is applied via pod irrigation through underground effluent pipes with hydrants. While GV3 has 56 ha of consented effluent area applied by way of pod irrigation through underground effluent pipes and hydrants.

In addition to the Resource consents held by Gladvale Farms, Fonterra Limited holds Consent AUTH-20146925-V5 to authorise the application of whey to the Gladvale properties. Fonterra's spreading contractor provided information of the paddocks that whey is applied too. Appendix A, Figure 4 shows the extent of the whey application area.



3.12 Amenity, Cultural, Heritage and Community Values

The property is in fee simple title, there is no public access entitlement onto the property.

There are no known cultural or archaeological sites, nor traditional communal activities that take place on or near the property that could be in any way affected by the proposed activity. No heritage buildings are recorded in this locality. There are no schools, maraes, hospitals, or other community facilities near enough to be affected by the proposed activity.



4 ACTIVITY DESCRIPTION

4.1 Scope of Activity

SPM has a requirement to remove about 4,000 m³ of MES from its Awarua meat processing plant every year. The scope of the proposed activity is that road tankers will be used to ferry MES to Gladvale Farms between spring and late summer, MES will then be transferred to a slurry wagon from the road tanker and will be directly applied onto the land on arrival at the farm. MES will be applied after a grazing event. This is to avoid grazing or harvesting sites where MES may still be visible and is in line with the Biosecurity (Ruminant Protein) Regulations 1999. Additionally, MES will be applied to areas that are to be cultivated with fodder beet or pasture crop as appropriate and left to grow until it is ready for *in situ* harvest by grazing livestock or for cut-and-carry at the farmer's discretion.

It is proposed to commence the activity as soon as consents have been granted. The activity will be ongoing, and no completion date is contemplated.

4.2 Material to be Applied to Land

Liquid effluent generated at SPM's Awarua plant is treated through a treatment pond system before its duly authorised discharge into the Invercargill City municipal sewer system. The source of this effluent is ovine in nature with a period from July to November each year where bovine waste does enter the system. Wastewater is derived from the processing of meat products from the slaughter board with some yard wash entering the system. The main components of this wastewater are traces of blood and water with all offal waste extracted. Wastewater filters through a contrashear system to remove solids. It then passes through another final screen system before entering the sump and pumped to the anaerobic pond. There is no stormwater or municipal wastewater that enters the anaerobic pond.

The biological breakdown in SPM's treatment system produces an organic sludge in the anaerobic pond comprising mostly the decayed remains of micro-organisms. This material accumulates on the pond floor. It is this sludge which is now to be removed from the treatment pond system, in order to maintain the design volume capacity of the treatment pond.

The material to be removed from the pond is pumpable and is to be pumped directly from the pond using infrastructure already in place and into a road tanker for delivery to Gladvale Farms.

The sludge has been repeatedly analysed over the last 3 years and has a solids content of about 3 % and a nitrogen concentration of about 1,200 g N/m³ (results for other analytes are addressed below). The nitrogen content is about 83 % organic compounds, with the remaining 17 % in ammoniacal form; nitrates and nitrites are almost always below detection limits. Ammoniacal nitrogen is soluble and readily plant available, but nitrogen bound into organic compounds is neither soluble nor immediately plant available, breaking down progressively over a period of several years into soluble and plant available forms.

The results of 20 analyses of samples of sludge taken from the Awarua treatment ponds between 25 November 2015 and 27 December 2017 are tabulated in Table 4.1 below. An annual monitoring report from which results from November 2016 to May 2017 were used has been lodged with ES for consent number AUTH – 20167378-01 & -02, also held by SPM.



The material to be applied to land may be described as aged anaerobic sludge, in a largely mineralised condition. Being anaerobic material, it has a sulphurous odour, which may be described as rural and organic, rather than putrid or offensive. Farmers who have applied SPM sludge to land describe the odour as being distinctive rather than offensive, and directly comparable with that of farm dairy effluent pond sludge. The material is not known to include any hazardous substances, and certainly not in concentrations which might be of concern at the proposed application rate, which is to be limited by its total nitrogen content.

Table 4.1: Analysis Results for SPM Awarua Sludge Nov 2015 – Dec 2017.

Parameter		Sampling Values		
	Units	Mean	Max	Max/Mean
pH units	pH	7.1	7.5	1.07
Total Solids	g/m ³	29,430	44,000	1.50
Total Calcium	g/m ³	862	1628	1.89
Total Magnesium	g/m ³	119	231	1.94
Total Potassium	g/m ³	88	154	1.75
Sodium Absorption Ratio	ratio	4.1	6.6	1.61
Total Sodium	g/m ³	495	1056	2.13
Total Sulphur	g/m ³	407	764	1.88
Total Nitrogen	g/m ³	1207	1722	1.43
Total Ammoniacal Nitrogen	g/m ³	249	328	1.32
Nitrite-N	mg/kg dry	<22	<100	4.55
Nitrate-N	mg/kg dry	<29	<140	4.83
Nitrite-N plus Nitrate-N	mg/kg dry	<22	<100	4.55
Total Phosphorus	g/m ³	466	1012	2.17
Oil & Grease	g/m ³	27	49	1.81

Sometimes sludge may need to be de-watered. In this case, a change in N concentration may occur. Generally, N concentrations as stated previously average 1,200 g/m³. However, a conservative approach will be used whereby annual N loading will be based on an N concentration of 1,500 g/m³ per application.

4.3 Proposed Land Application System

MES will be pumped into a road tanker, which will be transported from the Awarua processing plant to Gladvale Farms where it will be pumped into a slurry wagon that is to be towed by tractor and spray/spread onto the subject land.

The specification in this application utilises both nitrogen and hydraulic loading rates to limit what is applied. The MES will be applied to a depth not exceeding 10 mm per year, or to such other depth as may be required in order not to exceed a proposed consent limit of 150 kg N/ha/y. Each area used will receive up to 5 passes, with 2 to 5 mm depth being applied per pass. The use of multiple passes will help to ensure an even rate of application over the receiving site. This application regime is to be repeated no more frequently than once per year on any given site. The total nitrogen application rate will not exceed 150 kg N/ha/y. The breakdown of the applied MES will release the contained nitrogen in soluble and plant-available forms over a number of years, with the total released nitrogen equivalent to 80 kg N/ha/y after 10 to 12 years if the same area was used each year as shown in Figure 4.1. It is unlikely the same area would be used for many years in a row, given the 346 ha application area and only 40 ha of area is needed to achieve a 150 kg N/y load each year.

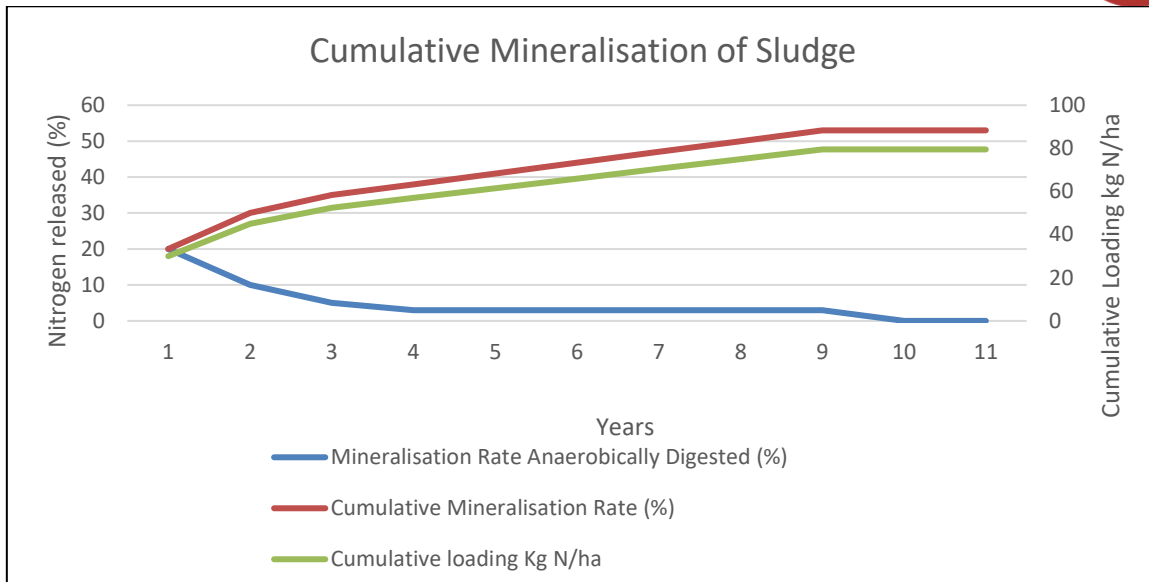


Figure 4.1: Cumulative Mineralisation Rates of Organic Nitrogen in Anaerobically Digested Sludge

At times when the application is to existing FDE paddocks, total N loading rates for N fertiliser, MES, whey and FDE will not exceed 150 kg N/ha/y. An OVERSEER® nutrient budget will be completed to analyse total loading rates and to establish base application rates to avoid over application.

The characteristics of the MES are known to vary slightly over time, so it is proposed to continue to take samples for analysis from the Awarua plant once each month while MES application is being undertaken. The results of the analysis will be used to adjust the application depth, as and if needed, to ensure the proposed nitrogen loading limit is not exceeded.

The application of MES to land by SPM is not new; since 2013, MES has been applied to land at Kingston and Garston, as authorised by consent numbers 302034-V1, and 302279-01-V1. Application of MES also began at a property in Otapiri Gorge in 2015 consent number AUTH-20169378-01 &-02. Experience gained during the operations under those consents has been used to inform this application.

The MES will not be spread on any land which has had other effluent (for example FDE or whey) applied within the preceding 12 months. This will be managed through a spreading plan which identifies and outlines paddocks that have received other forms of effluent and paddocks that are safe for MES application in the coming year. Advice from the whey spreading contractor is that the Gladvale property has not had whey applied recently under consent AUTH-20146925-V5. To manage cumulative loadings the whey discharge consent states in Condition 8 that there is a restriction of whey being applied to land that has received FDE, industrial wastewater or dairy wastewater treatment plant by-products. This condition is likely to mitigate the risk of whey being applied to the same area as MES within 12 months. A reciprocal condition is proposed for the MES application conditions.

There will be two land use regimes at Gladvale Farms following MES application. Either MES will be applied to cultivated bare land or top-dressed onto pasture. Each year an area of 40 ha will need to be set aside for MES application to land. This is so a total expected volume of 4,000 m³ of MES can be applied at a depth of 10 mm per year over 40 ha, equating to a load of no more than 150 kg N/ha/year. Generally, 25% of this load will be mineralised and available for plant uptake within the first year, with the remainder immobilised in organic matter to be slowly



released over time (Figure 4.1). The application information will be provided to the landowners to assist with managing these areas and to avoid any other discharges applied to the same area (FDE, whey).

Preparing an area for cropping will take approximately 2 – 3 weeks. MES could then be applied at the start of this practice before ploughing or after ploughing where it can be incorporated when the paddock is harrowed and drilled in late spring (Fodder Beet). Gladvale Farms will select at its discretion which paddocks within the authorised area are to receive MES in any given year, with the extent of application to crop land determined largely by MES availability at SPM, and road transport capacity. Additionally, soil moisture will be monitored to avoid application of MES when soil moisture is at or above field capacity. This will avoid the likelihood of run off or loss via drainage of nutrients.

The second land use regime will involve the topdressing of pasture, without cultivation. This will be able to take place at any time between September and March when soil moisture and weather are favourable. As with the cropping land, Gladvale Farms has a substantially greater area of suitable pasture land in any given year than would be required to take SPM's entire annual MES production.

It is proposed that records will be kept of where, when and how much MES is applied. It is also proposed that application of MES will **not occur** when it is raining, nor at times when available water holding capacity of the receiving soil does not exceed the planned MES application depth (of 2 - 5 mm per pass) using reference soil moisture monitoring data from the Heddon Bush Site and South Hillend monitoring sites.

4.4 Proposed Land Application Site

While SPM generates only sufficient MES to for a total nitrogen load of 150 kg N/ha on an area of 40 ha at the proposed application rate, approval is nevertheless sought to apply the MES within an area of some 346 ha of suitable flat land. This is to allow the farmer the discretion to decide from year to year where he can most advantageously apply the MES.

The proposed land application site is shown in Figure 2, Appendix A and is defined as follows:

- Land within property owned by Gladvale Farms and Nelson William Lindsay;
- Land not closer than 200 m to any residential or community building (both existing housing on the property and neighbouring properties);
- Land not closer than 100 m to any groundwater abstraction site; and
- Land not closer than 20 m from surface waterways and external property boundaries.
- Land not closer than 100 m from sites with a groundwater nitrate level of 8.5 mg/L or more as shown on Environment Southland Beacon site and Figure 3.10.

4.5 Operational Management Plan

It is intended that the application of meatworks effluent sludge to land under this consent will operate in accordance with an Operational Management Plan. This Operational Management Plan will outline how applications will be managed. This will include the use of a spreading plan to identify suitable application areas. The Operational Management plan is to be completed within 3 months of the consent decision date.



5 CONSIDERATION OF ALTERNATIVES

5.1 General

The basic alternatives available for SPM to manage its MES are to dump it to waste, or to re-cycle it. Dumping the MES to waste is the easy option, paying for the material to go into a landfill where its beneficial and valuable properties are permanently lost. The re-cycling option involves making the MES available to farms such as Gladvale Farms, to use as fertiliser and soil conditioner, enabling productive value to be realised from what would otherwise be a waste product.

Gladvale Farms options are to receive, or not to receive, MES to apply to the farm land as fertiliser. It has the alternative available of using commercial fertiliser, with parallel productive and environmental effects, without any resource consenting requirement.

It is noted that land application of MES is not new in Southland, with consents having been granted to enable the application of MES from SPM to land on three farms in Northern Southland. The Alliance company plant at Mataura is also consented to apply MES to land on a specified schedule of farms.

It is considered unlikely that there will be any significant adverse effects on the environment arising from the proposed activity, as will be demonstrated in the following sections.

5.2 Land Application Site Options

Gladvale Farms has a range of options for the application of MES to land so as to give the best productive and environmental results. It is proposed to obtain consent to authorise the application of MES to all the available and suitable land on Gladvale Farms, with decisions being made on an annual basis and within consent limits as to where that year's application is to be placed.

The entire annual MES production from SPM totals only some 4,000 m³, which at an application rate of 10 mm depth would require an annually available land area of 40 ha. Gladvale Farms has an available and suitable land area that is fifteen times larger than this.

Sites for MES application will be selected by Gladvale Farms from year to year that will best meet the farm's productive needs, within the environmental restraints that will be imposed by the resource consent under application here. A number of constraints need to be assessed when considering land application sites. The proximity to water bodies, impacts on soils, proximity to other community values or activities, potential odour effects and issues relating to the marketability of produce which has been irrigated with waste material, will all be factored into the specific choices of site for MES application in each year.

Other land sites could of course be considered by SPM, but issues of farmer interest in receiving the material, neighbourhood preferences and transport distance have a bearing on the selection of sites. Gladvale Farms has been selected by SPM because it has suitable land available, and because they wish to take advantage of the nutrient value of the MES material.

5.3 Application Method and Storage Options

While a range of MES application methods and contractors are potentially available, it is considered that the engagement of a reputable contractor using up-to-date and portable



equipment (as opposed to fixed spray reticulation) enables both best practice and flexibility without compromising the key deliverables.

The use of storage has been considered and there is the option to look at storage in the future. For the proposed application site given its close proximity to the SPM plant, storage will not be necessary. No application is being made for a storage facility.

5.4 Preferred Option

Gladvale Farms wishes to apply MES to its land. The application of the MES to land to enable a re-cycling of the nutrients involved is the option that best fits with the environmental preferences of ES, and with the land protection and production needs of Gladvale Farms. As a side benefit, it assists the sustainable operation of SPM's wastewater treatment system.

Gladvale Farms has a large enough area of suitable soils and a farming system which can be enhanced rather than compromised by the proposed activity.



6 ASSESSMENT OF ENVIRONMENTAL EFFECTS

6.1 Receiving Environment

The primary receiving environments for the MES are the soil on the flat land of the Gladvale Farms property at Oreti Plains.

Secondary receiving environments are potentially groundwater and surface water in the localities of the land application and further afield, and the air.

6.2 Sensitivity of Receiving Environment

Plants, the soil, groundwater, surface water and the air are all potentially sensitive to the proposed application of MES. However, in this location, at the rates and in the manner of the proposed application adverse effects on each of these receiving environments are expected to be less than minor.

The plants and soil are expected to benefit in terms of productivity from the application of MES; at the proposed application rate there is not expected to be significant sensitivity in terms of adverse effects.

Shallow groundwater will only be potentially sensitive to the proposed activity if MES is applied, whether deliberately or inadvertently, at greater than the proposed rate due to the nutrients being contained predominately in the solid fraction of the sludge.

Surface water should always be considered sensitive to discharges. However, a combination of the low annual MES application rate, the exclusion of application within buffer margins from waterways, and flat topography make it unlikely that any MES would reach surface water bodies.

Sensitivity to odour depends on both the degree of acceptability of the smell involved, and the proximity of people potentially offended by it. Most of the paddocks to which MES is proposed to be applied are at least 1 km from any residences not on Gladvale Farms.

Accordingly, it is concluded that there is comparatively low sensitivity of the receiving environment to the effects of the proposed activity.

6.3 Consideration of Activities with Comparable Effects

Two agricultural activities with comparable effects to those of the proposed MES application which are used routinely in Southland (and in the rest of New Zealand too) are the application to land of fertiliser, and the application of FDE. The application of whey from dairy factories to land is also widely practiced, and some regional plans (including in Southland region) make specific provision for this.

These common activities involve managing the risks of leaching surplus nitrogen to groundwater and ultimately to surface water, and the risks of direct or overland movement of phosphorus into watercourses. With FDE and whey there is the added issue of hydraulic loading, with the need to keep application rates sufficiently low to ensure that no ponding, run-off, or soil through-flow occur.



Another meat processing company with a plant at Mataura has consent granted by ES (consent number 207295, granted 21 February 2011, amended 17 January 2012) for the "discharge of wastewater treatment solids to land". The consent is applicable to a schedule of 19 farm properties, with further properties able to be added to the schedule "provided the adjoining neighbours have given written approval, and with the prior approval of the Director of Environmental Management." This consent limits the rate of application of "solids" to a maximum of 36 m³/ha for each application, being the approximate equivalent of 150 kg nitrogen (TKN) per hectare per year, with a minimum return period of one year between applications. Buffer widths, to which "solids" are not to be applied, are specified as 20 m from any surface watercourse, and 20 m from any property boundary. This consent was granted for a term of 25 years.

In the context of the Mataura consent it may be noted that SPM's MES has a total nitrogen concentration of about one third that of Mataura, as the SPM solids have been anaerobically digested prior to application; where a volume of 36 m³ of Mataura solids would apply 150 kg TKN/ha compared to 100 m³ of SPM's material for the same 150 kg nitrogen loading.

It is proposed that the MES application regime be constrained to operate within the same key parameters as that which apply to FDE or whey application.

It is noted that when adopting a nitrogen loading rate not exceeding 150 kg/ha/y, ES has regarded the potential for effects as less than minor.

Additionally, a consent condition is proposed which states that there shall be no MES spread on any land which has had other effluent (for example FDE or whey) applied within the preceding 12 months.

6.4 MES Properties of Potential Concern

The key properties of MES that have the potential to lead to environmental concerns are:

- Water, which comprises about 97 % of the MES in its raw form;
- Nitrogen in its ammoniacal (soluble) form which has the potential to leach into water;
- Nitrogen and Phosphorus, which can contaminate streams if it is discharged directly into them or is able to be washed into them with run-off or rain;
- Odour, which if it accompanies application could cause nuisance to neighbours; and
- Pathogens, which if passed on through pasture, spray drift or run-off might potentially lead to disease outbreaks.

6.5 Effects on Soil and Plants

The effects of the water in the MES from a single pass of the slurry wagon on soil and plants will be to moisten the soil to the same extent as a 2 – 5 mm shower of rain. Provided the water is applied at a nominal depth not exceeding 10 mm per year, (and this being made up of successive passes of not more than 2 – 5 mm each) there should be no ponding, run-off, through-flow, or any other adverse effect. It should be noted that the method of application using a slurry wagon will mean that wet soil conditions will be avoided, as the weight of the wagon could otherwise result in unacceptable soil compaction.

The effects of nitrogen and phosphorus on soil and plants will similarly be to enhance soil fertility and encourage plant growth. Provided the hydraulic application rate does not exceed 10 mm/application, (i.e., up to 5 passes at not more than 2 mm) and that there is therefore no run-off, ponding or through-flow, then the nutrients will be retained in the soil until consumed by



the pasture or crops as appropriate. The application rate of N and P will not be out of line with commercial fertiliser application rates. As noted in Section 3.6 above, the Glenelg, Drummond and Pukemara series soils which dominate the proposed application site have low to medium P retention, however given the organic nature of the MES and with its strong ability to bind onto the soil particles it is expected to be retained within the soil profile and available for plant assimilation, reducing the risk of P being transported from the site.

Pathogens in the sludge are not expected to persist or to lead to any environmental or public health or livestock difficulty in their interaction with plants and soil. The MES is from a meat processing plant and includes no human waste, so it is expected that there will be no human pathogens in the sludge. The time of residence of the sludge in the anaerobic treatment pond, at a temperature well below that of the source livestock, is expected to ensure that animal pathogens will have been reduced to a very low level if present at all. Any residual pathogens may be expected to be neutralised by exposure to UV light during application or desiccated and consumed by soil microbes within the receiving soil. Retention of the applied sludge on the application site, with no ponding, run-off or through-flow, are further expected to ensure that any persistent pathogens do not migrate from the site.

The effects of the proposed MES application on soil and plants are expected to be less than minor.

6.6 Effects on Groundwater

The application of MES to the flat land of Gladvale Farms has the potential to lead to a through-flow of water (i.e. additional drainage), and therefore a proportion of the dissolved nutrients could potentially be transported from the surface into the underlying groundwater.

However, a once per year application of a depth not exceeding a nominal 10 mm of MES in circumstances when the soil has greater than a 10 mm deficit will ensure a minimum movement of contaminants into the groundwater. This effect is expected to be within the range of effects arising from such activities as commercial fertiliser application, which do not need resource consent.

In the locality of Gladvale Farms, ES has records of five bores plus one proposed bore on the property and ten bores adjacent to the proposed application site. It is proposed that there is a buffer of 100 m from these bores, therefore the proposed activity is not expected to lead to any effect that can be detected in any neighbouring bore.

While there will be shallow groundwater movement through the soil from rainfall and towards surface streams, the groundwater is unlikely to be affected from application of MES for the following reasons; the application timing is matched to periods when there is a soil moisture deficit and the majority of the nitrogen is in a solid form which requires mineralisation prior to being plant available so is not leachable.

An artificial drainage network is present across the farm and increases the risk of preferential drainage. Application of MES will only occur when there is a soil moisture deficit therefore drainage through to the artificial network to groundwater will be avoided.

The area to the SW of the farm has a groundwater nitrate concentration of $> 8.5 \text{ g/m}^3$. Application of MES will not be applied within 100 m from the high nitrate area (Figure 6.1).

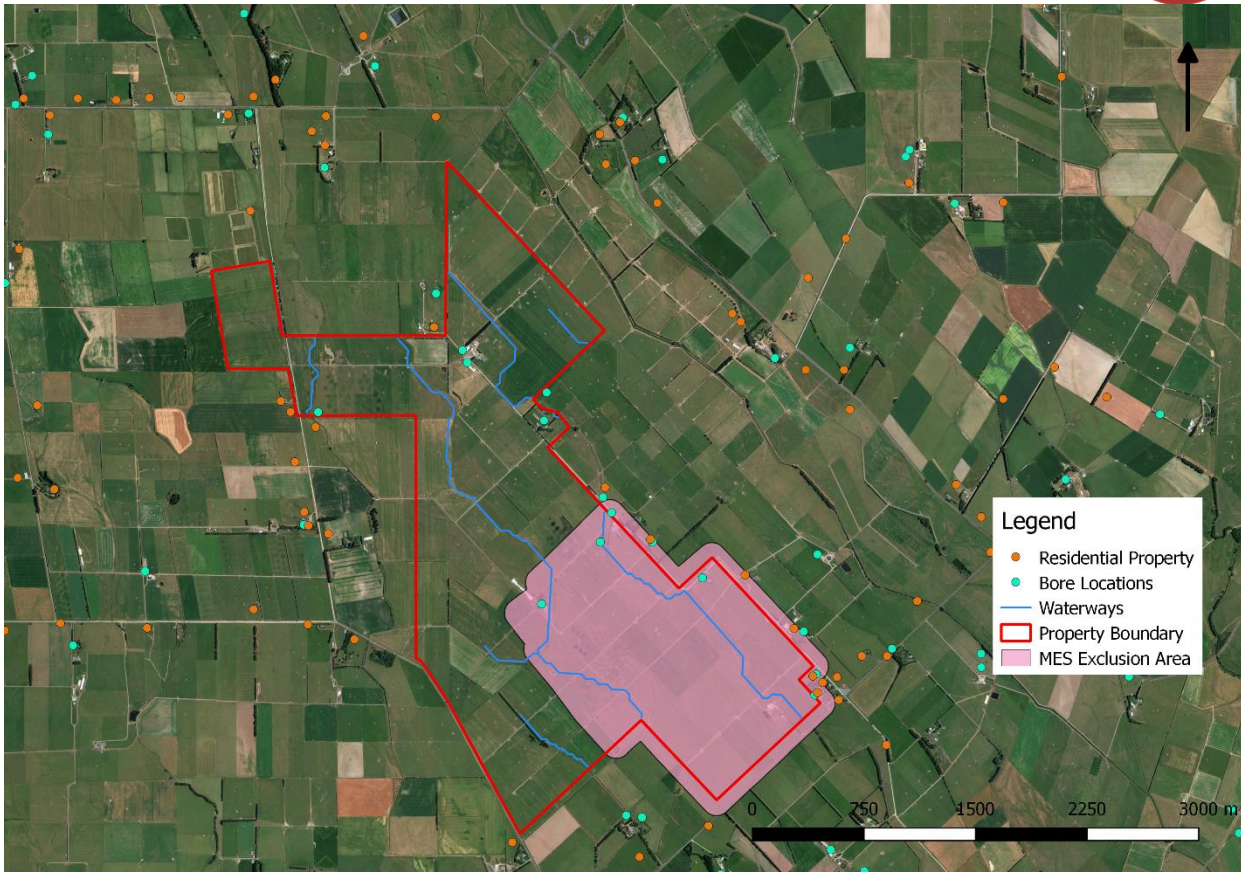


Figure 6.1: MES exclusion area on Gladvale Farm, Indicating the High Groundwater Nitrate Area (>8.5 g/m³) with 100 m Buffer Included.

Based on the considerations identified above, the effects of the proposed activity on groundwater is expected to be less than minor.

6.7 Effects on Surface Water

Surface water could potentially be contaminated either by direct application of MES into a water body, by surface run-off during or after MES application, or by the inclusion of contaminated groundwater.

It is proposed (Figure 2 of Appendix A) to exclude all water bodies and their margins from MES application, and to ensure that application only occurs in a manner that does not result in ponding or run-off. The 20 m separation required by the Regional Effluent Plan is expected to ensure that there will be no movement of MES into any surface water bodies. It is not expected that an annual application of up to 10 mm depth, with a total nitrogen application rate not exceeding 150 kg N/ha/y, at a distance not less than 20 m from any watercourse, will lead to any significant transport of contaminants through shallow groundwater to any surface water.

Based on the considerations identified above, it is expected that the effects of the MES application to land on surface water will be less than minor.



6.8 Effects on Habitats

Aquatic habitats have the potential to be adversely affected by contamination of water bodies. The Oreti River and its tributaries provide aquatic habitats which merit an appropriate level of protection.

The hydraulic loading rate limit of a nominal 10 mm delivered in passes of 2 – 5 mm depth at a time when the soils have greater than 10 mm deficit, is sufficiently low to ensure that there will be no significant movement of water, or of dissolved or suspended contaminants, into surface water. The avoidance of ponding or run-off will reinforce this protection. This will be further reinforced by the observance of appropriate exclusion margins around streams. The effect of the proposed MES application on habitats is expected to be less than minor.

6.9 Effects on the Air

There is potential for MES to emit odours as it is discharged from the road tanker to the slurry wagon. However, experience with the same material on other farms in Northern Southland has been that while the odour of the disturbed material is distinctive, it is not objectionable. Contingency planning for unforeseen odour events has included the careful selection of a transfer site away from any neighbouring residences, where any significant odour might potentially give rise to difficulties.

The method of application of the MES to land will involve a low-pressure spray from a slurry wagon towed behind a tractor. While the initial discharge from the slurry wagon is nominally to the air, it is by way of a squirt over a short distance and not projected high into the air. Any aerosol generated will be minor, immediately local, and short-lived.

The MES material to be applied has the potential to emit odours when initially in contact with the air, especially if the application mechanism is to be energetic enough to generate an aerosol. However, with low pressure discharge the minor aerosol formation is not expected to generate odours that will be offensive or objectionable beyond the property boundary.

The frequency of odour generation is expected to be daily for the duration of MES application for the Gladvale Farms property as a whole. The intensity of the odour is expected to be moderate at the point of discharge, reducing to less than minor at a distance exceeding 200 m. The duration of the odour (and its persistence) is expected to be limited by the rapid breakdown of the MES in contact with soil, pasture and air. The character of the odour may be described as rural and organic, rather than as putrid or offensive. The locality of the discharge will be a minimum of 200 m from the nearest dwelling not on the Gladvale property.

As described in Section 3.4 above, westerly and south-westerly winds which might carry odours across Oreti Drummond Road to neighbouring properties are to be expected.

While conditions on the consent to limit the propagation of odours will be appropriate, the effects of the proposed MES application to land on the air are nevertheless expected to be less than minor.

6.10 Cumulative Effects From Discharges

Gladvale Farms has a discharge to land consent for FDE from each of their two dairy sheds and one feedpad (GV2 and GV3). Additionally, Fonterra have a consent to discharge whey to the property under consent no. AUTH-20146925-V5 (excluding the areas where groundwater nitrate



levels are $>8.5 \text{ g/m}^3$ and areas where FDE, industrial wastewater or dairy wastewater by-products have previously been applied).

The application of MES in conjunction with FDE and whey discharges will need to be managed effectively to avoid over application of nitrogen (N) ($<150 \text{ kg N/ha/year}$) to any one particular area of the property.

To avoid cumulative effects with other discharge applications to the same area, the discharge of MES to land will not occur within a 12 month period of any other discharges. The property owner will need to identify an area of 40 ha each year that can be set aside to receive MES only and that has not had FDE or whey applied within 12 months.

This limitation to avoid cumulative effects will not impact on the current regime for FDE discharge as a total of 112 ha (Appendix C) out of a consented area for FDE application of 197 ha is required to be applied at a rate of no more than 150 kg N/ha/year . Additionally, the application of whey does not occur on a yearly basis and there is no obligation for Gladvale Farms to take Fonterra whey. If the N capacity of the property has been met through the use of MES and FDE, then Gladvale Farms does not have to accept any Fonterra whey in any one year as stated in the Fonterra consent no. AUTH-20146925-V5, Condition 8:

" No whey is to be applied to land which received dairy shed effluent, industrial wastewater or dairy wastewater treatment plant by-products".

This will also limit the application of whey after MES has been applied, minimising any cumulative effects. The cumulative effects of applying FDE after MES application could result in a cumulative load of N. However, as stated previously, consent no. AUTH-20146925-V5 restricts the application of whey to land that has previously had FDE, industrial wastewater or dairy wastewater treatment plant by-products applied; though it does not state a time frame between these applications.

There is no restriction to the application of FDE after application of MES. However, consent no. 300896-V3 states in the best practice and explanatory notes no. 5, that no more than 150 kg N/ha/year cumulative load from FDE and fertiliser should be applied.

Cumulative effects from applying MES, FDE, whey and any other applications of nutrients (fertiliser) will result in some N being mineralised and available within the first year of application. All other N is considered organic and will take time to mineralise.

As stated in Section 4.3, 25% of total N is available within the first year, with a portion of Total N being available in subsequent years. For example, if 150 kg N/ha/year is applied, then this results in 37 kg N being available for plant uptake or at risk of loss via drainage. FDE acts in a similar form, where most N in dairy effluent is present as organic N (Wallace & Johnstone, 2010). For example, the organic fraction in dairy slurry could be as high as 94% of the total N present. The small pool of available N forms is commonly present as ammonium-N. Nitrate-N levels are often very low; it is this pool of N that is most readily absorbed by plants. The work of Chadwick, *et al* (as cited in Wallace & Johnstone, 2010). It is unlikely in any one year, the cumulative effect from discharge to land of wastewater will result in $< 150 \text{ kg}$ available N being applied to land.

To avoid a cumulative load of $>150 \text{ kg N/ha/year}$ from MES, FDE and whey in any one year, planning a year out for MES application will need to occur. If the proposed activity of applying MES to Gladvale Farms is to go ahead, then a clear and concise record will need to be kept as reference for not only the property owner but SPM and Fonterra. As stated previously, an operational management plan will assist with paddock selection for MES application to avoid cumulative effects from previously or future applications of FDE and whey.



Out of the total MES area selected for this application, there is cross-over with FDE and whey applications to similar areas. However, there are areas that do not receive either FDE or whey, these areas could potentially be used specifically for MES or as stated previously, there is still an area within the consented FDE area that is not required for FDE application, providing flexibility for MES application.

While conditions on the consent to limit the cumulative effects will be appropriate, the effects of the proposed MES application to land on the water quality are nevertheless expected to be less than minor.

6.11 Effects on Amenity, Community, Cultural and Heritage Values

As noted in Section 3.12 above, there are no social values in the Oreti Plains locality that are likely to be compromised by the proposed activity. The peaceful rural scenery which is the area's main amenity attribute will not be affected at all by the proposed activity. While there will be the addition of several daily return truck delivery trips from Awarua, these are not expected to lead to any traffic congestion or other difficulty.

Because the effects of the MES application can practically be kept within the immediate confines of the designated application areas, it may be considered that the effects of the MES land application on amenity, community, cultural and heritage values will be less than minor.

6.12 Positive Effects

The two key positive effects of the proposed activity are the enhanced agricultural production expected from the managed application of nutrients to good agricultural land, and the avoidance of the unnecessary waste of the value of those nutrients which may otherwise go to landfill.

6.13 Summary of Effects

As described above, the proposed application of MES to land on the Gladvale Farms property potentially has effects on soil and plants, groundwater, surface water, habitats, the air, and amenity, community, cultural and heritage values.

However, the regime of MES application which is proposed is capable of ensuring that all of those potential negative effects will be less than minor. Further, the proposed activity will have the beneficial effects of both productivity enhancement and waste reduction. It is submitted that the effects of the proposed application of MES to the Gladvale Farms property will have no different effect, and certainly no greater effect, than those of the activities authorised to SPM by consent number AUTH-20167378-01 & -02 (To discharge agricultural effluent to land for the purpose of disposing of meatworks effluent sludge to land at Otapiri Gorge).



7 STATUTORY PLANNING

7.1 Introduction

The provisions of the Regional Policy Statement, Regional Effluent Land Application Plan, Regional Water Plan for Southland, The Proposed Southland Water and Land Plan, the Regional Air Plan and Iwi Management Plan are discussed in this section. This includes an assessment of the activity against the relevant rules of the statutory plans, an assessment of the activity against the relevant objectives and policies of the RPS, Regional Effluent Land Application Plan and Regional Water Plan, Regional Air Plan and consideration of the relevant matters in the Iwi Management Plan.

7.2 Rule Assessment

Under section 15(1)(d) of the RMA no person may discharge any contaminant from an industrial or trade premise onto or into land unless it is expressly authorised by a national environmental standard or other regulations, regional plan rules, or a resource consent. There are no national environmental standards or other regulations authorising the discharge, and therefore it will require authorisation by a regional plan rule or a resource consent.

7.2.1 Regional Effluent Land Application Plan 1998

The Regional Effluent Land Application Plan applies to all discharges of effluent and sludge onto or into land in the region. It became operative in 1998. This plan is currently under review and it is proposed to integrate the Land Application Plan into the Land and Water Plan in the future. However, the rules relating to discharges remain operative, and therefore the rules in the Regional Effluent Land Application Plan are still applicable. Rules 5.3.2 and 5.3.3 of the Regional Effluent Land Application Plan apply to sludge discharges as outlined below.

Effluent: *A liquid that may include solid components, discharged as a waste that originates from*

- (a) sanitary appliances and fixtures;*
 - (b) community sewage schemes;*
 - (c) agricultural activities;*
 - (d) an industrial or trade process;*
- but excludes solid waste.*

Sludge: *The solid residues from effluent.*

The MES described in this application comprises the organically decomposed residue of the micro-organisms that treat the wastewater in the treatment pond, which has settled at the bottom of the pond. This MES is combined with some of the associated liquid effluent and forms a slurry. As noted in Section 4.2 above, the sludge has a solids content of only 3.1% on average. This sludge better fits the Effluent Plan definition for "effluent" than that for "sludge" but is described as "sludge" in this application because it is separated from the effluent in the treatment pond.



Section 5.3 Sludges	
<p>Rule 5.3.1 The discharge of sludge onto or into land from individual foul water drainage systems or agricultural effluent treatment systems are permitted activities, provided that the following criteria are met:</p> <ul style="list-style-type: none"> a. the sludge is discharged onto the same property as it was generated. If the sludge is not discharged onto the same property, then the property which receives that discharge may not accept more than one sludge discharge application during a 12 month period; and b. there is no discharge of sludge directly to water, including groundwater, or the coastal marine area by: <ul style="list-style-type: none"> i. tile drainage ii. overland flow iii. pipes, or storm water drains iv. artificial free drainage areas; and c. the rate of discharge does not result in any runoff; and d. the maximum depth of sludge application is 7 mm; and e. the minimum return period for discharging any other sludge or effluent onto or into the site is 28 days; and f. the discharge is not within: <ul style="list-style-type: none"> i. 20 metres of any water or wetland listed in Appendix F, excluding groundwater; ii. 100 metres from any potable water abstraction point; iii. 20 metres of any property boundary; iv. 100 metres of any residential dwelling other than residential dwellings on the property; and g. the effluent discharge system is operated so that there is no odour or spray drift nuisance beyond the boundary of the property. 	<p>N/a The MES is not from individual foul water drainage systems or agricultural effluent treatment systems This rule does not permit sludge discharges from industrial and trade premises, and therefore the MES discharge does not meet the permitted activity rule.</p>
<p>Rule 5.3.2 The discharge of sludges onto or into land, other than those permitted under Rule 5.3.1 or non complying under Rule 5.3.3 is a discretionary activity.</p>	<p>As the proposed application didn't meet the requirements of Rule 5.3.1 the proposed activity is assessed as being a discretionary activity.</p>
<p>Rule 5.3.3 The discharge of sludge onto or into land is a non complying activity where the discharge takes place within:</p> <ul style="list-style-type: none"> a. 100 metres of a residential dwelling other than residential dwellings on the property; b. 100 metres of any potable water abstraction point; c. 20 metres of any water body or wetlands listed in Appendix F, excluding aquifers; d. 20 metres of any coastal marine area. 	<p>Given the proposed buffer zones incorporated into the application controls, the MES discharge can comply with all of these conditions, and therefore the activity is not a non-complying activity under Rule 5.3.3</p>



7.2.2 Regional Water Plan for Southland 2010

The Regional Water Plan applies to all discharges of effluent and sludge onto or into land in the region. It became operative in 2010. The relevant rule that relates to this proposal is Rule 16D.

Rule	Assessment
<p>Discharge of contaminants originating from industrial or trade premises</p> <p>Rule 16D – Discharge of contaminants originating from industrial or trade premises</p> <p>Except as provided elsewhere in this Plan or any other regional plan, the discharge of contaminants that has originated from any industrial or trade premises onto or into land is a discretionary activity.</p>	<p>Has also been provided for in the Regional Effluent Land Application Plan. According to this rule the proposed activity would be a discretionary activity.</p>

7.2.3 Regional Air Plan 2016

The Regional Air Plan (RAP) came into effect on October 2016. The plan is the outcome of two stage review of the 1999 Regional Air Quality Plan.

Stage 1, contains the updated policy framework that proposes new rules for domestic home heating, outdoor burning, the application of agrichemicals and fertilisers and fire training. Stage 1 replaces Section 6 of the Regional Air Quality Plan for Southland (1999) from the date of notification of this plan.

While Stage 2 is still under review it retains the Regional Air Quality Plan for Southland (1999) framework. Stage 2 framework is the appropriate regulatory regime for assessment of this activity.

The application of MES to land is an industrial process undertaken on production land. This process has been assessed against the relevant rules.

Overall the RAP applies to Industrial and Trade Premises and *Industrial or Trade Process*: And defines industrial and trade premises and industrial and trade processes as follows:

Industrial or Trade Premises:

- (e) Any premises used for any industrial or trade purposes; or*
- (f) Any premises used for the storage, transfer, treatment, or disposal of waste materials or for other waste management purposes, or used for composting organic materials; or*
- (g) Any other premises from which a contaminant is discharged in connection with any industrial or trade process –
and includes any factory farm; but does not include any production land.*

Industrial or Trade Process:

Includes every part of a process from the receipt of raw material to the dispatch or use in another process or disposal of any product or waste material, and any intervening storage of the raw material, partly processed matter, or product."

Although the MES will be applied to production land, the use of production land for the application of MES can be regarded as an Industrial or Trade Process. To ensure that all aspects of the discharge are properly authorised in terms of plan provisions, it is proposed that conditions relating to the air discharge will be attached to the permit to discharge to land.



Rule	Assessment
Rule 5.5.2 Discharges of contaminants into air from the following activities are discretionary activities	This rule does not apply. The discharge of MES does not match the activities listed in this rule.
Rule 5.5.3 Any discharges of contaminants into air from the following industrial or trade premises are permitted activities , provided that the criteria which follow the list are met	This rule does not apply as the discharge is onto Production Land.
Rule 5.5.4 Industrial or trade processes which are not permitted activities in Rule 5.5.3 above, and which are smaller in size or output than those in Rule 5.5.2 above are permitted activities , provided that the following criteria are met:	This rule does not apply. The discharge of MES does not match the activities listed in Rule 5.5.2.
Rule 5.5.5 Any industrial or trade processes which are not covered in Rules 5.5.2 or 5.5.3, or do not meet the criteria specified in Rules 5.5.3 or 5.5.4 above are discretionary activities .	Rule applies as MES application is not covered by rules 5.5.2 to 5.5.4. The proposal is therefore assessed as being a discretionary activity .

The Air Plan discusses the issue of odour emissions. Method 7.4.2 outlines a proposed approach to dealing with odour complaints, which includes the possibility of abatement notices or enforcement orders. Section 17 of the RMA 91 enables a Council to take enforcement action against a person doing anything that is "*noxious, dangerous, offensive or objectionable to such an extent that it has or is likely to have an adverse effect on the environment*". This may be considered to include adverse effects caused by odour emissions.

The Air Plan also provides suggested buffer distances in Appendix F. This appendix relates to industrial or trade processes and does not include any activities similar to MES application to land.

7.2.4 Proposed Southland Water and Land Plan (April 2018)

The proposed Southland Water and Land Plan has been through the plan hearing process and a decision version after recommendations from the hearing panel has been issued (April 2018) and this replaced the previously notified version (November 2017). This proposed plan provides guidance to plan rules, but it is not yet an operative plan and does not have full statutory weight. The plan is expected to be fully operative in 2019 subject to Environment Court appeals. However, an assessment of the rules applicable to the application of MES to land has been made and Rule 34 applies to the application of MES to land.



Rule	Assessment
<p>Rule 34 – Industrial and trade processes</p> <p>(a) Other than as provided for by Rule 32C, the discharge of wastewater, sludge or effluent from industrial and trade processes, other than agricultural effluent, onto or into land in circumstances where contaminants may enter water is a discretionary activity provided the following condition is met:</p> <p>(i) any pond, tank or structure used to store the wastewater, sludge or effluent prior to discharge is certified by a Chartered Professional Engineer as having no visible cracks or defects that would allow wastewater, sludge or effluent to leak from the storage.</p> <p>(b) The discharge of wastewater, sludge or effluent from industrial and trade processes, other than agricultural effluent, onto or into land in circumstances where contaminants may enter water that does not meet the condition of Rule 34(a) is a non-complying activity.</p>	<p>The discharge of MES is from an Industrial and Trade process and therefore the rule is relevant; Condition 1 of the rule can be complied with as there is no storage facilities at the Gladvale property. Therefore, the proposal can be assessed as being a discretionary activity.</p>



8 STATUTORY PROVISIONS

8.1 Introduction

The provisions of the Resource Management Act 1991, Regional Effluent Land Application Plan 1998, National Policy Statement, Regional Water Plan for Southland, The Proposed Southland Water and Land Plan, the Regional Air Plan and Iwi Management Plan are discussed in this section. This includes an assessment of the activity against the relevant rules of the statutory plans, an assessment of the activity against the relevant objectives and policies of the RPS, Regional Effluent Land Application Plan and Regional Water Plan, Regional Air Plan and consideration of the relevant matters in the Iwi Management Plan.

8.2 Resource Management Act 1991

The proposed application of MES to land is potentially restricted by Section 15 of the Act. The relevant parts of this section are as follows:

15. Discharge of contaminants into the environment.

(2) "No person may discharge any—

- (a) contaminant or water into water; or*
- (b) contaminant onto or into land in circumstances which may result in that contaminant (or any other contaminant emanating as a result of natural processes from that contaminant) entering water; or*
- (c) contaminant from any industrial or trade premises into air; or*
- (d) contaminant from any industrial or trade premises onto or into land—*

unless the discharge is expressly allowed by a national environmental standard or other regulations, a rule in a regional plan as well as a rule in a proposed regional plan for the same region (if there is one), or a resource consent.

(3) No person may discharge a contaminant into the air, or into or onto land, from a place or any other source, whether moveable or not, in a manner that contravenes a national environmental standard unless the discharge—

- (a) is expressly allowed by other regulations; or*
- (b) is expressly allowed by a resource consent; or*
- (c) is an activity allowed by section 20A.*

(2A) No person may discharge a contaminant into the air, or into or onto land, from a place or any other source, whether moveable or not, in a manner that contravenes a regional rule unless the discharge—

- (a) is expressly allowed by a national environmental standard or other regulations; or*
- (b) is expressly allowed by a resource consent; or*
- (c) is an activity allowed by section 20A."*

The proposal under application here will comply with the requirements of section 15 by virtue of being subject to a resource consent requirement.

8.3 National Policy Statements and Environmental Standards

The National Policy Statement for Freshwater Management (NPS-FM, 2017) sets out objectives and policies that direct Regional Councils to manage water in an integrated and sustainable way, while providing for economic growth within set water quantity and quality limits. This is achieved



primarily through Regional Plan changes incorporating nationally consistent limits on water quality and values, nationally consistent consideration of matters when determining resource consent applications, and monitoring of fresh water quality.

For Southland, the provisions of the NPS-FM were incorporated into the Regional Water Plan. However, the current version of the Water Plan precedes the most current version of the NPS-FM which was updated in 2017. Therefore, for completeness of this AEE, the consistency of the proposal with the relevant provisions of the 2017 NPS-FM is also assessed here.

Water Quality

Objective A1 To safeguard:

- a) The life-supporting capacity, ecosystem processes and indigenous species including their associated ecosystems, of fresh water; and*
 - b) The health of people and communities, as affected by contact with fresh water;*
- In sustainably managing the use and development of land, and of discharges of contaminants.*

Objective A2 The overall quality of fresh water within a freshwater management unit is maintained or improved while

- a) Protecting the significant values of outstanding freshwater bodies*
- b) Protecting the significant values of wetlands; and*
- c) Improving the quality of fresh water in water bodies that have been degraded by human activities to the point of being over-allocated.*

It is noted that the 2017 amendments to the NPS-FM narrowed the focus of Objective A2 from quality of fresh water within a region, to within a freshwater management unit, as this is the scale at which water values, attributes, limits and monitoring are set and undertaken.

Objective A2 reflects the clear expectation that fresh water quality not be degraded, and at least maintained if not improved. The expected water quality effects of the proposal are very minor, and conditions to mitigate any perceived risk ensures that quality of fresh water will be maintained at a standard that is anticipated by the Water Plan.

Objective A3 The quality of fresh water within a freshwater management unit is improved so it is suitable for primary contact more often, unless:

- a) regional targets established under Policy A6(b) have been achieved; or*
- b) naturally occurring processes mean further improvement is not possible.*

This objective was introduced in the 2017 amendments to the NPS-FM. The regional targets referred to (Policy A6(b)) are to be set by regional councils, toward improving the quality of fresh water in specified rivers and lakes, and thereby contribute to achieving the national target. The national target (Appendix 6 to the NPS-FM) is to increase the proportions of specified rivers and lakes that are suitable for primary contact to at least 80% by 2030, and 90% no later than 2040, but also to improve water quality across the board.

It is anticipated that the change in nitrate loss arising from the application of MES to land will be marginal, possibly lower given the slow release of nutrients and not in itself deteriorate the health of the rivers, streams, lakes and wetlands to a level or degree that would compromise their overall suitability for contact recreation.

Overall, it is intended that the proposed MES application to land will meet the requirements of this national policy statement by minimising any adverse effect on the environment, and in particular on freshwater quality and its associated ecosystems.



8.4 National Environmental Standard for Sources of Drinking Water (NES-DW)

The NES-DW requires regional authorities to ensure the effects on community water supply and sources are considered in decision on resource consents and regional plans.

The possible transfer of nitrates from MES to any drinking water source will be minor. There are no community drinking water sites within the application area, limiting the amount of MES applied and only applying during correct soil conditions, as described in Section 4 ensure that this proposal will not adversely affect sources of drinking water in the Southland Region. Further mitigations to avoid effects on drinking water supplies in the used of non-application buffer zones imposed between MES application and any potable water bore on the property.

8.5 Southland Regional Policy Statement

The Southland Regional Policy Statement (RPS) became operative in October 2017. The RPS provides a framework for the manner in which Southland's natural and physical resources will be managed. It directs regional and district plans to address the cumulative effects of resource use and development. It considers the community's aspirations and the actions required to achieve success, while encouraging people to work together. It also recognises our connections to our environment by encompassing the Ngāi Tahu philosophy of "ki uta ki tai" – from the mountains to the sea.

The vision and principles of the SRPS are embodied in the Regional Water Plan, Regional Air Plan, Land Application Plan and Iwi Management Plan, where they are specific to the management in those areas.

For instance, Objective WQUAL.2 of the SRPS requires that the life-supporting capacity of water and related ecosystems; and health of people and communities is safeguarded. Whilst water quality is maintained and improved to meet the reasonably foreseeable social, economic and cultural needs of future generations. This is provided for in Objective 4.12 and 4.1.3 of the Regional Effluent Land Application Plan.

Another example is SRPS Objective AQ.1 which aims to enable the discharge of contaminants into air while managing the adverse effects of those contaminants on human health and wellbeing, and the environment. This is provided for in the Regional Air Plan Objectives 2.2-2.4.

The chapters and objectives in the SRPS that are considered to most closely relate to this proposal as discussed below, but this list is not exhaustive.

Chapter 3 Tangata Whenua Provisions

Objective TW.1

The principles of the Treaty of Waitangi/Te Tiriti o Waitangi are taken into account in a systematic way through effective partnerships between tangata whenua and local authorities, which provide the capacity for tangata whenua to be fully involved in council decision-making processes.

Objective TW.2

All local authority resource management processes and decisions take into account iwi management plans.



Objective TW.3

Maori and wairua are sustained or improved where degraded, and mahinga kai and customary resources are healthy, abundant and accessible to tangata whenua.

Objective TW.4

Wāhi tapu, wāhi taonga and sites of significance are appropriately managed and protected.

Objective TW.5

Māori are able to develop and use their land and resources and provide for their social, economic and cultural wellbeing, in a manner that is sustainable.

Tangata Whenua have been considered in each of the Regional Plans. For example, Objective 2.5 in the Regional Air Plan aims to ensure that Maori cultural and traditional beliefs are recognised and provided for when dealing with discharges to air. Whilst Policy 4.2.8 of the Regional Effluent Land Application plan also states that tangata whenua concerns must be recognised and provided for in relation to the discharge of effluent and sludge onto or into land.

Buffer Zones from waterways, sensitive environments or sites of significance will be protected to further ensure that this proposal will not negatively impact the environment, allowing for the continued sustainment of mahinga kai and customary resources used by the tangata whenua.

Chapter 4: Water Quality: Part A

Objective WQUAL.1 *Water quality in the region:*

(a) safeguards the life-supporting capacity of water and related ecosystems;

(b) safeguards the health of people and communities

(c) is maintained, or improved in accordance with freshwater objectives formulated under the National Policy Statement for Freshwater Management 2014;

(d) is managed to meet the reasonably foreseeable social, economic and cultural needs of future generations

Objective WQUAL.2 *Halt the decline, and improve water quality in lowland water bodies and coastal lakes, lagoons, tidal estuaries, salt marshes and coastal wetlands in accordance with freshwater objectives formulated in accordance with the National Policy Statement for Freshwater Management 2014.*

Objective WQUAL.3 *Maintain the quality of water where it is in its natural state.*

As set out in Section 6 above, the potential adverse effects of the proposal on surface water quality is likely to be associated with nitrogen losses from runoff or leaching. This potential adverse effect has been assessed to be less than minor overall due to the nature of MES material, small application depth and low total annual application load of 150 kg N/ha/y which is equivalent to the permitted activity level for dairy farm effluent. Additionally, management measures to prevent runoff and leaching from adversely affecting water quality and ecosystem health have been proposed. Water quality will be maintained within and not exceed the limits set out in the Water Plan.

Chapter 5: Rural Land/Soils

Objective RURAL.1 *Achieve sustainable use of Southland's rural land resource, in respect of:*

(a) agriculture and primary sector activities;

(b) subdivision, use and development activities;

(c) earthworks and vegetation clearance activities;

(d) the use of soil resources;



(e) mineral extraction activities; and
(f) on-site wastewater systems.

Objective RURAL.2 *Safeguard the life-supporting capacity, mauri and health of soils in rural areas, and prevent or minimise soil erosion and sedimentation from land use soil disturbance.*

This proposal will protect the health of the Regions soils, through ensuring that applications of MES only occur during the appropriate soil moisture conditions. This will minimise the impact of damage from vehicles used to apply the MES. A benefit of MES to soils is the addition of organic matter which can improve soil structure, fertility and water holding capacity.

Chapter 9: Air Quality

Objective AQ.1 *Enable the discharge of contaminants into air while managing the adverse effects of those contaminants on human health and wellbeing, and the environment.*

Objective AQ.2 *New activities established in Southland do not hinder the region's ability to achieve compliance with national environmental standards and guidelines for ambient air quality.*

The Regional Air Plan based on these CRPS objectives, outlines further objectives and policies to ensure air quality in the region is protected. This proposal will not breach the national environmental standards and has suggested buffer areas to ensure that nearby residents are not affected.

Chapter 13: Solid Waste

Objective WASTE.1 *Reduce the generation of solid waste in Southland.*

Objective WASTE. 2 *Avoid, mitigate, or where appropriate remedy the adverse environmental effects of solid waste storage, disposal, processing, handling and transportation*

This proposal allows the successful operation of the SPM Awarua plant and reduces the volume of solids from the treatment plant that would otherwise have to be disposed of via landfilling. The alternative options section of this report details why land application is the best method of discharge. This method has low environmental effects associated with its handling, transportation and discharge, while providing a beneficial organic fertiliser.

In light of the discussion above and the alignment of the proposal with the relevant objectives and policies of the relevant Regional Plans, it is considered that the proposal is consistent with the SRPS.

8.6 The Proposed Southland Water and Land Plan

The Proposed Southland Water and Land Plan (PSWLP) is not yet operative, but it has been notified. However, the policies of this plan have been considered as these could potentially affect the application once the plan is in place. This plan is designed to be an amalgamation of the existing Regional Water Plan and Regional Effluent Land Application Plan.

There are 18 Objectives in this plan. The Objectives relevant to this application aim to ensure:

- That land, water and ecosystems are managed sustainably (Objective 1);
- That the water and land is recognised as an enabler of primary production and the economic, social and cultural wellbeing of the region (Objective 2);



- That the mauri of waterbodies is protected to provide for the continued health and mauri of people and the environment (Objective 3);
- That tangata whenua values are identified and managed appropriately (Objective 4); and
- Nga Tahu must have continued access to mahinga kai resources, nohoanga, mātaimai and taiāpure (Objective 5).

Objective 6 and 8 relate to the quality of groundwater in terms of meeting drinking water standards and the development of new Freshwater Management Units which will define water quality objectives. While, Objective 13 (A – C) looks to enable the use and development of land and soils to support the economic, social, and cultural wellbeing of the region, provided that the quantity, quality and structure of soil resources are not irreversibly degraded through landuse activities and/or discharges to land; and that any discharges of contaminants to land or water that have significant or cumulative adverse effects on human health are avoided.

Other relevant objectives ensure that indigenous ecosystems and habitats must be maintained or enhanced (Objective 14) and that taonga species and habitats must be recognised and provided for (Objective 15). The natural character of the river must be protected (Objective 17) and all activities must be managed in accordance with 'good management practice' (Objective 18).

An assessment of the proposal against all the objectives in the plan are given below in Table 8.1

Table 8.1: **Assessment of Proposal against Objectives of Southland Water and Land Plan**

OBJECTIVE	ASSESSMENT
Objective 1: Land and water and associated ecosystems are sustainably managed as integrated natural resources, recognising the connectivity between surface water and groundwater, and between freshwater, land and the coast.	YES: Proposal will be carried out in a sustainable way, using good management practices and will not degrade the regions water (both groundwater and freshwater), land or coast.
Objective 2: Water and land is recognised as an enabler of primary production and the economic, social and cultural wellbeing of the region.	YES: In this proposal both land and water are enabling primary production and the economic, social and cultural wellbeing of the region.
Objective 3: The mauri of waterbodies provide for te hauora o te tangata (health and mauri of the people), te hauora o te taiao (health and mauri of the environment) and te hauora o te wai (health and mauri of the waterbody).	YES: Low application rates, applications tailored to soil type and incorporation of buffers from surface water ways mean that proposed discharge will not impact on the health and mauri of waterbodies, people or the environment. The life supporting capacity of the regions land and water resources are maintained or improved
Objective 4: Tangata whenua values and interests are identified and reflected in the management of freshwater and associated ecosystems.	YES: The proposal is to be carried out with low application rates, applications tailored to soil type and incorporation of buffers from surface water ways mean that proposed discharge is therefore, not impacting on Tangata whenua values in relation to the management of freshwater and associated ecosystems.
Objective 5: Ngāi Tahu have access to and sustainable customary use of, both	YES: The proposal will not in any way impact on the access to or sustainable use



<p>commercial and non-commercial, mahinga kai resources, nohoanga, mātaimai and taiāpure.</p>	<p>by Ngai Tahu of mahinga kai resources, nohoanga, mātaimai and taiāpure.</p>
<p>Objective 6: There is no reduction in the overall quality of freshwater, and water in estuaries and coastal lagoons, by: (a) maintaining the quality of water in waterbodies, estuaries and coastal lagoons, where the water quality is not degraded; (b) improving the quality of water in waterbodies, estuaries and coastal lagoons, that have been degraded by human activities.</p>	<p>YES: As demonstrated in the AEE, soil type selection and application scheduling using soil moisture status combined with low application rates, and incorporation of buffers from surface water ways mean that proposed discharge will not result in a reduction in overall freshwater quality.</p>
<p>Objective 7: Any further over-allocation of freshwater (water quality and quantity) is avoided and any existing over-allocation is phased out in accordance with freshwater objectives, freshwater quality limits and timeframes established under Freshwater Management Unit processes.</p>	<p>NA: No water is proposed to be taken by the Proposal.</p>
<p>Objective 8: (a) The quality of groundwater that meets both the Drinking Water Standards for New Zealand 2005 (revised 2008) and any freshwater objectives, including for connected surface waterbodies, established under Freshwater Management Unit processes is maintained; and (b) The quality of groundwater that does not meet Objective 8(a) because of the effects of land use or discharge activities is progressively improved so that: (1) groundwater (excluding aquifers where the ambient water quality is naturally less than the Drinking Water Standards for New Zealand 2005 (revised 2008)) meets the Drinking Water Standards for New Zealand 2005 (revised 2008); and (2) groundwater meets any freshwater objectives and freshwater quality limits established under Freshwater Management Unit processes</p>	<p>YES: As demonstrated in the AEE, soil type selection and application scheduling with low application rates, buffers from groundwater abstraction points mean that proposed discharge will not result in an adverse change in groundwater below the application area that is more than minor.</p>
<p>Objective 9: The quantity of water in surface waterbodies is managed so that aquatic ecosystem health, life supporting capacity, outstanding natural features and landscapes and natural character are safeguarded.</p>	<p>NA: No water will be taken from surface waterbodies as part of this proposal.</p>
<p>Objective 9A: Surface water is sustainably managed to support the reasonable needs of people and communities to provide for</p>	<p>YES: Surface water will not be impacted by this proposal.</p>



their social, economic and cultural wellbeing.	
Objective 9B: The effective development, operation, maintenance and upgrading of Southland's regionally significant, nationally significant and critical infrastructure is enabled.	YES: Will enable the operations of new meat works plant. This plant has regional significance.
Objective 10: The national importance of existing hydro-electric generation schemes, including the Manapōuri hydro-electric generation scheme in the Waiau catchment, is provided for, recognised in any resulting flow and level regime, and their structures are considered as part of the existing environment.	NA: This proposal will not impact on existing hydroelectric generation schemes.
Objective 11: The amount of water abstracted is shown to be reasonable for its intended use and water is allocated and used efficiently.	NA: No water will be abstracted as a result of this proposal.
Objective 12: Groundwater quantity is sustainably managed, including safeguarding the life-supporting capacity, ecosystem processes and indigenous species of surface water bodies where their flow is, at least in part, derived from groundwater.	NA: No water will be abstracted as a result of this proposal. Therefore, groundwater quantity will not be impacted.
Objective 13: Enable the use and development of land and soils to support the economic, social, and cultural wellbeing of the region.	YES: Economic benefit to land owners and the Gore district e.g. reduced fertiliser costs, increased yields. Direct and Indirect regional employment opportunities e.g. contractors, factory workers, famers. Beneficial reuse of material.
Objective 13A: The quantity, quality and structure of soil resources are not irreversibly degraded through land use activities or discharges to land.	YES: Soil will not be degraded by this proposal.
Objective 13B : The discharges of contaminants to land or water that have significant or cumulative adverse effects on human health are avoided.	YES: As demonstrated in the AEE at the proposed application rates, the proposal does not have significant or cumulative adverse effects on human health.
Objective 14: The range and diversity of indigenous ecosystem types and habitats within rivers, estuaries, wetlands and lakes, including their margins, and their life-supporting capacity are maintained or enhanced.	YES: Indigenous ecosystems and habitats are maintained as this proposal incorporates low nutrient application rates and separation distances to surface water features, therefore having less than minor impact on these areas.
Objective 15: Taonga species, as set out in Appendix M, and related habitats, are recognized and provided for.	YES: The proposal incorporates low nutrient application rates and separation distances to surface water features, therefore no Taonga species or habitats will be affected by this proposal.



<p>Objective 16: Public access to, and along, river (excluding ephemeral rivers) and lake beds is maintained and enhanced, except in circumstances where public health and safety or significant indigenous biodiversity values are at risk.</p>	<p>YES: This application will not restrict public access to any river or lake bed. Application will not occur within set buffer distances of any surface waterways.</p>
<p>Objective 17: The natural character values of wetlands, rivers and lakes and their margins, including channel and bed form, rapids, seasonably variable flows and natural habitats, are protected from inappropriate use and development.</p>	<p>YES: Applications will only be on existing agricultural land. Natural character areas will not be degraded.</p>
<p>Objective 18: All activities operate in accordance with “good management practice” or better to optimize efficient resource use, safeguard the life supporting capacity of the region’s land and soils, and maintain or improve the quality and quantity of the region’s water resources.</p>	<p>YES: Good management practices will be carried out and it is an efficient use of a resource that would otherwise be waste e.g. is beneficial to landowners. Will not degrade water resources or life supporting capacity of regions land and soils.</p>

The supporting policies within the plan outline how these objectives may be met. The policies relevant to this proposal are Policies 1-3 which are Ngai Tahu policies to ensure that the papatipu Rūnanga can participate in freshwater management, that iwi management plans are taken into consideration and that taonga species are not adversely affected.

The Iwi Management Plan has been considered (Section 8.9) and taonga species of importance when selecting land for MES have been listed by Ngai Tahu (DOC 2006). The application of MES to only existing pasture and crop land will avoid impacting on listed taonga species.

Other relevant policies within the Proposed Plan, are Policies 4 – 12 which are related to the Physiographic zones from the Southland region. The relevant Zone for this proposal is the Central Plain Zone.

Policy 5 ‘Central Plains’ which states that:

In the Central Plains physiographic zone, avoid, remedy, or mitigate adverse effects on water quality from contaminants, by:

- 1. requiring implementation of good management practices to manage adverse effects on water quality from contaminants transported via artificial drainage and deep drainage;*
- 2. having particular regard to adverse effects on water quality from contaminants transported via artificial drainage and deep drainage when assessing resource consent applications and preparing or considering management plans.*
- 3. decision makers should generally not grant resource consents for additional dairy farming of cows and additional intensive winter grazing where contaminant losses increase.*

This application does not result in additional dairy farming of cows or additional intensive winter grazing. Physiographic zone details have been considered in the low rate application methodology along with timing of the application to take into consideration the key transport pathways for contaminants for Central Plains physiographic zone. Good management practice of applying MES to land will be carried out.



The PSWLP contains a relevant section on Water Quality (Policies 13-18). An assessment of the proposal against the policies in relation to water quality is provided in Table 8.2 below. The main policy in this section that is relevant to the proposal is Policy 16A, as the application is a result of an industrial and trade process.

Table 8.2: Assessment of Proposal against Water Quality Policies of Southland Water and Land Plan

POLICY	ASSESSMENT
<p>Policy 13 – Management of land use activities and discharges</p> <p>1. Recognise that the use and development of Southland’s land and water resources, including for primary production, enables people and communities to provide for their social, economic and cultural wellbeing.</p> <p>2. Manage land use activities and discharges (point source and non-point source) to enable the achievement of Policies 15A, 15B and 15C.</p>	<p>YES: This proposal adds to uses of Southland’s land and water resources that are in a productive way to provide for the regions wellbeing. Policies 15A and B do not apply. Policy 15 C is met.</p>
<p>Policy 14 – Preference for discharges to land</p> <p>Prefer discharges of contaminants to land over discharges of contaminants to water, unless adverse effects associated with a discharge to land are greater than a discharge to water. Particular regard shall be given to any adverse effects on cultural values associated with a discharge to water.</p>	<p>YES: This proposal is the preferred discharge to land rather than a discharge to water, which would be an alternative option. Adverse effects on cultural values are avoided as the discharge is not to water.</p>
<p>Policy 15A – Maintain water quality where standards are met</p> <p>Where existing water quality meets the Appendix E Water Quality Standards or bed sediments meet the Appendix C ANZECC sediment guidelines, maintain water quality including by:</p> <p>1. avoiding, remedying or mitigating the adverse effects of new discharges, so that beyond the zone of reasonable mixing, those standards or sediment guidelines will continue to be met; and</p> <p>2. requiring any application for replacement of an expiring discharge permit to demonstrate how the adverse effects of the discharge are avoided, remedied or mitigated, so that beyond the zone of reasonable mixing those standards or sediment guidelines will continue to be met</p>	<p>Not Applicable: The discharge in this proposal is not directly into waterways. There will be no mixing with receiving waters. Water quality and sediment in waterbodies will not be affected and proposal will not impact the ability of a waterbody to continue to meet guidelines.</p>



<p>Policy 15B – Improve water quality where standards are not met</p> <p>Where existing water quality does not meet the Appendix E Water Quality Standards or bed sediments do not meet the Appendix C ANZECC sediment guidelines, improve water quality including by:</p> <ol style="list-style-type: none"> 1. avoiding where practicable and otherwise remedying or mitigating any adverse effects of new discharges on water quality or sediment quality that would exacerbate the exceedance of those standards or sediment guidelines beyond the zone of reasonable mixing; and 2. requiring any application for replacement of an expiring discharge permit to demonstrate how and by when adverse effects will be avoided where practicable and otherwise remedied or mitigated, so that beyond the zone of reasonable mixing water quality will be improved to assist with meeting those standards or sediment guidelines 	<p>Not Applicable:</p> <p>As the discharge to water is avoided by the proposed conditions, water quality measures in Appendix E do not apply. There are also no adverse effects from this proposal that would exacerbate the exceedance of those measures.</p> <p>The proposal is not the replacement of an expiring discharge consent.</p>
<p>Policy 15C – Maintaining and improving water quality after FMU processes</p> <p>Following the establishment of freshwater objectives and limits under Freshwater Management Unit processes, and including through implementation of non-regulatory methods, improve water quality where it is degraded to the point where freshwater objectives are not being met and otherwise maintain water quality where freshwater objectives are being met</p>	<p>YES: The proposal due to the low N loading rates and organic nature of the material will help to maintain and may improve water quality in areas where freshwater objective are not being met after the FMU process.</p>
<p>Policy 16 – Farming activities that affect water quality</p> <ol style="list-style-type: none"> 1. Minimising the adverse environmental effects (including on the quality of water in lakes, rivers, artificial watercourses, modified watercourses, wetlands, tidal estuaries and salt marshes, and groundwater) from farming activities by: <ol style="list-style-type: none"> (a) discouraging the establishment of new dairy farming of cows or new intensive winter grazing activities in close proximity to Regionally Significant Wetlands and Sensitive Waterbodies identified in Appendix A; and (b) ensuring that, in the interim period prior to the development of freshwater objectives under Freshwater Management 	<p>Not Applicable: Not directly applicable but parts are relevant as proposal is part of farming activity that could affect water quality.</p> <p>Adverse effects on environment from this proposal are avoided when the MES application is performed in accordance with the proposed conditions.</p> <p>The landowner will be provided the information on MES being applied for addition to their Farm Environmental Plans.</p> <p>Application methods and buffers are in place to avoid runoff transporting wastewater to surface water bodies.</p>



Unit processes, applications to establish new, or further intensify existing, dairy farming of cows or intensive winter grazing activities will generally not be granted where:

(i) the adverse effects, including cumulatively, on the quality of groundwater, or water in lakes, rivers, artificial watercourses, modified watercourses, wetlands, tidal estuaries and salt marshes cannot be avoided or mitigated; or

(ii) existing water quality is already degraded to the point of being overallocated; or

(iii) water quality does not meet the Appendix E Water Quality Standards or bed sediments do not meet the Appendix C ANZECC sediment guidelines; and

(c) ensuring that, after the development of freshwater objectives under Freshwater Management Unit processes, applications to establish new, or further intensify existing, dairy farming of cows or intensive winter grazing activities:

(i) will generally not be granted where freshwater objectives are not being met; and

(ii) where freshwater objectives are being met, will generally not be granted unless the proposed activity (allowing for any offsetting effects) will maintain the overall quality of groundwater and water in lakes, rivers, artificial watercourses, modified watercourses, wetlands, tidal estuaries and salt marshes.

2. Requiring all farming activities, including existing activities, to:

(a) implement a Farm Environmental Management Plan, as set out in Appendix N; and

(b) actively manage sediment run-off risk from farming and hill country development by identifying critical source areas and implementing practices including setbacks from waterbodies, sediment traps, riparian planting, limits on areas or duration of exposed soils and the prevention of stock entering the beds of surface waterbodies; and

(c) manage collected and diffuse run-off and leaching of nutrients, microbial contaminants and sediment through the



<p>identification and management of critical source areas within individual properties.</p> <p>3. When considering a resource consent application for farming activities, consideration should be given to the following matters:</p> <p>(a) whether multiple farming activities (such as cultivation, riparian setbacks, and winter grazing) can be addressed in a single resource consent; and</p> <p>(b) granting a consent duration of at least 5 years.</p>	
<p>Policy 16A – Industrial and trade processes that may affect water quality</p> <p>Minimize the adverse environmental effects (including on the quality of water in lakes, rivers, artificial watercourses, modified watercourses, wetlands, tidal estuaries, salt marshes and groundwater) by requiring the adoption of the best practicable option to manage the treatment and discharge of contaminants derived from industrial and trade processes</p>	<p>YES: Alternative discharge options have been considered and the proposed application is considered to be the best practical option. There will be no significant effects on water quality or the environment. Good management practices are proposed in conditions to be carried out</p>
<p>Policy 17 – Agricultural effluent management</p> <p>1. Avoid significant adverse effects on water quality, and avoid, remedy, or mitigate other adverse effects of the operation of, and discharges from, agricultural effluent management systems.</p> <p>2. Manage agricultural effluent systems and discharges from them by:</p> <p>(a) designing, constructing and locating systems appropriately and in accordance with best practice; and</p> <p>(b) maintaining and operating effluent systems in accordance with best practice guidelines; and</p> <p>(c) avoiding any surface run-off or overland flow, ponding or contamination of water, including via sub-surface drainage, resulting from the application of agricultural effluent to pasture; and</p> <p>(d) avoiding the discharge of untreated agricultural effluent to water.</p> <p>Note: Examples of best practice referred to in Policy 17(2)(a) for agricultural effluent include IPENZ Practice Note 21: Farm Dairy</p>	<p>Not Applicable: Not directly applicable as the wastewater is not Agricultural effluent. Runoff, ponding and overland flow is avoided. No direct discharge of wastewater to water will occur.</p>



<p>Effluent Pond Design and Construction and IPENZ Practice Note 27: Dairy Farm Infrastructure.</p> <p>Note: Examples of best practice guidelines referred to in Policy 17(2)(b) for agricultural effluent include DairyNZ's guidelines A Farmer's Guide to Managing Farm Dairy Effluent – A Good Practice Guide for Land Application Systems, 2015 and A Staff Guide to Operating Your Effluent Irrigation System, 2013.</p>	
<p>Policy 17A – Community sewerage schemes and on-site wastewater systems.</p>	<p>Not Applicable: Proposal does not relate to community sewerage schemes or on-site wastewater systems</p>
<p>Policy 18 – Stock exclusion from waterbodies</p>	<p>Not Applicable: Proposal does not relate to stock</p>

Policies 20 – 25 relate to water quantity and as this proposal is not for the take of water these policies are not relevant. Also, policies 26 - 38 in the PSWLP are not relevant as the proposal does not relate to any of the listed activities that could affect water quality and quantity.

The council has some policies for consideration when deciding any resource consent applications, and therefore these are relevant to this proposal. These considerations are outlined in Policies 39- 43 and an assessment of this proposal against them has been carried out in Table 8.3 below.

Table 8.3: Assessment of Proposal against Policies 39 – 44 of Southland Water and Land Plan

POLICY	ASSESSMENT
<p>Policy 39 – Application of the permitted baseline</p> <p>When considering any application for resource consent for the use of land for a farming activity, the Southland Regional Council should consider all adverse effects of the proposed activity on water quality, whether or not this Plan permits an activity with that effect</p>	<p>Not Applicable: Not a farming activity. Consideration of all adverse effects has been carried out, including cumulative effects. Mitigation measures which contribute to the low leaching include only applying MES when there is:</p> <ul style="list-style-type: none"> • a soil moisture deficit; • low application rates; and • no prior industrial or FDE applied
<p>Policy 39A – Integrated management</p> <p>When considering the cumulative effects of land use and discharge activities within whole catchments, consider:</p> <ol style="list-style-type: none"> 1. the integrated management of freshwater and the use and development of land including the interactions between freshwater, land and associated ecosystems (including estuaries); and 2. through the Freshwater Management Unit process, facilitating the collective management of nutrient losses, including through initiatives such as 	<p>YES: The cumulative effects have been considered and effects on surface water, groundwater from the discharge of MES has been assessed. The FMU process is not yet developed, therefore policy 39A 2 does not apply.</p>



nutrient user groups and catchment management groups	
<p>Policy 40 – Determining the term of resource consents</p> <p>When determining the term of a resource consent consideration will be given, but not limited, to:</p> <ol style="list-style-type: none"> 1. granting a shorter duration than that sought by the applicant when there is uncertainty regarding the nature, scale, duration and frequency of adverse effects from the activity or the capacity of the resource; 2. relevant tangata whenua values and Ngāi Tahu indicators of health; 3. the duration sought by the applicant and reasons for the duration sought; 4. the permanence and economic life of any capital investment; 5. the desirability of applying a common expiry date for water permits that allocate water from the same resource or land use and discharges that may affect the quality of the same resource; 6. the applicant's compliance with the conditions of any previous resource consent, and the applicant's adoption, particularly voluntarily, of good management practices; and 7. the timing of development of FMU sections of this Plan, and whether granting a shorter or longer duration will better enable implementation of the revised frameworks established in those sections 	<p>YES: Have considered Iwi Management Plan and a consent duration of 25 years is requested. 25 years is considered appropriate for this application given the low risk of environmental risk, the near equivalent practices to those which are permitted activities and that compliance reports will be provided annually.</p>
<p>Policy 41 – Matching monitoring to risk</p> <p>Consider the risk of adverse environmental effects occurring and their likely magnitude when determining requirements for auditing and supply of monitoring information on resource consents.</p>	<p>YES: Conditions which stipulate monitoring requirements have been proposed. Risk can be managed via monthly monitoring of wastewater constituents.</p>
<p>Policy 42 – Consideration of water permit applications</p>	<p>Not Applicable</p>
<p>Policy 43 – Transfer of water permits</p>	<p>Not Applicable</p>

The less than minor impact on water quality will also ensure that the relevant policies in the Freshwater Management Unit Process section (Policies 44 - 47) will be met and the application will be managed to ensure that any future water quality limits set out in those Freshwater Management Units are met.

The application is therefore considered to be consistent with all the relevant policies and objectives of the PSWLP.



8.7 Regional Effluent Land Application Plan for Southland

This plan became operative from 30 May 1998. This plan is currently under review and it is proposed to integrate the Land Application Plan into the Land and Water Plan in the future.

The relevant objectives aim to protect water quality and the life supporting capacity of the soil and water ecosystems are safeguarded from the adverse effects of discharges of effluent and sludge onto or into land which may enter water. (Objectives 4.1.1 and 4.1.2). The policies related to these objectives look to ensure the sustainability of the soil ecosystem and aim to utilise the land treatment of effluent and sludge where this can be undertaken in a sustainable manner and without significant adverse effects (Policies 4.2.1- 4.2.3).

Human and animal health is also considered. Objective 4.1.3 and Policy 4.2.6 aims to ensure that effluent and sludge discharges onto or into land do not adversely affect human and animal health. With Policy 4.2.6 stating that a precautionary approach to the discharge of effluent and sludge onto or into land should be taken where there are uncertainties regarding adverse effects.

Policy 4.1.5 and 4.1.6 state that amenity values and significant vegetation or habitats are not adversely affected by discharges of effluent and sludge onto or into land. These are governed by Policies 4.2.9 and 4.2.15. The protection of these values leads to Objective 4.1.5 which ensure that the relationship of tangata whenua with ancestral sites, wahi tapu and other taoka are recognised and provided for (Policy 4.2.8).

There are other relevant policies designed to help achieved some of above objectives. These include Policy 4.2.1 monitoring of effects, Policy 4.2.7 which promotes good practice, management and maintenance of effluent and sludge systems.; and Policy 4.2.13 which promotes the development and use of properly deigned and managed sludge treatment facilities.

The application of MES to land from the Awarua treatment facility, assures that properly designed and managed sludge treatment facilities are being used in the region. The proposed consent conditions around odour drift, buffer distances, return period, rate, depth and timing of application to soils all aim to ensure sustainability of soil and water ecosystems. The proposal utilises land application of sludges in a way that will not have adverse effects on human health. The restrictions to application (hydraulic and nutrient loading) can be seen as taking a precautionary approach. Amenity values and significant vegetation are protected, incorporating tangata whenua values. Good management practices will be adhered too, and potential effects monitored to ensure compliance.

Overall, the discharge of MES is considered to be consistent with the relevant policy framework of the Regional Effluent Land Application Plan.

8.8 Regional Water Plan for Southland 2010

The Regional Water Plan (RWP) for Southland was made operative in January 2010. It promotes the sustainable management of Southland's rivers, lakes and water resources. It is intended to be merged into the Proposed Water and Land Plan which is discussed above. As the relevant plans have not yet been merged into the Water and Land Plan, this plan still needs to be considered. However, there are no specific rules that apply to this application as they have been provided for in the Regional Effluent Land Application Plan.



The relevant regional wide objectives and policies that this plan which could be applicable to MES application relate to water quality, groundwater, land and soil and discharges in general. Table 8.4 assesses the proposal against the objectives of RWP that are relevant to this proposal.

Table 8.4: Assessment of proposal against water quality objectives in Regional Water Plan for Southland

OBJECTIVE	ASSESSMENT
<p>Objective 1 – Natural State Waters To maintain the quality of water where it is in its natural state</p>	<p>YES: Proposal will not occur within national parks, or within areas listed in Table 1 of Appendix M “Natural State Waters outside National Parks”.</p>
<p>Objective 2 – Maintain water quality To manage water quality so that there is no reduction in the quality of the water in any surface water body, beyond the zone of reasonable mixing for discharges, below that of the date this Plan became operative (January 2010).</p>	<p>YES: Proposal is not for the discharge of contaminants directly into surface water ways. There will be no zone of reasonable mixing.</p>
<p>Objective 3 – Surface water bodies other than in Natural State Waters To maintain and enhance the quality of surface water bodies so that the following values are protected where water quality is already suitable for them, and where water quality is currently not suitable, measurable progress is achieved towards making it suitable for them.</p> <p>In surface water bodies classified as mountain, hill, lake-fed, spring-fed, lowland (hard bed), lowland (soft bed) and Mataura 1, Mataura 2 and Mataura 3:</p> <p>(a) bathing, in those sites where bathing is popular; (b) trout where present, otherwise native fish; (c) stock drinking water; (d) Ngāi Tahu cultural values, including mahinga kai; (e) natural character including aesthetics.</p> <p>In surface water bodies classified as mountain lakes and hill lakes:</p> <p>(a) bathing (b) trout (c) Ngāi Tahu cultural values, including mahinga kai (d) natural character including aesthetics</p> <p>In surface water bodies classified as lowland/coastal lakes:</p> <p>(a) native migratory fish; (b) stock drinking waterwater; (c) healthy aquatic habitats; (d) Ngāi Tahu cultural values, including mahinga kai;</p>	<p>YES: As demonstrated in the AEE, low application rates, and incorporation of buffers from surface water ways mean that proposed discharge will not result in a reduction in overall freshwater quality.</p>



<p>(e) natural character including aesthetics</p>	
<p>Objective 4 – Gradual improvement in surface water quality parameters To manage the discharge of contaminants and encourage best environmental practice to improve the water quality in surface water bodies classified as hill, lowland (hard bed), lowland (soft bed) and spring fed, and in particular to achieve a minimum of 10 percent improvement in levels of the following water quality parameters over 10 years from the date this Plan became operative (January 2010):</p> <ul style="list-style-type: none"> (a) microbiological contaminants (b) nitrate (c) phosphorus (d) clarity 	<p>YES: Is not direct discharge into surface water bodies and best practice will be carried out during application. Future technology improvements will be regularly considered to assist with improving proposed activity.</p>
<p>Objective 8 – Drinking Water Standard To maintain groundwater quality in aquifers that already meet the Drinking-Water Standards for New Zealand 2000; and</p> <ul style="list-style-type: none"> (b) To enhance groundwater quality in aquifers degraded by land use and discharge activities (with the exception of those aquifers where ambient water quality is naturally less than the Drinking-Water Standards for New Zealand 2000) to ensure general compliance with the Drinking-Water Standards for New Zealand 2000 by the year 2010. 	<p>YES: The proposed land application of MES is unlikely to result in contamination of groundwater, to the extent that the drinking water standard is exceeded.</p>
<p>Objective 9 – Sustainable abstraction To ensure that the total volume and rate of groundwater abstraction is sustainable.</p>	<p>Not applicable: This proposal is not for the take of groundwater.</p>
<p>Objective 9A – Maintain soil quality</p>	<p>YES: Proposal will be managed so that soil quality is not adversely affected. Nutrients are being added which increase quality.</p>



<p>To manage discharges onto or into land so that the quality and structure of soil resources are maintained.</p>	<p>Consideration to determinantal components have been given.</p>
<p>Objective 9B – Human health To manage discharges onto or into land so that adverse effects on human health are avoided</p>	<p>YES: Appropriate buffers and mitigations are proposed which ensure that adverse effects on human health are avoided.</p>
<p>Objective 9C – Habitats and ecosystems and other values To manage discharges onto or into land so that any adverse effects on: (a) the diversity and integrity of habitats and ecosystems; and (b) amenity and historic heritage values are avoided, remedied or mitigated to ensure that these values are maintained or enhanced</p>	<p>YES: Proposal will be managed in a way that ensures that there is no adverse effects on habitats and ecosystems and amenity or historic heritage values.</p>

The proposal against the polices that relate to water quality, groundwater, land, soil and discharges are accessed in Table 8.5.



Table 8.5: Assessment of Proposal against Policies of Regional Water Plan for Southland

POLICY	ASSESSMENT
<p>Policy 1A – Take into account Iwi Management Plans Any assessment of an activity covered by this plan must take into account any relevant Iwi Management Plan</p>	<p>YES: The proposal has considered the relevant Iwi Management Plan</p>
<p>Policy 1 – Surface water body classes (a) Recognise the different characteristics of the following surface water body classes when managing discharges: (i) Natural State Waters (ii) Lowland (hard bed) (iii) Lowland (soft bed) (iv) Hill (v) Mountain (vi) Lake-fed (vii) Spring-fed (viii) Mataura 1 (ix) Mataura 2 (x) Mataura 3 (xi) Lowland/coastal lakes and wetlands (xii) Hill lakes and wetlands (xiii) Mountain lakes and wetlands (b) Apply water quality standards established under any Water Conservation Order.</p>	<p>YES: The proposal is not for the discharges directly into any of the listed surface waterbodies. Water quality standards for all water body classes will continue to be met.</p>
<p>Policy 2 – Natural State Waters Provide for discharges to Natural State Waters only where there will be no measurable adverse effects on existing water quality beyond the zone of reasonable mixing, unless it is consistent with the sustainable management of natural and physical resources as set out in Part 2 of the Resource Management Act 19</p>	<p>Not Applicable: The proposal will not discharge into Natural State Waters and as it is not a discharge to water there will be no zone of reasonable mixing.</p>
<p>Policy 3 – No reduction in water quality Notwithstanding any other policy or objective in this plan, allow no discharges to surface water bodies that will result in a reduction of water quality beyond the zone of reasonable mixing, unless it is consistent with the promotion of the sustainable management of natural and physical resources,</p>	<p>Not Applicable: The proposal will not discharge into surface water bodies and therefore there will be no zone of reasonable mixing.</p>
<p>Policy 4 – Surface water bodies outside Natural State Waters</p>	<p>YES: The proposal will not directly discharge into any surface water body outside of Natural State Waters and the water quality standards referred to in Rule</p>



<p>For surface water bodies outside Natural State Waters, manage point source and non-point source discharges to meet or exceed the water quality standards referred to in Rule 1 and specified in Appendix G “Water Quality Standards”, unless it is consistent with the promotion of the sustainable management of natural and physical resources, as set out in Part 2 of the Resource Management Act 1991, to do so and so avoid levels of contaminants in water and sediments that could harm the health of humans, domestic animals including stock and/or aquatic life.</p>	<p>1 and specified in Appendix G “Water Quality Standards” will continue to be meet.</p>
<p>Policy 5 – Discharges to water in artificial watercourses</p>	<p>Not Applicable</p>
<p>Policy 6 – Non-regulatory methods (a) Use non-regulatory methods, in addition to rules, to maintain and enhance surface water and groundwater quality, and to avoid, remedy or mitigate adverse effects on soil quality. (b) Assess on an ongoing basis whether the adoption of nonregulatory methods has resulted in improvements to water or soil quality, and consider the introduction of other interventions if improvements have not resulted.</p>	<p>Not Applicable</p>
<p>Policy 7 Prefer discharges to land Prefer discharges to land over discharges to water where this is practicable, and the effects are less adverse.</p>	<p>YES: The proposed MES application to land is consistent with this policy.</p>
<p>Policy 8 – Discharges to water</p>	<p>Not Applicable: Proposal is not for the discharge to water.</p>
<p>Policy 9 – Zone of reasonable mixing</p>	<p>Not Applicable: Proposal is not for the discharge into waterways where there would be a zone of mixing.</p>
<p>Policy 10 - Use of diffusers</p>	<p>Not Applicable</p>
<p>Policy 11 – Stormwater discharges Apply consent conditions requiring consented discharges of stormwater to meet both the ANZECC sediment guidelines (as shown in Appendix E of this Plan) and the relevant water quality standards specified in Appendix G “Water</p>	<p>Not Applicable</p>



<p>Quality Standards” following reasonable mixing to: (a) all resource consents for new stormwater discharges; and (b) all new resource consents for existing stormwater discharges. Unless it is consistent with the purpose of the Act to allow further time, existing discharges will be required to meet the standards and guidelines by 2010 or the date the resource consent commences, whichever is the latter.</p>	
<p>Policy 12 – Application of agrichemicals and vertebrate pest control poisons</p>	<p>Not Applicable</p>
<p>Policy 13 – Discharge of untreated effluent Avoid the point source discharge of raw sewage, foul water and untreated agricultural effluent to water.</p>	<p>Not Applicable</p>
<p>Policy 13A – Transitional policy relating to the establishment of new dairy farms</p>	<p>Not Applicable</p>
<p>Policy 25 - Adverse effects arising from point source and non-point source discharges To avoid, remedy or mitigate the adverse effects arising from point source and non-point source discharges so that there is no deterioration in groundwater quality after reasonable mixing, unless it is consistent with the promotion of the sustainable management of natural and physical resources, as set out in Part 2 of the Resource Management Act 1991, to do so.</p>	<p>YES: Given the mitigation proposed in relation to the application of MES to land, adverse effects on groundwater quality are unlikely.</p>
<p>Policy 26 - Adverse effects of bores and wells To avoid the adverse effects on groundwater quality and quantity arising from bores and wells by ensuring that bores and wells are appropriately designed, constructed and maintained in a way that adverse effects are avoided to the extent practicable.</p>	<p>Not Applicable: Also buffers around bores ensure adverse effects are avoided.</p>
<p>Policy 27 – Groundwater research and investigation</p>	<p>Not Applicable</p>
<p>Policy 31A – Matching discharges onto or into land to risk Match the level of management that is required for discharges of contaminants onto or into land to the level of</p>	<p>YES: The risk from the listed factors in this policy have been considered when establishing the proposed management criteria.</p>



<p>environmental risk posed by the following risk factors:</p> <ul style="list-style-type: none"> (a) Nature and quantity of contaminants in the discharge (b) Sloping land (c) Soils with artificial drainage or coarse structures (d) Soils with impeded drainage or low infiltration rates (e) Well drained soils (f) Climate (g) Proximity to groundwater (h) Proximity to surface water (i) Soil's current physical, chemical and biological characteristics and its potential to leach nutrients (j) Natural hazards (for example, flooding and erosion) 	
<p>Policy 31B – Natural State Catchments Recognise that discharges onto or into land in the catchments of Natural State Waters can have adverse effects on water quality, and manage such discharges in accordance with Policy 2 and Policy 31A of this Plan</p>	<p>YES: Proposal will be managed in accordance with Policy 2 and Policy 31A.</p>
<p>Policy 31C - Manage discharges of contaminants onto or into land Manage discharges of contaminants onto or into land to avoid, remedy or mitigate adverse effects, including on:</p> <ul style="list-style-type: none"> (a) soil quality; (b) amenity values; (c) habitats, ecosystems and indigenous biological diversity; (d) historic heritage, cultural and traditional values; (e) natural character; (f) outstanding natural features. 	<p>YES: Cumulative effects have been considered and proposal will be managed in a way that ensures adverse effects on any of the features listed in Policy 31C are avoided.</p>
<p>Policy 31D – Beneficial reuse Encourage the beneficial reuse of materials where this is appropriate and promote discharges of these materials onto or into land to maximise the potential reuse of the nutrients and water contained in the discharge.</p>	<p>YES: Nutrients are being reused in a way that is beneficial.</p>

Even though there are no specific rules relating to MES application in the Regional Water Plan, the application of MES to land from SPM treatment pond is considered to be consistent with the relevant wider policy framework of the Water Plan.



8.9 Regional Air Plan

The Regional Air Plan was made operative in 2016 and it contains five objectives which relate to air quality in Southland. Objectives 2.1 - 2.3 relate to ambient air quality, while Objectives 2.4 and 2.5 relate to localised air quality.

Objectives 2.1 -2.3 seek to improve air quality in areas where concentrations of contaminants exceed NESAQ, seek to maintain ambient air quality in those parts of the Southland region that have good air quality and enhance air quality in those parts of the region where it is poor or has been degraded. The aim is to reduce adverse effects on human health and the environment.

Objectives 2.4 and 2.5 aim to avoid, remedy or mitigate any adverse effects upon the localised air quality environment (including health, nuisance and amenity effects) from the discharge of contaminants to air; and ensure that Maori cultural and traditional beliefs are recognised and provided for when dealing with discharges to air.

The relevant policies which set out how the objectives may be achieved include Policy 3.9 which requires that any discharge of odour which is likely to have an offensive or objectionable effect beyond the property boundary, shall be managed such that the effect is suitably avoided, remedied or mitigated. Policy 3.12 looks at the potential general adverse effects from the discharge of contaminants to air and requires that any discharge avoid, remedy or mitigate adverse effects on:

- (a) The receiving environment;
- (b) Human health and wellbeing;
- (c) Cultural, spiritual and traditional values;
- (d) Water quality.

Policy 13 requires applications that seek to discharge contaminants to air, to comply with the NESAQ and have regard to the appropriate ambient air quality guidelines.

This proposal has determined that any adverse effects from odour will no more than minor. Buffer zones have been suggested to avoid any offensive or objectionable odour beyond the property boundary. These will assist to mitigate any potential adverse effects on the receiving environment and human health, consistent with the objectives and policies of the Proposed Air Plan.

8.10 Iwi Management Plan

The Iwi Management Plan is a natural resource and environmental iwi management plan developed by Ngāi Tahu ki Murihiku. The purpose of the Plan is to provide a document that can assist Ngāi Tahu ki Murihiku to effectively participate in natural resource planning. Many of the policies relate to the way in which Ngai Tahu ki Murihiku aims to operate. However, it is also designed as a resource for local authorities to ensure Ngāi Tahu ki Murihiku issues and policies are provided for. It helps councils determine the nature and extent of consultation required with respect to specific activities or areas of importance.

The policies within the Iwi Management Plan are outlined in seven separate chapters, with Chapters 3.2-Air and 3.5-Southland Plains being relevant to this proposal. The application of MES will not be applied in Fiordland or coastal areas, so coastal environment and high country/foothills chapters do not apply.

In Chapter 3.5 Southland Plains the relevant section is 3.5.3 Industry Waste. There is also a general river section 3.5.11 which also applies. Policy 1 in Section 3.5.3 is to encourage industry



to set an example through demonstrating a commitment to best practice, new technology, environment, community and public health. The use of resources in industrial operations must be balanced with investments in the community and the environment.

Policy 5 focuses on finding ways to avoid adverse effects on cultural values as a result of industrial activities.

The application of MES as a result of this proposal aims to always operate at best management practice. The proposed consent conditions are considered sufficient to avoid adverse effects on cultural values.

Policy 8 requires the industry to develop and maintain, where required, working relationships with iwi, through mechanisms such as yearly site visits, progress reports, or monitoring results. Policy 11 requires that monitoring programs monitor for effects, but also include clear provisions for effective responses to the detection of adverse effects.

Yearly monitoring and compliance reports will be submitted and made available for Iwi to access.

Ngāi Tahu ki Murihiku advocate for consent durations of 25 years or less for industrial operations, as per Policy 13. Consent conditions should require operators to periodically review available technology, and provide a report indicating if better technology is available. Reports should highlight the use or otherwise of new or better technologies.

A consent duration of 25 years is requested. 25 years is considered appropriate for this application given the low risk of environmental risk, the near equivalent practices to those which are permitted activities and that compliance reports will be provided annually.

Policy 14 states that the water quality of any surface waterbody or groundwater resource must not be deteriorated to any extent (following a zone of reasonable mixing) due to industrial activity. The size of a zone of reasonable mixing needs to be determined on a case by case basis of which Ngāi Tahu ki Murihiku must be consulted. Factors influencing zone size includes:

- (a) effluent flow rate and concentration;
- (b) design of the outfall;
- (c) depth, velocity and rate of turbulent mixing of the receiving water; and
- (d) ambient concentrations in the receiving water.

Policy 16 Require that industry develop environmental management plans, including contingency plans to cope with any faults, breakdowns, natural disasters, or extreme weather events, and avoid any serious environmental effects.

The proposal will not directly discharge MES into the surface or groundwater resources and consent conditions will provide buffer zones and prevent runoff or overland flow. There is flexibility in the timing of removal of MES from the Awarua treatment pond which allows for adaption to avoid extreme conditions.

In Section 3.5.10 the policies relate to ensuring that the Ngāi Tahu ki Murihiku as kaitiaki of freshwater are acknowledged and ensuring that taonga is available for future generations in as good as, if not better quality. For example, Policy 1 and Policy 3 of this section. The proposal recognizes Ngāi Tahu ki Murihiku as a guardian of the natural resource. MES will only be applied to actively farmed land which ensures that there is no change in effects to culturally sensitive sites.



As the proposal will not degrade or negatively impact the current status of soil and water quality, there will be a less than minor effect on any cultural values.

As discussed above, the proposal to discharge MES to land is considered to achieve the policies and objectives set out in the Iwi Management Plan.

8.11 Biosecurity (Ruminant Protein) Regulations 1999

Another legislative document to consider is the Ruminant Protein Regulations 1999. Under this legislation, the interpretation of MES in this case is:

ruminant protein—(a) means protein derived from the tissue (including blood) of a ruminant;

The property owner is responsible for the management of all ruminants grazing the property to avoid the ingestion of ruminant protein. The property owner will be provided the information necessary, so he can manage land and stock in accordance with his milk supplier obligations.

The Biosecurity (Ruminant Protein) Regulations 1999 were not formed under RMA. Therefore, conditions are not required in any discharge permit granted by Environment Southland to cover biosecurity matters.

8.12 Summary

The discharge of MES to land is a **discretionary activity** in accordance with Rule 5.3.2 of the Land Application Plan, Rule 5.5.5 of the Regional Air Plan, Rule 16 D of the Regional Water Plan for Southland and Rule 34 of the Proposed Southland Water and Land Plan.

It is proposed to discharge MES to land in a manner that avoids adverse effects on soil and water. No direct discharge to water is proposed. Given this, and the mitigation measures proposed, it is considered that the discharge is consistent with the relevant provisions of the RMA and regional planning documents.



9 CONTINGENCY PLAN

9.1 Contingency Plan Requirements

Under Rule 5.3.2 of the Regional Effluent Land Application Plan, there is no specific requirement for a contingency plan. However, Rule 5.4.6 (agricultural effluent) of the plan specifies a requirement for a contingency plan to be lodged with a consent application. Because the effects of the proposed MES discharge are considered to be comparable to those of agricultural effluent, a contingency plan is included as a precautionary measure.

9.2 Spill Contingency Plan

There is a risk of uncontrolled spills of MES to roadways or water courses. This could occur:

- At the plant when transferring the MES to the road tankers or directly to the slurry wagon;
- During transport to the farm;
- During transfer from the road tanker to the slurry wagon; and
- During spreading.

The transfer to the road tanker or slurry wagon at the treatment plant will occur in a locality and under conditions that minimise the potential for spills. This part of the operation will be undertaken by SPM, who will be responsible for both prevention and remedy of any such spills. Should they occur any material will be contained and either pumped into the tanker or back into the treatment system.

During transport, the MES is under the direct control of the transport operator working to SPM's requirements. The transport operator will be required to operate in accordance with this contingency plan. This plan acknowledges the need to make people safe, the roadway safe, and/or protect any watercourse, in the event of a spill. In this situation any spilt material will be contained, will be prevented from moving into water courses where possible, and will be recovered to be spread onto land in a controlled manner.

When the MES arrives at the farm, should it be spilt during transfer from the road tanker to the slurry wagon, it will be firstly contained and then pumped into the slurry wagon for spreading. Any residual material on the soil surface will be managed to ensure the potential for contaminant lost from the site via surface flow or leaching to groundwater is minimised.

Should a spill occur during spreading, all practical steps shall be taken to avoid a discharge to surface water. If possible, the spilt material should be recovered for spreading in the usual manner.

9.3 Land Availability Contingency Plan

SPM will arrange for the delivery of MES to Gladvale Farms and will manage its spreading onto land in line with Gladvale and resource consent requirements. It is possible that the area available for spreading may be limited on occasions. For example, land requirements for farming may change on a seasonal basis, odour or noise concerns could postpone spreading at some sites on occasions, and adverse weather conditions could delay spreading operations



Contingency planning here comes under four key headings, as follows:

- **Area of suitable land** on the Gladvale property (346 ha out of 627 ha total) is much larger than what is required for sludge application in any one year (i.e. only 40 ha is needed in total for the entire SPM sludge production). If parts of the property are unavailable for MES application for any reason, there is a reasonable expectation that other suitable parts of the property may in fact be available.
- **Time constraint.** The capacity of the wastewater pond at the Awarua plant is sufficiently large that the need for sludge removal will not normally be critically constrained. If MES cannot for any reason be applied to land on Gladvale, it can be retained at the plant until such time (within reason) as land application again becomes practicable.
- **Access to further land.** Application of MES to other properties at Kingston, Garston and Otapiri Gorge has been consented, and this in itself will provide a contingency should some or all of the Gladvale Farms property become for any reason unavailable.
- **Landfill.** If all else fails, SPM could dispose of MES at the regional (AB Lime Ltd) landfill.



10 MITIGATION

The potential adverse effects of MES application to land are mitigated by several factors, as follows:

- Low hydraulic application rate. By limiting applications to a total depth not exceeding 10 mm per year, comprising up to 5 passes of not more than 2 – 5 mm, the risk of ponding, run-off and through-flow is reduced to a negligible level.
- Low nitrogen loading rate. By limiting the **total nitrogen** application rate to not greater than 150 kg total N/ha/y, the soluble or plant available nitrogen loading applied will not exceed about 80 kg N/ha/y. This aspect of the activity will align with FDE and whey discharges, which when carried out in Southland region within this limit are considered to have adverse environmental effects that are less than minor.
- Beneficial re-use. The nutrients in the MES are to be re-cycled into the farm environment, avoiding the alternatives of dumping them to waste, or leading to contamination of a more confined area at some other site.
- Locality. The Gladvale property is an operative Dairy farm, well away from most of the people or facilities that could potentially be sensitive to some aspect of the proposed activity.
- On-site separation distances. The Gladvale property is sufficiently large to be able to accommodate all the proposed MES application activity at distances from property boundaries, watercourses, and residential dwellings that will meet specific plan requirements and avoid potential nuisance effects.
- Low pressure spray application. This will largely avoid the generation of aerosols during application, reducing the likelihood of spray drift or odour problems.



11 MONITORING

It is proposed that the following monitoring measures be applied to the proposed activity, in order to maintain responsive awareness to any potential adverse environmental effect that may arise in practice.

- Monthly MES analyses. Concentrations of nitrogen species in the MES in particular will be monitored by SPM to ensure that field application rates can be adjusted if and as necessary to keep nitrogen application rate within consented limit.
- Application site record keeping. A log is to be maintained by SPM's contractor of volumes of MES, dates, and paddocks to which MES is applied, to be kept and reported to SPM's requirements.
- Complaints log. A register will be maintained by the consent holder for all and any complaints received relating to the proposed activity, including details of the complainant, the complaint, and the measures taken to resolve the complaint.
- Soil analyses. It is **not** proposed to take soil samples for analysis on a planned schedule. This is because with 346 ha available and only 40 ha being used for MES application in any given year, there is little likelihood of enough MES being applied to any one site in successive years to make a measurable difference in long-term soil composition.
- Groundwater and Surface Water analyses. Groundwater or surface water samples are **not** proposed to be taken and analysed on a scheduled basis. The low application of nutrient and the small area receiving MES in comparison to the Oreti River catchment landuse and fertiliser applications means it is unlikely that useful conclusions will be able to be drawn from any water quality monitoring program which specifically relate to this proposed MES application activity.



12 CONSULTATION AND NOTIFICATION

12.1 Direct Consultation

In preparing this application, consideration has been given to who might be potentially affected by the proposal. This section outlines the consultation undertaken as part of the development. Section 12.2 below also offers a notification recommendation in accordance with sections 95A, 95B, 95D and 95E of the RMA and provides a justification for the same.

There has been extensive consultation by SPM with the land owner. The land owner where MES may be applied are the primary affected party to be consulted (and they actually want the material).

While the effects of the proposed application of MES to land are considered to be less than minor, SPM have contacted Te Ao Marama on the 30 January 2018 by phone and will provide a draft AEE via email before lodgement for their comment.

12.2 Determination of Public Notification

Section 95A (1) of the RMA requires consent authorities to follow the sequential assessment set out in section 95A when deciding whether to publicly notify an application for resource consent. This assessment is set out below.

Step 1: Circumstances When Public Notification is Mandatory

Section 95A(2)(a) requires that a consent authority must publicly notify an application if the applicant has requested public notification. Public notification of this application is not requested.

Step 2: Circumstances When Public Notification is Precluded

The proposal does not meet the criteria of 95A (5) because:

- (a) None of the relevant rules or environmental standards preclude public notification; and
- (b) The application is not for a controlled activity, residential activity, or prescribed activity.

Step 3: Certain Circumstances

The proposal does not meet the criteria of 95A (8), and therefore public notification is not required under 95A(7)(a), because:

- (a) The proposal is not subject to any rule or environmental standard that requires public notification; and
- (b) As concluded in section 6 of this report, the adverse effects of the activity will not be more than minor overall.

When assessing whether an activity will have or is likely to have adverse effects on an environment that are more than minor, for the purposes of determining public notification, section 95D requires that a consent authority:

- (a) Must disregard any effects on persons who own or occupy the land on which the activity will occur, and any adjacent land; and
- (b) May disregard an adverse effect of the activity if a rule or a national environmental standard permits an activity with that effect; and
- (c) Must disregard an adverse effect of the activity if the effect does not relate to a matter for which a rule or a national environmental standard restricts discretion; and
- (d) Must disregard any effect on any person who has given written approval to the application.



An assessment of the environmental effects of the proposal is set out in section 6 of this report, which has been undertaken with reference to the activity being a classed as a **Discretionary Activity** and the following potential effects are deemed to be relevant to this resource consent application. That assessment concluded that the proposal would have less than minor effects on:

- Effect on soil and plants
- Effects on groundwater
- Effects on surface water
- Effects on habitats
- Effects on Air
- Effects on amenity, community, and cultural values

Step 4: Special Circumstances

The proposal seeks to beneficially use the MES as a fertiliser substitute, apply the material at a rate which is the same as the permitted activity standard for application of FDE and whey. The scale of the proposal and its associated effects are reasonably anticipated by the Regional Effluent Land Application Plan and will provide net benefit to the local community. Consequently, it is considered that there are no special circumstances that exist that would warrant public notification of the application, therefore in accordance with section 95A(9)(b) the application must not be publicly notified.

It should be noted that SPM and others hold consents (Fonterra Edendale permit 300490 and Alliance Group Matura permit 207295) for comparable activities are in operation in the Southland region. The key effects on the environment from these consents were comparable to this proposed application of MES to land on the Gladvale property. The consent conditions for the three application sites authorised to SPM and both Fonterra and Alliance were judged to provide adequate environmental protection, such as the provision of maximum nitrogen loading and buffer distances from sensitive receiving environments. Similar environmental protection conditions are proposed within this application; therefore, it is considered that a non-notified decision pathway would be consistent for this application.

12.3 Determination of Limited Notification

Section 95A(9)(b) requires that, if a consent authority does not publicly notify the application it must decide whether to give limited notification of the application under the provisions of section 95B. Section 95B (1) of the RMA requires consent authorities to follow the sequential assessment set out in section 95B when deciding whether to give limited notification of an application for resource consent. This assessment is set out below.

Step 1: Affected Parties and Groups

In accordance with section 95B (2), a determination must be made as to whether there are any customary rights groups or customary marine title groups that are affected by the proposal. In this regard, it is noted that there are no customary rights groups or customary marine titles groups affected by the proposed activity.

In accordance with section 95B (3), a determination must be made as to:

- (a) Whether the proposed activity is on, or adjacent to, or may affect, land that is subject to a statutory acknowledgement; and
- (b) Whether the person to whom the statutory acknowledgement is made is an affected person under section 95E.



In this regard, it is noted that there is a Statutory Acknowledgement under the Ngāi Tahu Claims Settlement Act 1998 schedule 50 for the Oreti River. While there is Statutory Acknowledgement for the Oreti River, Gladvale Farms and the proposed land application of MES is not an activity within, adjacent to, or impacting directly on statutory areas as the location is over 4.5 km from the Oreti River and the restrictions proposed on the MES application to land means the effects are less than minor and Ngai Tahu and the local Runanga are not considered to be affected party.

As it has been determined that there are no parties deemed to be affected by the proposal, **limited notification is not required** under section 95B (4).

Step 2: Certain Circumstances

The proposal does not meet the criteria of 95B (6) because:

- (a) None of the relevant rules or environmental standards preclude public notification;
- (b) The application is not for a controlled activity, or prescribed activity.

In regard to section 95B (7), it is noted that the proposal does not require resource consent for a boundary activity or prescribed activity.

Step 3: Affected Persons

Section 95B (8) requires a determination to be made as to whether there are any affected persons pursuant to section 95E. In making this determination, section 95E (3) provides that a person is not affected if:

- (a) The person has given and not withdrawn written approval for the activity to the consent authority, prior to a decision on affected persons being made; or
- (b) The consent authority is satisfied that it is unreasonable in the circumstances for the applicant to seek written approval.

Written approval has not been obtained from neighbouring properties as effects are considered to be less than minor and appropriate buffers from potentially sensitive sites have been proposed to be a condition.

For the purposes of determining limited notification, section 95E (1) directs that a person is an affected person if the consent authority decides that the activity's adverse effects on the person are minor or more than minor (but are not less than minor). Section 95E (2) requires that, when assessing an activity's adverse effects on a person, a consent authority:

- (e) May disregard an adverse effect of the activity on a person if a rule or a national environmental standard permits an activity with that effect; and
- (f) Must disregard an adverse effect of the activity on a person if the effect does not relate to a matter for which a rule or a national environmental standard reserves control or restricts discretion; and
- (g) Must have regard to every relevant statutory acknowledgement.

An assessment of the environmental effects of the proposal is set out in section 6 of this report. That assessment concluded that the proposal would have less than minor effects on:

- Effect on soil and plants
- Effects on groundwater
- Effects on surface water
- Effects on habitats
- Effects on Air
- Effects on amenity, community, and cultural values



In light of the conclusions made above, it is considered that there are no affected persons in regard to the proposal, **therefore limited notification is not required** under section 95B (9). However, local iwi will be consulted on the application as part of the obligation under the Ngai Tahu Settlement Act.

Step 4: Special Circumstances

The proposal enables the reasonably anticipated continued use of land for rural production, and associated activities in Southland regional area. It is considered that there are no special circumstances which exist that would warrant limited notification under section 95B (10).

If there are persons who are considered affected, notice of the application must be given to them.

Ngai Tahu, have kaitiakitanga over the Murihiku region associated with this proposed MES Land application. SPM are yet to forward on the draft AEE document to Te Ao Marama who will liaise with Runanga. SPM have assessed the proposed activity against the Iwi Management Plan to provide guidance when considering effects on cultural values. Based on the assessment, it is considered that the application is consistent with the Iwi Management Plan and there are no adverse effects to cultural values.

Section 95E(3)(b) of the RMA provides that despite anything else in section 95E, a consent authority must decide that a person is not an affected person if it is unreasonable in the circumstances to seek the person's written approval.

In addition to the effects of the activity being considered to be less than minor, the equivalent application of fertiliser is a permitted activity.

When taking into consideration the above, it is considered the effects from the MES application are less than minor and the processing of the consent applications should be considered on a **non-notified basis**.



13 PART TWO OF THE RESOURCE MANAGEMENT ACT

13.1 Resource Management Act 1991

13.1.1 Part 2 Considerations

Part 2 of the RMA sets out the purpose and principles of the Act. Section 5 states:

"(1) The purpose of this Act is to promote the sustainable management of natural and physical resources.

(2) In this Act, "sustainable management" means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety while –

(a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and

(b) Safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and

(c) Avoiding, remedying, or mitigating any adverse effects of activities on the environment."

The proposed land application of MES is an unavoidable component of the operation of SPM Awarua processing plant, that enables people and communities to provide for social and economic well-being. For example, SPM Awarua provides the area's farmers with a facility which can process their products, while the products produced at the plant are commodities which are in demand regionally, nationally, and internationally. In addition, the SPM is a significant local employer, with subsequent economic benefits for the local community. In relation to the potential effects on the environment associated with the wastewater management system activities, the assessments contained within this document have shown that subject to the implementation of the proposed controls, or mitigation approaches, the potentially affected resources of the area will be sustained along with their life-supporting capacity.

Section 6 of the RMA identifies matters of national importance which shall be 'recognised and provided for', while section 7 identifies other matters which 'shall be had regard to' under the Act. With regard to the MES application to land, the following matters are considered to be of relevance. They are:

"6(e) The relationship of Maori and their culture and traditions with their ancestral lands, water, sites, wahi tapu, and other taonga:

7(a) kaitiakitanga:

7(aa) the ethic of stewardship:

7(b) the efficient use and development of natural and physical resources:

7(c) the maintenance and enhancement of amenity values:

7(d) intrinsic values of ecosystems:

7(f) maintenance and enhancement of the quality of the environment:"

7(g) any finite characteristics of natural and physical resources:

7(h) the protection of the habitat of trout and salmon:

The proposed MES application to land, subject to the implementation of the proposed mitigation approaches, will ensure that the area's air, soil and groundwater resources are being used in an efficient manner. Potential effects of the MES land application activities that require resource



consents on amenity values, ecosystems values and the quality of the environment have been assessed in Section 6 of this document where it was concluded that such potential effects will be avoided, remedied, or mitigated. On this basis, regard has been had to the requirements of sections 7(b), (c), (d) and (f) and the application is considered to be consistent with all aspects of Section 7 of the Act. It is an efficient use of resources, recognises and maintains the identified values, and maintains the quality of the environment. It does not have more than minor adverse effects on any of these values or aspects of the environment.

In addition, section 8 of the RMA requires “*all persons exercising functions and powers*” under the Act to have regard to the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).

Ngai Tahu, have kaitiakitanga over Murihiku (Southland Region) associated with the proposed MES Land application. SPM have begun communication with Te Ao Marama on behalf of Ngai Tahu Runanga to assess the proposed activity against Ngai Tahu’s Iwi Management to inform the consideration of effects on cultural values. Based on the assessment it is considered that the application is consistent with and upholds the principles of the Treaty.

Given the above assessment, the activities for which resource consents are required for the MES application to land promotes sustainable management and is consistent with Part 2 of the RMA.

13.1.2 Part 6 Considerations – Sections 104 to 107

For any resource consent application, section 104 of the RMA requires the consent authority, in making a decision, to have regard to:

- The actual and potential effects on the environment of allowing the activity (section 104(1)(a)).
- The relevant provisions of any national environmental standard, other regulation, national policy statement, coastal policy statement, regional policy statement or proposed regional policy statement, plan or proposed plan (section 104(1)(b)).
- Any other matters considered relevant or necessary to consider (section 104(1)(c)).
- Given the requirements of section 104(1)(b), relevant statutory documents need to be assessed in relation to the activities for which resource consents are being sought. On this basis, the statutory documents of relevance to this document, which are assessed in Section 8, are:
 - The Southland Regional Policy Statement (SRPS);
 - Regional Effluent Land Application Plan (Land Application Plan);
 - The Regional Water Plan for Southland (Water Plan);
 - The Proposed Water and Land Plan for Southland; and
 - Iwi Management Plan
- The actual and potential effects associated with the activities for which resource consents are being sought have been assessed in Section 6 of this document (section 104(1)(a)). There are no other matters considered relevant or necessary under section 104(1)(c)).
- Section 105 of the RMA provides for matters that consent authorities must have regard to when considering applications for discharge permits. Effectively, section 105 requires:
 - An assessment of the discharges and sensitivity of the environment to adverse effects (section 105(1)(a)).
 - The reason for the proposed choice in relation to the discharges (section 105(1)(b)).
 - An outline of alternative discharge methods and locations (section 105(1)(c)).
- 15 Section 88 of the RMA states that resource consent applications must include an AEE, in accordance with the 4th Schedule of the RMA. As identified in Appendix D, this document contains the information required, where relevant, by the 4th Schedule.



The potential adverse effects on the environment associated with the discharges of MES have been assessed in Section 6 of this document. An overview of SPMs consideration of different treatment and the related disposal options is contained in Section 5 of this document. In relation to the preferred option selected, SPM consider that it will ensure that the actual and potential effects of the discharges will be avoided, remedied, or mitigated provided the proposed control measures are implemented.

Section 107 of the RMA is also of relevance to the land application of MES given that contaminants may enter water (i.e., groundwater). Under this section of the RMA, a consent authority shall not grant a discharge permit if the discharge, after reasonable mixing, gives rise to specific effects, identified in section 107(1)(c) to (g), in the receiving environment.

Given that the treated MES is applied to land, and not to surface water, the effects that have the potential to occur in groundwater relate to "the rendering of fresh water unsuitable for consumption by farm animals" (section 107(1)(f)). The potential effects of the MES application on stock water sourced from groundwater has effectively been assessed in Section 6 of this document and are considered to be less than minor.

Given the mitigation proposed, particularly low application rates, buffer distances to waterways, management of application during time of rainfall and the land has very low susceptibility to overland flow, it is unlikely that the MES will enter any waterways and result in any effects referred to in section 107.

13.2 Summary

The operation of the proposed SPM MES application to land requires two resource consents from Southland Regional Council in order to authorise the discharge of MES to land and the discharge of contaminants to air from the land application process. These activities are discretionary activities in accordance with Rules 5.3.2 of the Regional Water Plan and Rule 5.5.5 of the Regional Air Plan. This application document seeks the required resource consents.

These activities meet the relevant objectives of the SRPS, Regional Water Plan and the Regional Air Plan. The grant of this consent is also consistent with Part 2 of the RMA and will allow for the beneficial use of the MES as an organic fertiliser which enables the wider community to provide for its economic, social, and cultural wellbeing.



14 PROPOSED CONDITIONS

It is proposed that the consent under application here be granted subject to conditions as follows:

1. This consent is granted for a period of 25 years.
2. This consent authorises the discharge of meatworks effluent sludge, sourced from South Pacific Meats plant at Awarua, onto land, and the associated emission of contaminants to air, generally as described in the application, on the Gladvale property, being as follows:
 - Part Section 129 Block VIII Oreti Hundred, Part Lot 5 Block II Deposited Plan 209 and Part Lot 1 Deposited Plan 10524
 - Lot 2 Deposited Plan 479232 and Part Section 128 Block VIII Oreti Hundred and Section 126 Block VIII Oreti Hundred
 - Lot 1 Deposited Plan 14141
 - Part Section 124 Block VIII Oreti Hundred
 - Lot 9 Block Deposited Plan 208
 - Lot 8 Block II Deposited Plan
 - Lot 25 Deposited Plan 203
3. There shall be no meatworks effluent sludge spread on any land which has had other effluent (for example dairy effluent or whey) applied within the preceding 12 months.
4. There shall be no surface runoff/overland flow, ponding, direct discharge to water or contamination of water resulting from the application of the meatworks effluent sludge to land. To this end, each day's land application of meatworks effluent sludge shall **only** be undertaken if and when Southland Regional Council's nearest soil moisture recording site records that soil moisture is sufficiently low to allow effluent application.
5. The application of meatworks effluent sludge is limited to the following:
 - (i) a maximum application of 100 m³/ha for each application, or such volume as will not lead to the exceedance of a rate of 150 kg nitrogen per hectare per year;
 - (ii) in the event that South Pacific Meats dewateres the meatworks effluent sludge to an extent which results in a significant change in nitrogen concentration, then the hydraulic application rate may be changed to ensure that an average application rate of 150 kg nitrogen per hectare per year is not exceeded.
6. There shall not be any discharge of meatworks effluent sludge onto land, including spray drift, within:
 - (i) 20 metres of any surface watercourse;
 - (ii) 100 metres of any potable water abstraction point;
 - (iii) 20 metres of the boundary of any property;
 - (iv) 200 metres of any school, marae, or residential dwelling other than residential dwellings on the property; and
 - (v) onto land that has been identified as having a groundwater aquifer nitrate concentration above 8.5 mg/L based on Environment Southlands Beacon Layer 'Regional High Nitrates 2007-2014, or subsequent versions

(Note: Areas which do not have meatworks effluent sludge applied are "buffer areas")

7. The consent holder shall record the following information:



- (i) the application site;
- (ii) the volume of meatworks effluent sludge applied and the number of hectares per day;
- (iii) environmental complaints, such as odour; and
- (iv) uncontrolled spills and mitigation measures taken.

The information recorded shall be submitted to the Compliance Manager, annually or upon request.

8. The consent holder shall ensure that meatworks effluent sludge applied to land at Gladvale has been sampled and analysed monthly. The sample shall be analysed for:
- (i) pH,
 - (ii) SAR,
 - (iii) Oil and Grease,
 - (iv) Total Solids,
 - (v) Total Nitrogen,
 - (vi) Ammonia-N,
 - (vii) Nitrate-N,
 - (viii) Total Sulphur,
 - (ix) Total Phosphorus,
 - (x) Calcium,
 - (xi) Magnesium,
 - (xii) Sodium, and
 - (xiii) Potassium.

The results of such analyses shall be submitted to the Compliance Manager within 20 working days of the results being made known to the consent holder.

9. There shall be no discharge of odour or spray drift beyond the boundary of the property, as a result of the discharge, that is offensive or objectionable to such an extent that it has an adverse effect on the environment.

10. The consent holder shall:

- (a) Undertake a 5 yearly review of the application method and technology used.
- (b) Prepare a report which describes:
 - i. The current technology used for applying the MES to land,
 - ii. An assessment of available technologies for applying MES to land and the benefit if any of changing the application method. If improved technologies are available but not adopted, the consent holder should provide reasons why
- (c) Provide a copy of the report to the Southland Regional Council, Attention: Compliance Manager by the 30 September of that year the report is completed.

11. The consent holder shall pay an annual administration charge to the Southland Regional Council, collected in accordance with Section 36 of the Resource Management Act 1991, payable in advance on the first day of July each year.

12. The Southland Regional Council may serve notice of its intention to review the conditions of this consent, in accordance with the conditions of this resource consent and Sections 128 and 129 of the Resource Management Act 1991, for the purposes of:



- (i) dealing with any adverse or cumulative effects on the environment which may arise from the exercise of this consent;
- (ii) considering any changes to information on the effects of land discharge of sludge; and
- (iii) complying with the requirements of a regional plan.



15 CONCLUSION

Given the above assessment of effects on the environment, it is considered that it is appropriate to grant, on a **non-notified basis**, for the resource consent sought by SPM under the Resource Management Act 1991. The discharge of MES to land is acknowledged as the preference for discharges rather than to water in the Southland Region. The potential adverse effects of the proposed discharge of contaminants onto land and into air are considered to be less than minor. The proposed activities are not contrary to any of the objectives and policies of the relevant matters set out in Section 104 of the RMA, including the relevant regional plans for the Southland Region.

Overall, it is concluded that the proposal will contribute to the sustainable management of natural and physical resources, avoid unnecessary landfilling of a valuable fertiliser resource for the benefit of Southland community while avoiding, remedying, or mitigating any adverse effects on the environment.

The Applicant seeks a consent term of 25 years for all consents because of the less than minor adverse effects and significant beneficial effects. No parties are considered to be adversely affected. The application of MES has been assessed as being consistent with the purpose and principle of the RMA, other relevant provisions of the RMA, regional plans and policy statements and Iwi Management Plan.



16 REFERENCES

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17 APPENDICES

- Appendix A Figure 1 Farm Map
- Figure 2 MES Application Area
- Figure 3 Gladvale Farms Drainage Map
- Figure 4 Fonterra Whey Application Area
- Appendix B Location Map of Neighbouring Properties
- Appendix C Farm Dairy Effluent and Nitrogen Load Calculation



APPENDIX A

Figure 1 Gladvale Farms Map

Figure 2 MES Application Area

Figure 3 Gladvale Farms Drainage Map

Figure 4 Fonterra Whey Application Area

GV3 Dairy Farm

Dairy Supply No. 32681
360 Oreti Plains Road

Total farm area: 180ha
Total effective area: 172.63ha
Total effluent area: 56ha

ORETI DAIRIES

GV2 Dairy Farm Oreti
Dairy Supply No. 32682
185 Oreti Plains Road

Total farm area: 536ha (447ha + 89ha leased)
Total effective area: 517.64ha (428.64ha + 89ha leased)
Total effluent area: 140.60ha

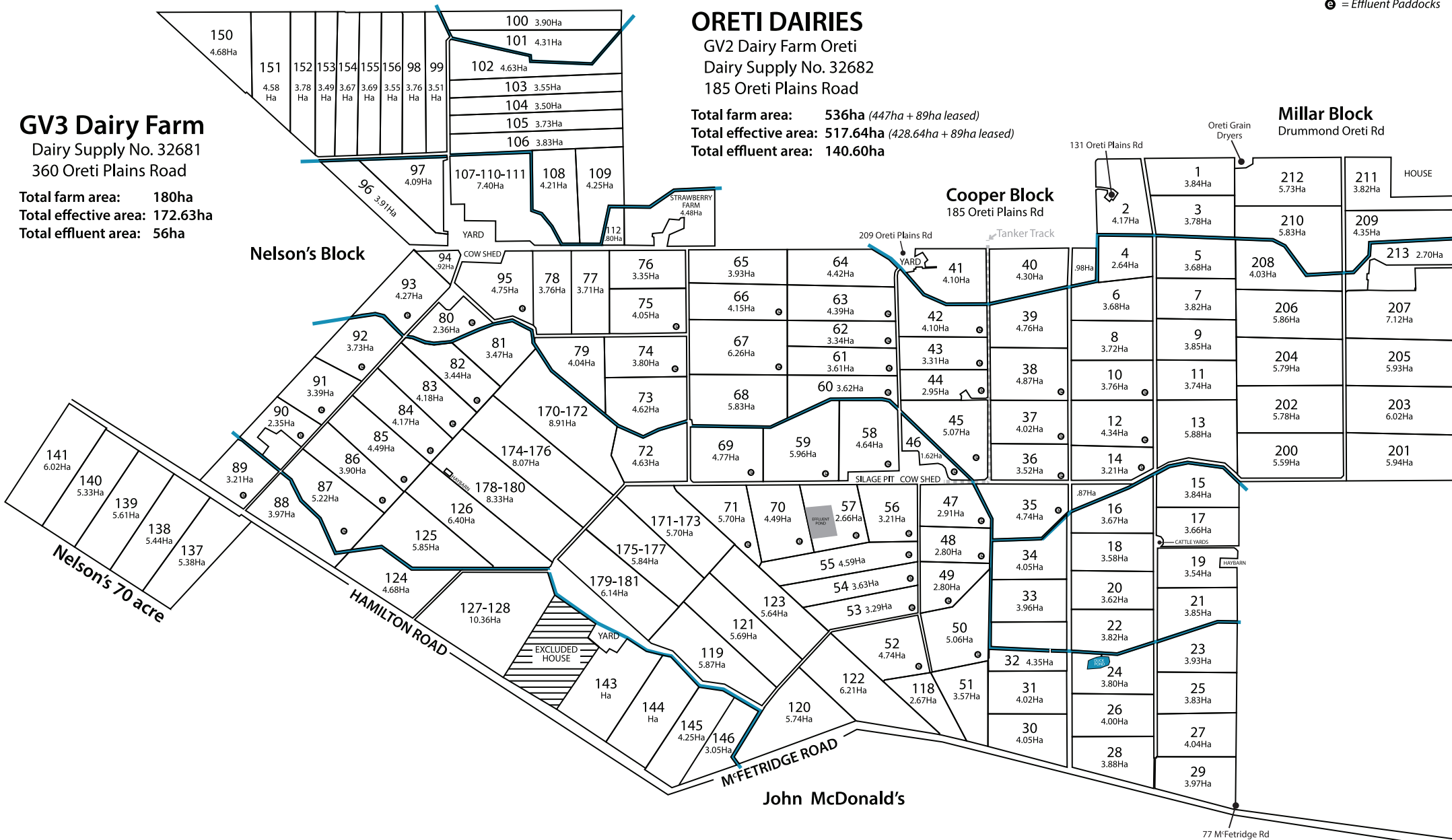
Miller Block

Drummond Oreti Rd

Nelson's Block

Cooper Block

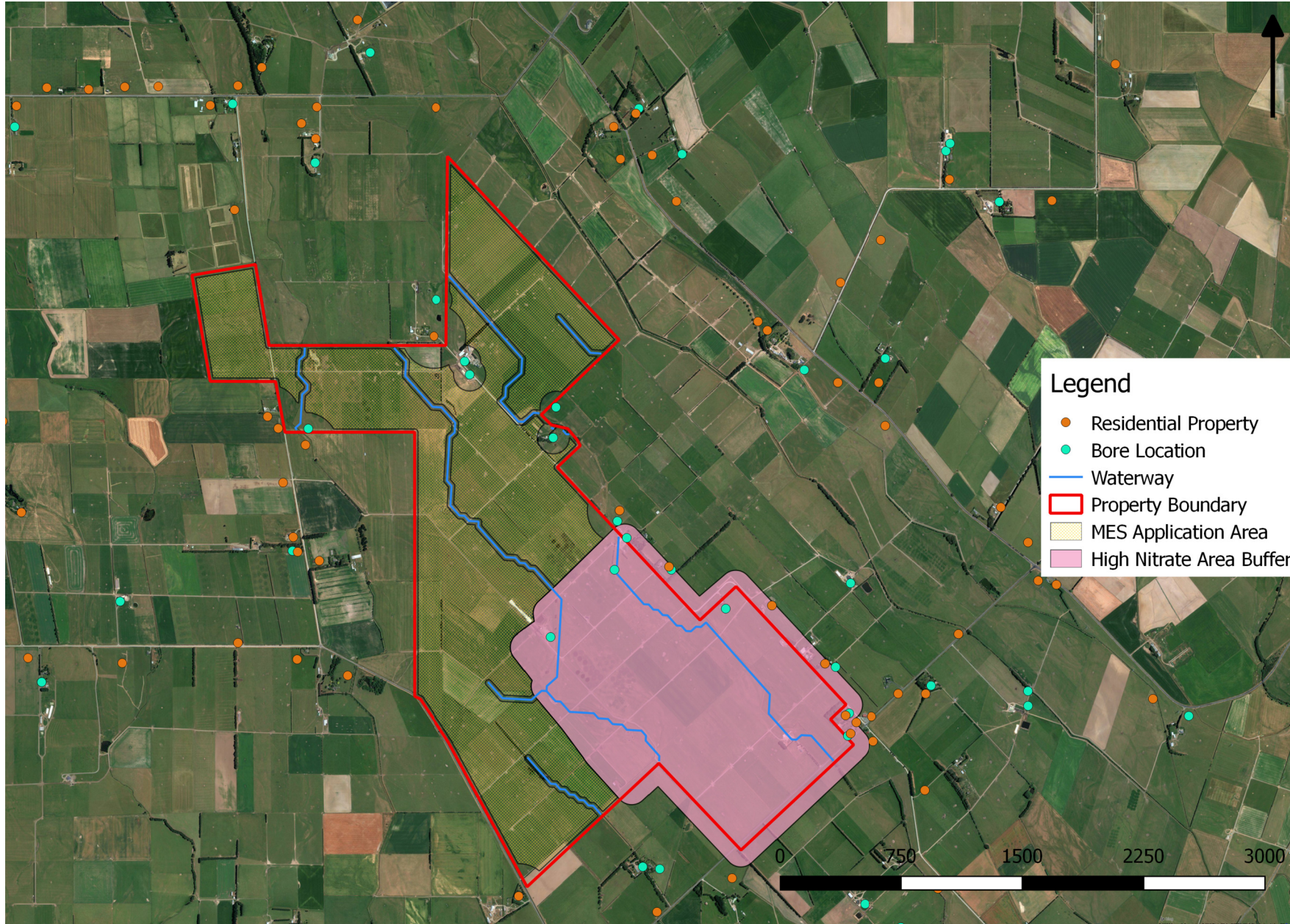
185 Oreti Plains Rd



Nelson's 70 acre

John McDonald's

FIVE ROADS



- Legend**
- Residential Property
 - Bore Location
 - Waterway
 - ▭ Property Boundary
 - ▨ MES Application Area
 - ▭ High Nitrate Area Buffer

NOTES



APPROVED	HL	
DESIGNED	AL	
DRAWN	AL	

CLIENT
South Pacific Meats



PROJECT
10107 - Land Application - Lindsay

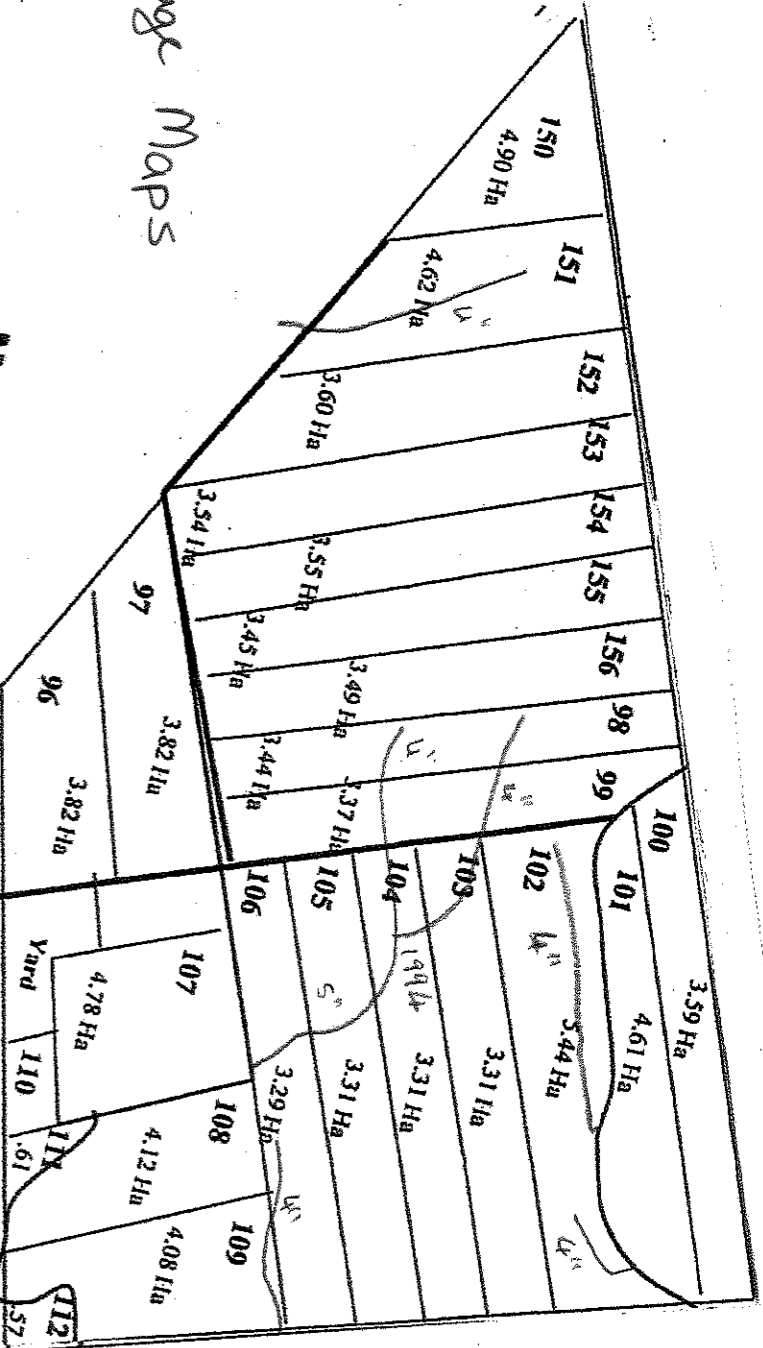
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Figure 3: MES Application Area

DRAWING STATUS
Final

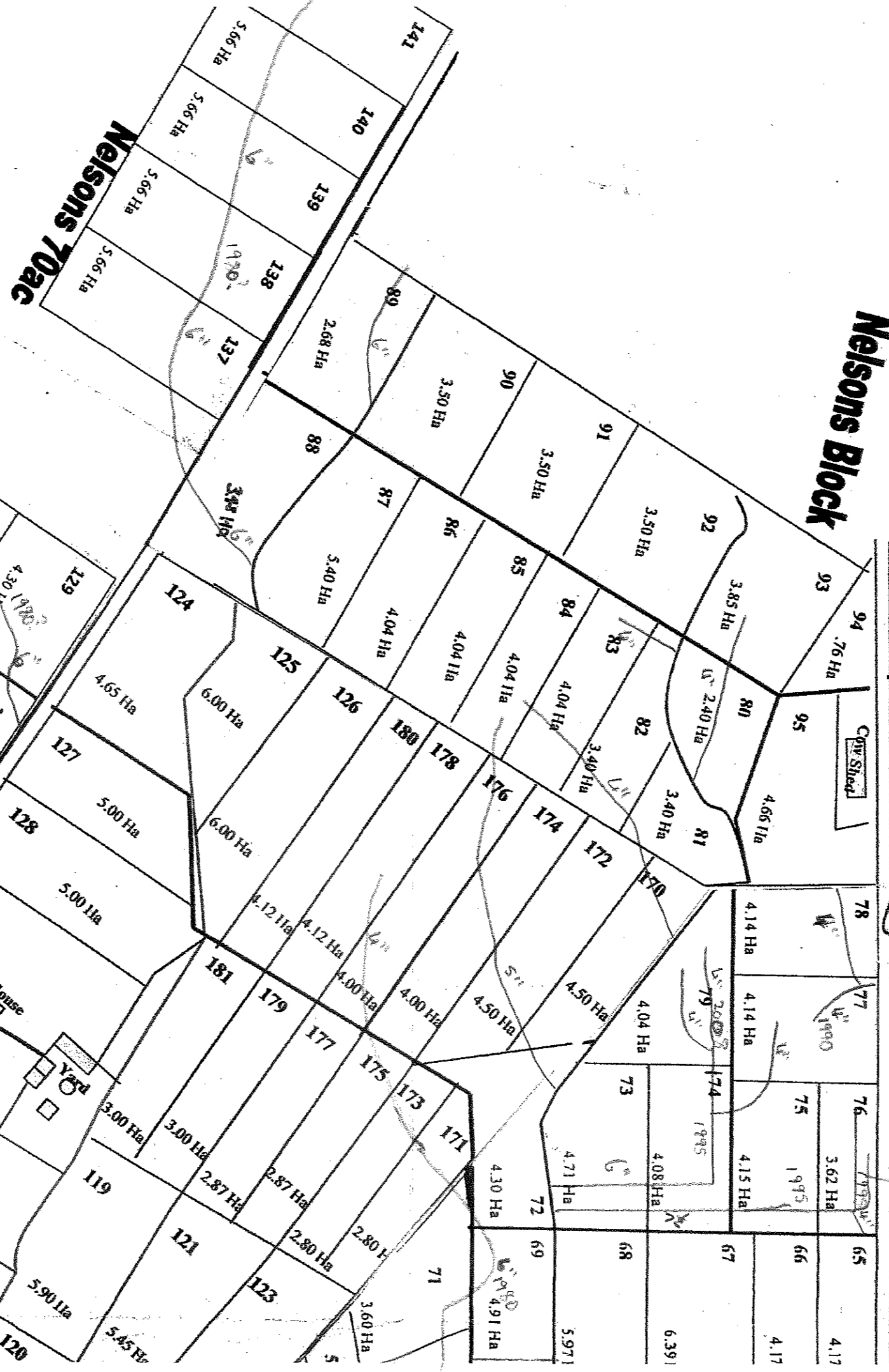
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FILE NAME
P:FI-10107-SPM-Lindsay-F3_MES_application_area-180329-RC

Drainage Maps

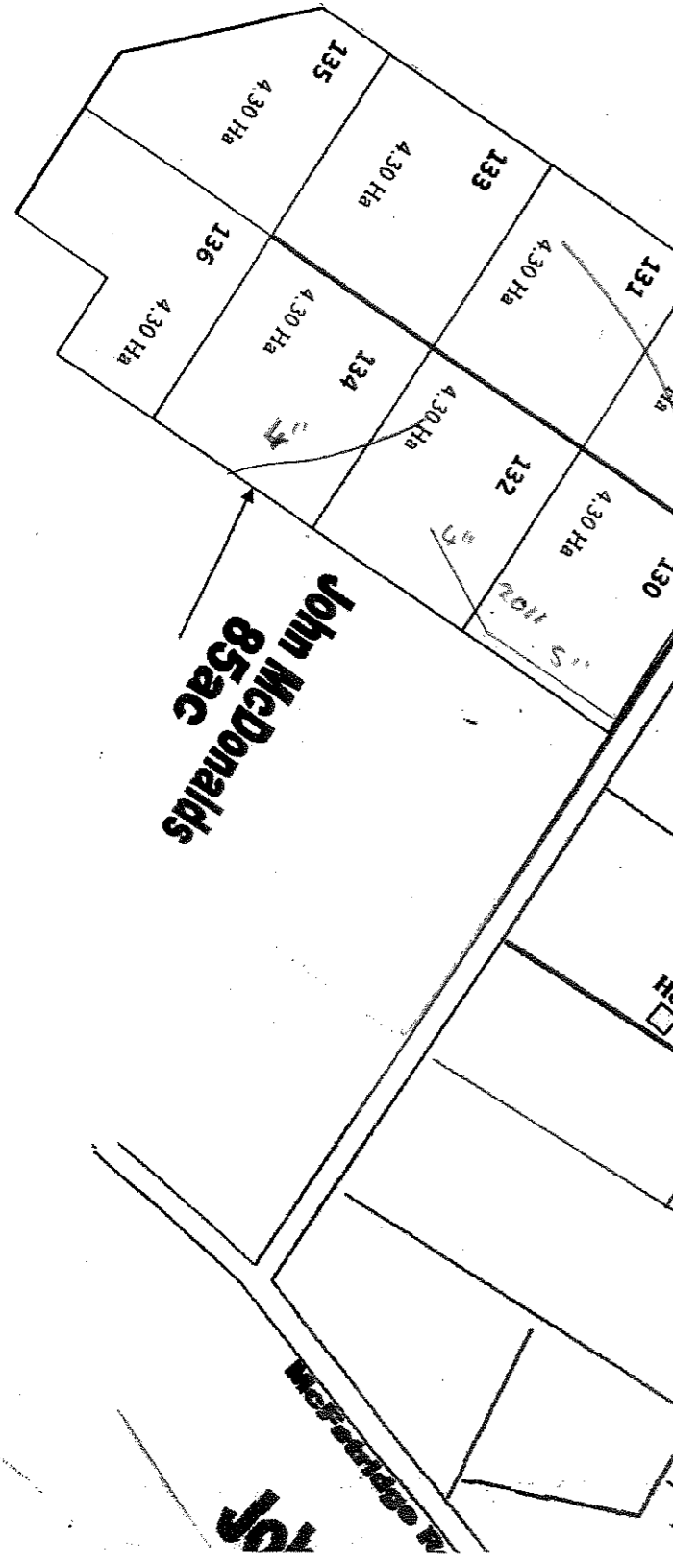


Nelsons Block



Nelsons 70ac

John McDonalds 85ac



Oreti D

McDonalds Rd

House

Yard

Cow Shed

Yard

57

1995

78

77

76

75

65

4.14 Ha

4.14 Ha

3.62 Ha

1.995

4.17

4.04 Ha

4.04 Ha

4.08 Ha

1.995

6.391

4.50 Ha

4.50 Ha

4.71 Ha

4.30 Ha

5.971

4.00 Ha

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1980? is a guess.
Drainage Maps

Varies

209

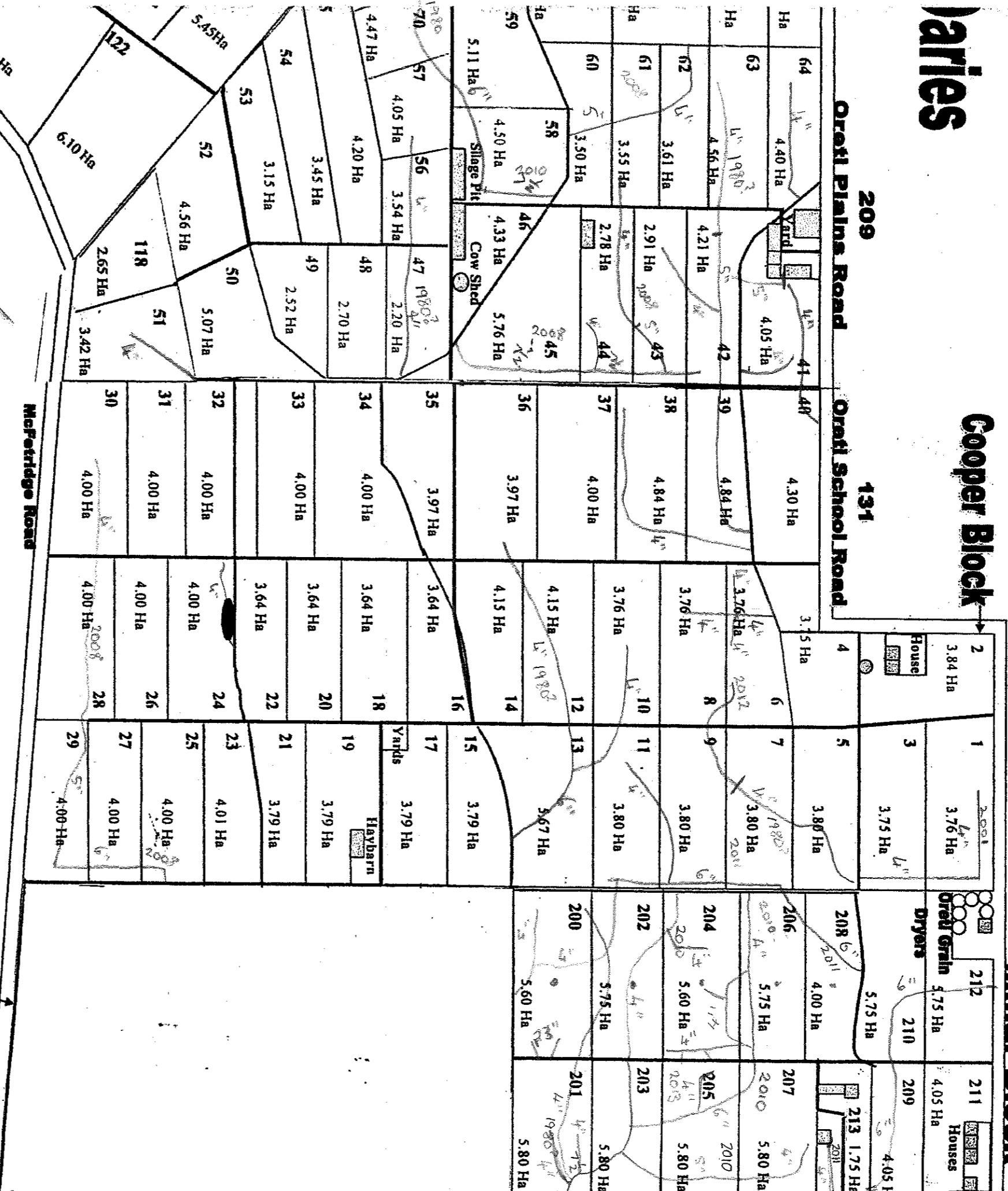
Oretl Plains Road

131

Oretl School Road

Cooper Block

Millar Block



McDonalds

Sutton Block

Five Road

ORETI DAIRIES
 GV2 Dairy Farm Oreti
 Dairy Supply No. 32682
 185 Oreti Plains Road

Total farm area: 536ha (447ha + 89ha leased)
 Total effluent area: 517.64ha (428.64ha + 89ha leased)
 Total effluent area: 140.60ha

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 Dairy Supply No. 32681
 360 Oreti Plains Road

Total farm area: 180ha
 Total effluent area: 172.63ha
 Total effluent area: 56ha



Nelson's Block

Cooper Block

Millar Block

John McDonald's

Nelson's 70 acre



APPENDIX B

Location Map of Neighbouring Properties

Property Owner Names

Date: 26/01/2018



1:25,000



While every effort has been made to ensure the content is correct. Environment Southland cannot guarantee the accuracy of the data. This information should not be reused in any manner without consultation.

DATA SOURCE: ES GIS 2018



APPENDIX C

Farm Dairy Effluent and Nitrogen Load Calculation

Workings for Farm Dairy Effluent for Gladvale Farm based on Farm Dairy Effluent – Design Standards and Code of Practice, Version 3, September 2015.

Parameter	Farm	
	GV2	GV3
Total Cow Numbers Milking	1,700	900
Total Cow Numbers Feedpad	800	
Area Consented (ha)	141	56
Total Time Milking/day	2	2
Total Time on Feedpad/day	1	
Length of Season (days)	287	287
N (kg/cow/day)	0.3	0.3
Volume of manure + urine/cow/day	70	70
Wash Volume (litres)	50	50
Dairyshed FDE/cow/day produced (L/cow/day)	54	54
Feedpad FDE/cow/day produced (L/cow/day)	53	
Dairyshed Total FDE/day (m ³)	92	49
Feedpad Total FDE/day (m ³)	42	
Total FDE/day (m³)	135	49
Total FDE/season (m³)	38,679	14,045
Dairyshed Nutrients Captured/animal/day (kg/cow/day N)	0.019	0.019
Feedpad Nutrients Captured/animal/day (kg/cow/day N)	0.013	
Nitrogen conc in diluted FDE Dairyshed (g/m ³)	345	345
Nitrogen conc in diluted FDE Feedpad (g/m ³)	236	
N kg/m ³ /day from Dairyshed	32	17
N kg/m ³ /day from Feedpad	10	
N per season from Dairyshed (kg)	9,148	4,843
N per season from Feedpad (kg)	2,870	
Total N per season (kg N)	12,018	4,843
Total area required/year for a rate of 150 kg N/ha/year (ha)	80	32

