

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Consent DSN 31827 {Copy} (2016)

FarmParameters



Farm details

Туре	Farm type	Full range
Assessment	Assessment year	2016
Region	Region	Southland
Farm blocks		
Dules Co 4 Efficient	Dt I	120

Puke_6a.1 Effluent	Pastoral	12.9
Puke_6a.1 Effluent Tile	Pastoral	65.9
Puke_6a.1 Effluent Solid Lease	Pastoral	39.5
Puke_6a.1 Effluent SolidTile	Pastoral	37.2
Puke_6a.1Effluent Solid	Pastoral	36.8
Waiki_30a.1 Eff Solids	Pastoral	17.9
Waiki_30a.1 Run Off	Pastoral	23.7
Parah_4a.1 Eff solids	Pastoral	2.7
Parah_4a.1 Run Off	Pastoral	2.9
Apar_2a.1 Eff solids Lease	Pastoral	4.5
Riparian Areas	Riparian	1.2
Total farm area declared in blocks	ha	245.2
Total farm area	ha	249.2
Non-productive area	ha	4

Farm animals

Stock numbers

Stock reconciliation - Dairy Production													
Milk solids				kg/yr			3520	00					
Milk volume yield				l/yr				ntered					
Fat yield				kg/yr			Not e	ntered					
Lactation length				days			Not e	ntered					
Average weight				kg/ar	nimal		Not e	ntered					
Calving times				٥.									
Median calving date							24	August					
Drying off							25	May					
Percent of herd							0						
Stock numbers													
Class	Breed	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
MilkingHerd	F x J cross	32	630	780	760	750	750	700	700	700	650	600	0
Max weight (kg) LW start (kg) 500 0	LW end (kg) 0	CW (kg) Ag 0	je (mont	hs) S	Source	Fate		ex emale	Mated			

Stock management

Dairy - Wintering pad, animal shelter or housing - Da Construction	airy	
Pad type		Uncovered wintering pad
Pad surface		Carbon rich (sawdust, bark, woodchips)
Lined or subsurface drainage capture		True
Surface craped regularly		False
Liquid effluent management		
Added to farm dairy effluent		True
Solid effluent management		
Solid management method		Spread on selected blocks
Storage method		No Storage
Time spent on structure		
May	30	8
July	100	20
August	60	8
September	30	8

Animal excreta distribution

No difference between blocks Relative productivity assessment method All blocks have a relative productivity value of 1

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Ratio of stock on blocks can differ from the farm stock ratios

Farm dairy effluent management system

Effluent management method Holding pond

Solid separation and disposal True

Solid separation

Seperated solids management Spread on selected blocks

Storage method Open months

Time in storage Pond solids

Pond solids management method

Spread on selected blocks

Pond emptied every years Liquid effluent

Liquid management method Spray infrequently

Animal health supplements

Animal - Dairy

No animal supplementation has been entered

Animal - Dairy replacements

No animal supplementation has been entered

Left over feeding

No left over feeding specified

Stored supplements

Supplement information

Conservation type Baleage

Name

Supplement amount

Dry weight basis Т 80

Fed to animal: Dairy

No timing of feeding has been specified

Imported supplements

Supplement information

Conservation type

Name Pasture good quality silage

Supplement amount

Dry weight basis

Fed on blocks: Puke_6a.1 Effluent, Puke_6a.1 Effluent Tile, Puke_6a.1 Effluent Solid Lease, Puke_6a.1 Effluent SolidTile, Puke_6a.1Effluent Solid, Waiki_30a.1 Eff Solids, Parah_4a.1 Eff solids, Apar_2a.1 Eff solids Lease

No timing of feeding has been specified

Supplement information

Conservation type Process byproducts Palm kernel meal Name

Supplement amount

Dry weight basis

Fed on blocks: Puke 6a.1 Effluent, Puke 6a.1 Effluent Tile, Puke 6a.1 Effluent Solid Lease, Puke 6a.1 Effluent SolidTile, Puke_6a.1Effluent Solid, Waiki_30a.1 Eff Solids, Parah_4a.1 Eff solids, Apar_2a.1 Eff solids Lease

No timing of feeding has been specified

Supplement information

Supplement amount

Conservation type

Pasture good quality silage Name

Dry weight basis Т 200 Utilisation Very good

Destination Wintering pad, animal shelter or housing

Animal

Greenhouse gas emission factors

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Enteric methane	- g methane/	kg DMI intake
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Sheep 20.9 Beef 21.6 Deer 21.3 Goats 20.9 Camelids 20.9	Dairy		21.6
Beef 21.6 Deer 21.3 Goats 20.9 Camelids 20.9 Young sheep 16.8 Horses kg methane/RSU 1.8	Dairy replacements		21.6
Deer 21.3 Goats 20.9 Camelids 20.9 Young sheep 16.8 Horses kg methane/RSU 1.8	Sheep		20.9
Goats 20.9 Camelids 20.9 Young sheep 16.8 Horses kg methane/RSU 1.8	Beef		21.6
Camelids 20.9 Young sheep 16.8 Horses kg methane/RSU 1.8	Deer		21.3
Young sheep 16.8 Horses kg methane/RSU 1.8	Goats		20.9
Horses kg methane/RSU 1.8	Camelids		20.9
3 ,	Young sheep		16.8
User defined kg methane/RSU 1.5	Horses	kg methane/RSU	1.8
	User defined	kg methane/RSU	1.5

Dung methane - g methane/kg dung

build illetilatie - a illetilatie, ka autig	
Dairy	0.982
Dairy replacements	0.982
Sheep	0.691
Beef	0.982
Deer	0.915
Goats	0.691
Other	0.691

Nitrous oxide

Use farm specific emission factors

Fuel and electricity

Embodied CO2 emissions		
Diesel	kg CO2 equivalents/litre	2.989
Petrol	kg CO2 equivalents/litre	2.773
Electricity	kg CO2 equivalents/kWh	0.271
Energy emissions		
Diesel	MJ / litre	42.24
Petrol	MJ / litre	42.4

Electricity

Use NZ national inventory

Allocation

Allocation method Enter actual allocation figures

MJ / kWh

8.21

Report settings

Greenhouse gas emission report units: CO2 equivalents (kg/ha/yr)

Target N application rate as effluent: kg N/ha/yr

Fertiliser costs \$/kg nutrient

	+, j .					
N	Р	K	S	Ca	Mg	Na
1.45	3.5	2.4	0.35	0.2	1.4	0.8

Block Information

Block - Puke 6a.1 Effluent

JOCK TAKE_OUT ETHICHE		
Block name		Puke_6a.1 Effluent
Block type		Pastoral
Area	ha	12.9
Relative productivity		1
Pasture block type		No
Topography		Flat
Distance from coast	km	25
Cultivated in last 5 years		False

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Conservation type



					*
Fodder rotates t	hrough				No
<i>Climate</i> Annual averag Mean annual t		ıre		mm/yr	1096 10.1
Seasonal varia Annual potenti Seasonal varia	ntion in ra ial evapot	infall transpiration		mm	731-1450 mm, Low 712 Moderate
Soil description Soil order (def Soil group (de					Pallic Recent/YGE/BGE
SMaps Sibling					Pukem_6a.1
Date downlo Wilting point				0 - 30cm 30 - 60cm	Unknown 22 25
Field capacit	у			> 60 0 - 30cm 30 - 60cm	1 40 41
Saturation				> 60 0 - 30cm 30 - 60cm > 60	2 54 48 3
Natural drair Depth to imp Top soil hori	peded lay	er	cal parameters	cm	Poor Not entered
ASC/PR Bulk densit			our paramotors	% kg/m³	22 1220
Clay Sand	,			% %	27 9
Sub soil Sub soil cla	ау			%	29
Soil profile Profile drainag					Use default
Top soil textur Maximum root Depth to impe	ing depth			m	Silt loam 0.58 0.58
Soil drainage Drainage meth	nod				
Method Hydrophobic cor Occurence of pu	ndition Igging dai	mage			None Use default Occasional
Compacted top	soil				False
Soil settings K leaching pot N immobilisati					
	QT K 9.6	QT Ca 10	QT Mg 28.6	QT Na 9.6	
Organic S Anion storage TBK reserve K K reserve stat	capacity test				15 Not entered Not entered Use default
<i>Pasture</i> Pasture type Clover levels					Ryegrass/white clove Use default
Supplements rea	ıformatior	า			Raloago

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Name



Wrapping Wrapped in plastic Supplement amount
Dry weight basis T 12

Destination Storage Storage conditions Average

Fertiliser application

Fertiliser products - December
Category
User defined

Product 2/3 Super & Lime

Amount kg/ha 750 Fertiliser products - August

Category Ravensdown cropping

Product Ammo 36

Amount kg/ha 100 Fertiliser products - October

Category User defined

Product Eff - Urea + Se

Amount kg/ha 61
Fertiliser products - September

Category User defined Product UREA BULK

Amount kg/ha 70

Fertiliser products - February
Category
User defined

Product UREA BULK

Amount kg/ha 40 Fertiliser products - December

Category User defined

Product UREA BULK Amount kg/ha 40

Fertiliser products - March

Category Ravensdown other

Product Urea
Amount kg/ha 60
Fertiliser products - April

Category Ravensdown other

Product Urea Amount kg/ha 50

Fertiliser products - May

Category Ravensdown other

Product Urea Amount kg/ha 20

Irrigation
No irrigation entered

Animals on block
Animals grazing
Dairy % 0

Dairy % 0
Water connectivity

Direct access to streams False

Animal grazing
January True
February True
March True
April True
May True
August True
September True

OctoberTrueNovemberTrueDecemberTrue

ha

km

mm

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FarmParameters



Effluent application

Liquid effluents

Receives farm dairy effluent

Effluent application depth

Percentage of block effluent applied to

Monthy applications of liquid effluent

January, February, March, April, September, October, November, December

Low application method

Block - Puke 6a.1 Effluent Tile

Block name Block type

Area

Relative productivity

Pasture block type Topography

Distance from coast Cultivated in last 5 years

Fodder rotates through

Climate

Annual average rainfall Mean annual temperature

Seasonal variation in rainfall

Annual potential evapotranspiration Seasonal variation in PET

Soil description

Soil order (default)

Soil group (default) **SMaps**

Sibling

Date downloaded

Wilting point

Field capacity

Saturation

Natural drainage class

Depth to impeded layer

Top soil horizon chemical and physical parameters

ASC/PR

Bulk density Clay Sand

Sub soil

Sub soil clay

Soil profile

Profile drainage class Top soil texture

Maximum rooting depth Depth to impeded drainage layer

Soil drainage

Drainage method Method

Percent of paddock drained

Hydrophobic condition Occurence of pugging damage

Compacted top soil

Puke 6a.1 Effluent Tile

Pastoral 65.9

Nο Flat 25

> False Nο

mm/yr 1096

10.1

731-1450 mm, Low 712

Moderate

Pallic

Recent/YGE/BGE

Pukem 6a.1

Unknown

22

25 1

54

0 - 30cm 40 30 - 60cm

41 2

> 60 0 - 30cm 30 - 60cm

0 - 30cm

> 60

> 60

cm

%

%

%

%

kg/m³

30 - 60cm

48 3

Poor

Not entered

22 1220

27 9

Use default

29

m

Silt loam 0.58

0.58

Mole/tile system

100 Use default

Occasional False

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FarmParameters



Soil settings

K leaching potential not set N immobilisation status

Soil tests

Olsen P QT K QT Ca QT Mg QT Na 38.2 9.6 28.6 9.6

Organic S 15

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

Pasture

Pasture type Ryegrass/white clover

Clover levels Use default

Supplements removed Supplement information

Conservation type Baleage Name

Wrapping Wrapped in plastic

Supplement amount Т 60 Dry weight basis

Destination Storage Storage conditions Average

Fertiliser application

Fertiliser products - December

Category User defined Product 2/3 Super & Lime

750 Amount kg/ha

Fertiliser products - August

Category Ravensdown cropping

Ammo 36 Product 100

kg/ha Amount Fertiliser products - October

Category User defined Product Eff - Urea + Se

61 Amount kg/ha

Fertiliser products - September

Category User defined **UREA BULK** Product

Amount kg/ha

Fertiliser products - February Category User defined

UREA BULK Product 40

Amount kg/ha Fertiliser products - December

Category User defined Product **UREA BULK**

kg/ha 40 Amount

Fertiliser products - March Category Ravensdown other

Product Urea

Amount kg/ha 60 Fertiliser products - April

Ravensdown other Category Product Urea

50 Amount kg/ha

Fertiliser products - May Ravensdown other Category

Product Urea Amount kg/ha 20

%

ha

km

mm/yr

mm

0 - 30cm

0 - 30cm

0 - 30cm

30 - 60cm

> 60

> 60

> 60

30 - 60cm

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Irrigation

No irrigation entered

Animals on block

Animals grazing

Dairy

Water connectivity

Direct access to streams

Animal grazing

January

February March

April May August

September October

November

December

Effluent application Liquid effluents

. Receives farm dairy effluent

Effluent application depth

Percentage of block effluent applied to

Monthy applications of liquid effluent

January, February, March, April, September, October, November, December

Block - Puke_6a.1 Effluent Solid Lease Block name

Block type Area

Relative productivity Pasture block type

Topography Distance from coast Cultivated in last 5 years

Fodder rotates through

Climate

Annual average rainfall Mean annual temperature

Seasonal variation in rainfall

Annual potential evapotranspiration Seasonal variation in PET

Soil description

Soil order (default)

Soil group (default)

SMaps Sibling

Date downloaded Wilting point

Field capacity

Saturation

Natural drainage class Depth to impeded layer

Top soil horizon chemical and physical parameters

Low application method

Puke_6a.1 Effluent Solid Lease **Pastoral** 39.5

0

False

True

1 No Flat

25 False No

1096 10.1

731-1450 mm, Low

712 Moderate

Pallic

Recent/YGE/BGE

Pukem 6a.1 Unknown

22 25

1 40 30 - 60cm 41 2

48 3 Poor

54

Not entered

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ASC/PR	%	22
Bulk density	kg/m³	1220
Clay	%	27
Sand	%	9
Sub soil		
Sub soil clay	%	29

Soil profile

Profile drainage class Use default Top soil texture Silt loam Maximum rooting depth 0.58 m Depth to impeded drainage layer 0.58

Soil drainage

Drainage method Method None Hydrophobic condition Use default Occurence of pugging damage Occasional Compacted top soil False

Soil settings

K leaching potential not set N immobilisation status

Soil tests

QT K Olsen P QT Mg QT Ca QT Na 30

QT SO4 5 Anion storage capacity or phosphate retention Not entered TBK reserve K test Not entered K reserve status Use default

Pasture

Pasture type Ryegrass/white clover

Clover levels Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - December Category User defined

Product 2/3 Super & Lime

Amount kg/ha

Fertiliser products - August

Ravensdown cropping Category

Ammo 36 Product

kg/ha 100 Amount Fertiliser products - October

Category User defined

Product Eff - Urea + Se

Amount kg/ha 61 Fertiliser products - September

Category User defined

UREA BULK Product 70 Amount kg/ha

Fertiliser products - February User defined Category

Product **UREA BULK**

40 kg/ha Amount Fertiliser products - December

Category User defined

Product **UREA BULK**

40 Amount kg/ha Fertiliser products - March

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FarmParameters



Category Ravensdown other

Product Urea Amount kg/ha

Fertiliser products - April

Category Ravensdown other Product Urea

Amount kg/ha 50

Fertiliser products - May Ravensdown other Category

Product Urea

Amount 20 kg/ha

Fertiliser products - January

Category Ravensdown other Product Urea

Amount kg/ha 60

Fertiliser products - November

Category Ravensdown other Urea Product

40

Amount kg/ha Fertiliser products - December

Ravensdown other Category

Product Potassium chloride

Amount 50 kg/ha

Irrigation No irrigation entered

Animals on block Animals grazing

% 0 Dairy

Water connectivity Direct access to streams False

Animal grazing January True **February** True March True

April True Mav True July True August True September True October True

November True December True

Effluent application

Solid effluents Effluent type added December Pond solids/sludge

Effluent type added January Holding pond separated solids Effluent type added November Solids from wintering pad

Block - Puke_6a.1 Effluent SolidTile

Block name Puke 6a.1 Effluent SolidTile

Block type Pastoral ha 37.2 Area Relative productivity 1 Pasture block type No Topography Flat

Distance from coast km 25 Cultivated in last 5 years False No

Fodder rotates through Climate

Annual average rainfall 1096 mm/yr Mean annual temperature 10.1

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FarmParameters



					•
Annual pote	ariation in rair ential evapotr ariation in PE1	anspiration		mm	731-1450 mm, Low 712 Moderate
Soil descripti Soil order (Soil group (SMaps	default)				Pallic Recent/YGE/BGE
Sibling Date dow	nloaded				Pukem_6a.1 Unknown
Wilting po	oint			0 - 30cm 30 - 60cm	22 25
Field capa	acity			> 60 0 - 30cm 30 - 60cm > 60	1 40 41 2
Saturation			0 - 30cm 30 - 60cm > 60	54 48 3	
Depth to	rainage class impeded laye			cm	Poor Not entered
ASC/PR Bulk de		cal and physic	al parameters	% kg/m³	22 1220
Clay Sand	nsicy			% %	27 9
Sub soil Sub soil				%	29
		ge laver		m	Use default Silt Ioam 0.58 0.58
Soil drainage Drainage m Method Percent o Hydrophobic	nethod f paddock dra condition pugging dam	ined			Mole/tile system 100 Use default Occasional False
	potential not s sation status	set			
Soil tests Olsen P 35	QT K 8	QT Ca 10	QT Mg 22	QT Na 8	_
QT SO4 Anion stora TBK reserve K reserve s	e K test	r phosphate re	etention		5 Not entered Not entered Use default
<i>Pasture</i> Pasture typ Clover leve					Ryegrass/white clover Use default
Supplements No supplem		d from this blo	ock		
Fertiliser app Fertiliser pr Category	<i>lication</i> oducts - Dece	ember			User defined
Product					2/3 Super & Lime

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October

November



1000 kg/ha Amount Fertiliser products - August Category Ravensdown cropping Product Ammo 36 Amount kg/ha 100 Fertiliser products - October Category User defined Eff - Urea + Se Product Amount kg/ha Fertiliser products - September User defined Category **UREA BULK** Product **Amount** kg/ha 70 Fertiliser products - February User defined Category **UREA BULK** Product Amount kg/ha 40 Fertiliser products - December User defined Category Product **UREA BULK** Amount kg/ha 40 Fertiliser products - March Category Ravensdown other Product Urea 60 Amount kg/ha Fertiliser products - April Category Ravensdown other Product Urea 50 Amount kg/ha Fertiliser products - May Category Ravensdown other Product Urea Amount kg/ha Fertiliser products - January Category Ravensdown other Urea Product Amount kg/ha Fertiliser products - November Ravensdown other Category Product Urea Amount kg/ha 40 Fertiliser products - December Category Ravensdown other Product Potassium chloride Amount kg/ha 50 Irrigation No irrigation entered Animals on block Animals grazing Dairy % 0 Water connectivity Direct access to streams False Animal grazing True January February True March True April True May True July True August True September True

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True

True

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Pukem_6a.1

Unknown

58

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December	True
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Effluent application	
Solid effluents	

Effluent type added December Pond solids/sludge
Effluent type added January Holding pond separated solids
Effluent type added November Solids from wintering pad

Block - Puke_6a.1Effluent Solid

Puke 6a.1Effluent Solid Block name Block type **Pastoral** Area ha 36.8 Relative productivity Pasture block type No Topography Flat Distance from coast km 25 Cultivated in last 5 years False Fodder rotates through No

Climate

Annual average rainfall mm/yr 1096
Mean annual temperature 10.1
Seasonal variation in rainfall 731-1450 mm, Low
Annual potential evapotranspiration mm 712
Seasonal variation in PET Moderate

Soil description

Soil order (default)
Soil group (default)
Pallic
Recent/YGE/BGE

SMaps Sibling Date downloaded Wilting point

22 0 - 30cm 30 - 60cm 25 > 60 1 Field capacity 0 - 30cm 40 30 - 60cm 41 > 60 2 Saturation 0 - 30cm 54 30 - 60cm 48 > 60 3 Natural drainage class Poor

Depth to impeded layer
Top soil horizon chemical and physical parameters

ASC/PR % 22 Bulk density kg/m³ 1220 Clav % 28 Sand % 9 Sub soil % 29 Sub soil clay

Soil profile

Profile drainage class
Use default
Top soil texture
Maximum rooting depth
Depth to impeded drainage layer

Use default
Silt loam
0.58
0.58

Soil drainage

Drainage method
Method
None
Hydrophobic condition
Use default
Occurence of pugging damage
Compacted top soil

None
Use default
False

Soil settings

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K leaching potential not set N immobilisation status

Soil tests

QT K QT Ca QT Mg QT Na Olsen P 35

QT SO4 5

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

Pasture

Ryegrass/white clover Pasture type

Clover levels Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - December

Category User defined 2/3 Super & Lime Product

1000 Amount kg/ha

Fertiliser products - August

Category Ravensdown cropping

Ammo 36 Product kg/ha 100

Amount Fertiliser products - October

User defined Category Eff - Urea + Se Product

Amount kg/ha 61

Fertiliser products - September

User defined Category Product **UREA BULK**

Amount kg/ha 70

Fertiliser products - February User defined Category

UREA BULK Product 40

Amount kg/ha Fertiliser products - December

User defined Category **UREA BULK** Product

Amount kg/ha

Fertiliser products - March

Category Ravensdown other

Product Urea Amount kg/ha 60

Fertiliser products - April Ravensdown other Category

Product Urea

50 Amount kg/ha

Fertiliser products - May Ravensdown other Category

Product Urea

kg/ha 20 Amount

Fertiliser products - January Category Ravensdown other

Urea Product Amount kg/ha 60

Fertiliser products - November

Category Ravensdown other

Product Urea kg/ha 40

Amount Fertiliser products - December

Ravensdown other Category

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Product Amount kg/ha 50 Irrigation No irrigation entered Animals on block Animals grazing Dairy			
No irrigation entered		kg/ha	
Animals grazing Dairy Water connectivity Water connectivity Direct access to streams False			
Water connectivity			
Direct access to streams	•	%	0
January	Direct access to streams		False
March	January		
May July True True August August September October October October November December December December True True True True True True True True True	·		
July	•		
September	July		True
November December True True True True Effluent application Solid effluents Effluent type added December Holding pond separated solids Effluent type added November Solids from wintering pad Block - Waiki_30a.1 Eff Solids Block name Pastoral Block type Pastoral Area Pastoral Area Pasture block type Pastoral Area Pasture block type Pastoral Flat Pasture block type Pastoral Area Pasture block type Pastoral Anal state of type Pastoral Anal state of type Pastoral Annual state of type Pastoral Annual average rainfall Pastorates Pastoral Annual average rainfall Pastorates Pastoral Annual average rainfall Pastorates Pastoral Annual potential evapotranspiration PET Pastoratorates Pastoral Soli order (default) Pastoration in PET Pastoratorates Pastoratorates Pastoratorates Pastoratorates Pastoratorates Pastoratorates Pastoratoratoratoratoratoratoratoratoratora	September		True
Effluent application Solid effluents Effluent type added Block - Waiki_30a.1 Eff Solids Block name Block type Area Area Area Area Area Area Area Are			
Solid effluents Effluent type added Block - Waiki_30a.1 Eff Solids Block name Block type Block type Area Area Anea Alea 17.9 Relative productivity Pasture block type Topography Distance from coast Cultivated in last 5 years Fodder rotates through Climate Annual average rainfall Mean annual temperature Seasonal variation in rainfall Annual potential evapotranspiration Soil order (default) Soil group (defaul	December		True
Effluent type added Effluent type added Effluent type added November Solids from wintering pad S			
Block - Waiki_30a.1 Eff Solids Block name Block type Pastoral	Effluent type added		
Block name Walki_30a.1 Eff Solids		•	
Block type			
Relative productivity 1 Pasture block type No Topography Flat Distance from coast km 25 Cultivated in last 5 years False Fodder rotates through No Climate Annual average rainfall mm/yr 1096 Mean annual temperature 10.1 731-1450 mm, Low Seasonal variation in rainfall 712 Moderate Soil description Moderate Moderate Soil description Soil order (default) Sedimentary Soil group (default) Sedimentary SMaps Waiki_30a.1 Unknown Wilting point 0 - 30cm 21 30 - 60cm 25 5 Field capacity 0 - 30cm 42 30 - 60cm 43 Saturation 0 - 30cm 59 30 - 60cm 52 > 60 49 Natural drainage class Well			
Pasture block type No Topography Flat Distance from coast km 25 Cultivated in last 5 years False Fodder rotates through No Climate Annual average rainfall mm/yr 10.96 Mean annual temperature 10.1 10.1 Seasonal variation in rainfall 731-1450 mm, Low Annual potential evapotranspiration mm 712 Seasonal variation in PET Moderate Soil description Soil order (default) Brown Soil group (default) Sedimentary SMaps Waiki_30a.1 Sibling Waiki_30a.1 Date downloaded Unknown Wilting point 0 - 30cm 21 30 - 60cm 23 > 60 25 Field capacity 0 - 30cm 42 30 - 60cm 50 Saturation 0 - 30cm 59 30 - 60cm 52 > 60 49		ha	
Distance from coast	Pasture block type		No
Fodder rotates through	Distance from coast	km	25
Annual average rainfall mm/yr 1096 Mean annual temperature 10.1 Seasonal variation in rainfall 731-1450 mm, Low Annual potential evapotranspiration mm 712 Seasonal variation in PET Moderate Soil description Soil order (default) Brown Soil group (default) Sedimentary SMaps Sibling Waiki_30a.1 Date downloaded Unknown Wilting point 0 - 30cm 21 30 - 60cm 23 > 60 25 Field capacity 0 - 30cm 42 30 - 60cm 41 > 60 43 Saturation 0 - 30cm 59 30 - 60cm 52 > 60 49 Natural drainage class Well			
Mean annual temperature 10.1 Seasonal variation in rainfall 731-1450 mm, Low Annual potential evapotranspiration mm 712 Seasonal variation in PET Moderate Soil description Brown Soil group (default) Sedimentary SMaps Waiki_30a.1 Sibling Unknown Date downloaded Unknown Wilting point 0 - 30cm 21 30 - 60cm 23 > 60 25 Field capacity 0 - 30cm 42 30 - 60cm 41 > 60 43 Saturation 0 - 30cm 59 30 - 60cm 52 > 60 49 Natural drainage class Well		mm/vr	1006
Annual potential evapotranspiration Seasonal variation in PET Soil description Soil order (default) Soil group (default) Soil group (default) SMaps Sibling Date downloaded Wilting point 0 - 30cm Wilting point 0 - 30cm 21 30 - 60cm 23 > 60 25 Field capacity 5 edimentary Vaiki_30a.1 Unknown 21 30 - 60cm 23 > 60 25 Field capacity 0 - 30cm 42 30 - 60cm 41 > 60 43 Saturation 5 edimentary Waiki_30a.1 Unknown 21 30 - 60cm 50 50 41 Soil group (default) Sedimentary Sedimentary Sedimentary Waiki_30a.1 Unknown 21 30 - 60cm 52 30 - 60cm 59 30 - 60cm 59 30 - 60cm 59 30 - 60cm 50 49 Natural drainage class	Mean annual temperature	11111/y1	10.1
Seasonal variation in PET Moderate Soil description Brown Soil group (default) Sedimentary SMaps Waiki_30a.1 Sibling Unknown Date downloaded Unknown Wilting point 0 - 30cm 21 30 - 60cm 23 > 60 25 Field capacity 0 - 30cm 42 30 - 60cm 41 > 60 43 Saturation 0 - 30cm 59 30 - 60cm 52 > 60 49 Natural drainage class Well		mm	
Soil order (default) Brown Soil group (default) Sedimentary SMaps Waiki_30a.1 Sibling Unknown Date downloaded Unknown Wilting point 0 - 30cm 21 30 - 60cm 23 > 60 25 Field capacity 0 - 30cm 42 30 - 60cm 41 > 60 43 Saturation 0 - 30cm 59 30 - 60cm 52 > 60 49 Natural drainage class Well	Seasonal variation in PET		Moderate
Soil group (default) Sedimentary SMaps Waiki_30a.1 Sibling Unknown Date downloaded Unknown Wilting point 0 - 30cm 21 30 - 60cm 23 > 60 25 Field capacity 0 - 30cm 42 30 - 60cm 41 > 60 43 Saturation 0 - 30cm 59 30 - 60cm 52 > 60 49 Natural drainage class Well			Brown
Sibling Waiki_30a.1 Date downloaded Unknown Wilting point 0 - 30cm 21 30 - 60cm 23 > 60 25 Field capacity 0 - 30cm 42 30 - 60cm 41 > 60 43 Saturation 0 - 30cm 59 30 - 60cm 52 > 60 49 Natural drainage class Well	Soil group (default)		Sedimentary
Wilting point 0 - 30cm 21 30 - 60cm 23 > 60 25 Field capacity 0 - 30cm 42 30 - 60cm 41 > 60 43 Saturation 0 - 30cm 59 30 - 60cm 52 > 60 49 Natural drainage class Well	Sibling		
> 60 25 Field capacity 0 - 30cm 42 30 - 60cm 41 > 60 43 Saturation 0 - 30cm 59 30 - 60cm 52 > 60 49 Natural drainage class Well			
Field capacity 0 - 30cm 42 30 - 60cm 41 > 60 43 Saturation 0 - 30cm 59 30 - 60cm 52 > 60 49 Natural drainage class Well			
> 60 43 Saturation 0 - 30cm 59 30 - 60cm 52 > 60 49 Natural drainage class Well	Field capacity	0 - 30cm	42
30 - 60cm 52 > 60 49 Natural drainage class Well	_	> 60	43
Natural drainage class Well	Saturation		
	Natural drainage class	> 60	
		cm	

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Mark Crawford

Client reference:

Farm name: NB 2016 -17 Consent DSN 31827 {Copy} (2016)

FarmParameters



Top soil horizon chemical and physical parameters

ASC/PR % 43 Bulk density kg/m³ 1090 Clay % 28 Sand % 4 Sub soil Sub soil clay % 28

Soil profile

Profile drainage class

Top soil texture

Maximum rooting depth
Depth to impeded drainage layer

Use default
Silt loam
0
0

Soil drainage

Drainage method

Method

None

Hydrophobic condition

Use default

Occurence of pugging damage Occasional Compacted top soil False

Soil settings

K leaching potential not set N immobilisation status

Soil tests

Olsen P QT K QT Ca QT Mg QT Na 30 7 10 20 9

QT SO4 5

Anion storage capacity or phosphate retention

TBK reserve K test

K reserve status

Not entered

Use default

Pasture

Pasture type Ryegrass/white clover

Clover levels Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - December
Category
User defined

Product 2/3 Super & Lime

Amount kg/ha 1000

Fertiliser products - August

Category Ravensdown cropping

Product Ammo 36 Amount kg/ha 100

Fertiliser products - October

Category User defined Product Eff - Urea + Se

Amount kg/ha 61

Fertiliser products - September

Category User defined Product UREA BULK

Amount kg/ha 70 Fertiliser products - February

Category User defined Product UREA BULK

Amount kg/ha 40

Fertiliser products - December
Category
User defined

Product UREA BULK
Amount kg/ha 40

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Consent DSN 31827 {Copy} (2016)

FarmParameters



Ravensdown other

Fertiliser products - March Category

Product Urea
Amount kg/ha 60

Amount kg/ha 60 Fertiliser products - April

Category Ravensdown other

Product Urea Amount kg/ha 50

Fertiliser products - May
Category Ravensdown other

Product Urea Amount kg/ha 20

Fertiliser products - January

Category Ravensdown other Product Urea

Amount kg/ha 60

Fertiliser products - November
Category Ravensdown other

Product Urea

Amount kg/ha 40

Fertiliser products - December
Category Ravensdown other

Product Potassium chloride

Amount kg/ha 50

Irrigation
No irrigation entered

Animals on block

Animals grazing
Dairy % 0

Water connectivity
Direct access to streams False

Animal grazing
January True
February True

March True
April True
May True
July True
August True
September True
October True

November True December True

Effluent application
Solid effluents

Effluent type added December Pond solids/sludge

Effluent type added January Holding pond separated solids Effluent type added November Solids from wintering pad

Block - Waiki_30a.1 Run Off

Block name Waiki 30a.1 Run Off

Block type Pastoral
Area ha 23.7
Relative productivity 1
Pasture block type No
Topography Flat
Distance from coast km 25

Cultivated in last 5 years False
Fodder rotates through No

Climate

Annual average rainfall mm/yr 1096

Mark Crawford

Client reference: Farm name: NB 2016 -17 Consent DSN 31827 {Copy} (2016)

FarmParameters



			•
Mean annual temperature Seasonal variation in rainfall Annual potential evapotranspiral Seasonal variation in PET	cion	mm	10.1 731-1450 mm, Low 712 Moderate
Soil description			
Soil order (default)			Brown
Soil group (default)			Sedimentary
SMaps			,
Sibling			Waiki_30a.1
Date downloaded			Unknown
Wilting point		0 - 30cm	21
		30 - 60cm	23
Field capacity		> 60 0 - 30cm	25 42
rield capacity		30 - 60cm	41
		> 60	43
Saturation		0 - 30cm	59
		30 - 60cm	52
		> 60	49
Natural drainage class			Well
Depth to impeded layer		cm	Not entered
Top soil horizon chemical and	physical parameters	0/	42
ASC/PR Bulk density		% kg/m³	43 1090
Clay		%	28
Sand		%	4
Sub soil			•
Sub soil clay		%	28
Soil profile			
Profile drainage class			Use default
Top soil texture			Silt loam
Maximum rooting depth		m	0
Depth to impeded drainage laye	r		0
Soil drainage			
Drainage method			
Method			None
Hydrophobic condition			Use default
Occurence of pugging damage			Occasional
Compacted top soil			False
Soil settings			
K leaching potential not set			
N immobilisation status			
_ ,, .			
Soil tests	C- OT M-	OT N-	
Olsen P QT K QT (27 9 9	Ca QT Mg 16	QT Na 10	
QT SO4	10	10	10
Anion storage capacity or phosp	hate retention		Not entered
TBK reserve K test			Not entered
K reserve status			Use default
Pasture			
Pasture type			Ryegrass/white clover
Clover levels			Use default
Supplements removed			
Supplement information Conservation type			Baleage
Name			Daleage
Wrapping			Wrapped in plastic
Supplement amount			P.F P.S

Mark Crawford

User defined

Client reference:

Farm name: NB 2016 -17 Consent DSN 31827 {Copy} (2016)

FarmParameters



Dry weight basis	Т	20
Destination		Storage
Storage conditions		Average

Fertiliser application

Fertiliser products - December

Category Product

2/3 Super & Lime 1000 Amount kg/ha

Fertiliser products - August

Category Ravensdown cropping Product Ammo 36

kg/ha 100

Amount Fertiliser products - October

Category User defined Product Eff - Urea + Se

Amount kg/ha 61

Fertiliser products - September

User defined Category

UREA BULK Product

Amount kg/ha 70 Fertiliser products - February

User defined Category

UREA BULK Product

Amount kg/ha 40 Fertiliser products - December

Category User defined

Product **UREA BULK**

Amount kg/ha 40 Fertiliser products - March

Category Ravensdown other

Product Urea 60

kg/ha Amount Fertiliser products - April

Ravensdown other Category

Product Urea 50 Amount kg/ha

Fertiliser products - May Ravensdown other Category

Product Urea

20 Amount kg/ha Fertiliser products - January

Category Ravensdown other

Product Urea

60 Amount kg/ha

Fertiliser products - November Category Ravensdown other

Product Urea

Amount kg/ha 40

Fertiliser products - December Category Ravensdown other

Product Potassium chloride

Amount kg/ha 50

Irrigation No irrigation entered

February

Animals on block Animals grazing

Dairy % 0

Water connectivity

Direct access to streams **False**

Animal grazing January True

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True

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Consent DSN 31827 {Copy} (2016)

FarmParameters



March April May August September October November	True True True True True True
November December	True True

Effluent application

Solid effluents

Pond solids/sludge Effluent type added December

Effluent type added January Holding pond separated solids Effluent type added November Solids from wintering pad

Block - Parah_4a.1 Eff solids

Parah 4a.1 Eff solids Block name Block type **Pastoral** 2.7 ha Area Relative productivity Pasture block type No Topography Flat

Distance from coast km 25 Cultivated in last 5 years False Fodder rotates through No

Climate

Annual average rainfall mm/yr 1096 Mean annual temperature 10.1

Seasonal variation in rainfall 731-1450 mm, Low

Annual potential evapotranspiration mm 712 Seasonal variation in PET Moderate

Soil description

Soil order (default) Pallic

Soil group (default) Recent/YGE/BGE

SMaps Sibling

Parah_4a.1 Date downloaded Unknown Wilting point 0 - 30cm 24 30 - 60cm 26 > 60 27 0 - 30cm 38 Field capacity

30 - 60cm 38 > 60 39 Saturation 0 - 30cm 50 30 - 60cm 46 > 60 44

Natural drainage class Imperfect Not entered

Depth to impeded layer cm Top soil horizon chemical and physical parameters

ASC/PR % 23 Bulk density kg/m³ 1220 % 34 Clay Sand % 12 Sub soil

Sub soil clay % 34

Soil profile

Profile drainage class Use default Silt loam Top soil texture 0 Maximum rooting depth m Depth to impeded drainage layer 0

Soil drainage

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Consent DSN 31827 {Copy} (2016)

FarmParameters



Drainage method Method None Hydrophobic condition Use default Occurence of pugging damage Occasional Compacted top soil False

Soil settings

K leaching potential not set N immobilisation status

Soil tests

Olsen P QT K QT Ca QT Mg QT Na 30 10 20

QT SO4

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

Pasture

Ryegrass/white clover Pasture type

Clover levels Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - December

Category User defined Product 2/3 Super & Lime

Amount kg/ha 1000

Fertiliser products - August

Ravensdown cropping Category

Product Ammo 36 Amount kg/ha 100

Fertiliser products - October

User defined Category Eff - Urea + Se Product

Amount kg/ha 61

Fertiliser products - September

User defined Category Product **UREA BULK**

Amount 70 kg/ha

Fertiliser products - February Category User defined

UREA BULK Product Amount kg/ha 40

Fertiliser products - December

User defined Category **UREA BULK** Product

4۱ Amount kg/ha

Fertiliser products - March Ravensdown other Category

Product Urea

Amount 60

kg/ha Fertiliser products - April

Category Ravensdown other Urea Product

50

Amount kg/ha Fertiliser products - May

Ravensdown other Category

Product Urea kg/ha 20 Amount

Fertiliser products - January Ravensdown other Category

Product

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Consent DSN 31827 {Copy} (2016)

FarmParameters



60 kg/ha Amount

Fertiliser products - November

Category Ravensdown other

Product Urea Amount kg/ha 40

Fertiliser products - December

Category Ravensdown other Product Potassium chloride

Amount 50 kg/ha

Irrigation

No irrigation entered

Animals on block Animals grazing

0 Dairy %

Water connectivity

Direct access to streams False

Animal grazing January True February True March True April True May True July True

August True September True October True November True December True

Effluent application

Solid effluents Effluent type added December Pond solids/sludge

Effluent type added January Holding pond separated solids Effluent type added November Solids from wintering pad

Block - Parah_4a.1 Run Off

Block name Parah_4a.1 Run Off

Block type **Pastoral** 2.9 Area ha Relative productivity Pasture block type No Topography Flat

Distance from coast 25 km Cultivated in last 5 years **False**

Fodder rotates through No

Climate

Annual average rainfall 1096 mm/yr Mean annual temperature 10.1

Seasonal variation in rainfall 731-1450 mm, Low

Annual potential evapotranspiration mm 712 Seasonal variation in PET Moderate

Soil description

Soil order (default) **Pallic** Soil group (default) Recent/YGE/BGE

SMaps

Parah 4a.1 Sibling Date downloaded Unknown Wilting point 0 - 30cm 24

30 - 60cm 26 > 60 27 Field capacity 0 - 30cm 38

Mark Crawford

Client reference: Farm name: NB 2016 -17 Consent DSN 31827 {Copy} (2016)

FarmParameters

Fertiliser products - February



					_ ,
Saturation				30 - 60cm > 60 0 - 30cm 30 - 60cm > 60	38 39 50 46 44
Depth to in	ainage class npeded laye rizon chemi	r cal and physic	cal parameters	cm	Imperfect Not entered
ASC/PR Bulk dens Clay Sand				% kg/m³ % %	23 1220 34 12
Sub soil Sub soil d	clay			%	34
Soil profile Profile draina Top soil textoo Maximum roo Depth to imp	ure oting depth	age layer		m	Use default Silt loam 0 0
Soil drainage Drainage me Method	ethod				None
Hydrophobic of p Occurence of p Compacted top	ougging dan	nage			Use default Occasional False
<i>Soil settings</i> K leaching po N immobilisa		set			
Soil tests Olsen P 27 Organic S Anion storag TBK reserve K reserve sta	K test	QT Ca 8.9 or phosphate r	QT Mg 16 etention	QT Na 10.2	10.5 Not entered Not entered Use default
<i>Pasture</i> Pasture type Clover levels					Ryegrass/white clover Use default
Supplements r No suppleme		d from this bl	ock		
Fertiliser applic Fertiliser pro Category Product Amount	ducts - Dec			kg/ha	User defined 2/3 Super & Lime 1000
Fertiliser pro Category Product Amount	ducts - Aug	ust		kg/ha	Ravensdown cropping Ammo 36 100
Fertiliser pro Category Product Amount	ducts - Octo	bber		kg/ha	User defined Eff - Urea + Se 61
Fertiliser pro Category Product Amount Fertiliser pro				kg/ha	User defined UREA BULK 70
FORTILICAL DEC	CHICTS - FANI	uarv			

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Consent DSN 31827 {Copy} (2016)

FarmParameters



Category User defined Product UREA BULK

Amount kg/ha 40

Fertiliser products - December

Category User defined Product UREA BULK

Amount kg/ha 40 Fertiliser products - March

Category Ravensdown other

Product Urea

Amount kg/ha 60 Fertiliser products - April

Category Ravensdown other

Product Urea Amount kg/ha 50

Fertiliser products - May

Category Ravensdown other

Product Urea

Amount kg/ha 20

Fertiliser products - January
Category Ravensdown other

Product Urea

Amount kg/ha 60
Fertiliser products - November

Category Ravensdown other

Product Urea

Amount kg/ha 40

Fertiliser products - December
Category Ravensdown other

Product Potassium chloride

Amount kg/ha 50

Irrigation

Animals on block

Animals grazing
Dairy % 0

Water connectivity
Direct access to streams
False

Animal grazing

January True
February True
March True

March True
April True
May True
August True
September True

October True
November True
December True

Effluent application

No irrigation entered

Solid effluents

Effluent type added

December

Pond solids/sludge

Effluent type added January Holding pond separated solids Effluent type added November Solids from wintering pad

Block - Apar_2a.1 Eff solids Lease

Block name Apar 2a.1 Eff solids Lease

Block type Pastoral
Area ha 4.5

Relative productivity 1
Pasture block type No
Topography Flat

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Client reference: Farm name: NB 2016 -17 Consent DSN 31827 {Copy} (2016)

FarmParameters



				•
Distance from coast Cultivated in last 5 years Fodder rotates through			km	25 False No
Climate Annual average rainfall Mean annual temperature Seasonal variation in rainfal Annual potential evapotrans Seasonal variation in PET			mm/yr	1096 10.1 731-1450 mm, Low 712 Moderate
Soil description Soil order (default) Soil group (default) SMaps Sibling Date downloaded Wilting point Field capacity Saturation			0 - 30cm 30 - 60cm > 60 0 - 30cm 30 - 60cm > 60 0 - 30cm 30 - 60cm > 60	Brown Sedimentary Apar_2a.1 Unknown 23 26 1 45 42 2 63 53 3
Natural drainage class Depth to impeded layer Top soil horizon chemical ASC/PR Bulk density Clay Sand Sub soil Sub soil clay	and physical p	parameters	cm % kg/m³ % %	Imperfect Not entered 43 1090 25 6
Soil profile Profile drainage class Top soil texture Maximum rooting depth Depth to impeded drainage	layer		m	Use default Silt loam 0.58 0
Soil drainage Drainage method Method Hydrophobic condition Occurence of pugging damage Compacted top soil	e			None Use default Occasional False
Soil settings K leaching potential not set N immobilisation status				
Soil tests Olsen P QT K 30 7 QT SO4 Anion storage capacity or pl TBK reserve K test K reserve status	QT Ca 10 hosphate rete	QT Mg 20 ntion	QT Na 9	5 Not entered Not entered Use default
<i>Pasture</i> Pasture type Clover levels				Ryegrass/white clover Use default

Supplements removed

kg/ha

SOUTH DAIRY LTD - ALEXANDER D

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Consent DSN 31827 {Copy} (2016)

FarmParameters



No supplements removed from this block

rertiliser application
Fertiliser products

- December Category

Product

Amount Fertiliser products - August

Category

Product Amount

Fertiliser products - October

Category Product

Amount Fertiliser products - September

Category Product

Amount

Fertiliser products - February Category

Product

Amount Fertiliser products - December

Category Product

Amount

Fertiliser products - March Category

Product Amount

Fertiliser products - April Category

Product Amount

Fertiliser products - May

Category

Product Amount

Fertiliser products - January Category

Product Amount

Fertiliser products - November

Category

Product Amount

Fertiliser products - December Category

Product Amount

Dairy Water connectivity

Animal grazing January

February March April

User defined 2/3 Super & Lime

1000

Ravensdown cropping Ammo 36

100

User defined Eff - Urea + Se

User defined **UREA BULK** 70 kg/ha

User defined

UREA BULK 40

User defined **UREA BULK**

40

Ravensdown other

Urea 60

Ravensdown other

Urea 50

Ravensdown other

Urea 20

Ravensdown other

Urea 60

Ravensdown other

Urea 4٥

Ravensdown other Potassium chloride

50

Irrigation No irrigation entered

Animals on block Animals grazing

Direct access to streams

%

0

False True

True True True

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SOUTH DAIRY LTD - ALEXANDER D

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Consent DSN 31827 {Copy} (2016)

FarmParameters



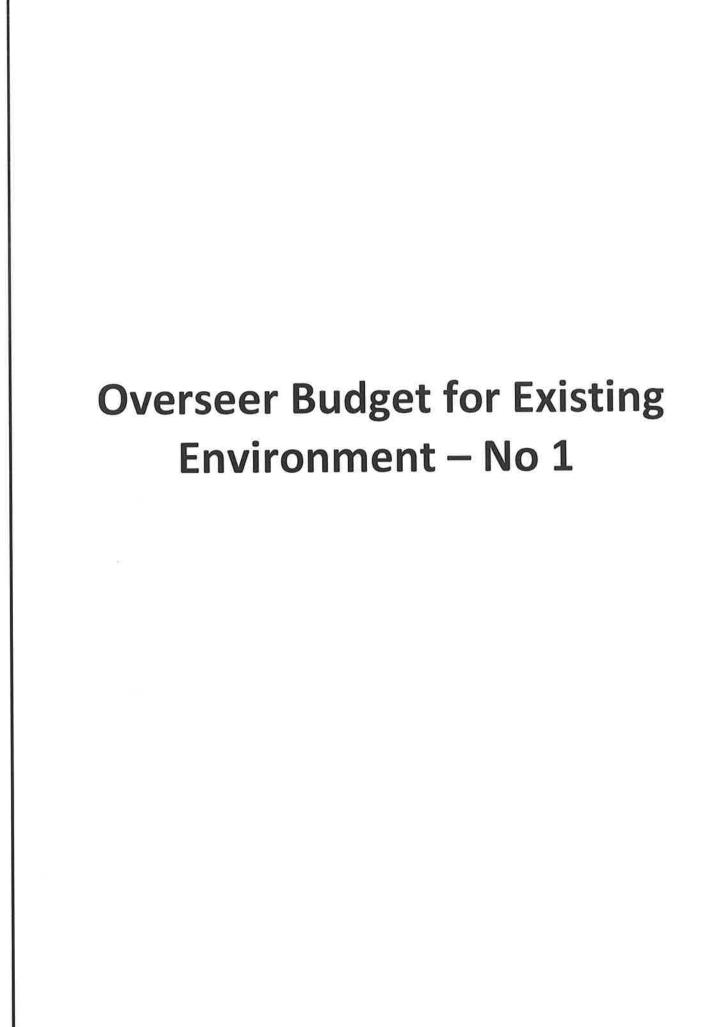
MayTrueJulyTrueAugustTrueSeptemberTrueOctoberTrueNovemberTrueDecemberTrue

Effluent application
Solid effluents

Effluent type added December Pond solids/sludge
Effluent type added January Holding pond separated solids
Effluent type added November Solids from wintering pad

Block - Riparian Areas

Block name Riparian Areas Block type Riparian Areas Area ha 1.2



Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} (2016)

FarmParameters



Farm details

Type Assessment Region	Farm type Assessment year Region	Full range 2016 Southland	
Farm blocks			
Puke_6a.1 Effluent Tile	Pastoral	54.5	
Puke_6a.1 Non Eff Lease	Pastoral	39.5	
Puke_6a.1 Non Eff Tile	Pastoral	48.6	
· · · · · · · · · · · · · · · · · · ·			

Puke_6a.1 Non Effluent **Pastoral** 49.7 Waiki_30a.1 Non Eff 17.9 **Pastoral** Waiki_30a.1 Run Off **Pastoral** 23.7 Parah_4a.1 Non Effluent **Pastoral** 2.7 Parah_4a.1 Run Off 2.9 **Pastoral** Apar_2a.1 Non Eff Lease 4.5 **Pastoral** Riparian Areas Riparian 1.2 Total farm area declared in blocks ha 245.2 248.5 Total farm area ha

Non-productive area ha 3.30000000000001

Farm animals

Stock numbers

Average weight kg/animal Not entered Calving times Median calving date 24 August Drying off 25 May Percent of herd 0 Stock numbers	
Class Breed Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jul	n
MilkingHerd F x J cross 0 406 580 565 560 560 555 555 550 500 0	
Max weight (kg) LW start (kg) LW end (kg) CW (kg) Age (months) Source Fate Sex Mated 520 0 0 0 Female	
Stock numbers - Dairy replacements	
Class Breed Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jul	n
HeiferReplacements F x J cross 0 0 0 130 130 130 130 130 130 130 0	
Max weight (kg) LW start (kg) LW end (kg) CW (kg) Age (months) Source Fate Sex Mated 0 0 230 0 0 Weaned Female	

0

Age (months)

CW (kg)

Stock management

Max weight (kg)

Animal excreta distribution

HeiferReplacements

Relative productivity assessment method

LW start (kg)

All blocks have a relative productivity value of 1

Ratio of stock on blocks can differ from the farm stock ratios

F x J cross

LW end (kg)

480

Farm dairy effluent management system

Effluent management method

Spray from sump

0

0

Sex

No difference between blocks

Female

0

Mated

0

0

0

Fate

Source

Brought

Animal health supplements

Animal - Dairy

No animal supplementation has been entered

Animal - Dairy replacements

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} (2016)

FarmParameters



No animal supplementation has been entered

Left over feeding

No left over feeding specified

Stored supplements

No supplements from storage added to this farm

Imported supplements

Supplement information

Conservation type Silage

Name Pasture good quality silage

Supplement amount

Dry weight basis T 25

Fed on blocks: Puke_6a.1 Effluent Tile, Puke_6a.1 Non Eff Lease, Puke_6a.1 Non Eff Tile, Puke_6a.1 Non Effluent, Waiki_30a.1

Non Eff,Parah_4a.1 Non Effluent,Apar_2a.1 Non Eff Lease

No timing of feeding has been specified

Supplement information

Conservation type Process byproducts Name Palm kernel meal

Supplement amount

Dry weight basis T 90

Fed on blocks: Puke_6a.1 Effluent Tile,Puke_6a.1 Non Eff Lease,Puke_6a.1 Non Eff Tile,Puke_6a.1 Non Effluent,Waiki_30a.1

21 6

Non Eff, Parah_4a.1 Non Effluent, Apar_2a.1 Non Eff Lease

No timing of feeding has been specified

Greenhouse gas emission factors

Enteric methane -	g	methane/kg	DMI intake
Dairy			

Daily		21.0
Dairy replacements		21.6
Sheep		20.9
Beef		21.6
Deer		21.3
Goats		20.9
Camelids		20.9
Young sheep		16.8
Horses	kg methane/RSU	1.8
User defined	kg methane/RSU	1.5

Dung methane - g methane/kg dung

Dairy	0.982
Dairy replacements	0.982
Sheep	0.691
Beef	0.982
Deer	0.915
Goats	0.691
Other	0.691

Nitrous oxide

Use farm specific emission factors

Fuel and electricity

Embodied CO2 emissions		
Diesel	kg CO2 equivalents/litre	2.989
Petrol	kg CO2 equivalents/litre	2.773
Electricity	kg CO2 equivalents/kWh	0.271
Energy emissions Diesel	MJ / litre	42.24

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} (2016)

FarmParameters



 Petrol
 MJ / litre
 42.4

 Electricity
 MJ / kWh
 8.21

GWP

Use NZ national inventory

Allocation

Allocation method Enter actual allocation figures

Report settings

Greenhouse gas emission report units: CO2 equivalents (kg/ha/yr)

Target N application rate as effluent: kg N/ha/yr

Fertiliser costs \$/kg nutrient

N P K S Ca Mg Na 1.45 3.5 2.4 0.35 0.2 1.4 0.8

Block Information

Block - Puke_6a.1 Effluent Tile
Block name Puke 6a.1 Effluent Tile

Topography Flat
Distance from coast km 25
Cultivated in last 5 years False
Fodder rotates through No

Climate

Annual average rainfall mm/yr 1096 Mean annual temperature 10.1

Seasonal variation in rainfall 731-1450 mm, Low

Annual potential evapotranspiration mm 712
Seasonal variation in PET Moderate

Soil description

Soil order (default) Pallic

Soil group (default) Recent/YGE/BGE SMaps

Sibling Pukem_6a.1
Date downloaded Unknown
Wilting point 0 20cm 22

Wilting point 0 - 30cm 22
30 - 60cm 25
> 60 1
Field capacity 0 - 30cm 40
30 - 60cm 41

> 60 2
Saturation 0 - 30cm 54
30 - 60cm 48
> 60 3

Natural drainage class Poor
Depth to impeded layer cm Not entered

Depth to impeded layer cm Not entered Top soil horizon chemical and physical parameters

 ASC/PR
 %
 22

 Bulk density
 kg/m³
 1220

 Clay
 %
 27

 Sand
 %
 9

 Sub soil

Soil profile

Sub soil clay

Profile drainage class
Use default
Top soil texture
Silt loam

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%

29

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Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} (2016)

FarmParameters



Maximum rooting depth m 0.58
Depth to impeded drainage layer 0.58

Soil drainage

Drainage method

Method Mole/tile system

Percent of paddock drained 100
Hydrophobic condition Use default
Occurence of pugging damage Occasional
Compacted top soil False

Soil settings

K leaching potential not set N immobilisation status

Soil tests

Olsen P QT K QT Ca QT Mg QT Na 38.2 9.6 10 28.6 9.6

Organic S 15

Anion storage capacity or phosphate retention

TBK reserve K test

K reserve status

Not entered

Use default

Pasture

Pasture type Ryegrass/white clover

Clover levels Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - December

Category User defined Product 2/3 Super & Lime

Amount kg/ha 750

Fertiliser products - August

Category Ravensdown cropping

Product Ammo 36

Amount kg/ha 100

Fertiliser products - October
Category User defined

Product Eff - Urea + Se

Amount kg/ha 40

Fertiliser products - September
Category
User defined

Product UREA BULK

Amount kg/ha 60

Fertiliser products - February

Category User defined Product UREA BULK

Amount kg/ha 40 Fertiliser products - December

Category User defined
Product UREA BULK

Amount kg/ha 40

Fertiliser products - March

Category Ravensdown other

Product Urea Amount kg/ha 60

Fertiliser products - April

Category Ravensdown other Product Urea

Amount kg/ha 40

Fertiliser products - May
Category Ravensdown other

Mark Crawford

Client reference: Farm name: NB 2016 -17 Current DSN 31827 {Copy} (2016)

FarmParameters



		•
Product Amount	kg/ha	Urea 20
Irrigation No irrigation entered		
Animals on block Animals grazing		
Dairy Water connectivity	%	100
Direct access to streams Animal grazing		False
January February		True True
March April		True True
May		True
August September		True True
October November		True True
December		True
Effluent application Liquid effluents		
Receives farm dairy effluent Effluent application depth		Low application method
Percentage of block effluent applied to	%	100
Block - Puke_6a.1 Non Eff Lease Block name		Puke_6a.1 Non Eff Lease
Block type Area	ha	Pastoral 39.5
Relative productivity	na	1
Pasture block type Topography		No Flat
Distance from coast Cultivated in last 5 years	km	25 False
Fodder rotates through		No
Climate Annual average rainfall	mm/yr	1096
Mean annual temperature	11111/y1	10.1
Seasonal variation in rainfall Annual potential evapotranspiration	mm	731-1450 mm, Low 712
Seasonal variation in PET		Moderate
Soil description Soil order (default)		Pallic
Soil group (default) SMaps		Recent/YGE/BGE
Sibling		Pukem_6a.1
Date downloaded Wilting point	0 - 30cm	Unknown 22
	30 - 60cm > 60	25 1
Field capacity	0 - 30cm 30 - 60cm	40 41
	> 60	2
Saturation	0 - 30cm 30 - 60cm	54 48
Natural drainage class	> 60	3 Poor
Depth to impeded layer	cm	Not entered
Top soil horizon chemical and physical parameters		

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} (2016)

FarmParameters



ASC/PR % 22 Bulk density kg/m³ 1220 % 27 Clav Sand % 9 Sub soil % Sub soil clay 29

Soil profile

Profile drainage class
Use default
Top soil texture
Silt loam
Maximum rooting depth
m
0.58
Depth to impeded drainage layer
0.58

Soil drainage

Drainage method

Method None
Hydrophobic condition Use default
Occurence of pugging damage Occasional
Compacted top soil False

Soil settings

K leaching potential not set N immobilisation status

Soil tests

Olsen P QT K QT Ca QT Mg QT Na 30 7 10 20 9

QT S04 5

Anion storage capacity or phosphate retention

TBK reserve K test

K reserve status

Not entered

Use default

Pasture

Pasture type Ryegrass/white clover

Clover levels Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - December

Category User defined Product 2/3 Super & Lime

Amount kg/ha 1000

Fertiliser products - August
Category Ravensdown cropping

Product Ammo 36

Amount kg/ha 100

Fertiliser products - October

Category User defined

Product Eff - Urea + Se Amount kg/ha 40

Fertiliser products - September

Category User defined Product UREA BULK

Amount kg/ha 60

Fertiliser products - February
Category
User defined

Product UREA BULK

Amount kg/ha 40 Fertiliser products - December

Category User defined

Product UREA BULK Amount kg/ha 40

Fertiliser products - March

Mark Crawford

100

True

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} (2016)

FarmParameters



Category Ravensdown other

Product Urea Amount kg/ha

Fertiliser products - April

Category Ravensdown other Urea

Product Amount kg/ha 40

Fertiliser products - May Ravensdown other Category

Product Urea

Amount 20 kg/ha

Fertiliser products - January

Category Ravensdown other Product Urea

Amount kg/ha 40

Fertiliser products - November Category Ravensdown other

Urea Product

Amount kg/ha 40

Fertiliser products - December Ravensdown other Category

Product Potassium chloride

Amount 50 kg/ha

Irrigation

No irrigation entered

Animals on block

Animals grazing %

Dairy Water connectivity

Direct access to streams False

Animal grazing January True **February** True March True April True Mav True

August True September True October True November True

December Effluent application

Receives no liquid or solid effluents

Block - Puke_6a.1 Non Eff Tile

Block name Puke 6a.1 Non Eff Tile

Block type **Pastoral** 48.6 Area ha Relative productivity Pasture block type No

Flat Topography Distance from coast km 25 Cultivated in last 5 years False

Fodder rotates through No

Climate

1096 Annual average rainfall mm/yr Mean annual temperature 10.1

Seasonal variation in rainfall 731-1450 mm, Low

Annual potential evapotranspiration mm 712 Seasonal variation in PET Moderate

Mark Crawford

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FarmParameters



Soil description Soil order (de Soil group (d SMaps	efault)				Pallic Recent/YGE/BGE
Sibling Date downl Wilting poir				0 - 30cm 30 - 60cm	Pukem_6a.1 Unknown 22 25
Field capac	ity			> 60 0 - 30cm 30 - 60cm	1 40 41
Saturation				> 60 0 - 30cm 30 - 60cm > 60	2 54 48 3
	npeded layer	l and physical	parameters	cm	Poor Not entered
ASC/PR Bulk dens Clay Sand	iity			% kg/m³ % %	22 1220 27 9
Sub soil Sub soil c	lay			%	29
Soil profile Profile draina Top soil textu Maximum roo Depth to imp	ire	e layer		m	Use default Silt loam 0.58 0.58
Soil drainage Drainage med Method Percent of p Hydrophobic co Occurence of p Compacted top	paddock drain ondition ugging dama				Mole/tile system 100 Use default Occasional False
Soil settings K leaching po N immobilisa	otential not se tion status	t			
Soil tests Olsen P 35 QT SO4 Anion storage	QT K 8 e capacity or I	QT Ca 10 ohosphate rete	QT Mg 22 ention	QT Na 8	5 Not entered
TBK reserve K reserve sta	K test	·			Not entered Use default
Pasture Pasture type Clover levels					Ryegrass/white clover Use default
Supplements ro No suppleme		from this block	(
Category Product Amount	cation ducts - Decen ducts - Augus			kg/ha	User defined 2/3 Super & Lime 750
Category					Ravensdown cropping

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} (2016)

FarmParameters



Product		Ammo 36
Amount	kg/ha	100

Fertiliser products - October

Category User defined

Product Eff - Urea + Se Amount kg/ha 40

Fertiliser products - September
Category
User defined

Product UREA BULK
Amount kg/ha 60

Fertiliser products - February
Category
User defined

Product UREA BULK
Amount kg/ha 40

Fertiliser products - December

Category User defined Product UREA BULK

Amount kg/ha 40 Fertiliser products - March

Category Ravensdown other Product Urea

Amount kg/ha 60

Fertiliser products - April
Category Ravensdown other

Product Urea Amount kg/ha 40

Fertiliser products - May
Category Ravensdown other

Product Ravensdown of

Amount kg/ha 20 Fertiliser products - January

Category Ravensdown other

Product Urea Amount kg/ha 40

Fertiliser products - November

Category Ravensdown other Product Urea

Amount kg/ha 40

Irrigation
No irrigation entered

Animals on block
Animals grazing
Dairy % 100

Water connectivity

Direct access to streams False
Animal grazing

January True February True March True April True May True August True September True October True November True

December

Effluent application

Block - Puke_6a.1 Non Effluent

Receives no liquid or solid effluents

Block name Puke_6a.1 Non Effluent Block type Pastoral

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True

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FarmParameters



Relative productivity Pasture block type No Flat	Area				ha	49.7
Topography						=
Cultivated in last 5 years False Fodder rotates through Fodder	Topography				lone	
Climate					кm	
Annual average rainfall Mean annual temperature 10.1 731-1450 mm, Low 712 731-1450 mm, Low	Fodder rotates	s through				No
Mean annual temperature 10.1 731-1450 mm, Low 71.2 731-1450					,	1005
Seasonal variation in rainfall					mm/yr	
Seasonal variation in PET	Seasonal va	riation in rainf	fall		m.m	•
Soil order (default)			пѕрігаціон		111111	• ==
Soil order (default) Pallic Recent/YGE/BGE Soil group (default) Pukem_6a.1 Unknown	Soil descriptio	n				
SMaps Sibling Pukem_6a.1 Unknown	Soil order (d	lefault)				
Date downloaded Wilting point		derault)				Recent/YGE/BGE
Wilting point	Sibling	loadod				
Field capacity Field capacity Field capacity A 0 - 30cm					0 - 30cm	
Field capacity						<u>-</u> -
Saturation	Field capa	city			0 - 30cm	40
Saturation						:=
Natural drainage class Depth to impeded layer Top soil horizon chemical and physical parameters ASC/PR Bulk density Clay Sand Sub soil Sub soil clay Soil profile Profile drainage class Top soil texture Maximum rooting depth Depth to impeded drainage layer Soil drainage Drainage method Method Hydrophobic condition Occurence of pugging damage Compacted top soil Soil settings K leaching potential not set N immobilisation status Soil tests Olsen P QT K QT Ca QT Mg QT Na 35 8 10 22 8 QT SO4 Anion storage capacity or phosphate retention TBK reserve K test Not entered	Saturation				0 - 30cm	54
Depth to impeded layer Top soil horizon chemical and physical parameters ASC/PR Bulk density Clay Sand Sub soil Sub soil Sub soil clay Soil profile Profile drainage class Top soil texture Maximum rooting depth Depth to impeded drainage layer Soil drainage Drainage Drainage Drainage Drainage method Method Method Hydrophobic condition Cocurence of pugging damage Compacted top soil Soil tests Olsen P QT K QT Ca QT Mg QT Na 35 8 10 22 8 QT SO4 Anion storage capacity or phosphate retention TBK reserve K test None type of the standard of						• •
Top soil horizon chemical and physical parameters ASC/PR Bulk density Clay Sand Sub soil Sub soil clay Soil profile Profile drainage class Top soil texture Maximum rooting depth Depth to impeded drainage layer Soil drainage Drainage method Method Method Hydrophobic condition Cocurence of pugging damage Compacted top soil Soil settings K leaching potential not set N immobilisation status Soil tests Olsen P QT K QT Ca QT Mg QT Na 35 8 10 22 8 Kleaching scapacity or phosphate retention TBK reserve K test Not entered Not entered Not entered						
Bulk density Clay Clay Sand Sub soil Sub soil clay Soil profile Profile drainage class Top soil texture Maximum rooting depth Depth to impeded drainage layer Soil drainage Drainage Drainage method Method Method Method Moccurence of pugging damage Compacted top soil Soil settings K leaching potential not set N immobilisation status Soil tests Olsen P QT K QT Ca QT Mg QT Na 35 8 10 22 8 QT SO4 Anion storage capacity or phosphate retention TBK reserve K test N immobilisation storage capacity or phosphate retention TBK reserve K test N intered Method None Use default Occasional Coccasional False Variable Squar			al and physical	l parameters	CITI	58
Clay Sand % 9 Sub soil Sub soil clay % 29 Soil profile Profile drainage class Use default Top soil texture Silt loam Maximum rooting depth m 0.58 Depth to impeded drainage layer 0.58 Soil drainage Drainage method Method None Hydrophobic condition Use default Occurence of pugging damage Compacted top soil False Soil settings K leaching potential not set N immobilisation status Soil tests Olsen P QT K QT Ca QT Mg QT Na 35 8 10 22 8 QT SO4 Anion storage capacity or phosphate retention TBK reserve K test Not entered		city				
Sub soil Sub soil clay Soil profile Profile drainage class Profile drainage class Profile drainage class Profile drainage class Top soil texture Maximum rooting depth Maximum rooting depth Maximage Drainage Drainage Drainage Drainage method Method Method Hydrophobic condition Occurence of pugging damage Compacted top soil Soil settings K leaching potential not set N immobilisation status Soil tests Olsen P QT K QT Ca QT Mg QT Na 35 8 10 22 8 QT SO4 Anion storage capacity or phosphate retention TBK reserve K test Number 129 Wes default Occasional Corpacted top Soil False Vise default Occasional False Vise default Occasional False None Vise default Occasional False None None None None None 15 Not entered Not entered	Clay	Sicy			%	28
Sub soil clay % 29 Soil profile Profile drainage class Top soil texture Maximum rooting depth Depth to impeded drainage layer Soil drainage Drainage method Method Hydrophobic condition Occurence of pugging damage Compacted top soil Soil settings K leaching potential not set N immobilisation status Soil tests Olsen P QT K QT Ca QT Mg QT Na 35 8 10 22 8 QT SO4 Anion storage capacity or phosphate retention TBK reserve K test Use default Occasional False Corps QT Na 35 8 10 22 8 OT SO4 Anion storage capacity or phosphate retention TBK reserve K test Use default Occasional False Vocasional False Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na Soil Tests Olsen P QT K QT Ca QT Mg QT Na					%	9
Profile drainage class Top soil texture Maximum rooting depth Depth to impeded drainage layer Soil drainage Drainage method Method Method Hydrophobic condition Occurence of pugging damage Compacted top soil Soil settings K leaching potential not set N immobilisation status Soil tests Olsen P QT K QT Ca QT Mg QT Na 35 8 10 22 8 QT SO4 Anion storage capacity or phosphate retention TBK reserve K test Use default Silt loam None Use default Ocsasional False Sone Vocasional False Use default Ocsasional None Variables Var		clay			%	29
Top soil texture Maximum rooting depth Depth to impeded drainage layer Soil drainage Drainage method Method Hydrophobic condition Occurence of pugging damage Compacted top soil Soil settings K leaching potential not set N immobilisation status Soil tests Olsen P QT K QT Ca QT Mg QT Na 35 8 10 22 8 QT SO4 Anion storage capacity or phosphate retention TBK reserve K test Silt loam 0.58 Soil tests Olsen Not entered TBK reserve K test						
Maximum rooting depth Depth to impeded drainage layer Soil drainage Drainage method Method Hydrophobic condition Occurence of pugging damage Compacted top soil Soil settings K leaching potential not set N immobilisation status Soil tests Olsen P QT K QT Ca QT Mg QT Na 35 8 10 22 8 QT SO4 Anion storage capacity or phosphate retention TBK reserve K test m 0.58 0.58 Use default Occasional False Sor QT Na 35 8 10 22 8 Not entered Not entered						
Soil drainage Drainage method Method Hydrophobic condition Occurence of pugging damage Compacted top soil Soil settings K leaching potential not set N immobilisation status Soil tests Olsen P QT K QT Ca QT Mg QT Na 35 8 10 22 8 QT SO4 Anion storage capacity or phosphate retention TBK reserve K test None None Use default Occasional False State Occasional False Occasional False Soil tests Ot Not entered Not entered	Maximum ro	oting depth			m	0.58
Drainage method Method None Hydrophobic condition Occurence of pugging damage Compacted top soil Soil settings K leaching potential not set N immobilisation status Soil tests Olsen P QT K QT Ca QT Mg QT Na 35 8 10 22 8 QT SO4 Anion storage capacity or phosphate retention TBK reserve K test None None Use default Occasional False Screation Volcasional False Occasional False Sol Settings Volcasional False Volcasional False Soil tests Not entered Not entered	Depth to im	peded drainag	je layer			0.58
Method Hydrophobic condition Occurence of pugging damage Compacted top soil Soil settings K leaching potential not set N immobilisation status Soil tests Olsen P QT K QT Ca QT Mg QT Na 35 8 10 22 8 QT SO4 Anion storage capacity or phosphate retention TBK reserve K test Noccasional False Occasional False State Occasional False Occasional False Occasional False Occasional False Soil tests Notentered Not entered		ethod				
Occurence of pugging damage Compacted top soil Soil settings K leaching potential not set N immobilisation status Soil tests Olsen P QT K QT Ca QT Mg QT Na 35 8 10 22 8 QT SO4 Anion storage capacity or phosphate retention TBK reserve K test Occasional False Occasional False	Method					
Compacted top soil Soil settings K leaching potential not set N immobilisation status Soil tests Olsen P QT K QT Ca QT Mg QT Na 35 8 10 22 8 QT SO4 5 Anion storage capacity or phosphate retention TBK reserve K test False False Not entered			age			
K leaching potential not set N immobilisation status Soil tests Olsen P QT K QT Ca QT Mg QT Na 35 8 10 22 8 QT SO4 5 Anion storage capacity or phosphate retention TBK reserve K test Not entered			.5-			
Soil tests Olsen P QT K QT Ca QT Mg QT Na 35 8 10 22 8 QT SO4 5 Anion storage capacity or phosphate retention TBK reserve K test Soil tests						
Olsen P QT K QT Ca QT Mg QT Na 35 8 10 22 8 QT SO4 5 Anion storage capacity or phosphate retention Not entered TBK reserve K test Not entered			et			
Olsen P QT K QT Ca QT Mg QT Na 35 8 10 22 8 QT SO4 5 Anion storage capacity or phosphate retention Not entered TBK reserve K test Not entered	Soil tests					
QT SO4 5 Anion storage capacity or phosphate retention Not entered TBK reserve K test Not entered	Olsen P				-	
Anion storage capacity or phosphate retention Not entered TBK reserve K test Not entered		8	10	22	8	5
	Anion storag		phosphate ret	tention		
K reserve status						Use default

kg/ha

SOUTH DAIRY LTD - ALEXANDER D

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} (2016)

FarmParameters



Pasture

Pasture type

Clover levels

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - December

Category Product

Amount Fertiliser products - August

Category

Product

Amount

Fertiliser products - October

Category

Product

Amount

Fertiliser products - September Category

Product

Amount

Fertiliser products - February

Category Product

Amount

Fertiliser products - December

Category

Product

Amount Fertiliser products - March

Category

Product

Amount

Fertiliser products - April Category

Product

Amount

Fertiliser products - May

Category

Product

Amount

Fertiliser products - January

Category

Product

Amount

Fertiliser products - November Category

Product

Amount

Irrigation

No irrigation entered

Animals on block Animals grazing

Dairy

Water connectivity

Direct access to streams

Animal grazing

January February Ryegrass/white clover Use default

User defined

2/3 Super & Lime

Ravensdown cropping

Ammo 36

100

User defined

Eff - Urea + Se

kg/ha 40

User defined

UREA BULK

60

User defined

UREA BULK

40

User defined

UREA BULK

40

Ravensdown other

Urea

Ravensdown other

Urea

40

Ravensdown other Urea

20

Ravensdown other

Urea 40

Ravensdown other

Urea

40

100

False

True True

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%

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} (2016)

FarmParameters



March	True
April	True
May	True
August	True
September	True
October	True
November	True
December	True

Effluent application

Receives no liquid or solid effluents

Block -	Waiki	30a 1	Non	Fff
DIUCK -	vvaini	JUA.I	11011	

Block name		Waiki_30a.1 Non Ef
Block type		Pastoral
Area	ha	17.9
Relative productivity		1
Pasture block type		No
Topography		Flat
Distance from coast	km	25
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Cirriate		
Annual average rainfall	mm/yr	1096
Mean annual temperature		10.1
Seasonal variation in rainfall		731-1450 mm, Low
Annual potential evapotranspiration	mm	712
Seasonal variation in PFT		Moderate

Seasonal variation in FL1		Moderate
Soil description		
Soil order (default)		Brown
Soil group (default)		Sedimentary
SMaps		
Sibling		Waiki 30a.1
Date downloaded		Unknown
Wilting point	0 - 30cm	21
	30 - 60cm	23
	> 60	25
Field capacity	0 - 30cm	42
	30 - 60cm	41
	> 60	43
Saturation	0 - 30cm	59
	30 - 60cm	52
	> 60	49
Natural drainage class		Well
Depth to impeded layer	cm	Not entered
Top soil horizon chemical and physical parameters		

Natural drainage class		Well
Depth to impeded layer	cm	Not entered
Top soil horizon chemical and physical parameters		
ASC/PR	%	43
Bulk density	kg/m³	1090
Clay	%	28

% Sand 4 Sub soil Sub soil clay % 28

Soil profile

Use default Profile drainage class Silt loam Top soil texture . Maximum rooting depth 0 m 0 Depth to impeded drainage layer

Soil drainage

Drainage method Method None Hydrophobic condition Use default

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} (2016)

FarmParameters



Occurence of pugging damage Occasional Compacted top soil False

Soil settings

K leaching potential not set N immobilisation status

Soil tests

Olsen P QT Ca QT Mg QT Na 30

QT SO4

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

Pasture

Pasture type Ryegrass/white clover

Use default Clover levels

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - December

Fertiliser products - October

User defined Category Product 2/3 Super & Lime

kg/ha Amount

Fertiliser products - August

Category Ravensdown cropping Ammo 36

Product

Amount 100 kg/ha

Category User defined

Product Eff - Urea + Se

Amount kg/ha 40 Fertiliser products - September

Category User defined **UREA BULK** Product

Amount kg/ha 60

Fertiliser products - February

Category User defined UREA BULK Product Amount kg/ha 40

Fertiliser products - December

User defined Category

Product **UREA BULK** Amount kg/ha 40

Fertiliser products - March Ravensdown other Category

Product Urea

kg/ha 60 Amount Fertiliser products - April

Ravensdown other Category

Product Urea 40 Amount

kg/ha Fertiliser products - May

Category Ravensdown other Product Urea

Amount kg/ha Fertiliser products - January

Category Ravensdown other

Product Urea Amount kg/ha 40

Fertiliser products - November Ravensdown other Category

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Mark Crawford

Client reference: Farm name: NB 2016 -17 Current DSN 31827 {Copy} (2016)

FarmParameters



Product	lea/bo	Urea 40
Amount	kg/ha	40
Irrigation		
No irrigation entered		
Animals on block		
Animals grazing		
Dairy	%	100
Water connectivity Direct access to streams		False
Animal grazing		i disc
January		True
February		True
March April		True True
May		True
August		True
September October		True True
November		True
December		True
Effluent application		
Effluent application Receives no liquid or solid effluents		
Block - Waiki_30a.1 Run Off		
Block name		Waiki_30a.1 Run Off
Block type Area	ha	Pastoral 23.7
Relative productivity	114	1
Pasture block type		No
Topography Distance from coast	km	Flat 25
Cultivated in last 5 years	Kill	False
Fodder rotates through		No
Climate		
Annual average rainfall	mm/yr	1096
Mean annual temperature		10.1
Seasonal variation in rainfall Annual potential evapotranspiration	mm	731-1450 mm, Low 712
Seasonal variation in PET		Moderate
Soil description		
Soil order (default)		Brown
Soil group (default)		Sedimentary
SMaps		M-:L: 20- 1
Sibling Date downloaded		Waiki_30a.1 Unknown
Wilting point	0 - 30cm	21
	30 - 60cm	23
Field capacity	> 60 0 - 30cm	25 42
Ficial capacity	30 - 60cm	41
	> 60	43
Saturation	0 - 30cm	59 53
	30 - 60cm > 60	52 49
Natural drainage class		Well
Depth to impeded layer	cm	Not entered
Top soil horizon chemical and physical parameters ASC/PR	%	43
Bulk density	kg/m³	1090
Clay	%	28

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Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} (2016)

FarmParameters



Sand % Sub soil Sub soil clay % 28

Soil profile

Profile drainage class Use default Silt loam Top soil texture Maximum rooting depth m Depth to impeded drainage layer 0

Soil drainage

Drainage method

Method None Hydrophobic condition Use default Occurence of pugging damage Occasional Compacted top soil **False**

Soil settings

K leaching potential not set N immobilisation status

Soil tests

Olsen P QT Mg QT Na 27 10

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

K reserve status

Pasture Pasture type Ryegrass/white clover

Clover levels Use default

Supplements removed

Supplement information Conservation type Baleage

Name

Wrapping Wrapped in plastic

Supplement amount Number of bales 350

Packaging Round bales

Bale size Standard bale equivalents 12

Fed to animal: Dairy

No timing of feeding has been specified

Fertiliser application

Fertiliser products - September

Fertiliser products - December Category User defined

Product 2/3 Super & Lime

Amount kg/ha 750

Fertiliser products - August Category Ravensdown cropping

Product Ammo 36

100 Amount kg/ha Fertiliser products - October

User defined Category Eff - Urea + Se Product

Amount 40 kg/ha

Category User defined **UREA BULK** Product

Amount kg/ha 60

Fertiliser products - February

Category User defined

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} (2016)

FarmParameters



Product **UREA BULK** Amount 40

kg/ha Fertiliser products - December

User defined Category

UREA BULK Product 40 Amount kg/ha

Fertiliser products - March Ravensdown other Category

Product Urea

kg/ha 60 Amount Fertiliser products - April

Ravensdown other Category

Product Urea 40 Amount kg/ha

Fertiliser products - May

Category Ravensdown other

Product Urea 20 Amount kg/ha

Fertiliser products - January

Category Ravensdown other Product Urea

Amount kg/ha 40

Fertiliser products - November Ravensdown other Category

Urea Product

Amount kg/ha 40

Irrigation No irrigation entered

Animals on block

Animals grazing % 60 Dairy

Water connectivity

Direct access to streams **False** Animal grazing

January True February True March True April True May True August True September

Animals grazing

Dairy replacements % 40 Water connectivity

Direct access to streams False

Animal grazing January True February True March True April True

May True July True November True December

Effluent application

October

Receives no liquid or solid effluents

Block - Parah_4a.1 Non Effluent

Parah 4a.1 Non Effluent Block name

Block type Pastoral Area 2.7 ha

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True

True

True

Mark Crawford

Client reference: Farm name: NB 2016 -17 Current DSN 31827 {Copy} (2016)

FarmParameters



Relative produ Pasture block t Topography Distance from Cultivated in la Fodder rotates	coast st 5 years			km	1 No Flat 25 False No
	temperature iation in rainfitial evapotra	all		mm/yr	1096 10.1 731-1450 mm, Low 712 Moderate
Soil description Soil order (de Soil group (de SMaps Sibling Date downle	efault) efault) oaded			0 - 30cm 30 - 60cm > 60	Pallic Recent/YGE/BGE Parah_4a.1 Unknown 24 26 27
Field capac				0 - 30cm 30 - 60cm > 60 0 - 30cm 30 - 60cm > 60	38 38 39 50 46 44
	npeded layer rizon chemica sity	al and physic	al parameters	cm % kg/m³ % %	Imperfect Not entered 23 1220 34 12 34
Soil profile Profile draina Top soil texto Maximum roo Depth to imp	ire	e layer		m	Use default Silt loam 0 0
Soil drainage Drainage me Method Hydrophobic co Occurence of p Compacted top	ondition ougging dama	ge			None Use default Occasional False
Soil settings K leaching po N immobilisa	otential not se tion status	et			
Soil tests Olsen P 30 QT SO4 Anion storag TBK reserve K reserve sta		QT Ca 10 phosphate ro	QT Mg 20 etention	QT Na 9	5 Not entered Not entered Use default

Pasture

kg/ha

%

SOUTH DAIRY LTD - ALEXANDER D

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Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} (2016)

FarmParameters



Ryegrass/white clover Pasture type Clover levels Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - December

Category Product

Amount

Fertiliser products - August Category

Product

Amount Fertiliser products - October

Category

Product Amount

Fertiliser products - September

Category

Product

Amount

Fertiliser products - February

Category

Product

Amount Fertiliser products - December

Category

Product

Amount

Fertiliser products - March

Category Product

Amount

Fertiliser products - April

Category Product

Amount

Fertiliser products - May

Category

Product

Amount

Fertiliser products - January

Category

Product

Amount

Fertiliser products - November

Category

Product

Amount

Irrigation

No irrigation entered

Animals on block

Animals grazing

Dairy Water connectivity

Direct access to streams

Animal grazing

January February

April

March

User defined

2/3 Super & Lime

750

Ravensdown cropping

Ammo 36

100

User defined

Eff - Urea + Se

40

User defined

UREA BULK

60

User defined

UREA BULK

40

User defined

UREA BULK

40

Ravensdown other

Urea

60

Ravensdown other

Urea

40

Ravensdown other

Urea 20

Ravensdown other

Urea

40

Ravensdown other

Urea 40

100

False

True True

True True

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} (2016)

FarmParameters



May	True
August	True
September	True
October	True
November	True
December	True

Effluent application

Receives no liquid or solid effluents

Block	- Dai	rah 4	a 1 D	lin (∩ff
DIOCK	- Pai	an 4	a.1 r	tun (UII

Block name		Parah_4a.1 Run Off
Block type		Pastoral
Area	ha	2.9
Relative productivity		1
Pasture block type		No
Topography		Flat
Distance from coast	km	25
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1096
Mean annual temperature		10.1
Seasonal variation in rainfall		731-1450 mm, Low
Annual potential evapotranspiration	mm	712
_ '		

Seasonal variation in PET mm /12
Moderate

Soil description

Soil order (default)	Pallic
Soil group (default)	Recent/YGE/BGE
SMans	

Sibling Date downloaded		Parah_4a.1 Unknown
Wilting point	0 - 30cm	24
	30 - 60cm	26
	> 60	27
Field capacity	0 - 30cm	38
	30 - 60cm	38
	> 60	39
Saturation	0 - 30cm	50
	30 - 60cm	46

	> 60	44
Natural drainage class		Imperfect
Depth to impeded layer	cm	Not entered

Depth to impeded layer cm Not entere
Top soil horizon chemical and physical parameters

Top son nonzon chemical and physical parameters		
ASC/PR	%	23
Bulk density	kg/m³	1220
Clay	%	34
Sand	%	12
Sub soil		
Sub soil clay	%	34

Soil profile

Profile drainage class		Use default
Top soil texture		Silt loam
Maximum rooting depth	m	0
Depth to impeded drainage layer		0

Soil drainage

Drainage method
Method
None
Hydrophobic condition
Use default
Occurence of pugging damage
Compacted top soil

None
Use default
False

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} (2016)

FarmParameters



Soil settings

K leaching potential not set N immobilisation status

Soil tests

Olsen P QT K QT Ca QT Mg QT Na 27 8.7 8.9 16 10.2

Organic S 10.5
Anion storage capacity or phosphate retention Not entered TBK reserve K test Not entered K reserve status Use default

Pasture

Pasture type Ryegrass/white clover

Clover levels Use default

Supplements removed
Supplement information

Conservation type Baleage

Name
Wrapping Wrapped in plastic

Supplement amount
Number of bales 50

Number of bales 50
Packaging Round bales

Bale size

Standard bale equivalents 12
Fed to animal: Dairy replacements

No timing of feeding has been specified

Fertiliser application

Fertiliser products - December
Category
User defined

Product 2/3 Super & Lime

Amount kg/ha 750

Fertiliser products - August
Category Ravensdown cropping

Product Ammo 36

Amount kg/ha 100
Fertiliser products - October

Category User defined

Product Eff - Urea + Se Amount kg/ha 40

Fertiliser products - September

Category User defined Product UREA BULK

Amount kg/ha 60

Fertiliser products - February
Category
User defined

Product UREA BULK
Amount kg/ha 40

Amount kg/ha 40
Fertiliser products - December

Category User defined

Product UREA BULK Amount kg/ha 40

Fertiliser products - March

Category Ravensdown other Product Urea

Amount kg/ha 60
Fertiliser products - April

Category Ravensdown other

Product Urea
Amount kg/ha 40
Fertiliser products - May

Category Ravensdown other

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} (2016)

FarmParameters



Product Urea Amount kg/ha 20

Fertiliser products - January

Category Ravensdown other

Product Urea Amount kg/ha 40

Fertiliser products - November
Category Ravensdown other

Product Urea Amount kg/ha 40

Irrigation

Animals on block

No irrigation entered

Animals grazing
Dairy % 60

Water connectivity

Direct access to streams False
Animal grazing

January True
February True
March True
April True
May True

August True
September True
October True

Animals grazing
Dairy replacements % 40

Water connectivity
Direct access to streams
False

Direct access to streams False
Animal grazing

January True
February True
March True
April True
May True
July

November True
December True

Effluent application

Receives no liquid or solid effluents

Block - Apar_2a.1 Non Eff Lease

Block name Apar_2a.1 Non Eff Lease

Block type Pastoral
Area ha 4.5
Relative productivity 1
Pasture block type No
Topography Flat

Distance from coast km 25
Cultivated in last 5 years False
Fodder rotates through No

Climate

Annual average rainfall mm/yr 1096

Mean annual temperature 10.1

Seasonal variation in rainfall 731-1450 mm, Low

Annual potential evapotranspiration mm 712
Seasonal variation in PET Moderate

Soil description

Soil order (default)

Brown

Mark Crawford

Client reference: Farm name: NB 2016 -17 Current DSN 31827 {Copy} (2016)

FarmParameters



Soil group (defa	ault)				Sedimentary
Sibling	4-4				Apar_2a.1
Date downloa	iaea			0 20.000	Unknown
Wilting point				0 - 30cm	23
				30 - 60cm	26
Field conseils				> 60	1
Field capacity				0 - 30cm	45
				30 - 60cm	42
C-++!				> 60	2
Saturation				0 - 30cm	63
				30 - 60cm	53
Notural dusing				> 60	3
Natural drain				cm.	Imperfect Not entered
Depth to import Top soil horiz	eueu iayei	l and physica	l naramatara	cm	Not entered
ASC/PR	on chemica	i and physica	i parameters	%	43
Bulk density				kg/m³	1090
	/			%	25
Clay Sand				%	6
				70	0
Sub soil clay	.,			%	28
Sub soil clay	у			70	20
Soil profile					
Profile drainage	class				Use default
Top soil texture					Silt loam
Maximum rooti				m	0.58
Depth to imped	led drainag	e laver		***	0
_ op		- 1, -1			-
Soil drainage					
Drainage methor	od				
Method					None
Hydrophobic con-	dition				Use default
Occurence of pug		ge			Occasional
Compacted top s		_			False
Soil settings					
K leaching pote		et .			
N immobilisatio	n status				
Soil tosts					
Soil tests Olsen P	ΣT K	QT Ca	OT Ma	OT No	
30 7		10	QT Mg 20	QT Na 9	
		10	20	9	E
QT SO4					5 Not ontoned
Anion storage of TBK reserve K t		рпоѕрпасе ге	tention		Not entered Not entered
K reserve statu	S				Use default
Pasture					
Pasture type					Ryegrass/white clover
Clover levels					Use default
Clovel levels					ose deladie
Supplements ren	noved				
No supplement		from this blo	ck		
Fertiliser applicat					
Fertiliser produ	cts - Decen	nber			
Category					User defined
Product					2/3 Super & Lime
Amount				kg/ha	750
Fertiliser produ	cts - Augus	t			
Category					Ravensdown cropping
Product					Ammo 36
Amount				kg/ha	100
Fertiliser produ	cts - Octob	er			

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} (2016)

FarmParameters



Category User defined
Product Eff - Urea + Se

Amount kg/ha 40

Fertiliser products - September
Category
Product
User defined
UREA BULK

Amount kg/ha 60

Fertiliser products - February
Category
Product
User defined
UREA BULK

Amount kg/ha 40

Fertiliser products - December

Category User defined Product UREA BULK

Amount kg/ha 40 Fertiliser products - March

Category Ravensdown other

Product Urea Amount kg/ha 60

Fertiliser products - April

Category Ravensdown other Product Urea

Amount kg/ha 40 Fertiliser products - May

Category Ravensdown other

Product Urea Amount kg/ha 20

Fertiliser products - January

Category Ravensdown other

Product Urea Amount kg/ha 40

Fertiliser products - November
Category Ravensdown other

Product Urea

Amount kg/ha 40

Irrigation

No irrigation entered

Animals on block

Animals grazing
Dairy % 100

Water connectivity

Direct access to streams False

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

Effluent application

December

Receives no liquid or solid effluents

Block - Riparian Areas

Block name Riparian Areas Block type Riparian Area ha 1.2

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True



Farm Scenario Plan

Prepared by Mark Crawford
Senior Farm Environmental Consultant

Customer Name SOUTH DAIRY LTD Customer Address C/- D ALEXANDER;

11 MCCONACHIE ROAD; RD 1; WINTON, 9781

Date 19/12/2016

Reviewed by Andrée Callaghan - Certified NMA







Executive Summary

The purpose of this report is to outline the environmental loss risk indicators including N loss to the bottom of the root zone and P loss to second order streams for the proposed renewal/update of the property effluent discharge consent with more winter grazing on the property.

- The property is situated near Lochiel, 23.0 km North of Invercargill city and 25 km to the south west coast. It is of flat topography on a Pallic soil type, with some Brown soils. Climate data shows averages of 1096 mm rainfall, 10.1 degrees average temperature and 712 mm PET.
- The farm intends to seasonally peak milk 750 Jersey Friesian cross dairy cows at a stocking of 3.2 cows/ha producing 352,000 kg Milk solids or 1443 kg MS/ha. It is proposed this will be achieved with moderate to high Nitrogen inputs (211 kg N/ha/year) and imported supplements of 600 T DM (Dry Matter) or 2459 kg DM/ha/year.
- The Nitrogen loss modelled using Overseer Nutrient Budgets (6.2.3) for the proposed system is 34 kg
 N/ha/year or 8352 kg N/year. The current farm system loses are 32 kg N/ha/year or 8050 kg N/year.
- It must be noted that the N loss is influenced by the high pastoral productivity calculated by OVERSEER
 which is greater than known measured values for the district. This will increase the risk of N losses to
 groundwater. Higher quality pastures, pasture utilisation and measurement variabilities may contribute
 to this discrepancy.
- P losses are also calculated as a low to moderate risk at 1.3 kg P/ha/year for the proposed farm system.
 Risk is due largely to Overseer reported "other" losses. Mitigation with fencing of streams and lanes plus riparian planting will reduce this, as well as reduced effluent applications at low volumes on the shoulders of the season from storage, targeting non tiled areas in the later part of the season.
- The farm is in a zone with moderate (range low to high) risk to nitrate levels and the physiographic
 zones point to both artificial drains and overland flows, plus Nitrogen depositions from fertiliser and
 urine as being risk factors. The planned farm effluent system and feed pad plus good management
 practices with critical source areas will help mitigate this risk.

Key influences on the property's' proposed N loss are the higher productivity (at moderate to high stocking rates); the soil types on this property, mostly heavier, poorer draining types which reduce losses through the root zone by having less drainage, with some high risk leaching soils and the use of a feed pad for calving cattle on the property, allowing a high stocking rate over a period where drainage events are likely to occur. The planned feed pad and effluent system mitigations minimise the increase in N losses from the higher productivity and stocking rate.

 $Overseer\ nutrient\ budgets\ Version\ 6.2.3\ has\ been\ used\ to\ create\ the\ nutrient\ budgets\ presented\ in\ this\ report.$





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Mark Crawford
Senior Farm Environmental Consultant

Allenta.

19/12/2016





General

Aim and Purpose of Farm Scenario Plan

The purpose of this report is to provide a Nutrient Budget for the dairy unit for a renewal of the effluent discharge consent, with any associated changes to the effluent area and system to be included in the budget. The owners have requested this to ascertain the environmental nutrient loss indicators including N loss to the bottom of the root zone and P loss to second order streams, for the proposed farm system, including the impact of added cow numbers and a wintering pad, over the current farming system.

Overseer modelling of the proposed system has been undertaken in accordance with the Overseer 6.2.3 "best practice data input standards" and has been reviewed by a certified nutrient management advisor.

The following report summarises the respective Overseer 6.2.3 nutrient budgets and key assumptions made.

Property Details

Location/address	11 McConnachie Road; Winton
Legal Description	Lot 2 & 3 Deposited Plan 377137 and Sections 48- 49, 51 -
	53 , Part Section 47 Block I Winton Hundred; Lot 1
	Deposited Plan 7035, Section 11 Block II Winton Hundred
	Run off Section 48 Block I and Part Section 25-26 Block I
	Winton Hundred and Section 2 Survey Office Plan 11951
Total area (ha)	249.2 ha with paper roads, less drain margins = 248.5 ha;
	stated 244 ha effective
Owners	South Dairy Ltd c/- Dean and Suzanne Alexander
Contact details	
Phone	Dean (03) 9738989 mobile (027) 4066878
Email	alexander.farms@vodafone.co.nz
Farm Type	Seasonal dairy Supply
Dairy supply number	31827

Proposed Farm System Analysis

Description of Proposed (Consent) Farm System

The 249.2 ha Seasonal supply dairy farm is situated at 373 O'Shannessy Road, Lochiel, 5.5 km North West to Winton Township and 23.0 km North of Invercargill city. It is estimated to be 25 km from the south west coast. It is of flat topography, with a number of drains and a small tributary of the Tussock Creek stream meandering through the property. It is predominantly a Pallic (201.1 ha) soil (Pukemutu soils_6a.1, silt loam over clays, poorly drained; Paraha soils_4a.1 aka Northope, silt loams, imperfectly drained), with Brown (41.53 ha) soils (Waikiwi_30a.1 aka Edendale, silt loam, well drained and Aparima_2a.1 aka Waianiwa, silt loam over clay;





imperfect drained); S Maps and Southland Topoclimate map series. (S Map data and soil table and maps, pages 9 & 10). A small area of Woodlands soil (0.001 ha) was not included and was termed non-productive. In addition there is a high proportion of artificial drains, with estimates over 80 % in some paddocks, so an estimate was made of a percentage of paddocks that contained tile drains, and these being 100 % tile and mole drained with the rest of paddocks blocked as non-tiled.

Effective farm area is approximately 244.0 ha for the current property (owner stated), with titled area at 248.7 ha. However, there are numerous drains and the GIS soil areas were calculated at 249.2 ha which was used as total area. There is included in this total area; 1.2 ha of riparian stream area, with the remaining 4.0 ha of non-productive area made up of houses, cow shed and yards, shelter belts plus laneways and drains. The average annual rainfall is 1096 mm, with evapotranspiration (PET) at 712 mm and average temperature at 10.1 degrees (OVERSEER Climate tool, NIWA dataset, Lat. 46.194000, Long. 168.350700).

For the proposed scenario season, 780 predominantly Friesian Jersey cross cows are calved (750 peak milked; 500 kg average live weight (LW)), mean calving 24th August, drying off 25th May, with cows never milked once a day. All cows are wintered off, with Replacement heifers (First calvers) calving first. The cows are brought back in mobs from a support block bi-weekly from the start of calving with an ability to feed on a feed pad, combined with a standing off calving pad (60 to 100) prior to calving. The use of this pad will occur weather depending to effectively minimising pasture treading. The intent is to strip graze a small pastoral area otherwise over calving. Production is averaged at 352,000 kg milk solids (MS)/year, with 268 (default) day lactation. The replacements are grazed off from weaning (1st December) and not brought back to the milking platform until calving.

The effluent system will be based on a stone trap, with effluent gravity fed to a sump and then either out to a Travelling irrigator or effluent can be diverted to a holding pond, via a weeping wall stage, which can be stirred and sprayed via a similar travelling irrigator with low application depths. The Holding pond has storage of 1600 m³. This system is able to provide for deferred storage of effluent as per the Massey University Effluent calculator; and with appropriate measures to divert water when not in use. Storage will still enable the property to store effluent during high risk times. Both travelling irrigators are modelled at low application depths (<10 mm during the main season and < 5 mm on the season shoulders (April and August September). Pond sludge is spread every 4 years to the non-effluent blocks with pond solids and pad solids also spread over the non-effluent areas, modelled being spread in the months of December, January and November respectively.

There is intended to be a feed pad and calving pad built; however the system modelled was an uncovered wintering pad with a carbon rich base, with subsurface drained and effluent captured and applied via the farm dairy effluent system, Solids were not stored. Feeding was modelled as pad plus grazing to reflect the grazing of pastures when



possible and the time spent on the pad plus grazing hours was assessed as 60 % of cows in August and 30 % of cows in May and September, with 8 hours for all three months, whilst all cows in July are on the pad. This equates to approximately 6 to 7 days in August off pasture for the whole herd, while it is half this time in September and May

Supplements imported onto the property will be approximately 150 Tonnes (T) Dry Matter (DM) of Palm Kernel Extract (PKE) and 250 T DM Silage (good quality) both of which is fed on paddocks, with the PKE fed on trailers in the paddock. A further 200 T DM of good quality silage is fed on the feed pad/calving pad, whilst 92 T DM of baleage is made from paddocks (mainly effluent paddocks plus past run off area) on farm and stored and fed out on the shoulders of the season. It is modelled as mostly all fed out, with 92 T DM stored and fed out (80 T DM) the following season. This amount is weather dependent.

There is no crop intended to be sown on the dairy platform, with any pasture renewal done via grass to grass.

Soil fertility is at the values selected by the most recent soil tests in 2015/16 within the various blocks as shown below.

		Phosphate	Potassium	Org. Sulphur	Magnesium
Figures used;	Effluent	38	10	15	29
	Effluent Solids	35	8	5	22
	Lease block	27 to 30	7 to 9	5 to 10	16 to 20
Optimal		20 - 30	5 - 7	Org S 15 - 20	8 - 10

Pastoral fertiliser is as per Owner's inputs and the current maintenance fertiliser plan. Effluent blocks receive Superphosphate and Lime applied in December (NPKS 0-32-0-38). Ammo 36 is applied in August at rates of 100 kg/ha (36 kg N/ha) and then Urea follows at rates of 40 kg/ha for December and February, 50 kg/ha for April, 60 kg/ha for October and March, with 70 kg/ha in September. A further urea application is made in May at 40 kg/ha but only over half the block (9 kg N/ha). Solid effluent and Run off block (Lease) receive additional Nitrogen (Urea) applications to the above; (60 and 40 kg/ha) made in January and November respectively, with maintenance applications being a higher rate of Superphosphate and Lime plus potassium (NPKS rating 0-42-25-51). This accumulates in a total applied Nitrogen figure (organic and inorganic) of 293 kg N/ha/year for the Solid Effluent blocks and 248 kg N/ha/year for the Travelling Irrigator (Liquid) Effluent areas respectively. This calculates to an average of 219 kg N/ha/year (fertiliser) across all blocks (however 238 kg N/ha and 192 kg N/ha in fertiliser for solid effluent and effluent areas respectively).





Proposed Farm System Information

Farm System - Dairy					
Herd Type/Breed	Fr X	Total Milk Solids (kg/year)	352,000		
Seasonal Supply	Seasonal	Winter milk	No		
Number of cows	780	Milk Solids (kg/cow)	451		
Stocking rate (cows/ha)	3.2	Milk Solids (kg/ha)	1443		
Other Information					
Winter off milking platforn	1	Yes, a support block	Yes, a support block		
Charles and aff (or)		100 % off over June and July, init	100 % off over June and July, initially R 2 Heifers come back earlier in		
Stock grazed off (%)		first week of August, last week of	first week of August, last week of July modelled 32 cows for July		
Young stock reared off mill	ing platform	Yes from weaning	Yes from weaning		
Imported Feeds		150 T DM of PKE; 250 T DM Silage	e good quality, 200 T DM Silage to		
		Feed pad, plus 80 T DM Baleage f	Feed pad, plus 80 T DM Baleage from storage		

		Proposed			
Cows	Av weight kg LW	500 kg LW			
	Median calving Date	24 th August, ea	arlier for Heifers		
	Dry-Off date	25 th May			
	Peak Milk (1 Dec)	750 cows	750 cows		
	Cow Numbers		No cows	In shed feeding (Y/N) No	
		Jul	32		
		Aug	630		
		Sept	780		
		Oct	760		
		Nov	750		
		Dec	750		
		Jan	700		
		Feb	700		
		Mar	700		
		Apr	650		
		May	600		
		Jun	0		
	Production kg/MS	352,000			
	Lactation length	268 days defa	ılt		
	Once a day Milking	Never			
	(e.g half season, dry off, never)				
	Calves fed milk powder (Y/N)	N			
Supplements Imported		Amount (T/DM)	Fed (e.g. paddock, she	d, trough, crop)	
	Good quality Silage	250 & 200	On paddocks and on fe	ed pad	
	Straw (Barley)				
	Other PKE	150	In paddocks in trailers		
Supplements Made		Amount (T/DM)	На	Fed or stored?	
	Baleage and Silage	92	0.9 T DM/ha cut from Effluent and Waikiwi Run off blocks	Fed mostly, 12 T DM left over	
	Other				
Effluent	Type/system		ectly from sump or store in to receives effluent from fe		
	Application Depth mm	Low application for Irrigator.	Low application < 10 mm main season, September to April		
Replacements	On/off farm when & what age	Off farm from	weaning		

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Proposed Land Management Unit details and Soil Information: Table 1

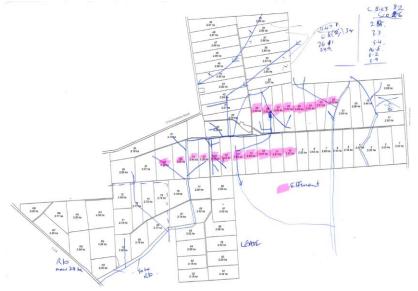
Block Name	Land Use	Block Type	Soil	Soil Texture	Drainage	Effective
			Order		Class	Area (ha)
Puke_6a.1 Effluent	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	12.9
Puke_6a.1 Effluent Tile	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	65.9
Puke_6a.1 Effluent Solid Lease	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	39.5
Puke_6a.1 Effluent Solid Tile	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	37.2
Puke_6a.1 Effluent Solid	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	36.8
Riparian Areas	Riparian	Riparian				1.2
Waiki_30a.1 Eff Solids	Dairy	Pastoral	Brown	Silt Loam	Well	17.9
Waiki_30a.1 Run Off	Dairy	Pastoral	Brown	Silt Loam	Well	23.7
Parah_4a.1 Eff solids	Dairy	Pastoral	Pallic	Silt Loam	Imperfect	2.7
Parah_4a.1 Run Off	Dairy	Pastoral	Pallic	Silt Loam	Imperfect	2.9
Apar_2a.1 Eff solids Lease	Dairy	Pastoral	Brown	Silt Loam over Clay	Imperfect	4.5
Non productive	Non effective	Non productive				4.0
Whole Farm					Total	249.2

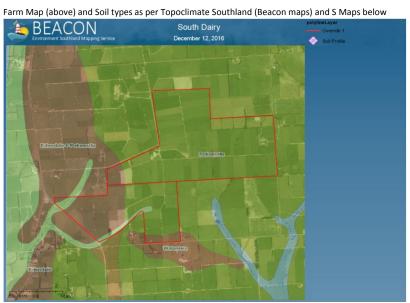
Current Land Management Unit details and Soil Information: Table 1 (b)

Block Name	Land Use	Block Type	Soil Order	Soil Texture	Drainage Class	Effective Area (ha)
Puke_6a.1 Effluent Tile	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	54.5
Puke_6a.1 Effluent Solid Lease	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	39.5
Puke_6a.1 Effluent Solid Tile	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	48.6
Puke_6a.1 Effluent Solid	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	49.7
Riparian Areas	Riparian	Riparian				1.2
Waiki_30a.1 Eff Solids	Dairy	Pastoral	Brown	Silt Loam	Well	17.9
Waiki_30a.1 Run Off	Dairy	Pastoral	Brown	Silt Loam	Well	23.7
Parah_4a.1 Eff solids	Dairy	Pastoral	Pallic	Silt Loam	Imperfect	2.7
Parah_4a.1 Run Off	Dairy	Pastoral	Pallic	Silt Loam	Imperfect	2.9
Apar_2a.1 Eff solids Lease	Dairy	Pastoral	Brown	Silt Loam over Clay	Imperfect	4.5
Non productive	Non effective	Non productive				4.0
Whole Farm					Total	249.2



Current and Proposed Land Management Unit Maps









Map of Nutrient Allocation Zone



 $Southland\ Physiographic\ Zones\ (Gleyed\ and\ Oxidising)\ as\ per\ Environment\ Southland\ Beacon\ Map$





Water Quality Map from ES Beacon map with Yellow line delineating between lower Oreti and Makarewa Catchments and the boundary between the pristine pre European and minor to moderate plus moderate to high Land use impact zones for Nitrate levels. See The Extent of Nitrate in Southland Groundwater's Technical Report or visit

 $\underline{\text{http://www.es.govt.nz/environment/water/groundwater/reporting/}}$

Regional Council Nutrient Management Regulations

Environment Southland (Southland Regional Council) has specified the following rules and policies:

Effluent(c) The discharge of farm dairy effluent to land, lawfully being undertaken up to and including 17 July 2010, in any of the following situations is a restricted discretionary activity:

(i) high rate irrigation to soil/landscape categories A, B, D and E as identified on Map 1 of Appendix N http://www.es.govt.nz/media/16996/water-classification-maps.pdf or determined by farm-scale soils mapping undertaken

by a suitably qualified person; or

(ii) low rate irrigation to soil/landscape category C as identified on Map 1 of Appendix N or determined by farm-scale soils mapping undertaken by a suitably qualified person; or

(iii) where the discharge falls within the situations listed in Rule 50(b) but cannot meet the conditions contained in Rule (50)(b).

The Council will restrict the exercise of its control to the following matters:

(a) application depth and rate, storage requirements, nitrogen loading and contingency plans;

(b) the separation distance of the discharge from surface water bodies, artificial watercourses, subsurface drains, the coastal marine area, residential dwellings, places of assembly, urban areas, property boundaries, water abstraction points and registered drinking-water supplies;

(c) inspection and audit requirements;

(d) water quality monitoring directly relating to the possible effects of the authorised discharge. (NB: This does not include general state of the environment water quality monitoring.)

Effluent: (d) The discharge of farm dairy effluent to land, that was not being lawfully undertaken as at 17 July 2010 (including an increase in the scale of an activity) in any of the following situations is a restricted discretionary activity: (i) low rate irrigation to soil/landscape categories A and B, and D and E as identified on Map 1 of Appendix N or determined by farm-scale soils mapping undertaken by a suitably qualified person; or

(iii) low or high rate irrigation by slurry tanker to soil/landscape categories A, B, D and E as identified on Map 1 of Appendi N <a href="http://www.es.govt.nz/media/16996/water-classification-maps.pdf_or determined by farm scale soils mapping undertaken by a suitably qualified person, does not exceed 5 mm in depth. provided the following conditions are met:





- 1. the discharge is not within 20 metres of any surface water body, artificial watercourse or the coastal marine area;
- 2. the discharge is not within 200 metres of any place of assembly or dwelling not on the same property, or 20 metres of the boundary of any other property; and
- 3. the discharge is not within 100 metres of any water abstraction point.
- The Council will restrict the exercise of its discretion to the following matters:
- (a) Application depth and rate, storage requirements, nutrient loading (in particular nitrogen) and contingency plans-
- (b) The separation distance (beyond that required under conditions 1, 2 and 3 above) of the discharge from surface water bodies, artificial watercourses, subsurface drains, the coastal marine area, residential dwellings, places of assembly, urban areas, property boundaries, water abstraction points and registered drinking water supplies.
- (c) Other measures to avoid, remedy or mitigate adverse effects (including cumulative effects directly related to the discharge of farm dairy effluent) on water quality taking into account the nature and sensitivity of the receiving environment.
- (g) Where the discharge of farm dairy effluent is to a mix of the soil/landscape categories identified on Map 1 of Appendix N, the status of the activity under Rules 50(a) to (e) will be determined by the soil/landscape category that has the highest concept test.
- (h) Where the discharge of farm dairy effluent to land will occur using both high rate and low rate irrigation, the status of the activity under Rules 50(a) to (d) will be based on the low rate irrigation.
- (i) An application for resource consent under clause (c) or (d) does not need to be notified and does not need to be served on persons who may be adversely affected by the activity unless the applicant requests notification or the Council considers special circumstances exist that warrant notification of the application
- Fertiliser: The discharge of fertiliser onto or into land is a permitted activity, providing it is not directly discharged into surface water, water bodies or ground water and is applied at levels which ensure minimal leaching of nutrients to ground water. The practice of application needs to ensure all practicable steps are taken to minimise fertiliser drift beyond target area and run off to surface water.

Nutrient related resource Consents held by the Landowner

Resource Consent No.	Condition No.	Condition Text	Resource consent expiry date
AUTH -			13/02/2017





Current Farm System Analysis

Description of Current Farm System

Changes from the proposed farm system described above are as follows, with all other input data remaining the same unless stated otherwise;

- Total area remains the same, however the effluent area is only 54.5 ha (53 ha owner stated), with only 5
 days storage from the pond, so modelled spray from sump.
- Run off area of 26.6 ha is cut for silage (4t DM/ha) and fed on platform, with dairy replacements (130) grazed on the run off from weaning till May when they leave the farm for grazing. The dairy cows graze to the equivalent of 60 % of the pastoral production off this area.
- Supplements imported are 90 T DM of PKE, with 25 T DM of good quality silage imported as well. The rest
 of the silage is made on the platform and fed back out, however 96 T DM is made on the run off areas and
 fed onto the platform areas.
- There is no feed pad or calving pad at present
- The herd is 600 cows calved and 580 peak milked, with 272,600 kg Milk solids at a slightly heavier LW of 520 kg, given that with the added stocking rate under the proposed consent scenario, it is expected that the farmer would breed for lighter cows. In addition, in the proposed scenario, the replacements are grazed on the run off from weaning to May when they leave to come back at the start of calving in the last week of July.
- Nitrogen rates are as follows, with maintenance fertiliser the same;

Nitrogen rate (kg/ha) and Month	Effluent (kg N/ha)	Non Effluent (kg N/ha) and Run off
Ammo 36 @ 100 - August	36	36
Urea @ 60 - September	28	28
Urea + Se @ 40 - October	18	18
Urea @ 40 - November		18
Urea @ 40 - December	18	18
Urea @ 40 - January		18
Urea @ 40 - February	18	18
Urea @ 60 - March	28	28
Urea @ 40 - April	18	18
Urea @ 40 – May (50 % farm)	9	9
Total	174	210





Summary of Proposed Farm System Scenario: Table 2

	Consent scenario	Current System
System Type	Seasonal dairy Supply	Seasonal dairy Supply
Total Area (ha)	249.2	249.2
Effluent area (ha)	78.8 ha liquid; 165.2 ha solid effluent; in a moving block around the total farm	54.5 ha receiving liquid and sludge
Stocking rate (s.u/ha)	7021 s.u* or 28.8 s.u/ha effective or 3.2 cows/ha	5820 s.u or 23.85 s.u/ha effective
N use (kg N/ha/year)	219	199
Production (kg MS/ha)	1443	1117
Supplements (kg DM/ha/year)	600 T DM or 2459	115 T DM or 471
Wintering system	Off farm	Off farm
Pasture production(kg DM/ha/year)** - Platform Pastures	16458	15248

^{*} As calculated by OVERSEER ** As calculated by OVERSEER with standard default and ME values which are likely to be lower than Southland values.

Summary of Whole Farm Nutrient Loss Indicators: Table 3

	Consent Scenario	Current System
System Type	Seasonal Dairy Supply	Seasonal Dairy Supply
Nitrogen leaching loss to water (Total kg N)	8352	8050
Nitrogen leaching loss to water (kg N/ha)	34	32
Phosphorus runoff to water (Total kg P)	325	327
Phosphorus runoff to water (kg P/ha)	1.3	1.3
Nitrogen conversion efficiency %	26	25
(N in products / N inputs)		
Nitrous oxide (N ₂ O) (kg N/ha)	86.1	79.9



Discussion on Whole Farm Nutrient Loss Indicators

The overall N loss for the proposed farm operation is 34 kg N/ha/year or 8352 kg N total, as seen in the above Table 3 page 15. The overall N loss for the proposed farm is due mainly to the high production per ha (1443 kg MS/ha) at a higher stocking rate of 3.2 cows/ha platform (cf. to 2.73. NZ Southland Dairy statistics 2015-16) with 2459 kg DM/ha of supplement used, and consequently the high pasture production required at 16458 kg DM/ha/year as seen in table 2, page 15 above.

A note needs to be made regarding the estimated pasture production (16.5 T DM/ha/year) when farmer and advisory experience would point to measured production at an average of 13.5 to 14.5 T DM/ha/year (Woodlands long term average pasture production is 13401 kg DM/ha/year)). Higher pasture quality (ME value), pasture utilisation and variance in plate meter measurements will all influence the discrepancy, and thus the model in using default criteria is overstating the N loss because of this. It is this pastoral production and the added Nitrogen which are contributing to the N loss, countered by the feed pad and the effluent storage to an extent.

The N loss for the proposal ranges from 3 kg N/ha/year for the Riparian areas to 41 kg N/ha/year for the Aparima Effluent solids lease block; with dairy pastures ranging between 29 and 41 kg N/ha/year. (Block Nitrogen report, pages 21 and 25).

The key factors determining these losses are:

- Effluent disposal has a part to play in reducing risk. It has been modelled that the effluent from the travelling irrigator is irrigated over the September to April period. Deferred irrigation over the higher rainfall periods of May and August would reduce the risk of N losses. The average N applied from liquid effluent is 55 kg N/ha, with 54 kg N/ha applied via effluent solids and sludge, as well as solids from the feed pad. This effective spreading of effluent nutrients over the whole farm is due to the separation of solid effluent and the ability to store and defer irrigation.
- Nitrogen rates have been increased to recognise the need for additional feed with the higher stocking rate, as well as additional supplement. This additional N is seen in the Added N column in the Nitrogen block where the large majority of the farm has increased from 210 kg N/ha/year to 293 kg N/ha/year in added N.
 This additional N increases the risk of this N being lost over periods when the soil is draining.
- The higher the pastoral productivity from dairy land and the associated higher stocking, the higher the risk
 of N losses on dairy farms, especially under the climatic rainfall and evapotranspiration rates for Southland.
 The heavier poor draining pallic soils lose less N/ha/year when compared to freer draining Brown soils, with
 the average/ha losses being 31 kg N/ha/year for the effluent solid Pukemutu pastoral blocks, whilst the





Aparima and Waikiwi effluent solid pastoral blocks lose 37 kg N/ha/year on average. The heavier pallic soils act as a form of mitigation as their N losses are lower due to denitrification and their higher water holding capacity also means a lower risk of leaching Nitrogen. They do however lose nutrients through sediment flows over land when they become water logged and they are typically artificially drained which acts as a conduit for these nutrients into the water ways.

The riparian blocks and non-productive areas offset these N losses to an extent.

The other environmental risk indices are the proposed P losses to surface water at 1.3 kg P/ha/year and Nitrous oxide gaseous losses at 86.1 kg N/ha/year as seen in the Phosphate reports pages 20 and 24. The high nitrous oxide loses are due to the heavier pallic soils. The P risk is mostly influenced by losses from "other" sources (123 kg or 38 % of total of 325 kg, refer Phosphorous block report, pages 20 and 24) which is run off from tracks and yards into drains and ditches from the farm. Riparian strip planting and vegetation buffer zones can reduce this. The other major losses are from the heavier Pallic soils under effluent applications with tile drains (direct flow). Effluent storage and low volume applications (which is in place) will help to mitigate this risk, as is good fertility management to minimise P soil losses.

The proposal is rated 24.31, the lower range of category 3 under the Soil versatility rating system (Landcare Research, 2002), as calculated in the table 4 below (page 18) and using the Environment Southland Beacon mapping system. The farm already uses a number of effective Nitrogen mitigation strategies to minimise losses for the proposal culminating in the results above. As modelled, the farm uses;

- All water ways are fenced and adequate Riparian strips in place.
- The effluent system is holding ponds, with adequate storage and with effluent pumped by a low volume spray system with applications less than 10 mm during the application months. In addition effluent from the feed pad is proposed to be added to this and applied when conditions are more favourable. Effluent also will be spread equally between solids and liquids to all the farm
- The farm winters all cows off the platform, and will use a feed pad and calving pad complex to carry cows
 pre calving and over the riskier calving period to minimise pastoral treading and pugging.





Soil Vulnerability Land Management Rating: Table 4

Soil Type/Farm blocks	Soil Vulnerability	Vulnerability rating	% Farm	Rating score
Waiki_30a.1(Edendale)	High	1	16.8	0.17
Parah_4a.1(Northope)	Moderate	10	2.3	0.23
Pukem_6a.1	Limited	30	79.1	23.73
Apar_2a.1(Waianawa)	Moderate	10	1.8	0.18
Total			100.00	24.31

The property is situated in the both the lower Oreti and Makarewa river catchment and the Tussock Creek stream zone of the proposed Environment Southland Regional Water Plan. It is mostly on a Gley soil physiographic zone with some Oxidising zone (see map, page 11). The farm ranges within pristine to moderate to high environmental impacts for nitrate levels (0.01 to 8.5 ppm). Water quality is both lowland hard bed and low land alluvial gravel. Implications of this information are unknown at present but some catchment areas will be required to reduce their impacts. The zonal information would point to the presence of artificial drains as the key risk factor, however this is now being mitigated by the use of the effluent storage and low volume application and targeting the lowest volume effluent applications for the highest risk times. In addition limiting late nitrogen applications and urine nitrogen depositions at high risk times on the oxidising soils is also a mitigation factor to consider, so as to limit the risk of N losses through leaching.

Please see information contained in the Appendices for detail relating to nutrient budgets, nitrogen block reports, phosphorus block reports and estimated pasture production for the current situation and scenario modelled.

OVERSEER v6.2 has a new irrigation module to better reflect the management practices of irrigators. The Best Practice Data Input Standards give some guidance on what is now required. The model requires more information from users about their irrigation system and how water application decisions are made on farm. The extra data needed includes depth of water per application; return time and depending on how soil water is monitored what are the trigger points and targets (mm deficit). Ideally, this data needs to be actual long term average data as OVERSEER uses 30 year average climate data. Best estimates of these data will generally generate more drainage, and hence N loss to water, than has been the case with previous OVERSEER versions.

OVERSEER is a continually developing model with several aspects currently being investigated. In particular there are on-going issues in relation to the modelled nitrogen leaching from grazed crop blocks (and possibly forage blocks also) being less than expected. (Please see www.overseer.org.nz/OVERSEERModel/bugs.aspx for more detail).





When future versions of OVERSEER are stipulated for use associated with Regional Council rules both the current and the proposed farm systems will need to be re-modelled for consistency as the base N lost from the root zone may alter with updated OVERSEER versions.





Appendices

Proposed Farm System

Proposed Farm System

Proposed farm System Whole Farm Nutrient Budget

Nutrient Budget

OVERSEER

	N	P	K	s	Ca	Mg	Na	
		(kg/ha/yr)						
Nutrients added in								
Fertiliser, lime & other	219	38	17	56	257	0	0	_
Rain/clover N fixation	100	0	3	5	3	7	33	
Irrigation	0	0	0	0	0	0	0	
Supplements imported	66	8	51	7	9	5	3	
Nutrients removed	1							
As products	96	16	23	5	21	2	7	_
Exported effluent	0	0	0	0	0	0	0	
As Supplements	0	0	0	0	0	0	0	
To atmosphere	160	0	0	0	0	0	0	
To water	34	1.3	15	71	54	6	21	
Change in internal pools	1							
Plant material	1	0	0	0	0	0	0	
Organic pool	95	16	6	-8	0	0	-1	
Inorganic mineral	0	1	-19	0	-2	-3	-4	
Inorganic soil pool	0	11	44	0	196	7	14	

Proposed farm System Nutrient Loss Indicators

P report

Block P

Block Phosphorus

OVERSEER

Blockname	Total P	P lost		P loss categories		
	(kg P/yr)	(kg P/ha/yr)	Soil	Fertiliser	Effluent	
Puke_6a.1Effluent	13	1	Medium	Medium	N/A	
Puke_6a.1 Effluent Tile	67	1	Medium	Low	Low	
Puke_6a.1 Effluent Solid Lease	35	0.9	Medium	Medium	Low	
Puke_6a.1Effluent SolidTile	38	1	Medium	Medium	Low	
Puke_6a.1EffluentSolid	37	1	Medium	Medium	Low	
Riparian Areas	0	0.1	N/A	N/A	N/A	
Waiki_30a.1 Eff Solids	3	0.2	Low	Low	Low	
Waiki_30a.1 Run Off	4	0.2	Low	Low	Low	
Parah_4a.1 Eff solids	2	0.7	Low	Medium	Low	
Parah_4a.1 Run Off	2	0.6	Low	Medium	Low	
Apar_2a.1 Eff solids Lease	1	0.2	Low	Low	Low	
Other Sources	123					
Whole farm	325	1.3				



N report Farm N

Farm Nitrogen

OVERSEER

	Units	Benchmark farm	Current farm
Inputs (farm average)			
Clover N	kg N/ha/yr		98
Fertiliser N	kg N/ha/yr		219
Other N added	kg N/ha/yr		68
Indices			
Average N loss to water	kg N/ha/yr	24-42	34
includes N lost as effluent			
N2O emissions	kg N/ha/yr		86.1
For pastoral area of farm:			
Farm N surplus	kg N/ha/yr	123-191	283
N conversion efficiency	%	27-35	26

Block N

Block Nitrogen

OVERSEER

Block name	Total N lost	N lost to water	N in drainage *	N surplus	Added N **
	(kg N/yr)	(kg N/ha/yr)	(ppm)	(kg N/ha/yr)	(kg N/ha/yr)
Puke_6a.1 Effluent	378	29	6.5	228	248
Puke_6a.1 Effluent Tile	2009	30	6.6	228	248
Puke_6a.1 Effluent Solid Lease	1219	31	6.9	250	293
Puke_6a.1 Effluent SolidTile	1169	31	7	249	293
Puke_6a.1Effluent Solid	1136	31	6.9	250	293
Riparian Areas	4	3	NaN	0	0
Waiki_30a.1 Eff Solids	687	38	8.8	234	293
Waiki_30a.1 Run Off	813	34	7.8	202	293
Parah_4a.1 Eff solids	90	33	7.2	257	293
Parah_4a.1 Run Off	90	31	6.7	230	293
Apar_2a.1 Eff solids Lease	183	41	9.2	237	293
Other farm sources	574				
Whole farm	8352	34			
Less N removed in wetland	0				
Farm output	8352	34			

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

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



^{**} Sum of fertiliser and external factory effluent inputs.



${\it Proposed System Pasture Production \ and \ Other \ Values/Effluent \ Report}$

Block Pasture

OVERSEER

Block name	On-farm fresh pasture intake (kg DM/ha/yr)	Estimated utilisation (%)	Supplements removed (kg DM/ha/yr)	Pasture growth (kg DM/ha/yr)
Puke_6a.1 Effluent	13199	85	930	16458
Puke_6a.1 Effluent Tile	13215	85	910	16458
Puke_6a.1 Effluent Solid Lease	13989	85	0	16458
Puke_6a.1 Effluent SolidTile	13989	85	0	16458
Puke_6a.1Effluent Solid	13989	85	0	16458
Riparian Areas	0	0	0	0
Waiki_30a.1 Eff Solids	13989	85	0	16458
Waiki_30a.1 Run Off	13272	85	844	16458
Parah_4a.1 Eff solids	13989	85	0	16458
Parah_4a.1 Run Off	13989	85	0	16458
Apar_2a.1 Eff solids Lease	13989	85	0	16458

This report gives an estimated animal intake for each block based on animal production and supplements brought on to farm information supplied. Estimated annual pasture growth is shown for the animal utilisation value shown. Note: the model is not sensitive to changes in utilisation.

It is recommended that a consultant or software such StockPol is used to estimate farm pasture production.

Other values for farm - NB 2016 -17 Consent



Milking herd size (peak cows/ha grazed)	3.2
Milk solids (kg/ha grazed)	1443
Milk production per cow (kg milk solids /	451.3
Default calving data	06 August
Total liveweight brought (kg/ha grazed)	323
Total liveweight reared (kg/ha grazed)	64
Total liveweight sold (kg/ha grazed)	368
\$ on fertiliser per kg milk solids	\$0.39
\$ on fertiliser per ha	\$551.65
GHG: Allocation to milk	0.89
Dairy stock rate (RSU)	7021
Dairy replacements stock rate (RSU)	0



Effluent Report

OVERSEER

Based on pastoral farm area only	Units	Current farm
Current area receiving liquid effluent		
Total area including crops	ha	79
Pastoral area receiving liquid	ha	79
% of farm pastoral area	%	32
Average liquid effluent	kg N/ha/yr	55.0
Average fertiliser N	kg N/ha/yr	192.0
Average other N inputs	kg N/ha/yr	N/A
Area of farm to apply all effluent to ach	ieve rate:	
150 kg N/ha/yr	ha	89.0 #
Maintenance K	ha	1099
100 kg K/ha/yr	ha	159.0
Source of N in effluent block(s)		
Effluent from farm dairy	%	85
Effluent from feed pad	%	0
Effluent from wintering pad	%	15
Effluent from standoff	%	0

The report shows rates and target areas for farm liquid effluent only, assuming it is all applied to pastoral blocks. It excludes any farm solid effluent or imported effluent that may be added to effluent blocks. If this occurs, then target areas may need to be increased.

Proposed System Parameter Report

As attached in separate pdf format



^{*} Average K maintenance rates were less than 20 kg K/ha/yr - use with caution.



Current Farm System Current farm System Whole Farm Nutrient Budget

Nutrient Budget

OVERSEER

	N	P	K	s	Ca	Mg	Na	
				(kg/ha/yr)			
Nutrients added in								
Fertiliser, lime & other	198	33	4	49	221	0	0	_
Rain/clover N fixation	96	0	3	5	3	7	33	
Irrigation	0	0	0	0	0	0	0	
Supplements imported	13	2	7	2	1	1	1	
Nutrients removed								
As products	76	13	18	4	17	2	5	_
Exported effluent	0	0	0	0	0	0	0	
As Supplements	0	0	0	0	0	0	0	
To atmosphere	123	0	0	0	0	0	0	
To water	32	1.3	13	59	53	7	21	
Change in internal pools								
Plant material	0	0	0	0	0	0	0	
Organic pool	75	15	1	-7	0	0	0	
Inorganic mineral	0	1	-38	0	-2	-3	-4	
Inorganic soil pool	0	4	20	0	156	3	11	

Current farm System Nutrient Loss Indicators

P report

Block P

Block Phosphorus

OVERSEER

Blockname	Total P	Total P P lost	P loss categories		
	(kg P/yr)	(kg P/ha/yr)	Soil	Fertiliser	Effluent
Puke_6a.1 Effluent Tile	81	1.5	Medium	Low	High
Puke_6a.1 Non Eff Lease	35	0.9	Medium	Medium	N/A
Puke_6a.1 Non Eff Tile	47	1	Medium	Low	N/A
Puke_6a.1 Non Effluent	47	0.9	Medium	Medium	N/A
Riparian Areas	0	0.1	N/A	N/A	N/A
Waiki_30a.1 Non Eff	3	0.2	Low	Low	N/A
Waiki_30a.1 Run Off	4	0.2	Low	Low	N/A
Parah_4a.1 Non Effluent	2	0.6	Low	Low	N/A
Parah_4a.1 Run Off	2	0.6	Low	Low	N/A
Apar_2a.1 Non Eff Lease	1	0.2	Low	Low	N/A
Other Sources	106				
Whole farm	327	1.3			



N report

Farm N

Farm Nitrogen

OVERSEER

	Units	Benchmark farm	Current farm
Inputs (farm average)			
Clover N	kg N/ha/yr		94
Fertiliser N	kg N/ha/yr		198
Other N added	kg N/ha/yr		15
Indices			
Average N loss to water	kg N/ha/yr	24-42	32
includes N lost as effluent			
N2O emissions	kg N/ha/yr		79.9
For pastoral area of farm:			
Farm N surplus	kg N/ha/yr	123-191	230
N conversion efficiency	%	27-35	25

Block N

Block Nitrogen

OVERSEER

Block name	Total N lost (kg N/yr)	N lost to water (kg N/ha/yr)	N in drainage * (ppm)	N surplus (kg N/ha/yr)	Added N ** (kg N/ha/yr)
Puke_6a.1 Effluent Tile	2291	42	8.4	293	319
Puke_6a.1 Non Eff Lease	1040	26	5.9	201	210
Puke_6a.1 Non Eff Tile	1302	27	6	201	210
Puke_6a.1 Non Effluent	1309	26	5.9	201	210
Riparian Areas	4	3	NaN	0	0
Waiki_30a.1 Non Eff	574	32	7.3	185	210
Waiki_30a.1 Run Off	773	33	7.5	156	210
Parah_4a.1 Non Effluent	78	29	6.2	208	210
Parah_4a.1 Run Off	82	28	6.1	166	210
Apar_2a.1 Non Eff Lease	155	34	7.8	188	210
Other farm sources	443				
Whole farm	8050	32			
Less N removed in wetland	0				
Farm output	8050	32			

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

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



 $[\]hbox{** Sum of fertiliser and external factory effluent inputs.}$



Current System Pasture Production and Other Values/Effluent Report

Block Pasture

OYERSEER

Block name	On-farm fresh pasture intake (kg DM/ha/yr)	Estimated utilisation (%)	Supplements removed (kg DM/ha/yr)	Pasture growth (kg DM/ha/yr)
Puke_6a.1 Effluent Tile	12960	85	0	15248
Puke_6a.1 Non Eff Lease	12960	85	0	15248
Puke_6a.1 Non Eff Tile	12960	85	0	15248
Puke_6a.1 Non Effluent	12960	85	0	15248
Riparian Areas	0	0	0	0
Waiki_30a.1 Non Eff	12960	85	0	15248
Waiki_30a.1 Run Off	9480	81	3544	15248
Parah_4a.1 Non Effluent	12960	85	0	15248
Parah_4a.1 Run Off	8999	81	4138	15248
Apar_2a.1 Non Eff Lease	12960	85	0	15248

This report gives an estimated animal intake for each block based on animal production and supplements brought on to farm information supplied. Estimated annual pasture growth is shown for the animal utilisation value shown. Note: the model is not sensitive to changes in utilisation.

It is recommended that a consultant or software such StockPol is used to estimate farm pasture production.

Other values for farm - NB 2016 -17 Current



Milking herd size (peak cows/ha grazed)	2.5
Milk solids (kg/ha grazed)	1117
Milk production per cow (kg milk solids /	454.3
Default calving data	06 Augus
Total liveweight brought (kg/ha grazed)	259
Total liveweight reared (kg/ha grazed)	104
Total liveweight sold (kg/ha grazed)	368
\$ on fertiliser per kg milk solids	\$0.42
\$ on fertiliser per ha	\$464.26
GHG: Allocation to milk	0.85
Dairy stock rate (RSU)	5655
Dairy replacements stock rate (RSU)	165





Effluent Report

OYERSEER®

Based on pastoral farm area only	Units	Current farm	
Current area receiving liquid effluent			
Total area including crops	ha	54	
Pastoral area receiving liquid	ha	54	
% of farm pastoral area	%	22	
Average liquid effluent	kg N/ha/yr	145.0	
Average fertiliser N	kg N/ha/yr	174.0	
Average other N inputs	kg N/ha/yr	N/A	
Area of farm to apply all effluent to achie	ve rates		_
150 kg N/ha/yr	ha	53.0 #	
Maintenance K	ha	324	
100 kg K/ha/yr	ha	63.0	
Source of N in effluent block(s)			
Effluent from farm dairy	%	100	
Effluent from feed pad	%	0	
Effluent from wintering pad	%	0	
Effluent from standoff	%	0	

[#] based on the total of liquid and solid effluents generated on farm and imported effluents applied.

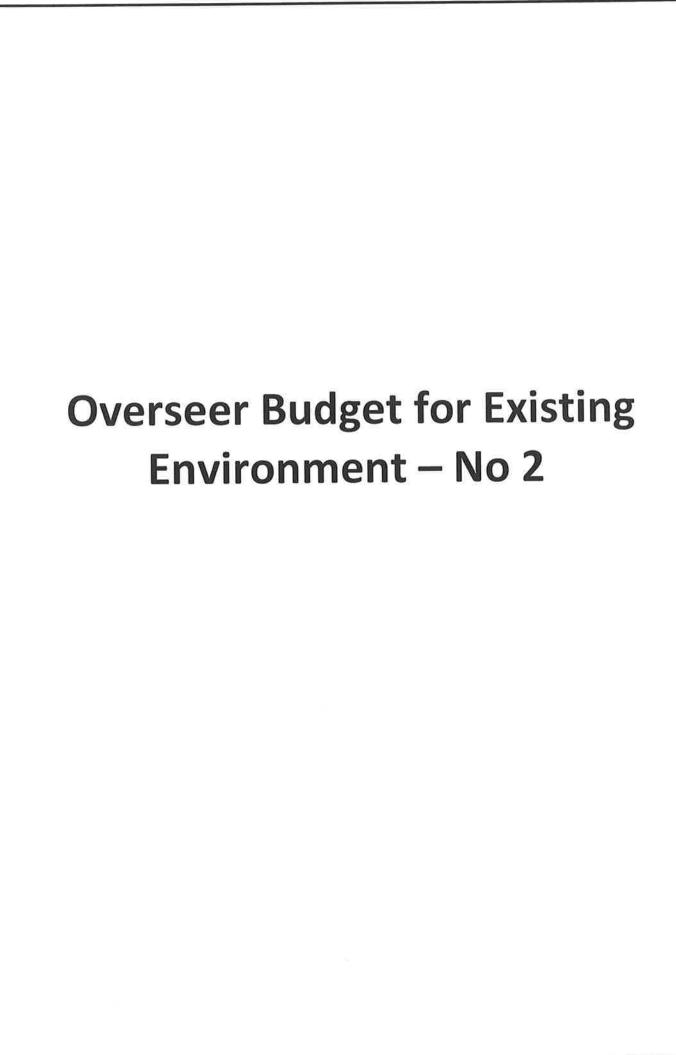
The report shows rates and target areas for farm liquid effluent only, assuming t is all applied to pastoral blocks. It excludes any farm soli

Current System Parameter Report

As attached in separate pdf format



^{*} Average K maintenance rates were less than 20 kg K/ha/yr - use with caution.



Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters



Farm details

i ai iii actaiis		
Type	Farm type	Full range
Assessment	Assessment year	2016
Region	Region	Southland
Farm blocks		
Puke_6a.1 Effluent Tile	Pastoral	54.5
Puke_6a.1 Non Eff Lease	Pastoral	35.4
Puke_6a.1 Non Eff Tile	Pastoral	44.5
Puke_6a.1 Non Effluent	Pastoral	45.6
Waiki_30a.1 Non Eff	Pastoral	17.9
Waiki_30a.1 Run Off	Pastoral	19.7
Parah_4a.1 Non Effluent	Pastoral	2.7
Parah_4a.1 Run Off	Pastoral	2.9
Apar_2a.1 Non Eff Lease	Pastoral	4.5
Riparian Areas	Riparian	1.2
Swedes	Fodder Crop	
Pasture to FB MP	Crop	6.2
FB/Barley MP	Crop	6.2
Pasture to FB RO	Crop	2
FB/Barley RO	Crop	2
Total farm area declared in blocks	ha	245.3
Total farm area	ha	248.5
Non-productive area	ha	3.1999999999999

Farm animals

Stock numbers

Stock reconciliation - Dairy Production Milk solids Milk volume yield Fat yield Lactation length Average weight Calving times				kg/yr l/yr kg/yr days kg/ar			Not e Not e Not e	ntered ntered ntered ntered					
Median calving date Drying off Percent of herd								August May					
Stock numbers													
Class	Breed	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
MilkingHerd	F x J cross	399	406	580	565	560	560	555	555	555	550	50Ó	259
Max weight (kg) LW start (kg		CW (Age (mont	hs)	Source	Fate		ex .	Mated			
520 0	0 alacomonto	0	1	0				F	emale				
Stock numbers - Dairy rep		71	4	Can	0-4	N/a	D	7	r-h	14	4	14-11	7
Class	Breed	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
HeiferReplacements Max weight (kg) LW start (kg	F x J cross) LW end (kg)	O CW (F	0	0 Age (mont	0	170 Source	170 Fate	170	170 Sex	170 Mated	170	170	170
0 0 0	230	0		nge (mont 0	.113)	Weaned	rate		emale	Mateu			
HeiferReplacements	F x J cross	140	140	140	140	140	140	140	140	140	140	140	140
Max weight (kg) LW start (kg		CW (Age (mont		Source	Fate		ex	Mated			
0 0	0	0		11		Brought		F	emale				
Stock reconciliation - Beef /	dairy grazing												
Stock production	dany grazing												
Calving percentage				%			Not e	ntered					
Percent replacements				%				ntered					
Mean calving date				70				ntered					
Mean weaning date								ntered					
Weaning weight				kg			Not e	ntered					
Stock numbers				5									
Class	Breed	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters



DairyMilking 0 0 0 0 0 Friesian X 200 174 0 0 0 200 iersev Max weight (kg) LW start (kg) LW end (kg) CW (kg) Age (months) Source Fate Sex Mated Female

Stock management

Animal excreta distribution

Relative productivity assessment method

All blocks have a relative productivity value of 1

Ratio of stock on blocks can differ from the farm stock ratios

Farm dairy effluent management system

Effluent management method

Spray from sump

No difference between blocks

Animal health supplements

Animal - Dairy

No animal supplementation has been entered

Animal - Dairy replacements

No animal supplementation has been entered

Animal - Beef / dairy grazing

No animal supplementation has been entered

Left over feeding

No left over feeding specified

Stored supplements

No supplements from storage added to this farm

Imported supplements

Supplement information

Conservation type Process byproducts
Name Palm kernel meal

Supplement amount

Dry weight basis T 90

Fed to animal: Dairy

No timing of feeding has been specified

Supplement information

Conservation type Silage

Name Pasture good quality silage

Supplement amount

Dry weight basis T 25

Fed on blocks: Puke_6a.1 Effluent Tile,Puke_6a.1 Non Eff Lease,Puke_6a.1 Non Eff Tile,Puke_6a.1 Non Effluent,Waiki_30a.1

Non Eff,Parah_4a.1 Non Effluent,Apar_2a.1 Non Eff Lease

No timing of feeding has been specified

Supplement information

Conservation type Greenfeeds
Name Turnips

Supplement amount
Dry weight basis T 135

Fed to animal: Dairy

No timing of feeding has been specified

Supplement information

Conservation type Silage

Name Barley milky dough silage

Supplement amount

Dry weight basis T 30

Fed to animal: Dairy
Feed timing to enterprise Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

Dairy 100

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters



Greenhouse gas emission factors

Enteric methane - g methane/kg DMI intake		
Dairy		21.6
Dairy replacements		21.6
Sheep		20.9
Beef		21.6
Deer		21.3
Goats		20.9
Camelids		20.9
Young sheep		16.8
Horses	kg methane/RSU	1.8
User defined	kg methane/RSU	1.5
Dung methane - g methane/kg dung		
Dairy		0.982

Dung methane - g methane/kg dung	
Dairy	0.982
Dairy replacements	0.982
Sheep	0.691
Beef	0.982
Deer	0.915
Goats	0.691
Other	0.691

Nitrous oxide

Use farm specific emission factors

Fuel and electricity

Embodied CO2 emissions		
Diesel	kg CO2 equivalents/litre	2.989
Petrol	kg CO2 equivalents/litre	2.773
Electricity	kg CO2 equivalents/kWh	0.271
Energy emissions		
Diesel	MJ / litre	42.24
Petrol	MJ / litre	42.4
Electricity	MJ / kWh	8.21

GWP

Use NZ national inventory

Allocation

Allocation method Enter actual allocation figures

Report settings

Greenhouse gas emission report units: CO2 equivalents (kg/ha/yr)

Target N application rate as effluent: kg N/ha/yr

Fertiliser costs \$/kg nutrient

N	Р	K	S	Ca	Mg	Na
1.45	3.5	2.4	0.35	0.2	1.4	0.8

Block Information

Block - Puke_6a.1 Effluent Tile

Block name		Puke_6a.1 Effluent Tile
Block type		Pastoral
Area	ha	54.5
Relative productivity		1
Pasture block type		No
Topography		Flat

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters

Pasture type

Clover levels



25 Distance from coast km Cultivated in last 5 years **False** Fodder rotates through No Climate Annual average rainfall mm/yr 1096 Mean annual temperature 10.1 Seasonal variation in rainfall 731-1450 mm, Low Annual potential evapotranspiration 712 mm Seasonal variation in PET Moderate Soil description Soil order (default) Pallic Soil group (default) Recent/YGE/BGE **SMaps** Pukem 6a.1 Sibling Date downloaded Unknown Wilting point 0 - 30cm 22 30 - 60cm 25 > 60 1 Field capacity 0 - 30cm 40 30 - 60cm 41 > 60 2 Saturation 0 - 30cm 54 30 - 60cm 48 > 60 3 Natural drainage class Poor Depth to impeded layer Not entered cm Top soil horizon chemical and physical parameters % ASC/PR 22 Bulk density 1220 kg/m³ % 27 Clay Sand % 9 Sub soil Sub soil clay % 29 Soil profile Profile drainage class Use default Silt loam Top soil texture Maximum rooting depth 0.58 m Depth to impeded drainage layer 0.58 Soil drainage Drainage method Method Mole/tile system Percent of paddock drained 100 Hydrophobic condition Use default Occurence of pugging damage Occasional Compacted top soil False Soil settings K leaching potential not set N immobilisation status Soil tests Olsen P QT K QT Mg QT Na OT Ca 9.6 38.2 9.6 28.6 Organic S 15 Anion storage capacity or phosphate retention Not entered TBK reserve K test Not entered K reserve status Use default Pasture

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Rvegrass/white clover

Use default

kg/ha

kg/ha

kg/ha

kg/ha

kg/ha

kg/ha

kg/ha

kg/ha

%

SOUTH DAIRY LTD - ALEXANDER D

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters



Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - December

Category Product

Amount Fertiliser products - August

Category

Product

Amount

Fertiliser products - October

Category

Product Amount

Fertiliser products - September

Category

Product

Amount

Amount

Fertiliser products - February Category

Product

Amount

Fertiliser products - December

Category Product

A --- -----

Amount

Fertiliser products - March Category

Product

Amount

Fertiliser products - April

Category

Product Amount

Fertiliser products - May

Category

Product

Amazumt

Amount

Irrigation

No irrigation entered

Animals on block

Animals grazing

Dairy Water connectivity

Direct access to streams

Animal grazing

January February March

April

May August September October

November December Effluent application

Liquid effluents
Receives farm dairy effluent

User defined

2/3 Super & Lime

750

Ravensdown cropping

Ammo 36

100

User defined

Eff - Urea + Se

40

User defined

UREA BULK

60

User defined

UREA BULK

kg/ha 40

User defined

UREA BULK

40

Ravensdown other

Urea

60

Ravensdown other

Urea

40

Ravensdown other

Urea

20

100

False

True True True True True True

True True True True

True

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters

K leaching potential not set N immobilisation status

Soil tests



Effluent application depth		Low application method
Percentage of block effluent applied to	0/0	100

Percentage of block effluent applied to	%	100
lock - Puke_6a.1 Non Eff Lease Block name		Puke 6a.1 Non Eff Lease
Block type		Pastoral
Area	ha	35.4
Relative productivity		1
Pasture block type		No Flat
Topography Distance from coast	km	25
Cultivated in last 5 years	KIII	False
Fodder rotates through		No
Climate		
Annual average rainfall	mm/yr	1096
Mean annual temperature	,,	10.1
Seasonal variation in rainfall		731-1450 mm, Low
Annual potential evapotranspiration	mm	712
Seasonal variation in PET		Moderate
Soil description		D. III
Soil order (default)		Pallic
Soil group (default) SMaps		Recent/YGE/BGE
Sibling		Pukem 6a.1
Date downloaded		Unknown
Wilting point	0 - 30cm	22
	30 - 60cm	25
et 11 a	> 60	1
Field capacity	0 - 30cm 30 - 60cm	40 41
	> 60	2
Saturation	0 - 30cm	54
	30 - 60cm	48
	> 60	3
Natural drainage class		Poor
Depth to impeded layer	cm	Not entered
Top soil horizon chemical and physical parameters	%	22
ASC/PR Bulk density	kg/m³	1220
Clay	%	27
Sand	%	9
Sub soil		
Sub soil clay	%	29
Soil profile		
Profile drainage class		Use default
l op soil texture		Silt loam
Maximum rooting depth Depth to impeded drainage layer	m	0.58 0.58
Depth to impeded drainage layer		0.56
Soil drainage		
Drainage method Method		None
Hydrophobic condition		Use default
Occurence of pugging damage		Occasional
Compacted top soil		False
Soil settings		
V looshing notantial not got		

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters



Olsen P QT K QT Ca QT Mg QT Na 30 7 10 20 9

QT SO4

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

Pasture

Pasture type Ryegrass/white clover

Clover levels Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - December
Category User defined

Product 2/3 Super & Lime

Amount kg/ha 1000

Fertiliser products - August

Category Ravensdown cropping

Product Ammo 36

Amount kg/ha 100 Fertiliser products - October

Category User defined Product Eff - Urea + Se

Product Eff - Urea
Amount kg/ha 40

Amount kg/ha 40 Fertiliser products - September

Category User defined Product UREA BULK

Amount kg/ha 60

Fertiliser products - February
Category
User defined

Product UREA BULK

Amount kg/ha 40
Fertiliser products - December

Category User defined

Product UREA BULK

Amount kg/ha 40
Fertiliser products - March

Category Ravensdown other
Product Urea

Product Urea Amount kg/ha 60

Fertiliser products - April

Category Ravensdown other

Product Urea Amount kg/ha 40

Fertiliser products - May

Category Ravensdown other Product Urea

Amount kg/ha 20

Fertiliser products - January

Category Ravensdown other

Product Urea

Amount kg/ha 40
Fertiliser products - November

Category Ravensdown other

Product Urea Amount kg/ha 40

Fertiliser products - December

Category Ravensdown other Product Potassium chloride

Amount kg/ha 50

Irrigation

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters



No irrigation entered

Animals on block		
Animals grazing		
Dairy	%	100
Water connectivity		
Direct access to streams		False
Animal grazing		
January		True
February		True
March		True
April		True
May		True
August		True
September		True
October		True
November		True
December		True

Effluent application

Receives no liquid or solid effluents

Block name		Puke_6a.1 Non Eff Tile
Block type		Pastoral
Area	ha	44.5
Relative productivity		1
Pasture block type		No
Topography		Flat
Distance from coast	km	25
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1096
Mean annual temperature		10.1
Seasonal variation in rainfall		731-1450 mm, Low

Annual potential evapotranspiration mm 712
Seasonal variation in PET Moderate

Soil description

Soil order (default)	Pallic
Soil group (default)	Recent/YGE/BGE
CMana	

 SMaps
 Pukem_6a.1

 Date downloaded
 Unknown

 Wilting point
 0 - 30cm
 22

 30 - 60cm
 25

 > 60
 1

 Field capacity
 0 - 30cm
 40

Field capacity 0 - 30cm 40 30 - 60cm 41 > 60 2 Saturation 54 30 - 60cm 48 > 60 3

Natural drainage class Poor
Depth to impeded layer cm Not entered

Sand % 9
Sub soil
Sub soil clay % 29

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters



Soil profile

Profile drainage class
Use default
Top soil texture
Silt loam
Maximum rooting depth
m
0.58
Depth to impeded drainage layer
0.58

Soil drainage

Drainage method

Method Mole/tile system

Percent of paddock drained 100
Hydrophobic condition Use default
Occurence of pugging damage Occasional
Compacted top soil False

Soil settings

K leaching potential not set N immobilisation status

Soil tests

Olsen P QT K QT Ca QT Mg QT Na 35 8 10 22 8

QT S04 5

Anion storage capacity or phosphate retention

TBK reserve K test

K reserve status

Not entered

Use default

Pasture

Pasture type Ryegrass/white clover

Clover levels Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - December

Fertiliser products - March

Category User defined Product 2/3 Super & Lime

Amount kg/ha 750
Fertiliser products - August

Category Ravensdown cropping

Product Ammo 36
Amount kg/ha 100

Amount kg/ha 1 Fertiliser products - October

Category User defined

Product Eff - Urea + Se

Amount kg/ha 40 Fertiliser products - September

Category User defined

Product UREA BULK Amount kg/ha 60

Fertiliser products - February

Category User defined Product UREA BULK

Amount kg/ha 40

Fertiliser products - December
Category
Product
User defined
UREA BULK

Amount kg/ha 40

Category Ravensdown other

Product Urea Amount kg/ha 60

Amount kg/ha 60 Fertiliser products - April

Category Ravensdown other

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters



Product Urea Amount kg/ha 40

Fertiliser products - May

Ravensdown other Category

Product Urea 20 Amount kg/ha

Fertiliser products - January Ravensdown other Category

Product Urea kg/ha 40 Amount

Fertiliser products - November

Category Ravensdown other

Product Urea 40 Amount kg/ha

Irrigation No irrigation entered

Animals on block Animals grazing

% 100 Dairy

Water connectivity Direct access to streams False

Animal grazing January True

February True March True April True May True August True September True True

October November True December True

Effluent application

Receives no liquid or solid effluents

Block - Puke_6a.1 Non Effluent

Block name Puke_6a.1 Non Effluent Block type **Pastoral** Area ha 45.6 Relative productivity 1 Pasture block type No Topography

Flat Distance from coast km 25 Cultivated in last 5 years False

Fodder rotates through No

1096 Annual average rainfall mm/yr Mean annual temperature 10.1

Seasonal variation in rainfall 731-1450 mm, Low

Annual potential evapotranspiration mm 712 Seasonal variation in PET Moderate

Soil description

Soil order (default)

Recent/YGE/BGE Soil group (default) **SMaps**

Sibling Pukem_6a.1 Date downloaded Unknown

0 - 30cm Wilting point 22 30 - 60cm 25 > 60 1

Mark Crawford

Client reference: Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters



					•
Field capa	citv			0 - 30cm	40
	,			30 - 60cm	41
				> 60	2
Saturation	า			0 - 30cm	54
				30 - 60cm	48
				> 60	3
Natural dr	ainage class				Poor
Depth to i	mpeded layer			cm	58
Top soil h	orizon chemic	al and physica	l parameters		
ASC/PR				%	22
Bulk der	nsity			kg/m³	1220
Clay				%	28
Sand				%	9
Sub soil				0.4	22
Sub soil	ciay			%	29
Soil profile					
Profile drain	ane class				Use default
Top soil tex					Silt loam
	ooting depth			m	0.58
	peded drainag	ge laver			0.58
= 0 p 3 33	,	50,			
Soil drainage					
Drainage m	ethod				
Method					None
Hydrophobic					Use default
Occurence of		age			Occasional
Compacted to	p soil				False
	ootential not s ation status	et			
Soil tests					
Olsen P	QT K	QT Ca	QT Mg	QT Na	
35	8 8	10	22	8	
QT S04	J	10	22	O	5
	ge capacity or	phosphate re	tention		Not entered
TBK reserve					Not entered
K reserve st	tatus				Use default
Pasture					5 (1"
Pasture type					Ryegrass/white clover
Clover level	S				Use default
Supplements	removed				
		from this blo	ck		
Fertiliser appl	lication				
Fertiliser pr	oducts - Dece	mber			
Category					User defined
Product					2/3 Super & Lime
Amount				kg/ha	750
	oducts - Augu	ST			Di
Category Product					Ravensdown cropping
Amount				kg/ha	Ammo 36 100
	oducts - Octol	ner		ку/па	100
Category	Jaces Octo	J-01			User defined
Product					Eff - Urea + Se
Amount				kg/ha	40
	oducts - Septe	ember			
Category	232				User defined
Product					UREA BULK
Amount				kg/ha	60
				.	

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters



Fertiliser products - February

Category User defined Product UREA BULK

Amount kg/ha 40

Fertiliser products - December

Category User defined Product UREA BULK

Amount kg/ha 40 Fertiliser products - March

Category Ravensdown other

Product Urea Amount kg/ha 60

Amount kg/ha 60 Fertiliser products - April

Category Ravensdown other

Product Urea Amount kg/ha 40

Fertiliser products - May

Category Ravensdown other

Product Urea

Amount kg/ha 20 Fertiliser products - January

Category Ravensdown other

Product Urea Amount kg/ha 40

Fertiliser products - November

Category Ravensdown other Product Urea

Amount kg/ha 40

Irrigation

No irrigation entered

Animals on block
Animals grazing

Dairy % 100

Water connectivity

Direct access to streams False

Animal grazing True January February True March True April True May True August True September True October True

November True
December True

Effluent application

Climate

Receives no liquid or solid effluents

Block - Waiki_30a.1 Non Eff

Block name Waiki_30a.1 Non Eff

Block type Pastoral
Area ha 17.9
Relative productivity 1
Pasture block type Yes
Topography Flat
Distance from coast km 25
Cultivated in last 5 years False

Fodder rotates through

Annual average rainfall mm/yr 1096

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Yes

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FarmParameters

Product



				*
Mean annual temperatur Seasonal variation in rai Annual potential evapotr Seasonal variation in PE	nfall ranspiration		mm	10.1 731-1450 mm, Low 712 Moderate
Soil description Soil order (default) Soil group (default)				Brown Sedimentary
SMaps Sibling				Waiki_30a.1
Date downloaded Wilting point			0 - 30cm	Unknown 21
Field capacity			30 - 60cm > 60 0 - 30cm 30 - 60cm > 60	23 25 42 41 43
Saturation			0 - 30cm 30 - 60cm > 60	59 52 49
Natural drainage class Depth to impeded laye	er		cm	Well Not entered
Top soil horizon chemi	cal and physic	cal parameters	%	42
ASC/PR Bulk density			% kg/m³	43 1090
Clay			%	28
Sand			%	4
Sub soil Sub soil clay			%	28
Soil profile				
Profile drainage class				Use default
Top soil texture				Silt loam
Maximum rooting depth Depth to impeded draina	age layer		m	0 0
Soil drainage				
Drainage method				No
Method Hydrophobic condition				None Use default
Occurence of pugging dan	nage			Occasional
Compacted top soil	-			False
Soil settings K leaching potential not	set			
N immobilisation status				
Soil tests Olsen P QT K	QT Ca	QT Mg	QT Na	
30 7 QT SO4	10	20	9	5
Anion storage capacity of TBK reserve K test K reserve status	or phosphate i	retention		Not entered Not entered Use default
Pasture				
Pasture type Clover levels				Ryegrass/white clover Use default
Supplements removed No supplements remove	d from this bl	ock		
Fertiliser application				
Fertiliser products - Dec Category	ember			User defined

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2/3 Super & Lime

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Direct access to streams

FarmParameters



		O / — -
Amount	kg/ha	750
Fertiliser products - August	Kg/ Hd	730
Category		Ravensdown cropping
Product		Ammo 36
Amount	kg/ha	100
Fertiliser products - October		
Category		User defined
Product		Eff - Urea + Se
Amount	kg/ha	40
Fertiliser products - September		
Category		User defined
Product		UREA BULK
Amount	kg/ha	60
Fertiliser products - February		
Category		User defined
Product	1 4	UREA BULK
Amount	kg/ha	40
Fertiliser products - December		11 d-6: d
Category Product		User defined UREA BULK
Amount	1:2 /h =	
	kg/ha	40
Fertiliser products - March		Ravensdown other
Category Product		Urea
Amount	kg/ha	60
Fertiliser products - April	ку/па	00
Category		Ravensdown other
Product		Urea
Amount	kg/ha	40
Fertiliser products - May	Kg/Tid	40
Category		Ravensdown other
Product		Urea
Amount	kg/ha	20
Fertiliser products - January	Kg/ Ha	20
Category		Ravensdown other
Product		Urea
Amount	kg/ha	40
Fertiliser products - November	5,	
Category		Ravensdown other
Product		Urea
Amount	kg/ha	40
Irrigation		
No irrigation entered		
Animals on block		
Animals on block Animals grazing		
Dairy	%	60
Water connectivity	70	60
Direct access to streams		False
Animal grazing		1 4.50
January		True
February		True
March		True
April		True
May		True
August		True
September		True
October		True
November		True
December		True
Animals grazing		
Dairy replacements	%	40
Water connectivity		
Direct access to streams		False

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False

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FarmParameters



Animal grazing

Dairy replacements graze block all year round

Effluent application

Receives no liquid or solid effluents

Block - Waiki 3	30a.1	Run	Off
-----------------	-------	-----	-----

Block name Waiki 30a.1 Run Off Block type **Pastoral** Area ha 19.7 Relative productivity 1 Pasture block type Yes Flat Topography Distance from coast km 25 Cultivated in last 5 years False Fodder rotates through Yes

Climate

Annual average rainfall mm/yr 1096 Mean annual temperature 10.1

Seasonal variation in rainfall 731-1450 mm, Low

Annual potential evapotranspiration mm 712
Seasonal variation in PET Moderate

Soil description

Soil order (default)

Soil group (default)

Sedimentary

SMaps

Sibling Waiki_30a.1
Date downloaded Unknown
Wilting point 0 - 30cm 21

30 - 60cm 23 > 60 25 Field capacity 0 - 30cm 42 30 - 60cm 41 > 60 43 Saturation 0 - 30cm 59

Saturation 0 - 30cm 59
30 - 60cm 52
> 60 49
Natural drainage class Well

Depth to impeded layer cm Not entered

Top soil horizon chemical and physical parameters

ub soil Sub soil clay

Soil profile

Soil drainage

Drainage method
Method
None
Hydrophobic condition
Occurence of pugging damage
Occasional

Compacted top soil

Soil settings
K leaching potential not set
N immobilisation status

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%

28

False

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FarmParameters



Soil tests

Olsen P QT K QT Ca QT Mg QT Na 10 27 16

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

Pasture

Ryegrass/white clover Pasture type

Clover levels Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - December

User defined Category Product 2/3 Super & Lime

Amount kg/ha

Fertiliser products - August

Ravensdown cropping Category

Ammo 36 Product Amount kg/ha 100

Fertiliser products - October

User defined Category Eff - Urea + Se Product

Amount kg/ha 40

Fertiliser products - September Category User defined

Product **UREA BULK**

Amount kg/ha 60

Fertiliser products - February Category User defined

UREA BULK Product

40 Amount kg/ha Fertiliser products - December

User defined Category Product **UREA BULK**

40 kg/ha Amount

Fertiliser products - March Category Ravensdown other

Product Urea 60 Amount kg/ha

Fertiliser products - April Ravensdown other

Category Product Urea

Amount kg/ha 40

Fertiliser products - May Category Ravensdown other

Urea Product

20 Amount kg/ha Fertiliser products - January

Ravensdown other Category

Product Urea Amount kg/ha 40

Fertiliser products - November

Category Ravensdown other

Product Urea Amount kg/ha 40

Irrigation

No irrigation entered

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters



Animals on block		
Animals grazing		
Dairy replacements	%	80
Water connectivity		
Direct access to streams		False
Animal grazing		
Dairy replacements graze block all year round		
Animals grazing		
Dairy	%	10
Water connectivity		
Direct access to streams		False
Animal grazing		
June		True
July		True
Animals grazing		
Beef / dairy grazing	%	10
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		
June		True
July		True
August		True

Effluent application

Receives no liquid or solid effluents

Block - Parah_4a.1 Non Effluent

Block name Parah 4a.1 Non Effluent Block type **Pastoral** 2.7 Area ha Relative productivity Pasture block type No Topography Flat Distance from coast km 25 Cultivated in last 5 years False Fodder rotates through No

Climate

Annual average rainfall mm/yr 1096
Mean annual temperature 10.1
Seasonal variation in rainfall 731-1450 mm, Low
Annual potential evapotranspiration mm 712

Annual potential evapotranspiration mm 712
Seasonal variation in PET Moderate

Soil description

Soil order (default) Pallic

Soil group (default) Recent/YGE/BGE

SMaps

 Sibling
 Parah_4a.1

 Date downloaded
 Unknown

 Wilting point
 0 - 30cm
 24

 30 - 60cm
 26

 > 60
 27

Field capacity 0 - 30cm 38
30 - 60cm 38
> 60 39
Saturation 0 - 30cm 50
30 - 60cm 46
> 60 44

Natural drainage class Imperfect
Depth to impeded layer cm Not entered

Top soil horizon chemical and physical parameters

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Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters



ASC/PR 23 % Bulk density kg/m³ 1220 % Clav 34 Sand % 12 Sub soil % Sub soil clay 34

Soil profile

Profile drainage class
Use default
Top soil texture
Silt loam
Maximum rooting depth
m
0
Depth to impeded drainage layer
0

Soil drainage

Drainage method
Method
None
Hydrophobic condition
Occurence of pugging damage
Compacted top soil

None
Use default
Occasional
False

Soil settings

K leaching potential not set N immobilisation status

Soil tests

 Olsen P
 QT K
 QT Ca
 QT Mg
 QT Na

 30
 7
 10
 20
 9

QT SO4 5
Anion storage capacity or phosphate retention 5
Not entered

TBK reserve K test

K reserve status

Not entered

Use default

Pasture

Pasture type Ryegrass/white clover

Clover levels Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - March

Fertiliser products - December
Category
User defined

Product 2/3 Super & Lime

Amount kg/ha 750

Fertiliser products - August
Category Ravensdown cropping

Product Ammo 36

Amount kg/ha 100

Fertiliser products - October

Category User defined

Product Eff - Urea + Se

Amount kg/ha 40
Fertiliser products - September

Category User defined

Product UREA BULK

Amount kg/ha 60

Fertiliser products - February
Category
User defined

Product UREA BULK

Amount kg/ha 40 Fertiliser products - December

Category User defined

Product UREA BULK

Amount kg/ha 40

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters



Category Ravensdown other

Product Urea Amount

kg/ha Fertiliser products - April

Category Ravensdown other

Product Urea Amount kg/ha 40

Fertiliser products - May

Ravensdown other Category Product Urea

Amount 20 kg/ha

Fertiliser products - January

Category Ravensdown other

Product Urea

Amount kg/ha 40

Fertiliser products - November Category Ravensdown other

Urea Product

Amount kg/ha 40

Irrigation

No irrigation entered

Animals on block Animals grazing

40 % Dairy replacements

Water connectivity

Direct access to streams False

Animal grazing

Dairy replacements graze block all year round Animals grazing

Dairy % 60

Water connectivity

Direct access to streams False

Animal grazing Dairy graze block all year round

Effluent application

Receives no liquid or solid effluents

Block - Parah_4a.1 Run Off

Block name Parah_4a.1 Run Off

Pastoral Block type Area ha 2.9 Relative productivity 1 Pasture block type Yes Topography Flat

Distance from coast km 25 Cultivated in last 5 years False

Fodder rotates through Yes

Climate

1096 Annual average rainfall mm/yr Mean annual temperature 10.1

Seasonal variation in rainfall 731-1450 mm, Low

Annual potential evapotranspiration mm 712 Seasonal variation in PET Moderate

Soil description

Soil order (default) **Pallic**

Recent/YGE/BGE Soil group (default)

SMaps Siblina Parah_4a.1

Date downloaded Unknown

Wilting point 0 - 30cm 24

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters

Category



			• , —-
Field capacity		30 - 60cm > 60 0 - 30cm 30 - 60cm	26 27 38 38
Saturation		> 60 0 - 30cm 30 - 60cm > 60	39 50 46 44
Natural drainage class Depth to impeded layer Top soil horizon chemical and p	hysical parameters	cm	Imperfect Not entered
ASC/PR Bulk density Clay Sand		% kg/m³ % %	23 1220 34 12
Sub soil Sub soil clay		%	34
Soil profile Profile drainage class Top soil texture Maximum rooting depth Depth to impeded drainage layer		m	Use default Silt loam 0 0
Soil drainage Drainage method Method Hydrophobic condition Occurence of pugging damage Compacted top soil			None Use default Occasional False
Soil settings K leaching potential not set N immobilisation status			
Soil tests Olsen P QT K QT C 27 8.7 8.9 Organic S Anion storage capacity or phosph TBK reserve K test K reserve status	16	QT Na 10.2	10.5 Not entered Not entered Use default
Pasture Pasture type Clover levels			Ryegrass/white clover Use default
Supplements removed No supplements removed from the	is block		
Fertiliser application Fertiliser products - December Category			User defined
Product Amount Fertiliser products - August		kg/ha	2/3 Super & Lime 750
Category Product Amount Fertiliser products - October		kg/ha	Ravensdown cropping Ammo 36 100
Category Product Amount Fertiliser products - September		kg/ha	User defined Eff - Urea + Se 40

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User defined

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Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters



Product	UREA BULK

Amount kg/ha 60 Fertiliser products - February

Category User defined

Product UREA BULK Amount kg/ha 40

Fertiliser products - December

Category User defined Product UREA BULK

Amount kg/ha 40 Fertiliser products - March

Category Ravensdown other

Product Urea Amount kg/ha 60

Fertiliser products - April

Category Ravensdown other

Product Urea Amount kg/ha 40

Fertiliser products - May

Category Ravensdown other

Product Urea Amount kg/ha 20

Fertiliser products - January
Category Ravensdown other

Product Urea

Amount kg/ha 40 Fertiliser products - November

Category Ravensdown other

Product Urea

Amount kg/ha 40

Irrigation
No irrigation entered

Animals on block

Animals grazing

Dairy replacements % 80

Water connectivity

Direct access to streams False
Animal grazing

Dairy replacements graze block all year round Animals grazing

Dairy % 10

Water connectivity
Direct access to streams False

Animal grazing

June True
July True

July
Animals grazing

Beef / dairy grazing % 10
Block intensity

Finishing beef False
Water connectivity

Direct access to streams False

Animal grazing
June True
July True
August True

Effluent application

Receives no liquid or solid effluents

Block - Apar_2a.1 Non Eff Lease

Block name Apar_2a.1 Non Eff Lease Block type Pastoral

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters



Area	abi db.			ha		4.5
Relative produce Pasture block t						1 Yes
Topography						Flat
Distance from				km		25 False
Cultivated in la Fodder rotates	,					False Yes
						. 55
Climate Annual avera	go rainfall			mm/yr		1096
Mean annual				111111/ y 1		10.1
	iation in rainfa					731-1450 mm, Low
Annual poten Seasonal vari	itial evapotrar	spiration		mm		712 Moderate
Seasonal van	iacion in FL1					Moderate
Soil description						_
Soil order (de Soil group (d						Brown Sedimentary
SMaps	cidaicy					Scaminentary
Sibling						Apar_2a.1
Date downl Wilting poir				0 - 30cm		Unknown 23
whichig poil	IC .			30 - 60cm	1	26
				> 60		1
Field capaci	ity			0 - 30cm 30 - 60cm		45 42
				> 60	l	2
Saturation				0 - 30cm		63
				30 - 60cm	1	53 3
Natural dra	inage class			> 60		Imperfect
Depth to im	npeded layer			cm		Not entered
	rizon chemica	l and physical	parameters	0/		43
ASC/PR Bulk dens	sitv			% kg/m³		43 1090
Clay	,			%		25
Sand				%		6
Sub soil Sub soil c	lav			%		28
	,			, ,		
Soil profile Profile draina	ine class					Use default
Top soil textu						Silt loam
Maximum roo				m		0.58
Depth to imp	eded drainage	e layer				0
Soil drainage						
Drainage met Method	thod					None
Hydrophobic co	ondition					Use default
Occurence of p	ugging dama	ge				Occasional
Compacted top	soil					False
Soil settings						
	tential not se	t				
N immobilisa	tion status					
Soil tests						
Olsen P 30	QT K 7	QT Ca	QT Mg 20	QT Na 9		
QT SO4	,	10	20	J		5
Anion storage		phosphate ret	ention			Not entered
TBK reserve l K reserve sta						Not entered Use default
k reserve sta	itus					use deladit

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters



Pasture

Pasture type

Clover levels

Ryegrass/white clover Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - December

Category

Product Amount

Fertiliser products - August

Category Product

Amount

Fertiliser products - October

Category Product

Amount

Fertiliser products - September Category

Product

Amount

Fertiliser products - February

Category Product

Amount

Fertiliser products - December Category

Product

Amount

Fertiliser products - March Category

Product

Amount

Fertiliser products - April

Category

Product

Amount Fertiliser products - May

Category

Product

Amount

Fertiliser products - January

Category

Product

Amount

Fertiliser products - November

Category

Product Amount

Irrigation No irrigation entered

Animals on block

Animals grazing

Dairy Water connectivity

Direct access to streams

Animal grazing

January February User defined

2/3 Super & Lime

kg/ha

Ravensdown cropping Ammo 36

100

User defined

Eff - Urea + Se

kg/ha 40

kg/ha

kg/ha

kg/ha

kg/ha

kg/ha

kg/ha

kg/ha

kg/ha

User defined **UREA BULK**

60

kg/ha

User defined **UREA BULK**

40

User defined

UREA BULK

40

Ravensdown other

Urea

Ravensdown other

Urea

40

Ravensdown other

Urea

20

Ravensdown other

Urea 40

Ravensdown other

Urea

40

% 100

False

True True

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters



March True April True Mav True August True September True October True November True December True

Effluent application

Receives no liquid or solid effluents

Block - Riparian Areas

Block name Riparian Areas Block type Riparian Area ha 1.2

Block - Swedes

Block name Swedes Block type Fodder Crop

Rotation area ha 7.8 Low N mineralisation False Final grid month October Irrigation system type No Irrigation

Crop information

Current assessment year 2016 November - Swedes

Crop management See details below Crop sown

Fertiliser or lime added See details below

December - Swedes

Fertiliser or lime added See details below

January - Swedes February - Swedes March - Swedes April - Mature - Swedes May - Mature - Swedes June - Swedes

See details below Defoliation Crop management

July - Swedes Crop management

August - Swedes Defoliation

Crop management See details below

September - Bare ground

October - Grazed

Crop management See details below Crop sown

Fertiliser or lime added See details below

Crop sowing information - November of the Current assessment year 2016

Crop category Fodder Swedes Crop type

Product yield T/ha dry matter

Cultivation practice at sowing Conventional

Defoliation information - June of the Current assessment year 2016

Defoliation method Grazed in-situ

Final harvest False Source of animal Farm stock - see Enterprise numbers panes

Percentage of crop eaten by animals

Dairy replacements % 20 Beef / dairy grazing 80

Crop grazed for hours/day Not entered

Defoliation information - July of the Current assessment year 2016

Grazed in-situ Defoliation method

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See details below

Defoliation

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FarmParameters



Final harvest False

Source of animal Farm stock - see Enterprise numbers panes

Percentage of crop eaten by animals

Dairy replacements % 20 Beef / dairy grazing % 80 Crop grazed for hours/day Not entered

Defoliation information - August of the Current assessment year 2016

Defoliation method Grazed in-situ Final harvest

Source of animal

Farm stock - see Enterprise numbers panes

Percentage of crop eaten by animals

Dairy replacements % 20 Beef / dairy grazing % 80 Crop grazed for hours/day Not entered

Crop sowing information - October of the Current assessment year 2016

Crop category Permanent pasture Grazed

Crop type Source of animals Not entered

Fertiliser application

Fertiliser products - Current assessment - November (N Method: Incorporated)

Ravensdown cropping Category Product Cropmaster DAP

Amount kg/ha 250 Fertiliser products - Current assessment - December (N Method: Surface applied)

Ravensdown other Category

Product Urea Amount kg/ha 100

Soluble fertiliser inputs (kg/ha/month) - Current assessment - October (N Method: Surface applied)

Ca Urea N Super P Sulphate S Mg K Na

0 0 0 0 18

Effluent application

Receives no liquid or solid effluents

Block - Pasture to FB MP

Block name Pasture to FB MP Block type Crop Area 6.2 ha Cultivated area % of area 100 Headland area % of area 0 Other area % of area 0 Distance from coast km 25 Final grid month October No Irrigation

Irrigation system type

Climate

Annual average rainfall 1096 mm/yr Mean annual temperature 10.1

Seasonal variation in rainfall 731-1450 mm, Low

Annual potential evapotranspiration mm 712 Seasonal variation in PET Moderate

Soil description

Soil order (default) Pallic

Recent/YGE/BGE Soil group (default) **SMaps**

Pukem_6a.1 Siblina

Date downloaded Unknown 0 - 30cm Wilting point 22

30 - 60cm 25 > 60 1 Field capacity 0 - 30cm 40

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters



30 - 60cm 41 2 > 60 54 Saturation 0 - 30cm 30 - 60cm 48 > 60 3 Natural drainage class Poor Depth to impeded layer cm Not entered

Top soil horizon chemical and physical parameters ASC/PR % 22 kg/m³ 1220 Bulk density Clay % 27 % Sand 9 Sub soil Sub soil clay % 29

Soil profile

Profile drainage class Use default Silt loam Top soil texture Maximum rooting depth 0.58 m Depth to impeded drainage layer 0.58

Soil drainage Drainage method

Method Mole/tile system

Percent of paddock drained 100

Soil settings

K leaching potential not set

Soil tests

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

Crop block history

Years in pasture

Prior history Grazed pasture

Source of animal information

Animal source

Pasture consumption by each class same as farm ratio

Crop information

Previous assesment year November - Grazed pasture December - Grazed pasture January - Grazed pasture February - Grazed pasture March - Grazed pasture April - Grazed pasture May - Grazed pasture June - Grazed pasture July - Grazed pasture August - Grazed pasture September - Grazed pasture October - Grazed pasture

Current assessment year 2016 November - Fodder beets Crop management Fertiliser or lime added

December - Fodder beets Fertiliser or lime added See details below

January - Fodder beets February - Fodder beets Crop sown

Farm stock - see Enterprise numbers panes

See details below

See details below

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters



March - Fodder beets

April - Mature - Fodder beets

May - Mature - Fodder beets

June - Mature - Fodder beets

July - Fodder beets

Crop management See details below Defoliation

August - Bare ground September - Bare ground

October - Forage barley (spring)

Crop management See details below Crop sown

Fertiliser or lime added See details below

Crop sowing information - November of the Current assessment year 2016

Crop category Fodder

Crop type Fodder beets

Product yield T/ha dry matter 21

Cultivation practice at sowing Conventional

Defoliation information - July of the Current assessment year 2016

Defoliation method Cut and Carry Final harvest True Destination of crop Exported

Crop sowing information - October of the Current assessment year 2016

Crop category Forages

Crop type Forage barley (spring)

Yield at final defoliation T/ha dry matter 8

Cultivation practice at sowing Conventional

Fertiliser application

Fertiliser products - Current assessment - November (N Method: Surface applied)

Category Ravensdown cropping Product Cropmaster DAP

Amount kg/ha 250

Fertiliser products - Current assessment - December (N Method: Surface applied)

Category Ravensdown other

Product Urea
Amount kg/ha 100

Fertiliser products - Current assessment - October (N Method: Incorporated)

Category Ravensdown cropping

Product Cropmaster 15

Amount kg/ha 300

Effluent application

Receives no liquid or solid effluents

Block - FB/Barley MP

Block name FB/Barley MP Block type Crop 6.2 Area ha Cultivated area % of area 100 Headland area % of area 0 Other area % of area 0 Distance from coast km 25

Final grid month October
Irrigation system type No Irrigation

Climate

Annual average rainfall mm/yr 1096 Mean annual temperature 10.1

Seasonal variation in rainfall 731-1450 mm, Low

Annual potential evapotranspiration mm 712
Seasonal variation in PET Moderate

Soil description

Soil order (default) Pallic

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters



Farm stock - see Enterprise numbers panes

Soil group (default)		Recent/YGE/BGE
SMaps Sibling		Pukem 6a.1
Date downloaded		Unknown
Wilting point	0 - 30cm	22
whiching point	30 - 60cm	25
	> 60	1
Field capacity	0 - 30cm	40
rield capacity	30 - 60cm	41
	> 60	2
Saturation	0 - 30cm	54
Saturation	30 - 60cm	48
	> 60	3
Natural drainage class	> 00	Poor
Depth to impeded layer	cm	Not entered
	cm	Not entered
Top soil horizon chemical and physical parameters ASC/PR	%	22
Bulk density	kg/m³	1220
	%	27
Clay Sand	% %	9
Sub soil	90	9
Sub soil clay	%	29
Sub Soli Clay	70	29
Soil profile		
Profile drainage class		Use default
Top soil texture		Silt loam
Maximum rooting depth	m	0.58
Depth to impeded drainage layer		0.58
- 4		
Soil drainage		
Drainage method		
Method		Mole/tile system
Percent of paddock drained		100
Soil settings		
K leaching potential not set		
it leadining potential not set		
Soil tests		
Anion storage capacity or phosphate retention		Not entered
TBK reserve K test		Not entered
K reserve status		Use default
Crop block history		
Years in pasture		8
Prior history		Grazed pasture
THO HISTORY		Grazea pasture
Source of animal information		

Crop information

Animal source

Previous assesment year November - Fodder beets

Crop management See details below Crop sown

Fertiliser or lime added See details below December - Fodder beets

Fertiliser or lime added See details below

Pasture consumption by each class same as farm ratio

January - Fodder beets February - Fodder beets March - Fodder beets April - Mature - Fodder beets

May - Mature - Fodder beets June - Mature - Fodder beets

July - Fodder beets

Crop management See details below Defoliation

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters



August - Bare ground September - Bare ground

October - Forage barley (spring)

Crop management See details below Crop sown

Fertiliser or lime added See details below

Current assessment year 2016

November - Forage barley (spring) December - Forage barley (spring) January - Forage barley (spring) February - Forage barley (spring)

Crop management See details below Defoliation

March - Bare ground

April - Grazed

Crop management See details below Crop sown

Fertiliser or lime added See details below

May - Grazed

Fertiliser or lime added See details below

June - Grazed July - Grazed

August - Grazed

Fertiliser or lime added See details below

September - Grazed

Fertiliser or lime added See details below

October - Grazed

Fertiliser or lime added See details below

Crop sowing information - November of the Previous assessment

Crop category Fodder
Crop type Fodder beets

Product yield T/ha dry matter 21

Cultivation practice at sowing Conventional

Defoliation information - July of the Previous assessment

Defoliation method Cut and Carry Final harvest True Destination of crop Exported

Crop sowing information - October of the Previous assessment

Crop category Forages

Crop type Forage barley (spring)

Yield at final defoliation T/ha dry matter 10

Cultivation practice at sowing Conventional

Defoliation information - February of the Current assessment year 2016

Defoliation method Cut and Carry Final harvest True Destination of crop Exported

Crop sowing information - April of the Current assessment year 2016

Crop category Permanent pasture

Crop type Grazed

Source of animals Farm stock - see Enterprise numbers panes

Percentage of crop eaten by animals

Dairy % 100

Fertiliser application

Fertiliser products - Previous assessment - November (N Method: Incorporated)

Category Ravensdown cropping Product Cropmaster DAP

Amount kg/ha 250 Fertiliser products - Previous assessment - December (N Method: Surface applied)

Category Ravensdown other

Product Urea
Amount kg/ha 100

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Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

Fertiliser products - Previous assessment - October (N Method: Incorporated)

FarmParameters



Fertiliser products - Previous assessment - October	(N Method: Incorpor	
Category		Ravensdown cropping
Product		Cropmaster 15
Amount	kg/ha	300
Soluble fertiliser inputs (kg/ha/month) - Current ass		
Urea N Super P K Sulphate		Mg Na
18 0 0 0	•	0 0
Soluble fertiliser inputs (kg/ha/month) - Current ass		
Urea N Super P K Sulphate		Mg Na
9 0 0 0	-	0 0
Soluble fertiliser inputs (kg/ha/month) - Current ass		
Urea N Super P K Sulphate		Mg Na
36 0 0 10	-	0 0
Soluble fertiliser inputs (kg/ha/month) - Current ass		
Urea N Super P K Sulphate		Mg Na
28 0 0 0	-	0 0
Soluble fertiliser inputs (kg/ha/month) - Current ass		
Urea N Super P K Sulphate		Mg Na
18 0 0 0	0	0 0
Effluent application Receives no liquid or solid effluents		
Block - Pasture to FB RO		
Block name		Pasture to FB RO
Block type		Crop
Area	ha ov6	2
Cultivated area	% of area % of area	100
Headland area Other area	% of area	0 0
Distance from coast	km	25
Final grid month	KIII	October
Irrigation system type		No Irrigation
irrigation system type		No irrigation
Climate		
Annual average rainfall	mm/yr	1096
Mean annual temperature		10.1
Seasonal variation in rainfall		731-1450 mm, Low
Annual potential evapotranspiration	mm	712
Seasonal variation in PET		Moderate
Soil description		B. III
Soil order (default)		Pallic
Soil group (default)		Recent/YGE/BGE
SMaps Sibling		Pukem 6a.1
Date downloaded		Unknown
Wilting point	0 - 30cm	22
withing point	30 - 60cm	25
	> 60	1
Field capacity	0 - 30cm	40
ricia capacity	30 - 60cm	41
	> 60	2
Saturation	0 - 30cm	54
	30 - 60cm	48
	> 60	3
Natural drainage class	- -	Poor
Depth to impeded layer	cm	Not entered
Top soil horizon chemical and physical parameters		
ASC/PR	%	22
Bulk density	kg/m³	1220
Clay	%	27
Sand	%	9
Sub soil		
Sub soil clay	%	29

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters



Farm stock - see Enterprise numbers panes

Soil profile

Use default Profile drainage class Top soil texture Silt loam Maximum rooting depth 0.58 m Depth to impeded drainage layer 0.58

Soil drainage

Drainage method

Method Mole/tile system

Percent of paddock drained 100

Soil settings

K leaching potential not set

Soil tests

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

Crop block history

Years in pasture Prior history Grazed pasture

Source of animal information

Pasture consumption by each class same as farm ratio

Crop information

Animal source

Previous assesment year

November - Grazed pasture December - Grazed pasture

January - Grazed pasture

February - Grazed pasture

March - Grazed pasture

April - Grazed pasture

May - Grazed pasture

June - Grazed pasture

July - Grazed pasture

August - Grazed pasture September - Grazed pasture

October - Grazed pasture

Current assessment year 2016

November - Fodder beets

Crop management See details below Crop sown

Fertiliser or lime added See details below

December - Fodder beets Fertiliser or lime added See details below

January - Fodder beets

February - Fodder beets

March - Fodder beets

April - Mature - Fodder beets

May - Mature - Fodder beets

June - Fodder beets

Crop management See details below Defoliation July - Fodder beets

Crop management See details below Defoliation

August - Fodder beets Crop management See details below Defoliation

September - Bare ground

October - Forage barley (spring)

Crop management See details below Crop sown

Fertiliser or lime added See details below

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters



Crop sowing information - November of the Current assessment year 2016

Crop category Fodder
Crop type Fodder beets

Product yield T/ha dry matter 21

Cultivation practice at sowing Conventional

Defoliation information - June of the Current assessment year 2016

Defoliation method Grazed in-situ

Final harvest False

Source of animal Farm stock - see Enterprise numbers panes

Percentage of crop eaten by animals

Dairy replacements % 100
Crop grazed for hours/day Not entered

Defoliation information - July of the Current assessment year 2016

Defoliation method Grazed in-situ

Final harvest False

Source of animal Farm stock - see Enterprise numbers panes

Percentage of crop eaten by animals

Dairy replacements % 100
Crop grazed for hours/day Not entered

Defoliation information - August of the Current assessment year 2016

Defoliation method Grazed in-situ

Final harvest True

Source of animal Farm stock - see Enterprise numbers panes

Percentage of crop eaten by animals

Dairy replacements % 100
Crop grazed for hours/day Not entered

Crop sowing information - October of the Current assessment year 2016

Crop category Forages

Crop type Forage barley (spring)

Yield at final defoliation T/ha dry matter 8

Cultivation practice at sowing Conventional

Fertiliser application

Fertiliser products - Current assessment - November (N Method: Incorporated)

Category Ravensdown cropping Product Cropmaster DAP

Amount kg/ha 250 Fertiliser products - Current assessment - December (N Method: Surface applied)

Category Rávensdown other

Product Urea
Amount kg/ha 100
Fertiliser products - Current assessment - October (N Method: Surface applied)

Category Ravensdown cropping

Product Cropmaster 15

Amount kg/ha 300

Effluent application

Receives no liquid or solid effluents

Block - FB/Barley RO

Block name FB/Barley RO Block type Crop Area Cultivated area % of area 100 Headland area % of area 0 Other area % of area 0 Distance from coast km 25 Final grid month October Irrigation system type No Irrigation

Climate

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters



Annual average rainfall mm/yr 1096 Mean annual temperature 10.1

Seasonal variation in rainfall 731-1450 mm, Low

Annual potential evapotranspiration mm 712
Seasonal variation in PET Moderate

Soil description

Soil order (default) Pallic

Soil group (default)

Recent/YGE/BGE

SMaps

Sibling Pukem_6a.1

 Date downloaded
 Unknown

 Wilting point
 0 - 30cm
 22

 30 - 60cm
 25

 > 60
 1

 Field capacity
 0 - 30cm
 40

Field capacity 0 - 30cm 40 30 - 60cm 41 > 60 2 Saturation 0 - 30cm 54

30 - 60cm 48 > 60 3

Natural drainage class Poor
Depth to impeded layer cm Not entered

Top soil horizon chemical and physical parameters

 ASC/PR
 %
 22

 Bulk density
 kg/m³
 1220

 Clay
 %
 27

 Sand
 %
 9

 Sub soil

Sub soil clay % 29

Soil profile

Profile drainage class
Use default
Top soil texture
Silt loam
Maximum rooting depth
m
0.58
Depth to impeded drainage layer
0.58

Soil drainage

Drainage method

Method Mole/tile system

Percent of paddock drained 100

Soil settings

K leaching potential not set

Soil tests

Anion storage capacity or phosphate retention

TBK reserve K test

K reserve status

Not entered

Use default

Crop block history

Years in pasture 8

Prior history Grazed pasture

Source of animal information

Animal source Farm stock - see Enterprise numbers panes

Pasture consumption by each class same as farm ratio

Crop information

Previous assesment year November - Fodder beets

Crop management See details below Crop sown

Fertiliser or lime added See details below December - Fodder beets

Fertiliser or lime added See details below

Mark Crawford

See details below

See details below

See details below

Defoliation

Defoliation

Defoliation

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters



January - Fodder beets

February - Fodder beets

March - Fodder beets April - Mature - Fodder beets

May - Mature - Fodder beets

June - Fodder beets

Crop management

July - Fodder beets

Crop management August - Fodder beets

Crop management

September - Bare ground

October - Forage barley (spring)

See details below Crop management Crop sown

Fertiliser or lime added See details below

Current assessment year 2016

November - Forage barley (spring) December - Forage barley (spring) January - Forage barley (spring)

February - Forage barley (spring)

Crop management See details below Defoliation

March - Bare ground

April - Grazed

Crop management See details below Crop sown

Fertiliser or lime added See details below

May - Grazed

Fertiliser or lime added See details below

June - Grazed July - Grazed

August - Grazed

Fertiliser or lime added See details below

September - Grazed

Fertiliser or lime added See details below October - Grazed

Fertiliser or lime added See details below

Crop sowing information - November of the Previous assessment

Crop category Fodder Crop type Fodder beets

T/ha dry matter Product yield 21

Cultivation practice at sowing Conventional

Defoliation information - June of the Previous assessment

Defoliation method Grazed in-situ

Final harvest False

Source of animal Farm stock - see Enterprise numbers panes

Percentage of crop eaten by animals Dairy replacements % 100

hours/day Not entered Crop grazed for

Defoliation information - July of the Previous assessment

Defoliation method Grazed in-situ

Final harvest False

Farm stock - see Enterprise numbers panes Source of animal

Percentage of crop eaten by animals

Dairy replacements % 100 hours/day Not entered Crop grazed for

Defoliation information - August of the Previous assessment

Defoliation method Grazed in-situ

Final harvest True

Source of animal Farm stock - see Enterprise numbers panes Percentage of crop eaten by animals

% Dairy replacements 100

Mark Crawford

Client reference:

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED (2016)

FarmParameters



Crop grazed to	r			nours/day		Not entered
Crop sowing info Crop category Crop type Yield at final de Cultivation pra	efoliation			<i>nent</i> T/ha dry matt		Forages Forage barley (spring) 8 Conventional
Defoliation inform Defoliation me Final harvest Destination of	thod	ruary of the Cu	ırrent assessm	ent year 2016	5	Cut and Carry True Exported
Crop sowing info Crop category Crop type Source of anim Percentage of Dairy	nals		ent assessment	t year 2016 %		Permanent pasture Grazed Farm stock - see Enterprise numbers pane 100
Urea N 18 Soluble fertilise Urea N 9 Soluble fertilise Urea N 36 Soluble fertilise Urea N 28	ucts - Previou ucts - Previou ucts - Previou er inputs (kg Super P 0 er inputs (kg	us assessment /ha/month) - C K 0	- December (N - October (N M - Octob	kg/ha I Method: Surf kg/ha lethod: Incorp kg/ha ment - April (N Ca 0 ment - May (N Ca 0 ment - August Ca 0 ment - Septen Ca 0	face ap porated N Metho Mg 0 N Metho Mg 0 t (N Met Mg 0 mber (N Mg 0	Ravensdown cropping Cropmaster DAP 250 plied) Ravensdown other Urea 100
Effluent applicati		offluents			-	

Receives no liquid or solid effluents



Farm Supplementary Scenario Plan Report

Prepared by Mark Crawford
Senior Farm Environmental Consultant



Customer Name SOUTH DAIRY LTD
Customer Address C/- D ALEXANDER;

11 MCCONACHIE ROAD; RD 1; WINTON, 9781

Date 26/10/2017







Executive Summary

The purpose of this report is to outline the environmental loss risk indicators including N loss to the bottom of the root zone and P loss to second order streams for the proposed renewal/update of the property effluent discharge consent with more dairy cows on the property, but less winter cropping.

- The property is situated near Lochiel, 23.0 km North of Invercargill city and 25 km to the south west coast. It is of flat topography on a Pallic soil type, with some Brown soils. Climate data shows averages of 1096 mm rainfall, 10.1 degrees average temperature and 712 mm PET.
- The farm intends to seasonally peak milk 750 Jersey Friesian cross dairy cows (winter 780) at a stocking of 3.2 cows/ha producing 352,000 kg Milk solids or 1442 kg MS/ha. It is proposed this will be achieved with moderate Nitrogen inputs (186 kg N/ha/year) and imported supplements of 550 T DM (Dry Matter) or 2459 kg DM/ha/year.
- The Nitrogen loss modelled using Overseer Nutrient Budgets (6.2.3) for the proposed system is 34 kg
 N/ha/year or 8423 kg N/year. The current farm system loses are 45 kg N/ha/year or 11,174 kg N/year.
- It must be noted that the N loss is influenced by the high pastoral productivity calculated by OVERSEER
 which is greater than known measured values for the district. This will likely increase the risk of N
 losses to groundwater. Higher quality pastures, pasture utilisation and measurement variabilities may
 contribute to this discrepancy.
- P losses are also calculated as a low to moderate risk at 1.3 kg P/ha/year for the proposed farm system,
 no change from the current scenario. Risk is due largely to Overseer reported "other" losses. Mitigation
 with fencing of streams and lanes plus riparian planting will reduce this, as well as reduced effluent
 applications at low volumes on the shoulders of the season from storage, targeting non tiled areas in
 the later part of the season.
- The farm is in a zone with moderate (range low to high) risk to nitrate levels and the physiographic zones point to both artificial drains and overland flows, plus Nitrogen depositions from fertiliser and urine as being risk factors. The planned reduction in cropping, the farm effluent system and feed pad plus good management practices with critical source areas will help mitigate this risk.

Key influences on the property's' proposed N loss are the higher productivity (at moderate to high stocking rates); the soil types on this property, mostly heavier, poorer draining types which reduce losses through the root zone by having less drainage, with some high risk leaching soils and the reduction in cropping ton winter cattle and the use of a feed pad for calving cattle on the property, allowing a high stocking rate over a period where drainage events are likely to occur. The planned feed pad and effluent system mitigations minimise the increase in N losses from the higher productivity and stocking rate.

Overseer nutrient budgets Version 6.2.3 has been used to create the nutrient budgets presented in this report.





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Mark Crawford

Senior Farm Environmental Consultant

19/12/2016

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General

Aim and Purpose of Farm Scenario Plan

The purpose of this report is to provide a revised Nutrient Budget for the dairy unit for a renewal of the effluent discharge consent, with any associated changes to the effluent area and system to be included in the budget. The owners have requested this to ascertain the environmental nutrient loss indicators including N loss to the bottom of the root zone and P loss to second order streams, for the proposed farm system, including the impact of added cow numbers and a wintering pad, over the revised current farming system. This should be read in conjunction with report 123 which outlined the original budgets used.

Overseer modelling of the proposed system has been undertaken in accordance with the Overseer 6.2.3 "best practice data input standards" and has been reviewed by a certified nutrient management advisor.

The following report summarises the respective Overseer 6.2.3 nutrient budgets and key assumptions made.

Property Details

Location/address	11 McConnachie Road; Winton
Legal Description	Lot 2 & 3 Deposited Plan 377137 and Sections 48- 49, 51 -
	53 , Part Section 47 Block I Winton Hundred; Lot 1
	Deposited Plan 7035, Section 11 Block II Winton Hundred
	Run off Section 48 Block I and Part Section 25-26 Block I
	Winton Hundred and Section 2 Survey Office Plan 11951
Total area (ha)	249.2 ha with paper roads, less drain margins = 248.5 ha;
	stated 244 ha effective
Owners	South Dairy Ltd c/- Dean and Suzanne Alexander
Contact details	
Phone	Dean (03) 9738989 mobile (027) 4066878
Email	alexander.farms@vodafone.co.nz
Farm Type	Seasonal dairy Supply
Dairy supply number	31827

Proposed Farm System Analysis

Description of Proposed (Consent) Farm System

The 249.2 ha Seasonal supply dairy farm is situated at 373 O'Shannessy Road, Lochiel, 5.5 km North West to Winton Township and 23.0 km North of Invercargill city. It is estimated to be 25 km from the south west coast. It is of flat topography, with a number of drains and a small tributary of the Tussock Creek stream meandering through the property. It is predominantly a Pallic (201.1 ha) soil (Pukemutu soils_6a.1, silt loam over clays, poorly drained; Paraha soils 4a.1 aka Northope, silt loams, imperfectly drained), with Brown (41.53 ha) soils





(Waikiwi_30a.1 aka Edendale, silt loam, well drained and Aparima_2a.1 aka Waianiwa, silt loam over clay; imperfect drained); S Maps and Southland Topoclimate map series. (S Map data and soil table and maps, pages 9 & 10). A small area of Woodlands soil (0.001 ha) was not included and was termed non-productive. In addition there is a high proportion of artificial drains, with estimates over 80 % in some paddocks, so an estimate was made of a percentage of paddocks that contained tile drains, and these being 100 % tile and mole drained with the rest of paddocks blocked as non-tiled.

Effective farm area is approximately 244.0 ha for the current property (owner stated), with titled area at 248.7 ha. However, there are numerous drains and the GIS soil areas were calculated at 249.2 ha which was used as total area. There is included in this total area; 1.2 ha of riparian stream area, with the remaining 4.0 ha of non-productive area made up of houses, cow shed and yards, shelter belts plus laneways and drains. The average annual rainfall is 1096 mm, with evapotranspiration (PET) at 712 mm and average temperature at 10.1 degrees (OVERSEER Climate tool, NIWA dataset, Lat. 46.194000, Long. 168.350700).

For the proposed scenario season, changes made from original report are;

• 780 predominantly Friesian Jersey cross cows are calved (750 peak milked; 500 kg average live weight (LW)), mean calving 24th August, drying off 25th May, with cows never milked once a day. All cows are wintered off, with Replacement heifers (First calvers) calving first. The cows are brought back in mobs from a support block bi-weekly from the start of calving with an ability to feed on a concrete feed pad, combined with a standing off calving pad with sub surface drainage (100 to 200) prior to calving. The use of this pad will occur weather depending to effectively minimising pasture treading. The intent is to strip graze a small pastoral area otherwise over calving. Production is averaged at 352,000 kg milk solids (MS)/year, with 268 (default) day lactation. The replacements are grazed off from weaning (1st December) and not brought back to the milking platform until calving. Cow numbers are in table below;

Stock class	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Total Milking cows	32	630	780	760	750	750	750	700	700	700	650	600

• Feed pad utilisation is as follows in table below with feed pad now inert rock (concrete), with sub surface drained and captured by farm effluent system; all other information remains the same.

Months	April	May	June	July	August	September	October
Dairy cows (%)	15	30	0	100	60	30	5
Hours per day on Pad	8.0	8.0	0	20.0	8.0	8.0	8.0





- The effluent system remains the same; however with information now stating effluent can be applied October to March and modelled as such.
- Supplements imported onto the property will be approximately 100 Tonnes (T) Dry Matter (DM) of Palm Kernel Extract (PKE) and 100 T DM Brewers grain fed on feed pad/calving pad complex along with 330 T DM Silage (good quality) which is also fed on the pads, with the PKE/Grain fed on trailers in the pad also. A further 92 T DM of baleage is made from paddocks (mainly effluent paddocks plus past run off area) on farm and stored and fed out. It is modelled as mostly all fed out, with 92 T DM stored and fed out on pastoral blocks, as the model would not accept any further supplement inputs for the feed pad, (80 T DM) in the following season. This amount is weather dependent.
- There is now 12 ha of fodder beet sown in November after cultivation, 25 T DM yield and lifted in August to be fed onto wintering feed pad. Sown with 250 kg/ha of Cropmaster 15, with further 1200 kg/ha of Urea in December.

Soil fertility is at the values selected by the most recent soil tests in 2015/16 within the various blocks as shown below.

		Phosphate	Potassium	Org. Sulphur	Magnesium
Figures used;	Effluent	38	10	15	29
	Effluent Solids	35	8	5	22
	Lease block	27 to 30	7 to 9	5 to 10	16 to 20
Optimal		20 - 30	5 - 7	Org S 15 - 20	8 - 10

Pastoral fertiliser is as per Owner's inputs and the current maintenance fertiliser plan. Effluent blocks receive Superphosphate and Lime applied in December (NPKS 0-32-0-38). Ammo 36 is applied in August at rates of 100 kg/ha (36 kg N/ha) and then Urea follows at rates of 40 kg/ha for October, December, February and April; 60 kg/ha for September and March. A further urea application is made in May at 40 kg/ha but only over half the block (9 kg N/ha). Solid effluent and Run off block (Lease) receive additional Nitrogen (Urea) applications to the above; at 40 kg/ha, made in January and November respectively, with maintenance applications being a higher rate of Superphosphate and Lime plus potassium (NPKS rating 0-42-25-51). This accumulates in a total applied Nitrogen figure (organic and inorganic) of 279 kg N/ha/year for the Solid Effluent blocks and 305 kg N/ha/year for the Travelling Irrigator (Liquid) Effluent areas respectively. This calculates to an average of 186 kg N/ha/year (fertiliser) across all blocks (however 210 kg N/ha and 174 kg N/ha in fertiliser for solid effluent and effluent areas respectively).



Proposed Farm System Information

Farm System - Dairy								
Herd Type/Breed	Fr X	Total Milk Solids (kg/year)	352,000					
Seasonal Supply	Seasonal	Winter milk	No					
Number of cows	780	Milk Solids (kg/cow)	451					
Stocking rate (cows/ha)	3.2	Milk Solids (kg/ha)	1442					
Other Information								
Winter off milking platform		Yes, a support block	Yes, a support block					
Stock grazed off (%)		100 % off over June and July, initia	100 % off over June and July, initially R 2 Heifers come back earlier in					
Stock grazed on (%)		first week of August, last week of	first week of August, last week of July modelled 32 cows for July					
Young stock reared off milk	ing platform	Yes from weaning						
		100 T DM of PKE and 100 T DM br	100 T DM of PKE and 100 T DM brewers grain; 250 T DM Silage good					
Imported Feeds		quality, 100 T DM Silage all to Fee	quality, 100 T DM Silage all to Feed pad, plus 80 T DM Baleage from					
		storage onto pastoral blocks, total	storage onto pastoral blocks, total 550 T DM purchased					

		Proposed						
Cows	Av weight kg LW		500 kg LW					
	Median calving Date		, earlier for Heifers					
	Dry-Off date	25 th May						
	Peak Milk (1 Dec)	750 cows	·					
	Cow Numbers		No cows	In shed feeding (Y/N) No				
		Jul	32					
		Aug	630					
		Sept	780					
		Oct	760					
		Nov	750					
		Dec	750					
		Jan	700					
		Feb	700					
		Mar	700					
		Apr	650					
		May	600					
		Jun	0					
	Production kg/MS	352,000						
	Lactation length	268 days de	efault					
	Once a day Milking (e.g half season, dry off, never)	Never						
	Calves fed milk powder (Y/N)	N						
Supplements Imported		Amount (T/DM)	Fed (e.g. paddock, shed, trou	igh, crop)				
	Good quality Silage	250 & 100	On paddocks and on feed page	d				
	Straw (Barley)							
	Other PKE and Brewers Grain	100 & 100	In paddocks in trailers					
Supplements Made		Amount (T/DM)	На	Fed or stored?				
	Baleage and Silage	92	0.3 to 0.9 T DM/ha cut from Effluent and Waikiwi Run off blocks	Fed mostly, 12 T DM left over				
Effluent	Type/system		tly from storage in pond via wed s effluent from feed & calving p					
	Application Depth mm		tion < 10 mm main season, Sep					
Replacements	On/off farm when & what age	Off farm fro						



Proposed Land Management Unit details and Soil Information: Table 1

Block Name	Land Use	Block Type	Soil Order	Soil Texture	Drainage Class	Effective Area (ha)
Puke_6a.1 Effluent*	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	12.9
Puke_6a.1 Effluent Tile*	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	65.9
Puke_6a.1 Effluent Solid Lease*	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	39.5
Puke_6a.1 Effluent Solid Tile*	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	37.2
Puke_6a.1 Effluent Solid*	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	36.8
Riparian Areas	Riparian	Riparian				1.2
Waiki_30a.1 Eff Solids*	Dairy	Pastoral	Brown	Silt Loam	Well	17.9
Waiki_30a.1 Run Off*	Dairy	Pastoral	Brown	Silt Loam	Well	23.7
Parah_4a.1 Eff solids*	Dairy	Pastoral	Pallic	Silt Loam	Imperfect	2.7
Parah_4a.1 Run Off*	Dairy	Pastoral	Pallic	Silt Loam	Imperfect	2.9
Apar_2a.1 Eff solids Lease*	Dairy	Pastoral	Brown	Silt Loam over Clay	Imperfect	4.5
Fodder Beet	Dairy	Fodder crop	Various	Various	Various	(12.0)
Non productive	Non effective	Non productive				4.0
Whole Farm					Total	249.2

^{*} Areas fodder crop rotates through.

Current Land Management Unit details and Soil Information: Table 1 (b)

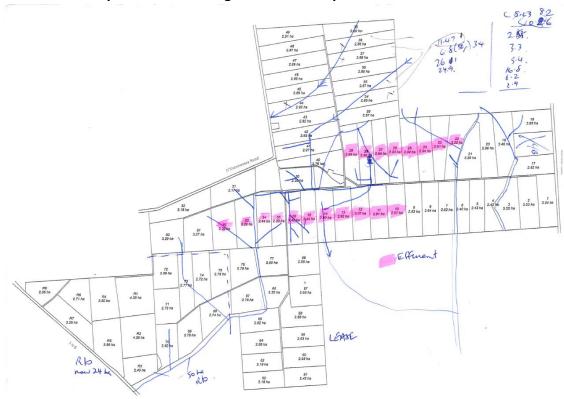
Block Name	Land Use	Block Type	Soil Order	Soil Order Soil Texture		Effective Area (ha)
Puke_6a.1 Effluent Tile	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	54.5
Puke_6a.1 Effluent Solid Lease	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	35.4
Puke_6a.1 Effluent Solid Tile	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	44.5
Puke_6a.1 Effluent Solid	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	45.6
Riparian Areas	Riparian	Riparian				1.2
Waiki_30a.1 Eff Solids*	Dairy	Pastoral	Brown	Silt Loam	Well	17.9
Waiki_30a.1 Run Off*	Dairy	Pastoral	Brown	Silt Loam	Well	19.7
Parah_4a.1 Eff solids*	Dairy	Pastoral	Pallic	Silt Loam	Imperfect	2.7
Parah_4a.1 Run Off*	Dairy	Pastoral	Pallic	Silt Loam	Imperfect	2.9
Apar_2a.1 Eff solids Lease*	Dairy	Pastoral	Brown	Silt Loam over Clay	Imperfect	4.5
Swedes	Dairy	Fodder Crop	Various	Various		(7.8)
Pasture to FBt MP	Dairy	Crop	Pallic	Silt Loam over Clay	Poor	6.2
FB/Barley MP	Dairy	Crop	Pallic	Silt Loam over Clay	Poor	6.2
Pasture to FBt RO	Dairy	Crop	Brown	Silt Loam	Well	2.0
FBt/Barley RO	Dairy	Crop	Brown	Silt Loam	Well	2.0
Non productive	Non effective	Non productive				3.9
Whole Farm					Total	249.2

^{*} Fodder crop rotates through these blocks

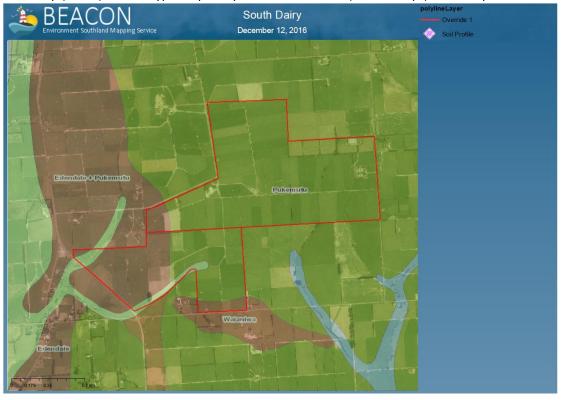




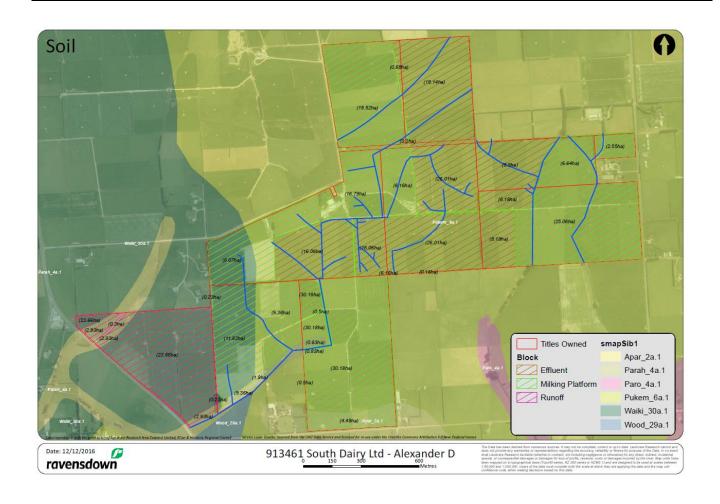
Current and Proposed Land Management Unit Maps



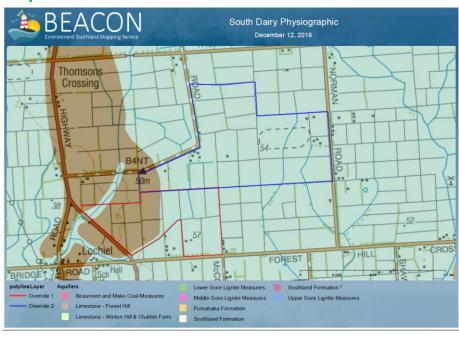
Farm Map (above) and Soil types as per Topoclimate Southland (Beacon maps) and S Maps below







Map of Nutrient Allocation Zone



Southland Physiographic Zones (Gleyed and Oxidising) as per Environment Southland Beacon Map







Water Quality Map from ES Beacon map with Yellow line delineating between lower Oreti and Makarewa Catchments and the boundary between the pristine pre European and minor to moderate plus moderate to high Land use impact zones for Nitrate levels. See The Extent of Nitrate in Southland Groundwater's Technical Report or visit http://www.es.govt.nz/environment/water/groundwater/reporting/





Current Farm System Analysis

Changes to Description of Current Farm System

Changes from the farm system described in Farm Scenario plan Report 123 are as follows, with all other input data remaining the same unless stated otherwise;

- Total area remains the same and the effluent area is still 54.5 ha (53 ha owner stated), with only 5 days storage from the pond, so modelled spray from sump.
- Run off area of 26.6 ha is no longer cut for silage; area is reduced by crop area of 4 ha and has 7.8 ha of swedes rotating through it, along with other lease areas. Dairy replacements (161) grazed on the run off from weaning till following October when reduced to in calf heifer numbers (148) and leave the farm in calf at the end of May for grazing. The dairy cows graze to the equivalent of 10 to 60 % of the pastoral production off this area.
- Crop areas reflect both grazing of swedes for replacements and dry cows, fodder beet which is primarily
 lifted for dairy cows, with some grazed for heifers, cows and dry cows with it going through cereal silage
 before being sown into permanent pasture.
- Supplements imported are 80 T DM of PKE, with 205 T DM of good quality silage imported as well for dairy cows; 105 T DM of baleage imported and fed to dairy replacements, with 135 T DM of fodder beet and 30 T DM of cereal silage imported back in from crops that are harvested off the run off and the platform areas.
- There is no feed pad or calving pad at present
- The herd is 592 cows calved and 566 peak milked, with 258,000 kg Milk solids at a slightly heavier LW of 520 kg, given that with the added stocking rate under the proposed consent scenario, it is expected that the farmer would breed for lighter cows. In addition, in the proposed scenario, the replacements are grazed on the run off from weaning till when they come back at the start of calving in the last week of July, whilst here they stay on until the following May when they leave before coming back in the last week of July for calving.



• A portion of cows are wintered on, 200 cows over June and July. Stock numbers are described in table below;

Stock class	End LW (kg)	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Milking cows	520	0	74	406	592	566	566	566	555	555	555	550	500
R 1 Heifer	230							161	161	161	161	161	161
R 2 Heifers	480	161	161	161	148	148	148	148	148	148	148	148	
Dry cows (wintered)	500	200	200	174									

• Nitrogen rates are as follows, which are the same as the proposed, with maintenance fertiliser the same;

Nitrogen rate (kg/ha) and Month	Effluent (kg N/ha)	Non Effluent (kg N/ha) and Run off
Ammo 36 @ 100 - August	36	36
Urea @ 60 - September	28	28
Urea + Se @ 40 - October	18	18
Urea @ 40 - November		18
Urea @ 40 - December	18	18
Urea @ 40 - January		18
Urea @ 40 - February	18	18
Urea @ 60 - March	28	28
Urea @ 40 - April	18	18
Urea @ 40 – May (50 % farm)	9	9
Total	174	210



Summary of Proposed Farm System Scenario: Table 2

	Consent scenario	Current System
System Type	Seasonal dairy Supply	Seasonal dairy Supply
Total Area (ha)	249.2	249.2
Effluent area (ha)	121.0 ha liquid and solid effluent; 96.4 ha solid effluent only; in a moving block around the total farm	54.5 ha receiving liquid and sludge
Stocking rate (s.u/ha)	6,999 s.u* or 28.6 s.u/ha effective or 3.2 cows/ha	6,542 s.u or 26.8 s.u/ha effective or 2.4 cows/ha
N use (kg N/ha/year)	186	189
Production (kg MS/ha)	1442	1133
Supplements (kg DM/ha/year)	550 T DM or 2254	390 T DM or 1598
Wintering system	Off farm	Off farm and crop
Pasture production(kg DM/ha/year)**		
- Platform Pastures	15857	16579
- Support pastures	n/a	16927 to 17088

^{*} As calculated by OVERSEER ** As calculated by OVERSEER with standard default and ME values which are likely to be lower than Southland values.

Summary of Whole Farm Nutrient Loss Indicators: Table 3

	Consent Scenario	Current System
System Type	Seasonal Dairy Supply	Seasonal Dairy Supply
Nitrogen leaching loss to water (Total kg N)	8,423	11,174
Nitrogen leaching loss to water (kg N/ha)	34	45
Phosphorus runoff to water (Total kg P)	333	327
Phosphorus runoff to water (kg P/ha)	1.3	1.3
Nitrogen conversion efficiency %	30	27
(N in products / N inputs)		
Nitrous oxide (N₂O) (kg N/ha)	74.1	82.8



Discussion on Whole Farm Nutrient Loss Indicators

The overall N loss for the proposed farm operation is 34 kg N/ha/year or 8,423 kg N total, as seen in the above Table 3 page 15. The overall N loss for the proposed farm is due mainly to the high production per ha (1442 kg MS/ha) at a higher stocking rate of 3.2 cows/ha platform (cf. to 2.73. NZ Southland Dairy statistics 2015-16) with 2254 kg DM/ha of supplement used, and consequently the high pasture production required at 15857 kg DM/ha/year as seen in table 2, page 15 above. The current farm system modelled has a 45 kg N/ha/year Nitrogen loss, with total yearly losses at 11,174 kg/year.

A note needs to be made regarding the estimated pasture production (15.9 T DM/ha/year) when farmer and advisory experience would point to measured production at an average of 13.5 to 14.5 T DM/ha/year (Woodlands long term average pasture production is 13401 kg DM/ha/year)). Higher pasture quality (ME value), pasture utilisation and variance in plate meter measurements will all influence the discrepancy, and thus the model in using default criteria is perhaps overstating the N loss because of this. It is this pastoral production and the added Nitrogen which are contributing to the N loss, countered by the feed pad and the effluent storage.

The N loss for the proposal ranges from 3 kg N/ha/year for the Riparian areas to 69 kg N/ha/year for the Fodder beet fodder crop block; with dairy pastures ranging between 29 and 39 kg N/ha/year. (Block Nitrogen report, pages 20 and 23).

The key factors determining these losses and the difference between the two systems modelled are:

- Crop blocks have the highest losses per ha; ranging from 84 to 164 kg N/ha/year plus these crop blocks contribute a total of 2958 kg Nitrogen/year or 26 % of total losses of 11,174 yet only occupying 10 % of the land area. In the proposal these figures are only 10 % of the total losses and 5 % of the total area. The reduced area and no wintering of cattle on crop has reduced the N losses on this property.
- Effluent disposal has a part to play in reducing risk. It has been modelled that the effluent in the proposal from the travelling irrigator is irrigated over the October to March period. Deferred irrigation over the higher rainfall periods of May and August would reduce the risk of N losses. The average N applied from liquid effluent is 130 kg N/ha/year from the current area, and 63 kg N/ha/year with the increased area and deferred irrigation (proposal). Additional Nitrogen however is applied with the solids, meaning little difference in total organic and inorganic Nitrogen applied per year (305 kg N/ha/year compared to 304 kg N/ha/year for the proposed and current scenarios) (see Effluent reports pages 21 and 24). This effective spreading of effluent nutrients over the whole farm is due to the separation of solid effluent and the ability to store and defer irrigation.



• The higher the pastoral productivity from dairy land and the associated higher stocking, the higher the risk of N losses on dairy farms, especially under the climatic rainfall and evapotranspiration rates for Southland. The heavier poor draining pallic soils lose less N/ha/year when compared to freer draining Brown soils, with the average/ha losses being 28 kg N/ha/year for the effluent solid Pukemutu pastoral blocks, whilst the Aparima and Waikiwi effluent solid pastoral blocks lose 36 and 37 kg N/ha/year on average respectively. The heavier pallic soils act as a form of mitigation as their N losses are lower due to denitrification and their higher water holding capacity also means a lower risk of leaching Nitrogen. They do however lose nutrients through sediment flows over land when they become water logged and they are typically artificially drained which acts as a conduit for these nutrients into the water ways.

The riparian blocks and non-productive areas offset these N losses to an extent.

The other environmental risk indices are the proposed P losses to surface water at 1.3 kg P/ha/year, no different to the current scenario of 1.3 kg N/ha/year, and Nitrous oxide gaseous losses are reduced from 82.8 kg N/ha/year to 76.3 kg N/ha/year, as seen in the Phosphate and Nitrogen reports pages 19, 20 and 22, 23. The high nitrous oxide loses are due to the heavier pallic soils, but with less cropping losses are reduced from the current scenario. The P risk is mostly influenced by losses from "other" sources (121 kg or 37 % of total of 333 kg, refer Phosphorous block report, pages 19 and 22) which is run off from tracks and yards into drains and ditches from the farm. Riparian strip planting and vegetation buffer zones can reduce this. The other major losses are from the heavier Pallic soils under effluent applications with tile drains (direct flow). Effluent storage and low volume applications (which is in place) will help to mitigate this risk, as is good fertility management to minimise P soil losses.

Please see information contained in the Appendices for detail relating to nutrient budgets, nitrogen block reports, phosphorus block reports and estimated pasture production for the current situation and scenario modelled.

OVERSEER v6.2 has a new irrigation module to better reflect the management practices of irrigators. The Best Practice Data Input Standards give some guidance on what is now required. The model requires more information from users about their irrigation system and how water application decisions are made on farm. The extra data needed includes depth of water per application; return time and depending on how soil water is monitored what are the trigger points and targets (mm deficit). Ideally, this data needs to be actual long term average data as OVERSEER uses 30 year average climate data. Best estimates of these data will generally generate more drainage, and hence N loss to water, than has been the case with previous OVERSEER versions.

OVERSEER is a continually developing model with several aspects currently being investigated. In particular there are on-going issues in relation to the modelled nitrogen leaching from grazed crop blocks (and possibly forage



blocks also) being less than expected. (Please see www.overseer.org.nz/OVERSEERModel/bugs.aspx for more detail).

When future versions of OVERSEER are stipulated for use associated with Regional Council rules both the current and the proposed farm systems will need to be re-modelled for consistency as the base N lost from the root zone may alter with updated OVERSEER versions.





Appendices

Proposed Farm System

Proposed farm System Whole Farm Nutrient Budget

SOUTH DAIRY LTD - ALEXANDER D

Mark Crawford

Client reference: 913461

Farm name: NB 2016 -17 Consent DSN 31827 (Copy) - UPDATED (2016)

Farm Nutrient Budget - Whole farm

	N	P	K	S	Ca	Mg	Na
				(kg/ha/yr)			
Nutrients added							
Fertiliser, lime & other	186	35	13	52	233	0	0
Rain/clover N fixation	96	0	3	5	3	7	33
Irrigation	0	0	0	0	0	0	0
Supplements imported	62	8	38	6	8	4	3
Nutrients removed							
As products	96	16	23	5	21	2	7
Exported effluent	0	0	0	0	0	0	0
As supplements	0	0	0	0	0	0	0
To atmospheric	139	0	0	0	0	0	0
To water	34	1.3	15	76	54	6	21
Change in internal pools							
Plant material	-6	-1	-6	0	-1	-1	0
Organic pool	77	15	-21	-18	-1	-1	-6
Inorganic mineral	0	1	-19	0	-2	-3	-4
Inorganic soil pool	4	10	61	Ō	172	8	19

Proposed farm System Nutrient Loss Indicators

P report

Block P

SOUTH DAIRY LTD - ALEXANDER D

Mark Crawford

Client reference: 913461

Farm name: NB 2016 -17 Consent DSN 31827 (Copy) - UPDATED (2016)

Block Phosphorus

Block name	Total P lost			P loss categories		
	(kg P/yr)	(kg P/ha/yr)	Soil	Fertiliser	Effluent	
Puke_6a.1 Effluent ##	37	1	Medium	Medium	Low	
Puke_6a.1 Effluent Tile ##	82	1	Medium	Low	Low	
Puke_6a.1 Effluent Solid Lease ##	34	0.9	Medium	Medium	Low	
Puke_6a.1 Effluent SolidTile ##	19	1	Medium	Medium	Low	
Puke_6a.1Effluent Solid ##	12	1	Medium	Medium	Low	
Riparian Areas	0	0.1	n/a	n/a	n/a	
Waiki_30a.1 Eff Solids ##	3	0.2	Low	Low	Low	
Waiki_30a.1 Run Off ##	4	0.2	Low	Low	Low	
Parah_4a.1 Eff solids ##	2	0.7	Low	Medium	Low	
Parah_4a.1 Run Off ##	2	0.6	Low	Medium	Low	
Apar_2a.1 Eff solids Lease ##	1	0.2	Low	Low	Low	
Fodder Beet	16	1.4	n/a	n/a	n/a	
Other farm sources	122					
Whole farm	333	1.3				

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



N report

Farm N

SOUTH DAIRY LTD - ALEXANDER D

Mark Crawford

Client reference: 913461

Farm name: NB 2016 -17 Consent DSN 31827 (Copy) - UPDATED (2016)

Farm Nitrogen

	Units	Benchmark farm	Current farm
Inputs (farm average)			
Clover N	kg N/ha/yr		94
Fertiliser N	kg N/ha/yr		186
Other N added	kg N/ha/yr		64
Indices			
Average N loss to water	kg N/ha/yr	24-42	34
includes N lost as effluent	kg N/ha/yr		0
N ₂ O emissions	kg N/ha/yr		74.1
For pastoral area of farm:			
Farm N surplus	kg N/ha/yr	123-191	242
N conversion efficiency	%	27-35	30

Block N

SOUTH DAIRY LTD - ALEXANDER D

Mark Crawford

Client reference: 913461

Farm name: NB 2016 -17 Consent DSN 31827 (Copy) - UPDATED (2016)

Block Nitrogen

Block name	Total N lost (kg N/yr)	N lost to water (kg N/ha/yr)	N in drainage * (ppm)	N surplus (kg N/ha/yr)	Added N ** (kg N/ha/yr
Puke_6a.1 Effluent ##	1083	31	6.8	281	327
Puke_6a.1 Effluent Tile ##	2454	31	6.7	277	327
Puke_6a.1 Effluent Solid Lease ##	1006	27	6.0	243	292
Puke_6a.1 Effluent SolidTile ##	500	27	6.1	243	292
Puke_6a.1Effluent Solid ##	316	27	6.0	243	292
Riparian Areas	4	3	N/A		
Waiki_30a.1 Eff Solids ##	613	36	8.2	238	320
Waiki_30a.1 Run Off ##	719	32	7.3	220	292
Parah_4a.1 Eff solids ##	74	28	6.1	249	292
Parah_4a.1 Run Off ##	79	28	6.1	249	292
Apar_2a.1 Eff solids Lease ##	150	35	7.9	231	292
Fodder Beet	823	69	12.5	-336	112
Other farm sources	602				
Whole farm	8423	34			
Less N removed in wetlands	0				
Farm output	8423	34			

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

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

^{##} Has a fodder crop rotating though, results for pastoral block component only



^{**} Sum of fertiliser and external factory effluent inputs.



Proposed System Pasture Production and Other Values/Effluent Report

SOUTH DAIRY LTD - ALEXANDER D

1ark Crawford

Client reference: 913461

Farm name: NB 2016 -17 Consent DSN 31827 (Copy) - UPDATED (2016)

Block Pasture

Block name	On-farm fresh pasture intake (kg DM/ha/yr)	Estimated utilisation (%)	Supplements removed (kg DM/ha/yr)	Pasture growth (kg DM/ha/yr)
Puke_6a.1 Effluent	13191	85	338	15857
Puke_6a.1 Effluent Tile	12837	85	754	15857
Puke_6a.1 Effluent Solid Lease	13478	85	0	15857
Puke_6a.1 Effluent SolidTile	13478	85	0	15857
Puke_6a.1Effluent Solid	13478	85	0	15857
Riparian Areas	0	0	0	0
Waiki_30a.1 Eff Solids	13478	85	0	15857
Waiki_30a.1 Run Off	12723	85	889	15857
Parah_4a.1 Eff solids	13478	85	0	15857
Parah_4a.1 Run Off	13478	85	0	15857
Apar_2a.1 Eff solids Lease	13478	85	0	15857
Fodder Beet	0	0	0	0

This report gives an estimated animal intake for each block based on animal production and supplements brought on to farm information supplied. Estimated annual pasture growth is shown for the animal utilisation value shown. Note: the model is not sensitive to changes in utilisation.

It is recommended that a consultant or software such as StockPol is used to estimate farm pasture production.

SOUTH DAIRY LTD - ALEXANDER D

Mark Crawford

Client reference: 913461

Farm name: NB 2016 -17 Consent DSN 31827 (Copy) - UPDATED (2016)

Other values for farm - NB 2016 -17 Consent

Milking herd size (peak cows/ha grazed)	3.2
Milk solids (kg/ha grazed)	1442
Milk production per cow (kg milk solids / cow)	451.3
Default calving data	06 August
Total liveweight brought (kg/ha grazed)	323
Total liveweight reared (kg/ha grazed)	64
Total liveweight sold (kg/ha grazed)	367
\$ on fertiliser per kg milk solids	\$0.34
\$ on fertiliser per ha	\$482.58
GHG: Allocation to milk	0.89
Dairy stock rate (RSU)	6999
Dairy replacements stock rate (RSU)	0

SOUTH DAIRY LTD - ALEXANDER D Mark Crawford

Client reference: 913461

Farm name: NB 2016 -17 Consent DSN 31827 (Copy) - UPDATED (2016)

Effluent Report

	Units	Current farm
Current effluent area		
Area of effluent blocks	ha	115
% of pastoral farm area	%	50
Area of farm to apply effluent to achieve rates of:		
150 kg N/ha/yr	ha	181
Maintenance K	ha	0
100 kg K/ha/yr	ha	288
Source of N applied to effluent blocks		
Average of N applied to effluent blocks	kg N/ha/yr	72
Effluent from farm dairy	%	42
Effluent from wintering pad	%	58
Effluent from feed pad	%	0
Average fertiliser N	kg N/ha/yr	174
Average other elements	kg N/ha/yr	81

Proposed System Parameter Report

As attached in separate pdf format





Current Farm System

Current farm System Whole Farm Nutrient Budget

Mark Crawford

Client reference: 913461

Farm name: NB 2016 -17 Current DSN 31827 (Copy) - UPDATED_2 (2016)

Farm Nutrient Budget - Whole farm

	N	Р	K	S	Ca	Mg	Na
				(kg/ha/yr)			
Nutrients added							
Fertiliser, lime & other	189	33	5	46	199	0	0
Rain/clover N fixation	102	0	3	5	3	7	33
Irrigation	0	0	0	0	0	0	0
Supplements imported	44	6	37	5	6	3	3
Nutrients removed							
As products	77	14	17	5	19	2	5
Exported effluent	0	0	0	0	0	0	0
As exported defoliation	13	3	13	3	8	2	6
To atmospheric	130	0	0	0	0	0	0
To water	45	1.3	14	55	64	7	21
Change in internal pools							
Plant material	-6	-1	-4	0	0	0	0
Organic pool	68	14	4	-7	1	0	0
Inorganic mineral	0	1	-28	0	-2	-3	-4
Inorganic soil pool	8	7	28	0	119	3	7

Current farm System Nutrient Loss Indicators

P report

Block P

SOUTH DAIRY LTD - ALEXANDER D

Mark Crawford

Client reference: 913461

Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED_2 (2016)

Block Phosphorus

lock name	Total P lost P lost		P loss categories			
	(kg P/yr)	(kg P/ha/yr)	Soil	Fertiliser	Effluent	
Puke_6a.1 Effluent Tile	78	1.4	Medium	Low	High	
Puke_6a.1 Non Eff Lease	31	0.9	Medium	Medium	n/a	
Puke_6a.1 Non Eff Tile	43	1	Medium	Low	n/a	
Puke_6a.1 Non Effluent	43	0.9	Medium	Medium	n/a	
Riparian Areas	0	0.1	n/a	n/a	n/a	
Waiki_30a.1 Non Eff ##	3	0.2	Low	Low	n/a	
Waiki_30a.1 Run Off ##	3	0.2	Low	Low	n/a	
Parah_4a.1 Non Effluent ##	1	0.6	Low	Low	n/a	
Parah_4a.1 Run Off ##	1	0.6	Low	Low	n/a	
Apar_2a.1 Non Eff Lease ##	1	0.2	Low	Low	n/a	
Swedes	3	0.4	n/a	n/a	n/a	
Pasture to FB MP	10	1.7	n/a	n/a	n/a	
FB/Barley MP	5	0.8	n/a	n/a	n/a	
Pasture to FB RO	1	0.4	n/a	n/a	n/a	
FB/Barley RO	0	0.2	n/a	n/a	n/a	
Other farm sources	103					
Whole farm	327	1.3				

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





N report

Farm N

SOUTH DAIRY LTD - ALEXANDER D

Mark Crawford

Client reference: 913461

Farm name: NB 2016 -17 Current DSN 31827 (Copy) - UPDATED_2 (2016)

Farm Nitrogen

	Units	Benchmark farm	Current farm		
Inputs (farm average)					
Clover N	kg N/ha/yr		100		
Fertiliser N	kg N/ha/yr		189		
Other N added	kg N/ha/yr	kg N/ha/yr			
Indices					
Average N loss to water	kg N/ha/yr	24-42	45		
includes N lost as effluent	kg N/ha/yr		0		
N ₂ O emissions	kg N/ha/yr		82.8		
For pastoral area of farm:					
Farm N surplus	kg N/ha/yr	123-191	245		
N conversion efficiency	96	27-35	27		

Block N

Client reference: 913461

Farm name: NB 2016 -17 Current DSN 31827 (Copy) - UPDATED_2 (2016)

Block Nitrogen

Block name	Total N lost (kg N/yr)	N lost to water (kg N/ha/yr)	N in drainage * (ppm)	N surplus (kg N/ha/yr)	Added N ** (kg N/ha/yr
Puke_6a.1 Effluent Tile	2338	43	8.7	308	304
Puke_6a.1 Non Eff Lease	1022	29	6.5	228	210
Puke_6a.1 Non Eff Tile	1309	29	6.6	227	210
Puke_6a.1 Non Effluent	1317	29	6.5	228	210
Riparian Areas	4	3	N/A		
Waiki_30a.1 Non Eff ##	658	44	10.0	259	210
Waiki_30a.1 Run Off ##	776	47	10.7	271	210
Parah_4a.1 Non Effluent ##	95	41	8.9	288	210
Parah_4a.1 Run Off ##	102	43	9.1	296	210
Apar_2a.1 Non Eff Lease ##	179	47	10.7	263	210
Swedes	1259	161	30.3	101	108
Pasture to FB MP	606	98	18.6	-241	135
FB/Barley MP	436	70	12.3	-43	109
Pasture to FB RO	338	169	34.1	119	135
FB/Barley RO	319	159	28.6	-4	109
Other farm sources	416				
	-				
Whole farm	11174	45			
Less N removed in wetlands	0				
Farm output	11174	45			

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

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

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



^{**} Sum of fertiliser and external factory effluent inputs.



Current System Pasture Production and Other Values/Effluent Report

Farm name: NB 2016 -17 Current DSN 31827 (Copy) - UPDATED_2 (2016)

Block Pasture

Block name	On-farm fresh pasture intake (kg DM/ha/yr)	Estimated utilisation (%)	Supplements removed (kg DM/ha/yr)	Pasture growth (kg DM/ha/yr)
Puke_6a.1 Effluent Tile	14092	85	0	16579
Puke_6a.1 Non Eff Lease	14092	85	0	16579
Puke_6a.1 Non Eff Tile	14092	85	0	16579
Puke_6a.1 Non Effluent	14092	85	0	16579
Riparian Areas	0	0	0	0
Waiki_30a.1 Non Eff	13711	81	0	16927
Waiki_30a.1 Run Off	12901	76	0	17088
Parah_4a.1 Non Effluent	13711	81	0	16927
Parah_4a.1 Run Off	12901	76	0	17088
Apar_2a.1 Non Eff Lease	13711	81	0	16927
Swedes	0	0	0	0
Pasture to FB MP	0	0	0	0
FB/Barley MP	3084	85	0	3629
Pasture to FB RO	0	0	0	0
FB/Barley RO	2760	75	0	3680
	I			

This report gives an estimated animal intake for each block based on animal production and supplements brought on to farm information supplied. Estimated annual pasture growth is shown for the animal utilisation value shown. Note: the model is not sensitive to changes in utilisation.

It is recommended that a consultant or software such as StockPol is used to estimate farm pasture production.

SOUTH DAIRY LTD - ALEXANDER D

Mark Crawford

Client reference: 913461 Farm name: NB 2016 -17 Current DSN 31827 {Copy} - UPDATED_2 (2016)

Other values for farm - NB 2016 -17 Current

Milking herd size (peak cows/ha grazed)	2.6
Milk solids (kg/ha grazed)	1133
Milk production per cow (kg milk solids / cow)	435.8
Default calving data	06 August
Total liveweight brought (kg/ha grazed)	273
Total liveweight reared (kg/ha grazed)	265
Total liveweight sold (kg/ha grazed)	1007
\$ on fertiliser per kg milk solids	\$0.40
\$ on fertiliser per ha	\$451.25
GHG: Allocation to milk	0.78
Dairy stock rate (RSU)	5399
Dairy replacements stock rate (RSU)	928
Beef / dairy grazing stock rate (RSU)	215

Farm name: NB 2016 -17 Current DSN 31827 (Copy) - UPDATED_2 (2016)

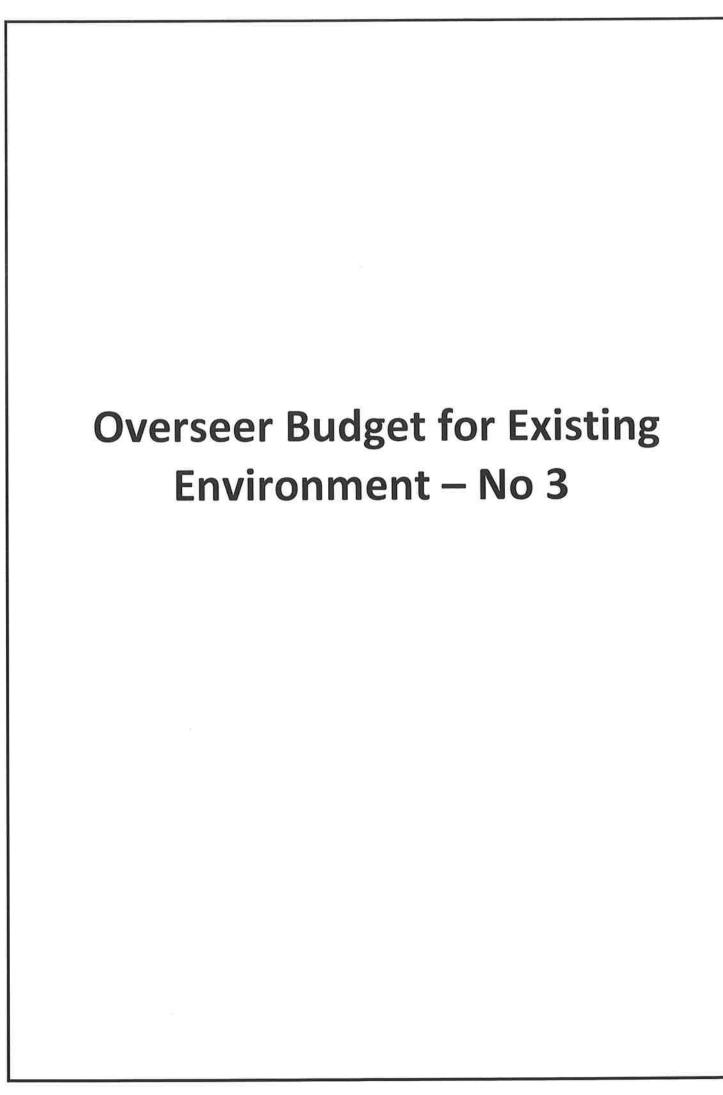
Effluent Report

	Units	Current farm
Current effluent area		
Area of effluent blocks	ha	54
% of pastoral farm area	%	25
Area of farm to apply effluent to achieve rates of:		
150 kg N/ha/yr	ha	47
Maintenance K	ha	3092
100 kg K/ha/yr	ha	58
Source of N applied to effluent blocks		
Average of N applied to effluent blocks	kg N/ha/yr	130
Effluent from farm dairy	%	100
Effluent from wintering pad	%	0
Effluent from feed pad	%	0
Average fertiliser N	kg N/ha/yr	174
Average other elements	kg N/ha/yr	0

Current System Parameter Report

As attached in separate pdf format





Farm tuno

SOUTH DAIRY LTD - ALEXANDER D

Mark Crawford

Full range

Client reference:

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2_2 (2016/17)

FarmParameters



Farm details

Type	Farm type	Full range
Assessment	Assessment year	2016/17
Region	Region	Southland
Farm blocks		
Puke 6a.1 Effluent Tile	Pastoral	49.1
Puke 6a.1 Non Eff Lease	Pastoral	35.6
Puke 6a.1 Non Eff Tile	Pastoral	43.8
Puke 6a.1 Non Effluent	Pastoral	44.8
Waiki_30a.1 Non Eff	Pastoral	17.9
Waiki_30a.1 Run Off	Pastoral	17.9
Parah_4a.1 Non Effluent	Pastoral	2.7
Parah_4a.1 Run Off	Pastoral	2.9
Apar_2a.1 Non Eff Lease	Pastoral	4.5
Riparian Areas	Riparian	1.2
Swedes (MP)	Fodder Crop	
Past>FBt (RO)	Crop	2.9
FBt>WCCS (RO)	Crop	2.9
Past>FBt Lft (MP)	Crop	9.5
FBt Lft>Past (MP)	Crop	9.5
Total farm area declared in blocks	ha	245.2
Total farm area	ha	248.5
Non-productive area	ha	3.30000000000001

Farm animals

Stock numbers

Stock reconciliation - Dairy Production Milk solids Milk volume yield Fat yield Lactation length Average weight Calving times Median calving date Drying off Percent of herd Stock numbers			kg/yr l/yr kg/yr days kg/ar	-		Not e Not e Not e	ntered ntered ntered ntered					
Class	Breed	Jul Au	g Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
MilkingHerd	F x J cross	0 43		599	599	599	589	589	589	590	540	0
Max weight (kg) LW start (kg)	LW end (kg)	CW (kg)	Age (mont		Source	Fate		Sex	Mated			-
520 0	0	0	0				1	emale				
Stock numbers - Dairy repla		7 / 4	6	0 1		_	-	- ,				-
Class	Breed	Jul Au		Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
HeiferReplacements	F x J cross LW end (kg)	0 0 CW (kg)	0 Age (mont	0	164 Source	164 Fate	164	164 Sex	164 Mated	164	164	164
Max weight (kg) LW start (kg) 0 0	230	CW (kg)	0	115)	Weaned	гаце		emale	Mateu			
HeiferReplacements	F x J cross	112 113	2 112	112	112	112	112	112	112	112	112	112
Max weight (kg) LW start (kg)	LW end (kg)	CW (kg)	Age (mont	ths)	Source	Fate		Sex	Mated			
0 230	480	0	0	0	Brought	0		Female	0	0	0	0
HeiferReplacements Max weight (kg) LW start (kg)	F x J cross LW end (kg)	112 0 CW (kg)	0 Age (mont	0	0 Source	0 Fate	0	0 Sex	0 Mated	0	0	0
520 480	480	0 (kg)	0	.113)	On-farm	rate		emale	Mateu			
Ci 1												
Stock reconciliation - Beef / d	airy grazing											
Stock production			0/			Nat a						
Calving percentage			% %				ntered					
Percent replacements			70				ntered					
Mean calving date							ntered ntered					
Mean weaning date			ka									
Weaning weight Stock numbers			kg			not e	ntered					
Stock numbers												

Mark Crawford

Client reference:

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2_2 (2016/17)

FarmParameters



Aug Class Breed Feh Apr May Tul Sep Oct Nov Dec lan Mar 1ıın DairyMilking Friesian X 0 162 26 0 0 0 0 0 0 n n 0 iersev Max weight (kg) LW start (kg) LW end (kg) CW (kg) Age (months) Source Fate Sex Mated 0 Female

Stock management

Animal excreta distribution

Relative productivity assessment method No difference between blocks

All blocks have a relative productivity value of 1

Ratio of stock on blocks can differ from the farm stock ratios

Farm dairy effluent management system

Effluent management method Spray from sump

Animal health supplements

Animal - Dairy

No animal supplementation has been entered

Animal - Dairy replacements

No animal supplementation has been entered

Animal - Beef / dairy grazing

No animal supplementation has been entered

Left over feeding

No left over feeding specified

Stored supplements

No supplements from storage added to this farm

Imported supplements

Supplement information

Conservation type Silage

Name Pasture good quality silage

Supplement amount

Dry weight basis T 205

Fed on blocks: Puke_6a.1 Effluent Tile,Puke_6a.1 Non Eff Lease,Puke_6a.1 Non Eff Tile,Puke_6a.1 Non Effluent,Waiki_30a.1

Non Eff,Parah_4a.1 Non Effluent,Apar_2a.1 Non Eff Lease

No timing of feeding has been specified

Supplement information

Conservation type Process byproducts
Name Palm kernel meal

Supplement amount

Dry weight basis T 80
Fed on blocks: Puke_6a.1 Effluent Tile,Puke_6a.1 Non Eff Lease,Puke_6a.1 Non Eff Tile,Puke_6a.1 Non Effluent,Waiki_30a.1

Non Eff,Parah_4a.1 Non Effluent,Apar_2a.1 Non Eff Lease

No timing of feeding has been specified

Supplement information

Conservation type User defined Name Fodder Beet

Supplement amount

Dry weight basis T 170

Fed to animal: Dairy

No timing of feeding has been specified

Supplement information

Conservation type Silage
Name Cereal silage

Supplement amount

Dry weight basis T 25

Fed to animal: Dairy

Mark Crawford

Client reference:

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2_2 (2016/17)

FarmParameters



No timing of feeding has been specified

Supplement information Conservation type Name Supplement amount Dry weight basis Fed to animal: Beef / dairy grazing No timing of feeding has been specified	Т	User defined Fodder Beet 10
Supplement information Conservation type Name Supplement amount Dry weight basis Fed on blocks: Swedes (MP),Past>FBt (RO) No timing of feeding has been specified	Т	Silage Baleage 55
Supplement information Conservation type Name Supplement amount Dry weight basis Supplements are distributed evenly across all p	T astoral blocks	Silage Baleage 55

Greenhouse gas emission factors

No timing of feeding has been specified

Enteric	methane -	~	methane/kg	DMT intake
Enteric	methane -	u	methane/ku	DMI INTAKE

Dairy		21.6
Dairy replacements		21.6
Sheep		20.9
Beef		21.6
Deer		21.3
Goats		20.9
Camelids		20.9
Young sheep		16.8
Horses	kg methane/RSU	1.8
User defined	kg methane/RSU	1.5

Dung methane - g methane/kg dung

0.982
0.982
0.691
0.982
0.915
0.691
0.691

Nitrous oxide

Use farm specific emission factors

Fuel and electricity

Embodied CO2 emissions		
Diesel	kg CO2 equivalents/litre	2.989
Petrol	kg CO2 equivalents/litre	2.773
Electricity	kg CO2 equivalents/kWh	0.271
Energy emissions		
Diesel	MJ / litre	42.24
Petrol	MJ / litre	42.4
Electricity	MJ / kWh	8.21

Mark Crawford

Yes

Client reference:

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2_2 (2016/17)

FarmParameters



GWP

Use NZ national inventory

Allocation

Allocation method Enter actual allocation figures

Report settings

Greenhouse gas emission report units: CO2 equivalents (kg/ha/yr)

Target N application rate as effluent: kg N/ha/yr

Fertiliser costs \$/kg nutrient

N P K S Ca Mg Na 1.45 3.5 2.4 0.35 0.2 1.4 0.8

Block Information

Block - Puke_6a.1 Effluent Tile

Puke 6a.1 Effluent Tile Block name Block type **Pastoral** Area ha 49.1 Relative productivity Pasture block type Yes Flat Topography Distance from coast km 25 Cultivated in last 5 years False

Fodder rotates through

Climate

Annual average rainfall mm/yr 1096 Mean annual temperature 10.1

Seasonal variation in rainfall 731-1450 mm, Low

Annual potential evapotranspiration mm 712
Seasonal variation in PET Moderate

Soil description

Soil order (default) Pallic

Soil group (default) Recent/YGE/BGE

SMaps

Sibling Pukem_6a.1

 Date downloaded
 Unknown

 Wilting point
 0 - 30cm
 22

 30 - 60cm
 25

 > 60
 1

 Field capacity
 0 - 30cm
 40

 30 - 60cm
 41

30 - 60cm 41 > 60 2 Saturation 0 - 30cm 54 30 - 60cm 48

30 - 60cm 48 > 60 3

Natural drainage class Poor
Depth to impeded layer cm Not entered

Depth to impeded layer cm Not entered Top soil horizon chemical and physical parameters

Sub soil clay % 29

Soil profile

Profile drainage class
Use default
Top soil texture
Silt loam
Maximum rooting depth
m
0.58
Depth to impeded drainage layer
0.58

Mark Crawford

Client reference:

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2_2 (2016/17)

FarmParameters



Soil drainage

Drainage method Method

Percent of paddock drained

Hydrophobic condition Occurence of pugging damage

Compacted top soil

Soil settinas

K leaching potential not set

N immobilisation status

Soil tests

Olsen P QT K 38.2

9.6

QT Ca 10

QT Mg 28.6

QT Na

kg/ha

kg/ha

kg/ha

kg/ha

kg/ha

kg/ha

kg/ha

9.6

Organic S Anion storage capacity or phosphate retention

TBK reserve K test K reserve status

Pasture

Pasture type

Clover levels

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - December

Category

Product Amount

Fertiliser products - August

Category

Product

Amount

Fertiliser products - October

Category Product

Amount

Fertiliser products - September

Category

Product

Amount

Fertiliser products - February Category

Product

Amount

Fertiliser products - December Category

Product

Amount

Fertiliser products - March

Category Product

Amount

Fertiliser products - April Category

Product

Category

Product Amount

Amount Fertiliser products - May

kg/ha

kg/ha

Mole/tile system 100

Use default Occasional

False

15

Not entered Not entered

Use default

Ryegrass/white clover

Use default

User defined 2/3 Super & Lime

750

Ravensdown cropping

Ammo 36

100

User defined

Eff - Urea + Se

40

User defined

UREA BULK

User defined

UREA BULK

40

User defined

UREA BULK

40

Ravensdown other

Urea 60

Ravensdown other

Urea 40

Ravensdown other

Urea

20

Mark Crawford

Client reference: Farm name: NB 2014 -17 Average DSN 31827 $\{Copy\}$ - copy 2_2 (2016/17)

FarmParameters

Bulk density



Irrigation No irrigation entered		
Animals on block		
Animals grazing		
Dairy	%	100
Water connectivity		
Direct access to streams		False
Animal grazing		
January		True
February		True
March		True
April		True
May		True
August		True
September		True
October November		True True
December		True
December		rrue
Effluent application		
Liquid effluents		
Receives farm dairy effluent		
Effluent application depth		Low application method
Percentage of block effluent applied to	%	100
Block - Puke_6a.1 Non Eff Lease		
Block name		Puke 6a.1 Non Eff Lease
Block type		Pastoral
Area	ha	35.6
Relative productivity	IIG	1
Pasture block type		Yes
Topography		Flat
Distance from coast	km	25
Cultivated in last 5 years		False
Fodder rotates through		Yes
Climate		
Annual average rainfall	mm/yr	1096
Mean annual temperature	111111/ y 1	10.1
Seasonal variation in rainfall		731-1450 mm, Low
Annual potential evapotranspiration	mm	712
Seasonal variation in PET		Moderate
Soil description		
Soil order (default)		Pallic
Soil group (default)		Recent/YGE/BGE
SMaps		Dulama Ca 1
Sibling Date downloaded		Pukem_6a.1 Unknown
Wilting point	0 - 30cm	22
wiiting point	30 - 60cm	25
	> 60	1
Field capacity	0 - 30cm	40
Tield capacity	30 - 60cm	41
	> 60	2
Saturation	0 - 30cm	54
	30 - 60cm	48
	> 60	3
Natural drainage class		Poor
Depth to impeded layer	cm	Not entered
Top soil horizon chemical and physical parameters		
ASC/PR	%	22
Pully density	l/a /m 3	1220

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kg/m³

1220

Mark Crawford

None

Client reference:

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FarmParameters



% 27 Clay 9 Sand % Sub soil 29 Sub soil clay %

Soil profile

Profile drainage class Use default Top soil texture Silt loam Maximum rooting depth 0.58 m Depth to impeded drainage layer 0.58

Soil drainage

Drainage method Method Hydrophobic condition Use default

Occurence of pugging damage Occasional Compacted top soil False

Soil settings

K leaching potential not set N immobilisation status

Soil tests

Olsen P QT K QT Ca QT Mg QT Na 30

QT SO4 5

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

Pasture

Pasture type Ryegrass/white clover

Clover levels Use default

Supplements removed Supplement information

Conservation type Baleage

Name

Wrapped in plastic Wrapping Supplement amount

Dry weight basis Т 18

Fed to animal: Dairy replacements No timing of feeding has been specified

Supplement information

Conservation type Silage

Name

Silage stack storage Stack effluent contained

Supplement amount Dry weight basis Τ 24

Silage cutting method Not entered

Fed to animal: Dairy

No timing of feeding has been specified

Fertiliser application

Fertiliser products - December Category User defined

Product 2/3 Super & Lime

1000 Amount kg/ha Fertiliser products - August

Ravensdown cropping Category

Product Ammo 36 100 Amount kg/ha

Fertiliser products - October

Category User defined Product Eff - Urea + Se

Mark Crawford

User defined

True

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FarmParameters



Amount	kg/ha	40
--------	-------	----

Fertiliser products - September

Category

Product UREA BULK Amount kg/ha 60

Fertiliser products - February

Category User defined Product UREA BULK

Amount kg/ha 40

Fertiliser products - December

Category User defined Product UREA BULK

Amount kg/ha 40

Fertiliser products - March
Category Ravensdown other

Product Urea Amount kg/ha 60

Amount kg/ha 60 Fertiliser products - April

Category Ravensdown other

Product Urea Amount kg/ha 40

Fertiliser products - May
Category Ravensdown other

Category Rave Product Urea

Amount kg/ha 20 Fertiliser products - January

Category Ravensdown other

Product Urea

Amount kg/ha 40 Fertiliser products - November

Category Ravensdown other

Product Urea Amount kg/ha 40

Fertiliser products - December

Category Ravensdown other Product Potassium chloride

Amount kg/ha 50

Irrigation

No irrigation entered

Animals on block
Animals grazing

Dairy % 100

Water connectivity

Direct access to streams False

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

December

Effluent application

Receives no liquid or solid effluents

Block - Puke_6a.1 Non Eff Tile

Block name Puke_6a.1 Non Eff Tile

Block type Pastoral Area ha 43.8

Mark Crawford

Client reference:

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2_2 (2016/17)

FarmParameters

Soil tests

35 QT SO4

Olsen P

TBK reserve K test K reserve status

QT K

Anion storage capacity or phosphate retention

QT Ca



Relative productivity Pasture block type Topography Distance from coast Cultivated in last 5 years Fodder rotates through	km	1 Yes Flat 25 False Yes
Climate Annual average rainfall Mean annual temperature Seasonal variation in rainfall Annual potential evapotranspiration Seasonal variation in PET	mm/yr	1096 10.1 731-1450 mm, Low 712 Moderate
Soil description Soil order (default) Soil group (default) SMaps Sibling Date downloaded Wilting point	0 - 30cm 30 - 60cm > 60	Pallic Recent/YGE/BGE Pukem_6a.1 Unknown 22 25
Field capacity Saturation	0 - 30cm 30 - 60cm > 60 0 - 30cm 30 - 60cm	40 41 2 54 48
Natural drainage class Depth to impeded layer Top soil horizon chemical and physical parameters ASC/PR Bulk density Clay Sand Sub soil Sub soil clay	> 60 cm % kg/m³ % %	3 Poor Not entered 22 1220 27 9
Soil profile Profile drainage class Top soil texture Maximum rooting depth Depth to impeded drainage layer	m	Use default Silt loam 0.58 0.58
Soil drainage Drainage method Method Percent of paddock drained Hydrophobic condition Occurence of pugging damage Compacted top soil		Mole/tile system 100 Use default Occasional False
Soil settings K leaching potential not set N immobilisation status		

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QT Na

5

Not entered Not entered

Use default

QT Mg

kg/ha

SOUTH DAIRY LTD - ALEXANDER D

Mark Crawford

Client reference:

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2_2 (2016/17)

FarmParameters



Pasture

Pasture type

Ryegrass/white clover Clover levels Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - December

Category Product

Amount

Fertiliser products - August

Category

Product Amount

Fertiliser products - October

Category

Product

Amount Fertiliser products - September

Category

Product

Amount Fertiliser products - February

Category

Product Amount

Fertiliser products - December

Category

Product

Amount

Fertiliser products - March Category

Product Amount

Fertiliser products - April

Category

Product

Amount

Fertiliser products - May

Category

Product

Amount

Fertiliser products - January

Category

Product

Amount Fertiliser products - November

Category

Product Amount

Irrigation

No irrigation entered

Animals on block

Animals grazing Dairy

Water connectivity

Direct access to streams

Animal grazing

January February User defined

2/3 Super & Lime

Ravensdown cropping

Ammo 36 100

User defined Eff - Urea + Se

40

kg/ha

User defined **UREA BULK**

60

User defined **UREA BULK**

40

User defined

UREA BULK

40

Ravensdown other

Urea

Ravensdown other

Urea

40

Ravensdown other Urea

20

Ravensdown other

Urea 40

Ravensdown other

Urea

40

% 100

False

True

True

Mark Crawford

Client reference:

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2_2 (2016/17)

FarmParameters



March	True
April	True
May	True
August	True
September	True
October	True
November	True
December	True

Effluent application

Receives no liquid or solid effluents

Block	- Puke	6a.1	Non	Effluent

Block name		Puke_6a.1 Non Effluent
Block type		Pastoral
Area	ha	44.8
Relative productivity		1
Pasture block type		Yes
Topography		Flat
Distance from coast	km	25
Cultivated in last 5 years		False
Fodder rotates through		Yes

Climate

Annual average rainfall	mm/yr	1096
Mean annual temperature		10.1
Seasonal variation in rainfall		731-1450 mm, Low
Annual potential evapotranspiration	mm	712
Seasonal variation in PET		Moderate

Soil description

Soil order (default)	Pallic
Soil group (default)	Recent/YGE/BGE
SMaps	

Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Pukem_6a.1
Date downloaded		Unknown
Wilting point	0 - 30cm	22
	30 - 60cm	25
	> 60	1
Field capacity	0 - 30cm	40
	30 - 60cm	41
	> 60	2
Saturation	0 - 30cm	54
	30 - 60cm	48

	> 60	3
Natural drainage class		Poor
Depth to impeded layer	cm	58
Top soil horizon chemical and physical parameters		
ASC/PR	%	22
Bulk density	kg/m³	1220
Clay	%	28
Sand	0/0	Q

Sub soil Sub soil clay % 29

Soil profile

Profile drainage class Use default Silt loam Top soil texture . Maximum rooting depth 0.58 m Depth to impeded drainage layer 0.58

Soil drainage

Drainage method Method None Hydrophobic condition Use default

Mark Crawford

Client reference:

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FarmParameters



Occurence of pugging damage Occasional Compacted top soil False

Soil settings

K leaching potential not set N immobilisation status

Soil tests

Olsen P QT K QT Ca QT Mg QT Na 35 8 10 22 8

QT S04

Anion storage capacity or phosphate retention

TBK reserve K test

K reserve status

Not entered

Use default

Pasture

Pasture type Ryegrass/white clover

Clover levels Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - December

Category User defined Product 2/3 Super & Lime

Amount kg/ha 750

Fertiliser products - August

Category Ravensdown cropping

Product Ammo 36

Amount kg/ha 100 Fertiliser products - October

Category User defined

Product Eff - Urea + Se

Amount kg/ha 40 Fertiliser products - September

Category User defined Product UREA BULK

Amount kg/ha 60

Fertiliser products - February

Category User defined Product UREA BULK

Amount kg/ha 40
Fertiliser products - December

Category User defined

Product UREA BULK
Amount kg/ha 40

Fertiliser products - March
Category Ravensdown other

Product Urea

Amount kg/ha 60 Fertiliser products - April

Category Ravensdown other

Product Urea

Amount kg/ha 40 Fertiliser products - May

Category Ravensdown other

Product Urea
Amount kg/ha 20
Fertiliser products - January

Category Ravensdown other

Product Urea Amount kg/ha 40

Fertiliser products - November

Category Ravensdown other

Mark Crawford

Client reference: Farm name: NB 2014 -17 Average DSN 31827 $\{Copy\}$ - copy 2_2 (2016/17)

FarmParameters



Product Amount	ka/ba	Urea 40
Amount	kg/ha	40
Irrigation		
No irrigation entered		
Animals on block		
Animals grazing		
Dairy	%	100
Water connectivity		
Direct access to streams Animal grazing		False
January		True
February		True
March		True
April		True
May August		True True
September		True
October		True
November		True
December		True
Effluent application		
Receives no liquid or solid effluents		
Block - Waiki_30a.1 Non Eff		
Block name Block type		Waiki_30a.1 Non Eff Pastoral
Area	ha	17.9
Relative productivity		1
Pasture block type		No
Topography Distance from coast	km	Flat 25
Cultivated in last 5 years	Kili	False
Fodder rotates through		No
Climate		
Annual average rainfall	mm/yr	1096
Mean annual temperature		10.1
Seasonal variation in rainfall	mm	731-1450 mm, Low 712
Annual potential evapotranspiration Seasonal variation in PET	mm	Moderate
Soil description		Brown
Soil order (default) Soil group (default)		Sedimentary
SMaps		,
Sibling		Waiki_30a.1
Date downloaded	0 - 30cm	Unknown 21
Wilting point	30 - 60cm	23
	> 60	25
Field capacity	0 - 30cm	42
	30 - 60cm > 60	41
Saturation	0 - 30cm	43 59
Saturation	30 - 60cm	52
	> 60	49
Natural drainage class		Well
Depth to impeded layer Top soil horizon chemical and physical parameters	cm	Not entered
ASC/PR	%	43
Bulk density	kg/m³	1090
Clay	%	28

Mark Crawford

Client reference:

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2_2 (2016/17)

FarmParameters



Sand % Sub soil Sub soil clay % 28

Soil profile

Profile drainage class Use default Silt loam Top soil texture Maximum rooting depth m 0 Depth to impeded drainage layer

Soil drainage

Drainage method

Method None Hydrophobic condition Use default Occurence of pugging damage Occasional Compacted top soil **False**

Soil settings

K leaching potential not set N immobilisation status

Soil tests

Olsen P QT Ca QT Mg QT Na 30 10 20

QT SO4

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

Pasture

Pasture type Ryegrass/white clover

Clover levels Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Fertiliser products - December

Category User defined 2/3 Super & Lime Product

750 Amount kg/ha

Fertiliser products - August

Ravensdown cropping Category

Product Ammo 36 100 Amount kg/ha

Fertiliser products - October

User defined Category

Eff - Urea + Se Product 40

Amount kg/ha Fertiliser products - September

Category User defined **UREA BULK** Product

kg/ha Amount

Fertiliser products - February

Category User defined **UREA BULK** Product

40 Amount kg/ha

Fertiliser products - December User defined Category **UREA BULK** Product

kg/ha 40

Amount Fertiliser products - March

Category Ravensdown other

Product Urea Amount kg/ha 60

Mark Crawford

Client reference:

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FarmParameters



Fertiliser products - April
Category Ravensdown other

Product Urea Amount kg/ha 40

Fertiliser products - May

Category Ravensdown other Product Urea

Amount kg/ha 20

Fertiliser products - January
Category Ravensdown other

Product Urea

Amount kg/ha 40 Fertiliser products - November

Category Ravensdown other

Product Urea Amount kg/ha 40

Irrigation
No irrigation entered

Animals on block
Animals grazing

Dairy % 100
Water connectivity

Direct access to streams False

Animal grazing
January True
February True
March True
April True
May True

May True
August True
September True
October True
November True
December True

Effluent application

Receives no liquid or solid effluents

Block - Waiki_30a.1 Run Off

Block name Waiki_30a.1 Run Off
Block type Pastoral

Area ha 17.9
Relative productivity 1
Pasture block type No
Topography Flat

Distance from coast km 25
Cultivated in last 5 years False
Fodder rotates through No

Climate

Annual average rainfall mm/yr 1096

Mean annual temperature 10.1
Seasonal variation in rainfall 731-1450 mm, Low

Annual potential evapotranspiration mm 712

Seasonal variation in PET Moderate

Soil description

Soil order (default)

Brown
Call and the fault

Soil group (default) Sedimentary SMaps

Sibling Waiki_30a.1
Date downloaded Unknown

Wilting point 0 - 30cm 21

Mark Crawford

Client reference: Farm name: NB 2014 -17 Average DSN 31827 $\{Copy\}$ - copy 2_2 (2016/17)

FarmParameters



Field capacity Saturation Natural drainage class Depth to impeded layer Top soil horizon chemical and physical paran ASC/PR Bulk density Clay	% 43 kg/m³ 1090 % 28
Sand Sub soil Sub soil clay	% 4 % 28
Soil profile Profile drainage class Top soil texture Maximum rooting depth Depth to impeded drainage layer	Use default Silt loam m 0 0
Soil drainage Drainage method Method Hydrophobic condition Occurence of pugging damage Compacted top soil	None Use default Occasional False
Soil settings K leaching potential not set N immobilisation status	
Soil tests Olsen P QT K QT Ca QT N 27 9 9 16 QT SO4 Anion storage capacity or phosphate retention TBK reserve K test K reserve status	QT Na 10 10 Not entered Not entered Use default
Pasture Pasture type Clover levels	Ryegrass/white clover Use default
Supplements removed Supplement information Conservation type Name Wrapping Supplement amount Dry weight basis Fed to animal: Dairy No timing of feeding has been specified Supplement information Conservation type	Baleage Wrapped in plastic T 7 Silage
Name Silage stack storage Supplement amount Dry weight basis Silage cutting method Fed to animal: Dairy No timing of feeding has been specified	Stack effluent contained T 14 Not entered

Mark Crawford

Client reference:

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Direct access to streams

FarmParameters



Fertiliser application Fertiliser products - December Category User defined Product 2/3 Super & Lime Amount kg/ha Fertiliser products - August Ravensdown cropping Category Ammo 36 Product Amount kg/ha 100 Fertiliser products - October User defined Category Product Eff - Urea + Se Amount kg/ha 40 Fertiliser products - September Category User defined **UREA BULK** Product 60 Amount kg/ha Fertiliser products - February Category User defined Product **UREA BULK** 40 Amount kg/ha Fertiliser products - December Category User defined Product **UREA BULK** Amount kg/ha Fertiliser products - March Category Ravensdown other Product Urea **Amount** kg/ha 60 Fertiliser products - April Category Ravensdown other Product Urea Amount kg/ha 40 Fertiliser products - May Category Ravensdown other Urea Product Amount kg/ha 20 Fertiliser products - January Category Ravensdown other Urea Product Amount kg/ha 40 Fertiliser products - November Ravensdown other Category Product Urea 40 Amount kg/ha Irrigation No irrigation entered Animals on block Animals grazing % 15 Dairy Water connectivity Direct access to streams False Animal grazing True April May True August True September True October True Animals grazing Dairy replacements % 80 Water connectivity

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False

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FarmParameters



Animal grazing		
January		True
February		True
March		True
April		True
May		True
June		True
July		True
August		True
September		True
November		True
December		True
Animals grazing		
Beef / dairy grazing	%	5
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		
August		True
September		True
ffluent application		

Effluent application

Receives no liquid or solid effluents

Block -	Parah	4a.1	Non	Effluent
---------	-------	------	-----	-----------------

Block name		Parah_4a.1 Non Effluent
Block type		Pastoral
Area	ha	2.7
Relative productivity		1
Pasture block type		No
Topography		Flat
Distance from coast	km	25
Cultivated in last 5 years		False
Fodder rotates through		No

Climate

Annual average rainfall	mm/yr	1096
Mean annual temperature		10.1
Seasonal variation in rainfall		731-1450 mm, Low
Annual potential evapotranspiration	mm	712
Seasonal variation in PET		Moderate

Soil description		
Soil order (default)		Pallic
Soil group (default)		Recent/YGE/BGE
SMaps		
Sibling		Parah_4a.1
Date downloaded		Unknown
Wilting point	0 - 30cm	24
	30 - 60cm	26
	> 60	27
Field capacity	0 - 30cm	38
• •	30 - 60cm	38
	> 60	39
Saturation	0 - 30cm	50
	30 - 60cm	46
	> 60	44
Natural drainage class		Imperfect

Natural drainage class Imperfect Depth to impeded layer cm Not entered Top soil horizon chemical and physical parameters

ASC/PR % 23 Bulk density kg/m³ 1220 Clay % 34 % 12 Sand

Mark Crawford

Client reference:

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2_2 (2016/17)

FarmParameters



Ravensdown cropping

Sub soil

Sub soil clay % 34

Soil profile

Profile drainage class
Use default
Top soil texture
Silt loam
Maximum rooting depth
m
0
Depth to impeded drainage layer
0

Soil drainage

Drainage method

Method None
Hydrophobic condition Use default
Occurence of pugging damage Occasional
Compacted top soil False

Soil settings

K leaching potential not set N immobilisation status

Soil tests

Olsen P QT K QT Ca QT Mg QT Na 30 7 10 20 9

QT SO4

Anion storage capacity or phosphate retention

TBK reserve K test

K reserve status

Not entered

Use default

Pasture

Pasture type Ryegrass/white clover

Clover levels Use default

Supplements removed

No supplements removed from this block

Fertiliser application

Category

Fertiliser products - December

Category User defined Product 2/3 Super & Lime

Amount kg/ha 750

Fertiliser products - August

Product Ammo 36

Amount kg/ha 100

Fertiliser products - October

Category User defined Product Eff - Urea + Se

Amount kg/ha 40

Fertiliser products - September
Category
User defined

Product UREA BULK Amount kg/ha 60

Fertiliser products - February

Category User defined Product UREA BULK

Amount kg/ha 40

Fertiliser products - December
Category
User defined

Category User defined Product UREA BULK

Amount kg/ha 40
Fertiliser products - March

Category Ravensdown other

Product Urea Amount kg/ha 60

Fertiliser products - April

Mark Crawford

Client reference:

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2_2 (2016/17)

FarmParameters



Category Ravensdown other

Product Urea Amount kg/ha

Fertiliser products - May Category

Ravensdown other Product Urea

Amount kg/ha 20

Fertiliser products - January Ravensdown other Category

Product Urea

Amount 40 kg/ha Fertiliser products - November

Category Ravensdown other

Product Urea

Amount kg/ha 40

Irrigation No irrigation entered

Animals on block

Animals grazing

Dairy % 100 Water connectivity

Direct access to streams False

Animal grazing

January True February True March True April True May True True August

September True October True November True December True

Effluent application

Receives no liquid or solid effluents

Block - Parah_4a.1 Run Off

Parah_4a.1 Run Off Block name

Block type **Pastoral** 2.9 Area ha Relative productivity Pasture block type No Topography Flat

Distance from coast km 25 Cultivated in last 5 years False

Fodder rotates through No

Climate Annual average rainfall mm/yr 1096

Mean annual temperature 10.1

Seasonal variation in rainfall 731-1450 mm, Low mm

Annual potential evapotranspiration 712 Seasonal variation in PET

Moderate

Soil description Soil order (default)

Pallic Soil group (default) Recent/YGE/BGE

SMaps

Sibling Parah_4a.1

Date downloaded Unknown Wilting point 0 - 30cm 24

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30 - 60cm

26

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No timing of feeding has been specified

FarmParameters



Field capacity		> 60 0 - 30cm 30 - 60cm	27 38 38
Saturation		> 60 0 - 30cm 30 - 60cm > 60	39 50 46 44
Natural drainage class Depth to impeded layer Top soil horizon chemical and physic ASC/PR	cal parameters	cm %	Imperfect Not entered
Bulk density Clay Sand Sub soil		kg/m³ % %	1220 34 12
Sub soil clay		%	34
Soil profile Profile drainage class Top soil texture Maximum rooting depth Depth to impeded drainage layer		m	Use default Silt loam 0 0
Soil drainage Drainage method Method Hydrophobic condition Occurence of pugging damage Compacted top soil			None Use default Occasional False
Soil settings K leaching potential not set N immobilisation status			
Soil tests Olsen P QT K QT Ca 27 8.7 8.9 Organic S Anion storage capacity or phosphate r TBK reserve K test K reserve status	QT Mg 16 retention	QT Na 10.2	10.5 Not entered Not entered Use default
Pasture Pasture type Clover levels			Ryegrass/white clover Use default
Supplements removed Supplement information Conservation type			Baleage
Name Wrapping			Wrapped in plastic
Supplement amount Dry weight basis Fed to animal: Dairy replacements No timing of feeding has been specif	fied	Т	2
Supplement information Conservation type			Silage
Name Silage stack storage			Stack effluent contained
Supplement amount Dry weight basis Silage cutting method Fed to animal: Dairy replacements		Т	2 Not entered

Mark Crawford

Client reference:

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2_2 (2016/17)

Direct access to streams

FarmParameters



Fertiliser application Fertiliser products - December Category User defined Product 2/3 Super & Lime Amount kg/ha Fertiliser products - August Ravensdown cropping Category Ammo 36 Product Amount kg/ha 100 Fertiliser products - October User defined Category Product Eff - Urea + Se Amount kg/ha 40 Fertiliser products - September Category User defined **UREA BULK** Product 60 Amount kg/ha Fertiliser products - February Category User defined Product **UREA BULK** 40 Amount kg/ha Fertiliser products - December Category User defined Product **UREA BULK** Amount kg/ha Fertiliser products - March Category Ravensdown other Product Urea **Amount** kg/ha 60 Fertiliser products - April Category Ravensdown other Product Urea Amount kg/ha 40 Fertiliser products - May Category Ravensdown other Urea Product Amount kg/ha 20 Fertiliser products - January Category Ravensdown other Urea Product Amount kg/ha 40 Fertiliser products - November Ravensdown other Category Product Urea 40 Amount kg/ha Irrigation No irrigation entered Animals on block Animals grazing % 15 Dairy Water connectivity Direct access to streams False Animal grazing True April May True August True September True October True Animals grazing Dairy replacements % 80 Water connectivity

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False

Mark Crawford

Client reference:

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2_2 (2016/17)

FarmParameters



Animal grazing Dairy replacements graze block all year rou	nd	
Animals grazing		
Beef / dairy grazing	%	5
Block intensity		
Finishing beef		False
Water connectivity		
Direct access to streams		False
Animal grazing		
August		True
September		True

Effluent application

Receives no liquid or solid effluents

Block - Apar_2a.1 Non Eff Lease		
Block name		Apar_2a.1 Non Eff Lease
Block type		Pastoral
Area	ha	4.5
Relative productivity		1
Pasture block type		No
Topography		Flat
Distance from coast	km	25
Cultivated in last 5 years		False
Fodder rotates through		No
Climate		
Annual average rainfall	mm/yr	1096
Mean annual temperature		10.1
Seasonal variation in rainfall		731-1450 mm, Low

Seasonal variation in rainfall 731-1450 mm, Low Annual potential evapotranspiration mm 712
Seasonal variation in PET Moderate

Soil description

Soil order (default)
Soil group (default)
Soll group (default)
Sedimentary
SMaps
Sibling
Date downloaded
Wilting point

Sedimentary
One of the street of

30 - 60cm 26 > 60 1 Field capacity 0 - 30cm 45 30 - 60cm 42 > 60 2 Saturation 0 - 30cm 63 30 - 60cm 53 > 60

Natural drainage class Imperfect
Depth to impeded layer cm Not entered

Top soil horizon chemical and physical parameters

ASC/PR

Bulk density

Clay

Sand

Sub soil

Sub soil clay % 28

Soil profile
Profile drainage class
Top soil texture
Maximum rooting depth
Depth to impeded drainage layer

Use default
Silt loam
0.58

Soil drainage

Mark Crawford

Client reference:

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2_2 (2016/17)

FarmParameters



Drainage method Method None Hydrophobic condition Use default Occurence of pugging damage Occasional Compacted top soil False

Soil settings

K leaching potential not set N immobilisation status

Soil tests

Olsen P QT K QT Ca QT Mg QT Na 30 10 20

QT SO4

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

Pasture

Pasture type Ryegrass/white clover

Clover levels Use default

Supplements removed Supplement information

Conservation type Baleage

Name

Wrapping Wrapped in plastic

Supplement amount Dry weight basis Т 3

Fed to animal: Dairy replacements

No timing of feeding has been specified Supplement information

Silage

Conservation type

Name Silage stack storage Stack effluent contained

Supplement amount

Dry weight basis Т

Silage cutting method Not entered

Fed to animal: Dairy

No timing of feeding has been specified

Fertiliser application

Product

Fertiliser products - December

Category User defined Product 2/3 Super & Lime

Amount kg/ha 750

Fertiliser products - August

Category Ravensdown cropping Product Ammo 36

100 kg/ha

Amount Fertiliser products - October

User defined Category

Eff - Urea + Se Product

Amount 40 kg/ha Fertiliser products - September

Category User defined **UREA BULK** Product

60

Amount kg/ha Fertiliser products - February

User defined Category **UREA BULK** Product

kg/ha 40 Amount

Fertiliser products - December User defined Category **UREA BULK**

Mark Crawford

Client reference:

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2_2 (2016/17)

FarmParameters



40 kg/ha Amount

Fertiliser products - March

Category Ravensdown other

Product Urea Amount kg/ha

Fertiliser products - April Category Ravensdown other

Product Urea

40 Amount kg/ha

Fertiliser products - May

Category Ravensdown other Urea

Product **Amount** kg/ha 20

Fertiliser products - January

Category Ravensdown other

Product Urea

Amount kg/ha 40

Fertiliser products - November Category Ravensdown other

Product Urea

40 Amount kg/ha

Irrigation

No irrigation entered

Animals on block Animals grazing

% 100 Dairy

Water connectivity

Direct access to streams **False** Animal grazing

January True February True March True

April True May True August True September True October True

November True December True

Effluent application

Receives no liquid or solid effluents

Block - Riparian Areas

Block name Riparian Areas Block type Riparian

Area ha 1.2

Block - Swedes (MP)

Block name Swedes (MP) Fodder Crop

Block type Rotation area ha 6.6 Low N mineralisation False Final grid month October

No Irrigation Irrigation system type

Crop information

Current assessment year 2016/17

November - Swedes Crop management See details below

Crop sown Fertiliser or lime added See details below

December - Swedes

Mark Crawford

Client reference:

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2_2 (2016/17)

FarmParameters



Fertiliser or lime added See details below

January - Swedes February - Swedes March - Swedes April - Mature - Swedes May - Mature - Swedes June - Mature - Swedes July - Mature - Swedes August - Swedes

Crop management See details below Defoliation

September - Swedes

Crop management See details below Defoliation

October - Grazed

Crop management See details below Crop sown

Crop sowing information - November of the Current assessment year 2016/17

Crop category Fodder
Crop type Swedes
Product yield T/ha dry matter 18

Cultivation practice at sowing Conventional

Defoliation information - August of the Current assessment year 2016/17

Defoliation method Grazed in-situ
Final harvest False

Source of animal Farm stock - see Enterprise numbers panes

Percentage of crop eaten by animals

Dairy % 30
Beef / dairy grazing % 70
Crop grazed for hours/day Not entered

Defoliation information - September of the Current assessment year 2016/17

Defoliation method Grazed in-situ

Final harvest True

Source of animal Farm stock - see Enterprise numbers panes

Percentage of crop eaten by animals

Dairy % 65
Dairy replacements % 30
Beef / dairy grazing % 5
Crop grazed for hours/day Not entered

Crop sowing information - October of the Current assessment year 2016/17

Crop category Permanent pasture

Crop type Grazed
Source of animals Not entered

Fertiliser application

Fertiliser products - Current assessment - November (N Method: Incorporated)

Category Ravensdown cropping
Product Cropmaster DAP Boron plus

Amount kg/ha 250 Fertiliser products - Current assessment - December (N Method: Surface applied)

Category Ravensdown other

Product Urea Amount kg/ha 100

Effluent application

Receives no liquid or solid effluents

Block - Past>FBt (RO)

Past>FBt (RO) Block name Block type Crop Area 2.9 ha Cultivated area % of area 100 Headland area % of area 0 Other area % of area 0

Mark Crawford

Client reference:

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2_2 (2016/17)

FarmParameters



Distance from coast km Final grid month September Irrigation system type No Irrigation

Climate

Annual average rainfall mm/yr 1096 Mean annual temperature 10.1

Seasonal variation in rainfall 731-1450 mm, Low

Annual potential evapotranspiration 712 mm Seasonal variation in PET Moderate

Soil description

Soil order (default) Brown Soil group (default) Sedimentary

SMaps

Waiki 30a.1 Sibling Date downloaded Unknown

Wilting point 0 - 30cm 21 30 - 60cm 23 25 > 60 Field capacity 0 - 30cm 42 30 - 60cm 41

> 60 43 Saturation 0 - 30cm 59 30 - 60cm 52 49 > 60 Natural drainage class Well

Not entered Depth to impeded layer cm

Top soil horizon chemical and physical parameters

% ASC/PR 43 Bulk density 1090 kg/m³ % 28 Clay Sand % Sub soil

Sub soil clay

Soil profile Profile drainage class Use default Top soil texture Silt loam Maximum rooting depth m 0 Depth to impeded drainage layer 0

Soil drainage

Drainage method

Method None

Soil settings

K leaching potential not set

Soil tests

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

Crop block history

Years in pasture

Prior history Grazed pasture

Source of animal information

Animal source Farm stock - see Enterprise numbers panes

%

28

Pasture consumption by each class same as farm ratio

Crop information

Previous assesment year October - Grazed pasture

Mark Crawford

Client reference:

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2_2 (2016/17)

FarmParameters



Fertiliser or lime added See details below

November - Grazed pasture Fertiliser or lime added See details below

December - Grazed pasture

Fertiliser or lime added See details below

January - Grazed pasture Fertiliser or lime added See details below

February - Grazed pasture

Fertiliser or lime added See details below

March - Grazed pasture Fertiliser or lime added See details below

April - Grazed pasture

Fertiliser or lime added See details below

May - Grazed pasture Fertiliser or lime added See details below

June - Grazed pasture July - Grazed pasture August - Grazed pasture September - Grazed pasture

Current assessment year 2016/17

October - Fodder beets

Crop management See details below Crop sown

Fertiliser or lime added See details below

November - Fodder beets December - Fodder beets

Fertiliser or lime added See details below

January - Fodder beets February - Fodder beets March - Fodder beets

April - Mature - Fodder beets May - Mature - Fodder beets

June - Fodder beets

Crop management See details below Defoliation

July - Fodder beets Crop management See details below Defoliation

August - Fodder beets Crop management See details below Defoliation

September - Bare ground

Crop sowing information - October of the Current assessment year 2016/17

Crop category Fodder Crop type Fodder beets

Product yield T/ha dry matter 25

Cultivation practice at sowing Conventional

Defoliation information - June of the Current assessment year 2016/17

Defoliation method Grazed in-situ

Final harvest **False** Source of animal Farm stock - see Enterprise numbers panes

Percentage of crop eaten by animals

Dairy replacements 100 Crop grazed for hours/day Not entered

Defoliation information - July of the Current assessment year 2016/17

Defoliation method Grazed in-situ

Final harvest

Farm stock - see Enterprise numbers panes Source of animal

Percentage of crop eaten by animals

% 100 Dairy replacements Crop grazed for hours/day Not entered

Defoliation information - August of the Current assessment year 2016/17

Defoliation method Grazed in-situ

Final harvest

Mark Crawford

Client reference:

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2_2 (2016/17)

FarmParameters



Farm stock - see Enterprise numbers panes Source of animal Percentage of crop eaten by animals % Dairy replacements 100 Crop grazed for hours/day Not entered Fertiliser application Soluble fertiliser inputs (kg/ha/month) - Previous assessment - October (N Method: Surface applied) Sulphate S Na Urea N Super P K Ca Mg 18 n n n n n n Soluble fertiliser inputs (kg/ha/month) - Previous assessment - November (N Method: Surface applied) Super P Ca Na Urea N Sulphate S K Mg 18 n 0 0 0 0 0 Soluble fertiliser inputs (kg/ha/month) - Previous assessment - December (N Method: Surface applied) Mg Urea N Super P K Sulphate S Ca Na 0 0 0 0 18 Soluble fertiliser inputs (kg/ha/month) - Previous assessment - January (N Method: Surface applied) Urea N Super P Sulphate S Ca K Mg Na 18 n n n 0 Soluble fertiliser inputs (kg/ha/month) - Previous assessment - February (N Method: Surface applied) Urea N Super P K Sulphate S Ca Mg Na 18 0 0 0 Soluble fertiliser inputs (kg/ha/month) - Previous assessment - March (N Method: Surface applied) Urea N Super P Sulphate S Ca Mg Na 28 0 0 0 0 Soluble fertiliser inputs (kg/ha/month) - Previous assessment - April (N Method: Surface applied) Super P Mg Urea N K Sulphate S Ca Na 0 0 0 18 Soluble fertiliser inputs (kg/ha/month) - Previous assessment - May (N Method: Surface applied) Urea N Super P K Sulphate S Ca Mg Na 0 0 0 0 0 Fertiliser products - Current assessment - October (N Method: Incorporated) Category Ravensdown cropping Cropmaster 15 Product Amount kg/ha 250 Fertiliser products - Current assessment - October (N Method: Incorporated) Category Ravensdown other Potassium chloride Product 100 Amount Fertiliser products - Current assessment - December (N Method: Surface applied) Ravensdown other Category Urea Product Amount kg/ha 150 Effluent application Receives no liquid or solid effluents Block - FBt>WCCS (RO) Block name FBt>WCCS (RO) Block type Crop 2.9 Area ha Cultivated area % of area 100 Headland area % of area 0 Other area % of area 0 Distance from coast 25 km Final grid month September Irrigation system type No Irrigation Climate Annual average rainfall 1096 mm/vr Mean annual temperature 10.1 Seasonal variation in rainfall 731-1450 mm, Low Annual potential evapotranspiration 712 mm Seasonal variation in PET Moderate

Soil description

Mark Crawford

Client reference:

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2_2 (2016/17)

FarmParameters



Soil order (default)		Brown
Soil group (default)		Sedimentary
SMaps Sibling		Waiki 20a 1
Date downloaded		Waiki_30a.1 Unknown
Wilting point	0 - 30cm	21
······································	30 - 60cm	23
	> 60	25
Field capacity	0 - 30cm	42
	30 - 60cm	41
	> 60	43
Saturation	0 - 30cm	59
	30 - 60cm	52
N	> 60	49
Natural drainage class		Well
Depth to impeded layer Top soil horizon chemical and physical parameters	cm	Not entered
ASC/PR	%	43
Bulk density	kg/m³	1090
Clay	%	28
Sand	%	4
Sub soil		
Sub soil clay	%	28
Soil profile		
Profile drainage class		Use default
Top soil texture		Silt loam
Maximum rooting depth	m	0
Depth to impeded drainage layer		0
Soil drainage		
Drainage method		
Method		None
Soil settings		
K leaching potential not set		
Soil tests		
Anion storage capacity or phosphate retention		Not entered
TBK reserve K test		Not entered
K reserve status		Use default
Crop block history		
Years in pasture		9
Prior history		Grazed pasture
Source of animal information		
Animal source		Farm stock - see Enterprise numbers panes
Pasture consumption by each class same as farm ratio		

Crop information

Previous assesment year

October - Fodder beets

Crop management See details below Crop sown

Fertiliser or lime added See details below

November - Fodder beets December - Fodder beets

Fertiliser or lime added See details below

January - Fodder beets

February - Fodder beets

March - Fodder beets April - Mature - Fodder beets

May - Mature - Fodder beets

June - Fodder beets

Crop management See details below Defoliation

Mark Crawford

Client reference:

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2_2 (2016/17)

FarmParameters



July - Fodder beets

Crop management See details below Defoliation August - Fodder beets Crop management See details below Defoliation

September - Bare ground

Current assessment year 2016/17

October - Forage barley (spring)

Crop management See details below Crop sown

Fertiliser or lime added See details below

November - Forage barley (spring)

December - Forage barley (spring)

Fertiliser or lime added See details below

January - Forage barley (spring) February - Forage barley (spring)

Crop management See details below Defoliation March - Grazed

See details below Crop management Crop sown

April - Grazed May - Grazed June - Grazed July - Grazed August - Grazed

Fertiliser or lime added See details below

September - Grazed

Fertiliser or lime added See details below

Crop sowing information - October of the Previous assessment

Crop category Fodder Crop type Fodder beets

Product yield T/ha dry matter 25

Cultivation practice at sowing Conventional

Defoliation information - June of the Previous assessment

Defoliation method Grazed in-situ False

Final harvest Farm stock - see Enterprise numbers panes Source of animal

Percentage of crop eaten by animals

Dairy replacements % 100 Crop grazed for hours/day Not entered

Defoliation information - July of the Previous assessment

Defoliation method Grazed in-situ

Final harvest **False**

Source of animal Farm stock - see Enterprise numbers panes

Percentage of crop eaten by animals Dairy replacements % 100 Crop grazed for hours/day Not entered

Defoliation information - August of the Previous assessment

Defoliation method Grazed in-situ

Final harvest

Farm stock - see Enterprise numbers panes Source of animal

Percentage of crop eaten by animals

Dairy replacements % 100 Crop grazed for hours/day Not entered

Crop sowing information - October of the Current assessment year 2016/17

Crop category Forages

Crop type Forage barley (spring)

Yield at final defoliation T/ha dry matter 11

Cultivation practice at sowing Conventional

Defoliation information - February of the Current assessment year 2016/17

Defoliation method Cut and Carry

Mark Crawford

Client reference:

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2_2 (2016/17)

FarmParameters



Final harvest True
Destination of crop Exported

Crop sowing information - March of the Current assessment year 2016/17

Crop category Permanent pasture

Crop type Grazed

Source of animals Farm stock - see Enterprise numbers panes

Percentage of crop eaten by animals

Dairy % 20 Dairy replacements % 80

Fertiliser application

Fertiliser products - Previous assessment - October (N Method: None)

Category Ravensdown other Product Potassium chloride

Amount kg/ha 100

Fertiliser products - Previous assessment - October (N Method: Incorporated)

Category Ravensdown cropping Product Cropmaster 15

Amount kg/ha 250 Fertiliser products - Previous assessment - December (N Method: Surface applied)

Category Ravensdown other

Product Urea Amount kg/ha 150

Fertiliser products - Current assessment - October (N Method: Incorporated)

Category Ravensdown cropping

Product Cropmaster 15

Amount kg/ha 150 Fertiliser products - Current assessment - December (N Method: Surface applied)

Category Ravensdown other

Product Urea Amount kg/ha 150

Fertiliser products - Current assessment - August (N Method: Surface applied)

Category Ravensdown cropping

Product Ammo 36
Amount kg/ha 100
Fertiliser products - Current assessment - September (N Method: Surface applied)

Category Ravensdown other

Product Urea Amount kg/ha 60

Effluent application

Receives no liquid or solid effluents

Block - Past>FBt Lft (MP)

Past>FBt Lft (MP) Block name Block type Crop Area ha 9.5 Cultivated area 100 % of area Headland area % of area 0 % of area Other area 0 Distance from coast 25 km

Final grid month September Irrigation system type No Irrigation

Climate

Annual average rainfall mm/yr 1096 Mean annual temperature 10.1

Seasonal variation in rainfall 731-1450 mm, Low

Annual potential evapotranspiration mm 712
Seasonal variation in PET Moderate

Soil description

Soil order (default) Pallic

Soil group (default) Recent/YGE/BGE

Mark Crawford

Client reference:

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2_2 (2016/17)

FarmParameters



SMaps Sibling		Pukem_6a.1	
Date downloaded		Unknown	
Wilting point	0 - 30cm	22	
	30 - 60cm	25	
	> 60	1	
Field capacity	0 - 30cm	40	
, ,	30 - 60cm	41	
	> 60	2	
Saturation	0 - 30cm	54	
	30 - 60cm	48	
	> 60	3	
Natural drainage class		Poor	
Depth to impeded layer	cm	58	
Top soil horizon chemical and physical parameters	Citi	30	
ASC/PR	%	22	
Bulk density	kg/m³	1220	
Clay	%	28	
Sand	%	9	
Sub soil	70	3	
Sub soil clay	%	29	
Sub Soil Clay	70	29	
Soil profile			
Profile drainage class		Use default	
Top soil texture		Silt loam	
Maximum rooting depth	m	0.58	
Depth to impeded drainage layer	111	0.58	
Depth to impeded drainage layer		0.50	
Soil drainage			
Drainage method			
Method		None	
Soil settings			
K leaching potential not set			
Soil tests			

Crop block history

TBK reserve K test

K reserve status

Years in pasture 10

Prior history Grazed pasture

Source of animal information

May - Grazed pasture

Animal source Farm stock - see Enterprise numbers panes

Not entered

Not entered Use default

Pasture consumption by each class same as farm ratio

Anion storage capacity or phosphate retention

Crop information

Previous assesment year October - Grazed pasture Fertiliser or lime added See details below November - Grazed pasture Fertiliser or lime added See details below December - Grazed pasture Fertiliser or lime added See details below January - Grazed pasture Fertiliser or lime added See details below February - Grazed pasture Fertiliser or lime added See details below March - Grazed pasture Fertiliser or lime added See details below April - Grazed pasture Fertiliser or lime added See details below

Mark Crawford

Client reference:

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2_2 (2016/17)

FarmParameters



Fertiliser or li June - Grazed July - Grazed p August - Graze September - G	pasture asture d pasture			See details be	elow	
October - Fodd Crop manage Fertiliser or li November - Fo	er beets ment me added dder beets	5/17		See details be		Crop sown
December - For Fertiliser or li January - Fodd February - Fode March - Fodder April - Mature - May - Fodder b	me added er beets der beets · beets · Fodder beets	5		See details be	elow	
Crop manage June - Bare gro July - Bare gro August - Bare g September - Ba	ound und ground			See details be	elow	Defoliation
Crop sowing info Crop category Crop type	rmation - Oct	ober of the Cu		,		Fodder Fodder beets
Product yield Cultivation prac	ctice at sowin	g	٦	Г/ha dry matte	r	18 Conventional
Defoliation inform Defoliation met Final harvest Destination of o	thod	of the Current	assessment ye	ear 2016/17		Cut and Carry True Exported
Fertiliser applicat		na/month) - Pi	revious assess	ment - October	r (N M	lethod: Surface applied)
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
18	0	0	0	0	0	0
Urea N 18	Super P 0	1a/month) - Pi K O	Sulphate S	ment - Novemi Ca 0	ber (N Mg 0	l Method: Surface applied) Na 0
Soluble fertilise Urea N 18	er inputs (kg/l Super P 0	na/month) - Pi K 0	revious assess Sulphate S 0	ment - Deceml Ca 0	oer (N Mg 0	Method: Surface applied) Na 0
Soluble fertilise Urea N 18	er inputs (kg/l Super P	na/month) - Pi K	revious assess Sulphate S 0	ment - January Ca 0	(N M Mg	lethod: Surface applied) Na
Soluble fertilise			revious assess	ment - Februar		Method: Surface applied)
Urea N 18	Super P 0	K 0	Sulphate S 0	Ca 0	Mg 0	Na 0
Soluble fertilise				ment - March (thod: Surface applied)
Urea N 28	Super P 0	K 0	Sulphate S 0	Ca 0	Mg 0	Na 0
						od: Surface applied)
Urea N 18	Super P 0	K 0	Sulphate S 0	Ca 0	Mg 0	Na 0
Soluble fertilise		na/month) - Pi	revious assess	ment - May (N	Metho	od: Surface applied)
Urea N 9	Super P 0	K 0	Sulphate S 0	Ca 0	Mg 0	Na 0
Fertiliser produ	•	•	•	•	•	
Category Product						Ravensdown cropping Cropmaster 15
Amount				kg/ha		250
Fertiliser produ	cts - Current	assessment -	October (N Me	thod: Incorpor	ated)	

Mark Crawford

Client reference:

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2_2 (2016/17)

FarmParameters



Category Ravensdown other Product Potassium chloride

Amount kg/ha 100 Fertiliser products - Current assessment - December (N Method: Surface applied)

Category Ravensdown other

Product Urea Amount kg/ha 150

Effluent application

Receives no liquid or solid effluents

Block - FBt Lft>Past (MP)

Block name FBt Lft>Past (MP) Block type Crop 9.5 Area ha Cultivated area % of area 100 Headland area % of area 0 Other area % of area 0 Distance from coast km 25

Final grid month September
Irrigation system type No Irrigation

Climate

Annual average rainfall mm/yr 1096

Mean annual temperature 10.1

Seasonal variation in rainfall 731-1450 mm, Low Annual potential evapotranspiration mm 712

Seasonal variation in PET Moderate

Soil description

Soil order (default) Pallic

Soil group (default) Recent/YGE/BGE

SMaps

Sibling Pukem_6a.1
Date downloaded Unknown

Wilting point 0 - 30cm 22 30 - 60cm 25 > 60 1 Field capacity 0 - 30cm 40 30 - 60cm 41

30 - 60cm 41 > 60 2 Saturation 0 - 30cm 54 30 - 60cm 48 > 60 3

Natural drainage class Poor
Penth to impeded layer 58

Depth to impeded layer cm 58
Top soil horizon chemical and physical parameters

ASC/PR % 22
Bulk density kg/m³ 1220
Clay % 28
Sand % 9

Sub soil
Sub soil clay % 29

Soil profile

Profile drainage class
Use default
Top soil texture
Silt loam
Maximum rooting depth
m
0.58
Depth to impeded drainage layer
0.58

Soil drainage

Drainage method

Method None

Soil settings

Mark Crawford

Client reference:

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2_2 (2016/17)

FarmParameters



K leaching potential not set

Soil tests

Anion storage capacity or phosphate retention

TBK reserve K test

K reserve status

Not entered

Use default

Crop block history

Years in pasture 10

Prior history Grazed pasture

Source of animal information

Animal source Farm stock - see Enterprise numbers panes

Pasture consumption by each class same as farm ratio

Crop information

Previous assesment year

October - Fodder beets
Crop management
See details below
Crop sown

Fertiliser or lime added See details below

November - Fodder beets

December - Fodder beets

Fertiliser or lime added See details below

January - Fodder beets February - Fodder beets March - Fodder beets

April - Mature - Fodder beets

May - Fodder beets

Crop management See details below Defoliation

June - Bare ground July - Bare ground August - Bare ground September - Bare ground

Current assessment year 2016/17

October - Grazed

Crop management See details below Crop sown

Fertiliser or lime added See details below

November - Grazed
Fertiliser or lime added
See details below

December - Grazed

Fertiliser or lime added See details below

January - Grazed

Fertiliser or lime added See details below

February - Grazed

Fertiliser or lime added See details below

March - Grazed

Fertiliser or lime added See details below

April - Grazed

Fertiliser or lime added See details below

May - Grazed

Fertiliser or lime added See details below

June - Grazed July - Grazed August - Grazed

Fertiliser or lime added See details below

September - Grazed

Fertiliser or lime added See details below

Crop sowing information - October of the Previous assessment

Crop category Fodder
Crop type Fodder beets

Product yield T/ha dry matter 25

Cultivation practice at sowing Conventional

Mark Crawford

Client reference: Farm name: NB 2014 -17 Average DSN 31827 $\{Copy\}$ - copy 2_2 (2016/17)

FarmParameters



Defoliation infor Defoliation me	,	of the Previou	s assessment			Cut and Carry
Final harvest	Etilou					True
Destination of	crop					Exported
	·					
Crop sowing info		tober of the Cι	ırrent assessm	ent year 2016		Dayman and mark wa
Crop category Crop type						Permanent pasture Grazed
Source of anin	nals					Farm stock - see Enterprise numbers panes
Percentage of		animals				rum stock see Enterprise numbers punes
Dairy	,			%		95
Dairy replace	ements			%		5
Fortiliser applies	ation					
Fertiliser applica		s assessment ·	October (N M	lethod: None)		
Category	ucts Treviou	3 0336331116110	October (IV III	letilou. None)		Ravensdown other
Product						Potassium chloride
Amount				kg/ha		100
Fertiliser prod	ucts - Previou	s assessment ·	October (N M		orated))
Category						Ravensdown cropping
Product						Cropmaster 15
Amount				kg/ha		250
	ucts - Previou	s assessment -	- December (N	Method: Surf	ace app	
Category						Ravensdown other
Product Amount				kg/ha		Urea 150
	er innuts (ka)	ha/month) - C	urrent access		r (N Me	ethod: Surface applied)
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
18	0	0	0	0	0	0
	ser inputs (kg/	-	-		-	Method: Surface applied)
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
18	0	0	0	0	0	0
Fertiliser prod	ucts - Current	assessment -	December (N	Method: Surfa	ice app	lied)
Category						Ravensdown super
Product						Superphosphate
Amount				kg/ha	(1)	350
						Method: Surface applied)
Urea N	Super P 0	K	Sulphate S	Ca	Mg	Na O
18	•	(ha/manth) C	0	0	0 , (N Mo	thod: Surface applied)
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
18	0	0	0	0	0	0
	ser inputs (kg/				ry (N M	ethod: Surface applied)
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
18	0	0	0	0	0	0
Soluble fertilis	er inputs (kg/	'ha/month) - C	urrent assessr	nent - March ((N Meth	nod: Surface applied)
Urea N	•	K	•		Mg	Na
28	0	0	0	0	0	0
						d: Surface applied)
Urea N 18	Super P	K O	Sulphate S	Ca	Mg 0	Na n
	or inpute (ka)	0	U Urrent accecc	nent - May (N	•	d: Surface applied)
Urea N	Super P	K	Sulphate S	Ca	Mg	Na
9	0	0	0	0	0	0
-	ucts - Current	assessment -	August (N Met	thod: Surface	applied	
Category			3			Ravensdown cropping
Product						Ammo 36
Amount				kg/ha		100
	ucts - Current	assessment -	September (N	Method: Surfa	ace app	
Category						Ravensdown other
Product						Urea
Amount				kg/ha		60

Effluent application

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SOUTH DAIRY LTD - ALEXANDER D

Mark Crawford

Client reference:

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2_2 (2016/17)

FarmParameters



Receives no liquid or solid effluents



Farm Supplementary Scenario Plan Report No 2

Prepared by Mark Crawford
Senior Farm Environmental Consultant



Customer Name SOUTH DAIRY LTD
Customer Address C/- D ALEXANDER;

11 MCCONACHIE ROAD; RD 1; WINTON, 9781

Date 22/12/2017







Executive Summary

The purpose of this report is to outline the environmental loss risk indicators including N loss to the bottom of the root zone and P loss to second order streams for the proposed renewal/update of the property effluent discharge consent with more dairy cows on the property, but less winter cropping.

- The property is situated near Lochiel, 23.0 km North of Invercargill city and 25 km to the south west coast. It is of flat topography on a Pallic soil type, with some Brown soils. Climate data shows averages of 1096 mm rainfall, 10.1 degrees average temperature and 712 mm PET.
- The farm intends to seasonally peak milk 750 Jersey Friesian cross dairy cows (winter 780) at a stocking of 3.2 cows/ha producing 352,000 kg Milk solids or 1442 kg MS/ha. It is proposed this will be achieved with moderate Nitrogen inputs (186 kg N/ha/year) and imported supplements of 550 T DM (Dry Matter) or 2459 kg DM/ha/year.
- The Nitrogen loss modelled using Overseer Nutrient Budgets (6.2.3) for the proposed system is 34 kg N/ha/year or 8423 kg N/year. The current averaged (14/15 to 16/17 seasons at consented numbers) farm system loses are 47 kg N/ha/year or 11,682 kg N/year.
- It must be noted that the N loss is influenced by the high pastoral productivity calculated by OVERSEER
 which is greater than known measured values for the district. This will likely increase the risk of N
 losses to groundwater. Higher quality pastures, pasture utilisation and measurement variabilities may
 contribute to this discrepancy.
- P losses are also calculated as a low to moderate risk at 1.3 kg P/ha/year for the proposed farm system,
 no change from the current scenario. Risk is due largely to Overseer reported "other" losses. Mitigation
 with fencing of streams and lanes plus riparian planting will reduce this, as well as reduced effluent
 applications at low volumes on the shoulders of the season from storage, targeting non tiled areas in
 the later part of the season.
- The farm is in a zone with moderate (range low to high) risk to nitrate levels and the physiographic zones point to both artificial drains and overland flows, plus Nitrogen depositions from fertiliser and urine as being risk factors. The planned reduction in cropping, the farm effluent system and feed pad plus good management practices with critical source areas will help mitigate this risk.

Key influences on the property's' proposed N loss are the higher productivity (at moderate to high stocking rates); the soil types on this property, mostly heavier, poorer draining types which reduce losses through the root zone by having less drainage, with some high risk leaching soils and the reduction in cropping to winter cattle and the use of a feed pad for calving cattle on the property, allowing a high stocking rate over a period where drainage events are likely to occur. The planned feed pad and effluent system mitigations minimise the increase in N losses from the higher productivity and stocking rate.





Overseer nutrient budgets Version 6.2.3 has been used to create the nutrient budgets presented in this report.

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Important Points to Note

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Mark Crawford

Senior Farm Environmental Consultant

19/12/2016

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General

Aim and Purpose of Farm Scenario Plan

The purpose of this report is to provide a revised Nutrient Budget for the dairy unit for a renewal of the effluent discharge consent, with any associated changes to the effluent area and system to be included in the budget. The owners have requested this to ascertain the environmental nutrient loss indicators including N loss to the bottom of the root zone and P loss to second order streams, for the proposed farm system, including the impact of added cow numbers and a wintering pad, over the revised current farming system. This should be read in conjunction with report 123 which outlined the original budgets used.

Overseer modelling of the proposed system has been undertaken in accordance with the Overseer 6.2.3 "best practice data input standards" and has been reviewed by a certified nutrient management advisor.

The following report summarises the respective Overseer 6.2.3 nutrient budgets and key assumptions made.

Property Details

Location/address	11 McConnachie Road; Winton
Legal Description	Lot 2 & 3 Deposited Plan 377137 and Sections 48- 49, 51 -
	53 , Part Section 47 Block I Winton Hundred; Lot 1
	Deposited Plan 7035, Section 11 Block II Winton Hundred
	Run off Section 48 Block I and Part Section 25-26 Block I
	Winton Hundred and Section 2 Survey Office Plan 11951
Total area (ha)	249.2 ha with paper roads, less drain margins = 248.5 ha;
	stated 244 ha effective
Owners	South Dairy Ltd c/- Dean and Suzanne Alexander
Contact details	
Phone	Dean (03) 9738989 mobile (027) 4066878
Email	alexander.farms@vodafone.co.nz
Farm Type	Seasonal dairy Supply
Dairy supply number	31827

Proposed Farm System Analysis

Description of Proposed (Consent) Farm System

The 249.2 ha Seasonal supply dairy farm is situated at 373 O'Shannessy Road, Lochiel, 5.5 km North West to Winton Township and 23.0 km North of Invercargill city. It is estimated to be 25 km from the south west coast. It is of flat topography, with a number of drains and a small tributary of the Tussock Creek stream meandering through the property. It is predominantly a Pallic (201.1 ha) soil (Pukemutu soils_6a.1, silt loam over clays, poorly drained; Paraha soils 4a.1 aka Northope, silt loams, imperfectly drained), with Brown (41.53 ha) soils





(Waikiwi_30a.1 aka Edendale, silt loam, well drained and Aparima_2a.1 aka Waianiwa, silt loam over clay; imperfect drained); S Maps and Southland Topoclimate map series. (S Map data and soil table and maps, pages 9 & 10). A small area of Woodlands soil (0.001 ha) was not included and was termed non-productive. In addition there is a high proportion of artificial drains, with estimates over 80 % in some paddocks, so an estimate was made of a percentage of paddocks that contained tile drains, and these being 100 % tile and mole drained with the rest of paddocks blocked as non-tiled.

Effective farm area is approximately 244.0 ha for the current property (owner stated), with titled area at 248.7 ha. However, there are numerous drains and the GIS soil areas were calculated at 249.2 ha which was used as total area. There is included in this total area; 1.2 ha of riparian stream area, with the remaining 4.0 ha of non-productive area made up of houses, cow shed and yards, shelter belts plus laneways and drains. The average annual rainfall is 1096 mm, with evapotranspiration (PET) at 712 mm and average temperature at 10.1 degrees (OVERSEER Climate tool, NIWA dataset, Lat. 46.194000, Long. 168.350700).

For the proposed scenario season, changes made from original report are;

• 780 predominantly Friesian Jersey cross cows are calved (750 peak milked; 500 kg average live weight (LW)), mean calving 24th August, drying off 25th May, with cows never milked once a day. All cows are wintered off, with Replacement heifers (First calvers) calving first. The cows are brought back in mobs from a support block bi-weekly from the start of calving with an ability to feed on a concrete feed pad, combined with a standing off calving pad with sub surface drainage (100 to 200) prior to calving. The use of this pad will occur weather depending to effectively minimising pasture treading. The intent is to strip graze a small pastoral area otherwise over calving. Production is averaged at 352,000 kg milk solids (MS)/year, with 268 (default) day lactation. The replacements are grazed off from weaning (1st December) and not brought back to the milking platform until calving. Cow numbers are in table below;

Stock class	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
Total Milking cows	32	630	780	760	750	750	750	700	700	700	650	600

• Feed pad utilisation is as follows in table below with feed pad now inert rock (concrete), with sub surface drained and captured by farm effluent system; all other information remains the same.

Months	April	May	June	July	August	September	October
Dairy cows (%)	15	30	0	100	60	30	5
Hours per day on Pad	8.0	8.0	0	20.0	8.0	8.0	8.0





- The effluent system remains the same; however with information now stating effluent can be applied October to March and modelled as such.
- Supplements imported onto the property will be approximately 100 Tonnes (T) Dry Matter (DM) of Palm Kernel Extract (PKE) and 100 T DM Brewers grain fed on feed pad/calving pad complex along with 330 T DM Silage (good quality) which is also fed on the pads, with the PKE/Grain fed on trailers in the pad also. A further 92 T DM of baleage is made from paddocks (mainly effluent paddocks plus past run off area) on farm and stored and fed out. It is modelled as mostly all fed out, with 92 T DM stored and fed out on pastoral blocks, as the model would not accept any further supplement inputs for the feed pad, (80 T DM) in the following season. This amount is weather dependent.
- There is now 12 ha of fodder beet sown in November after cultivation, 25 T DM yield and lifted in August to be fed onto wintering feed pad. Sown with 250 kg/ha of Cropmaster 15, with further 1200 kg/ha of Urea in December.

Soil fertility is at the values selected by the most recent soil tests in 2015/16 within the various blocks as shown below.

		Phosphate	Potassium	Org. Sulphur	Magnesium
Figures used;	Effluent	38	10	15	29
	Effluent Solids	35	8	5	22
	Lease block	27 to 30	7 to 9	5 to 10	16 to 20
Optimal		20 - 30	5 - 7	Org S 15 - 20	8 - 10

Pastoral fertiliser is as per Owner's inputs and the current maintenance fertiliser plan. Effluent blocks receive Superphosphate and Lime applied in December (NPKS 0-32-0-38). Ammo 36 is applied in August at rates of 100 kg/ha (36 kg N/ha) and then Urea follows at rates of 40 kg/ha for October, December, February and April; 60 kg/ha for September and March. A further urea application is made in May at 40 kg/ha but only over half the block (9 kg N/ha). Solid effluent and Run off block (Lease) receive additional Nitrogen (Urea) applications to the above; at 40 kg/ha, made in January and November respectively, with maintenance applications being a higher rate of Superphosphate and Lime plus potassium (NPKS rating 0-42-25-51). This accumulates in a total applied Nitrogen figure (organic and inorganic) of 279 kg N/ha/year for the Solid Effluent blocks and 305 kg N/ha/year for the Travelling Irrigator (Liquid) Effluent areas respectively. This calculates to an average of 186 kg N/ha/year (fertiliser) across all blocks (however 210 kg N/ha and 174 kg N/ha in fertiliser for solid effluent and effluent areas respectively).



Proposed Farm System Information

Farm System - Dairy							
Herd Type/Breed	Fr X	Total Milk Solids (kg/year)	352,000				
Seasonal Supply	Seasonal	Winter milk	No				
Number of cows	780	Milk Solids (kg/cow)	451				
Stocking rate (cows/ha)	3.2	Milk Solids (kg/ha)	1442				
Other Information							
Winter off milking platform		Yes, a support block					
Stock grazed off (%)		100 % off over June and July, initially R 2 Heifers come back earlier in first week of August, last week of July modelled 32 cows for July					
Young stock reared off milki	ng platform	Yes from weaning	dry modelied 32 cows for July				
		100 T DM of PKE and 100 T DM brewers grain; 250 T DM Silage good					
Imported Feeds		quality, 100 T DM Silage all to Feed pad, plus 80 T DM Baleage from					
		storage onto pastoral blocks, total	storage onto pastoral blocks, total 550 T DM purchased				

		Proposed				
Cows	Av weight kg LW	500 kg LW				
	Median calving Date		, earlier for Heifers			
	Dry-Off date	25 th May				
	Peak Milk (1 Dec)	750 cows				
	Cow Numbers		No cows	In shed feeding (Y/N) No		
		Jul	32			
		Aug	630			
		Sept	780			
		Oct	760			
		Nov	750			
		Dec	750			
		Jan	700			
		Feb	700			
		Mar	700			
		650				
		May				
		Jun	0			
	Production kg/MS	352,000				
	Lactation length	268 days default				
	Once a day Milking (e.g half season, dry off, never)	Never				
	Calves fed milk powder (Y/N)	N				
Supplements Imported		Amount (T/DM)	Fed (e.g. paddock, shed, trou	igh, crop)		
	Good quality Silage	250 & 100	On paddocks and on feed page	d		
	Straw (Barley)					
	Other PKE and Brewers Grain	100 & 100	In paddocks in trailers			
Supplements Made		Amount (T/DM)	На	Fed or stored?		
	Baleage and Silage	92	0.3 to 0.9 T DM/ha cut from Effluent and Waikiwi Run off blocks	Fed mostly, 12 T DM left over		
Effluent	Type/system		tly from storage in pond via wed			
	Application Depth mm		tion < 10 mm main season, Sep			
Replacements	On/off farm when & what age	Off farm fro				



Proposed Land Management Unit details and Soil Information: Table 1

Block Name	Land Use	Block Type	Soil Order	Soil Texture	Drainage Class	Effective Area (ha)
Puke_6a.1 Effluent*	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	12.9
Puke_6a.1 Effluent Tile*	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	65.9
Puke_6a.1 Effluent Solid Lease*	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	39.5
Puke_6a.1 Effluent Solid Tile*	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	37.2
Puke_6a.1 Effluent Solid*	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	36.8
Riparian Areas	Riparian	Riparian				1.2
Waiki_30a.1 Eff Solids*	Dairy	Pastoral	Brown	Silt Loam	Well	17.9
Waiki_30a.1 Run Off*	Dairy	Pastoral	Brown	Silt Loam	Well	23.7
Parah_4a.1 Eff solids*	Dairy	Pastoral	Pallic	Silt Loam	Imperfect	2.7
Parah_4a.1 Run Off*	Dairy	Pastoral	Pallic	Silt Loam	Imperfect	2.9
Apar_2a.1 Eff solids Lease*	Dairy	Pastoral	Brown	Silt Loam over Clay	Imperfect	4.5
Fodder Beet	Dairy	Fodder crop	Various	Various	Various	(12.0)
Non productive	Non effective	Non productive				4.0
Whole Farm					Total	249.2

^{*} Areas fodder crop rotates through.

Current Land Management Unit details and Soil Information: Table 1 (b)

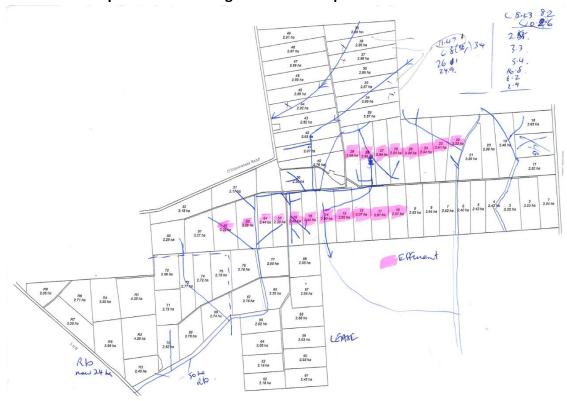
Block Name	Land Use	Block Type	Soil Order	Soil Texture	Drainage Class	Effective Area (ha)
Puke_6a.1 Effluent Tile*	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	49.1
Puke_6a.1 Non Effluent Lease*	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	35.6
Puke_6a.1 Non Effluent Tile*	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	43.8
Puke_6a.1 Non Effluent*	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	44.8
Riparian Areas	Riparian	Riparian				1.2
Waiki_30a.1 Non Effluent	Dairy	Pastoral	Brown	Silt Loam	Well	17.9
Waiki_30a.1 Run Off	Dairy	Pastoral	Brown	Silt Loam	Well	17.9
Parah_4a.1 Non Effluent	Dairy	Pastoral	Pallic	Silt Loam	Imperfect	2.7
Parah_4a.1 Run Off	Dairy	Pastoral	Pallic	Silt Loam	Imperfect	2.9
Apar_2a.1 Non Effluent Lease	Dairy	Pastoral	Brown	Silt Loam over Clay	Imperfect	4.5
Swedes	Dairy	Fodder Crop	Various	Various		(6.6)
Pasture to FBt Lift MP	Dairy	Crop	Pallic	Silt Loam over Clay	Poor	9.5
FBt Lift to Past (MP)	Dairy	Crop	Pallic	Silt Loam over Clay	Poor	9.5
Pasture to FBt RO	Dairy	Crop	Brown	Silt Loam	Well	2.9
FBt/Barley RO	Dairy	Crop	Brown	Silt Loam	Well	2.9
Non productive	Non effective	Non productive				4.0
Whole Farm					Total	249.2

^{*} Fodder crop rotates through these blocks

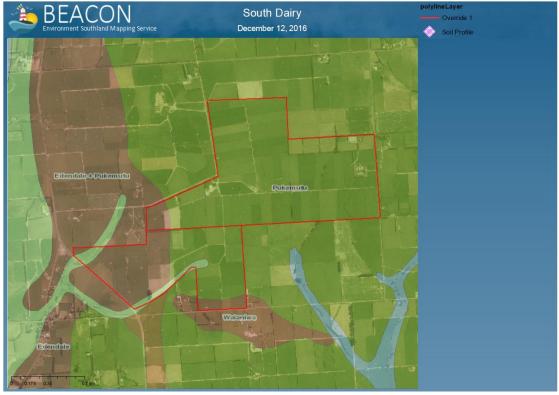




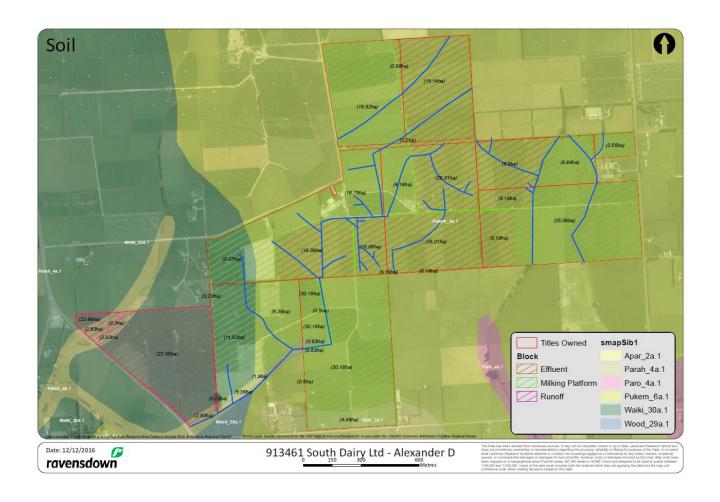
Current and Proposed Land Management Unit Maps



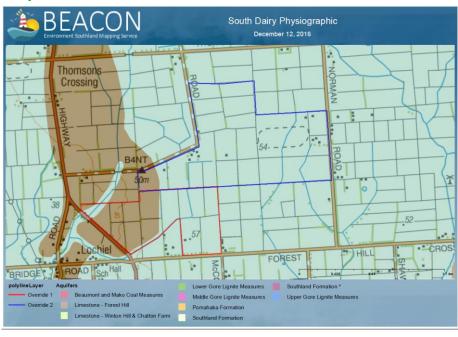
Farm Map (above) and Soil types as per Topoclimate Southland (Beacon maps) and S Maps below







Map of Nutrient Allocation Zone



Southland Physiographic Zones (Gleyed and Oxidising) as per Environment Southland Beacon Map







Water Quality Map from ES Beacon map with Yellow line delineating between lower Oreti and Makarewa Catchments and the boundary between the pristine pre European and minor to moderate plus moderate to high Land use impact zones for Nitrate levels. See The Extent of Nitrate in Southland Groundwater's Technical Report or visit http://www.es.govt.nz/environment/water/groundwater/reporting/





Current Farm System Analysis (Average Years 2014/15 to 2016/17)

Description of Current Farm System as above

Changes from the farm system described in Farm Scenario plan Report 123 are as follows, with all other input data remaining the same unless stated otherwise;

- Total area remains the same and the effluent area is still 54.5 ha (53 ha owner stated), with only 5 days storage from the pond, so modelled spray from sump.
- Run off area of 26.6 ha is no longer cut for silage; area is reduced by crop area of 5.6 ha, in which a crop rotation of pasture to fodder beet to whole crop cereal silage is modelled to equate to areas of grazed fodder beet for replacements grazed over winter and cereal silage harvested. Dairy replacements (164) grazed on the run off from weaning till June when reduced to in calf heifer numbers (112) and graze on farm and crop until they calve as in calf heifer replacements. The dairy cows graze to the equivalent of 15 % of the pastoral production off this area, and the dry cows at 5 % over the August September period. The rest of the time it is grazed with the replacement stock and cut for silage.
- Crop areas reflect both grazing of swedes and fodder beet for replacements and dry cows coming back to the platform prior to calving, plus an area of fodder beet which is primarily lifted for dairy cows. Areas are 2.9 ha of fodder beet grazed June to August by replacement heifers, conventionally cultivated and sown October, which is then sown into Forage barley for cereal silage, sown October and harvested February before being re sown into pasture in March. An area of 9.5 ha of fodder beet is sown in October and lifted before being sown into pasture on the milking platform, and finally a 6.6 ha fodder4 crop of swedes, rotating around the milking platform and the Pukemutu leased are is sown and used by dry cows and dairy cows prior to calving.
- Supplements imported are 80 T DM of PKE (increased from 65 T averaged), with 205 T DM of good quality silage imported as well for dairy cows (increased from 141 T DM); 110 T DM of baleage imported and fed evenly across pastoral blocks (50%) and 50 % to the swede and fodder beet crops, with 180 T DM of fodder beet and 25 T DM of cereal silage imported back in from crops that are harvested off the run off and the platform areas and fed mainly to dairy cows plus dry cattle (10 T DM fodder beet). A further 53 T DM of fodder beet was imported from off farm and fed evenly across pastoral blocks.
- There is no feed pad or calving pad at present
- The herd is 625 cows calved and 599 peak milked (consented numbers), with 275,000 kg Milk solids at a slightly heavier LW of 520 kg, given that with the proposed consent scenario, it is expected that the farmer would breed for lighter cows (500 kg LW).





 No cows are wintered on. Dry cows are to reconcile between consented milking numbers and calved cow numbers. Stock numbers are described in table below;

Stock class	End LW	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
	(kg)												
Milking cows	520	0	0	438	599	599	599	599	589	589	589	589	540
R 1 Heifer	230							164	164	164	164	164	164
R 2 Heifers	480	164	112	112	112	112	112	112	112	112	112	112	112
R 2 Heifers	480	112											
Dry cows)	520		162	26									

• Nitrogen rates are as follows, which are the same as the proposed, with maintenance fertiliser the same;

Nitrogen rate (kg/ha) and Month	Effluent (kg N/ha)	Non Effluent (kg N/ha) and Run off
Ammo 36 @ 100 - August	36	36
Urea @ 60 - September	28	28
Urea + Se @ 40 - October	18	18
Urea @ 40 - November		18
Urea @ 40 - December	18	18
Urea @ 40 - January		18
Urea @ 40 - February	18	18
Urea @ 60 - March	28	28
Urea @ 40 - April	18	18
Urea @ 40 – May (50 % farm)	9	9
Total	174	210

• Leased and Run off areas harvested for supplement;

Made from which Block	Туре	Amount (T/DM)	Destination (fed within same 12 month period, sold, stored)	Where fed?	Month Fed	Fed to which stock
Puke_6a.1 Non Eff Lease; Run off and Apar_2a.1 Lease	Baleage & Silage	30 & 44	Fed 25 T DM to replacements and 49 T DM to dairy cows	Pastoral	Evenly spread	Replacements and Milking cows



Summary of Proposed and Averaged (1/15 to 16/17) Farm System Scenario: Table 2

	Consent scenario (Proposed)	Current System
System Type	Seasonal dairy Supply	Seasonal dairy Supply
Total Area (ha)	249.2	249.2
Effluent area (ha)	121.0 ha liquid and solid effluent; 96.4 ha solid effluent only; in a moving block around the total farm	54.5 ha receiving liquid and sludge (
Stocking rate (s.u/ha)	6,999 s.u* or 28.6 s.u/ha effective or 3.2 cows/ha	6,722 s.u or 27.5 s.u/ha effective or 2.5 cows/ha
N use (kg N/ha/year)	186	190
Production (kg MS/ha)	1442	1127
Supplements (kg DM/ha/year)	550 T DM or 2254	448 T DM or 1836
Wintering system	Off farm	Off farm and crop
Pasture production(kg DM/ha/year)**		
- Platform Pastures	15857	16104
- Support pastures	n/a	18986

^{*} As calculated by OVERSEER ** As calculated by OVERSEER with standard default and ME values which are likely to be lower than Southland values.

Summary of Whole Farm Nutrient Loss Indicators: Table 3

	Consent Scenario	Current System
System Type	Seasonal Dairy Supply	Seasonal Dairy Supply
Nitrogen leaching loss to water (Total kg N)	8,423	11,682
Nitrogen leaching loss to water (kg N/ha)	34	47
Phosphorus runoff to water (Total kg P)	333	331
Phosphorus runoff to water (kg P/ha)	1.3	1.3
Nitrogen conversion efficiency %	30	29
(N in products / N inputs)		
Nitrous oxide (N₂O) (kg N/ha)	74.1	82.8



Discussion on Whole Farm Nutrient Loss Indicators

The overall N loss for the proposed farm operation is 34 kg N/ha/year or 8,423 kg N total, as seen in the above Table 3 page 15. The overall N loss for the proposed farm is due mainly to the high production per ha (1442 kg MS/ha) at a higher stocking rate of 3.2 cows/ha platform (cf. to 2.73. NZ Southland Dairy statistics 2015-16) with 2254 kg DM/ha of supplement used, and consequently the high pasture production required at 15857 kg DM/ha/year as seen in table 2, page 15 above. The current farm system modelled has a 47 kg N/ha/year Nitrogen loss, with total yearly losses at 11,682 kg/year, similar to the modelled farm system with crops prior.

A note needs to be made regarding the estimated pasture production (15.9 T DM/ha/year) when farmer and advisory experience would point to measured production at an average of 13.5 to 14.5 T DM/ha/year (Woodlands long term average pasture production is 13401 kg DM/ha/year)). Higher pasture quality (ME value), pasture utilisation and variance in plate meter measurements will all influence the discrepancy, and thus the model in using default criteria is perhaps overstating the N loss because of this. It is this pastoral production and the added Nitrogen which are contributing to the N loss, countered by the feed pad and the effluent storage.

The N loss for the proposal ranges from 3 kg N/ha/year for the Riparian areas to 69 kg N/ha/year for the Fodder beet fodder crop block; with dairy pastures ranging between 29 and 39 kg N/ha/year. (Block Nitrogen report, pages 20 and 23).

The key factors determining these losses and the difference between the two systems modelled are:

- Crop blocks have the highest losses per ha; ranging from 41 to 172 kg N/ha/year plus these crop blocks contribute a total of 3612 kg Nitrogen/year or 31 % of total losses of 11,682 yet only occupying 12.6 % of the land area. In the proposal these figures are only 10 % of the total losses and 5 % of the total area. The reduced area and no wintering of cattle on crop has reduced the N losses on this property.
- Effluent disposal has a part to play in reducing risk. It has been modelled that the effluent in the proposal from the travelling irrigator is irrigated over the October to March period. Deferred irrigation over the higher rainfall periods of May and August would reduce the risk of N losses. The average N applied from liquid effluent is 158 kg N/ha/year from the current area, and 63 kg N/ha/year with the increased area and deferred irrigation (proposal). Additional Nitrogen however is applied with the solids, meaning little difference in total organic and inorganic Nitrogen applied per year (305 kg N/ha/year compared to 332 kg N/ha/year for the proposed and current scenarios) (see Effluent reports pages 21 and 24). This effective spreading of effluent nutrients over the whole farm is due to the separation of solid effluent and the ability to store and defer irrigation.



• The higher the pastoral productivity from dairy land and the associated higher stocking, the higher the risk of N losses on dairy farms, especially under the climatic rainfall and evapotranspiration rates for Southland. The heavier poor draining pallic soils lose less N/ha/year when compared to freer draining Brown soils, with the average/ha losses being 28 kg N/ha/year for the effluent solid Pukemutu pastoral blocks, whilst the Aparima and Waikiwi effluent solid pastoral blocks lose 36 and 37 kg N/ha/year on average respectively. The heavier pallic soils act as a form of mitigation as their N losses are lower due to denitrification and their higher water holding capacity also means a lower risk of leaching Nitrogen. They do however lose nutrients through sediment flows over land when they become water logged and they are typically artificially drained which acts as a conduit for these nutrients into the water ways.

The riparian blocks and non-productive areas offset these N losses to an extent.

The other environmental risk indices are the proposed P losses to surface water at 1.3 kg P/ha/year, no different to the current scenario of 1.3 kg N/ha/year, and Nitrous oxide gaseous losses are reduced from 82.8 kg N/ha/year to 76.3 kg N/ha/year, as seen in the Phosphate and Nitrogen reports pages 19, 20 and 22, 23. The high nitrous oxide loses are due to the heavier pallic soils, but with less cropping losses are reduced from the current scenario. The P risk is mostly influenced by losses from "other" sources (121 kg or 37 % of total of 333 kg, refer Phosphorous block report, pages 19 and 22) which is run off from tracks and yards into drains and ditches from the farm. Riparian strip planting and vegetation buffer zones can reduce this. The other major losses are from the heavier Pallic soils under effluent applications with tile drains (direct flow). Effluent storage and low volume applications (which is in place) will help to mitigate this risk, as is good fertility management to minimise P soil losses.

Please see information contained in the Appendices for detail relating to nutrient budgets, nitrogen block reports, phosphorus block reports and estimated pasture production for the current situation and scenario modelled.

OVERSEER v6.2 has a new irrigation module to better reflect the management practices of irrigators. The Best Practice Data Input Standards give some guidance on what is now required. The model requires more information from users about their irrigation system and how water application decisions are made on farm. The extra data needed includes depth of water per application; return time and depending on how soil water is monitored what are the trigger points and targets (mm deficit). Ideally, this data needs to be actual long term average data as OVERSEER uses 30 year average climate data. Best estimates of these data will generally generate more drainage, and hence N loss to water, than has been the case with previous OVERSEER versions.

OVERSEER is a continually developing model with several aspects currently being investigated. In particular there are on-going issues in relation to the modelled nitrogen leaching from grazed crop blocks (and possibly forage



blocks also) being less than expected. (Please see www.overseer.org.nz/OVERSEERModel/bugs.aspx for more detail).

When future versions of OVERSEER are stipulated for use associated with Regional Council rules both the current and the proposed farm systems will need to be re-modelled for consistency as the base N lost from the root zone may alter with updated OVERSEER versions.





Appendices

Proposed Farm System

Proposed farm System Whole Farm Nutrient Budget

SOUTH DAIRY LTD - ALEXANDER D

Mark Crawford

Client reference: 913461

Farm name: NB 2016 -17 Consent DSN 31827 (Copy) - UPDATED (2016)

Farm Nutrient Budget - Whole farm

	N	P	K	S	Ca	Mg	Na
		(kg/ha/yr)					
Nutrients added							
Fertiliser, lime & other	186	35	13	52	233	0	0
Rain/clover N fixation	96	0	3	5	3	7	33
Irrigation	0	0	0	0	0	0	0
Supplements imported	62	8	38	6	8	4	3
Nutrients removed							
As products	96	16	23	5	21	2	7
Exported effluent	0	0	0	0	0	0	0
As supplements	0	0	0	0	0	0	0
To atmospheric	139	0	0	0	0	0	0
To water	34	1.3	15	76	54	6	21
Change in internal pools							
Plant material	-6	-1	-6	0	-1	-1	0
Organic pool	77	15	-21	-18	-1	-1	-6
Inorganic mineral	0	1	-19	0	-2	-3	-4
Inorganic soil pool	4	10	61	Ō	172	8	19

Proposed farm System Nutrient Loss Indicators

P report

Block P

SOUTH DAIRY LTD - ALEXANDER D

Mark Crawford

Client reference: 913461

Farm name: NB 2016 -17 Consent DSN 31827 (Copy) - UPDATED (2016)

Block Phosphorus

Block name	Total P lost	P lost			P loss categories	
	(kg P/yr)	(kg P/ha/yr)	Soil	Fertiliser	Effluent	
Puke_6a.1 Effluent ##	37	1	Medium	Medium	Low	
Puke_6a.1 Effluent Tile ##	82	1	Medium	Low	Low	
Puke_6a.1 Effluent Solid Lease ##	34	0.9	Medium	Medium	Low	
Puke_6a.1 Effluent SolidTile ##	19	1	Medium	Medium	Low	
Puke_6a.1Effluent Solid ##	12	1	Medium	Medium	Low	
Riparian Areas	0	0.1	n/a	n/a	n/a	
Waiki_30a.1 Eff Solids ##	3	0.2	Low	Low	Low	
Waiki_30a.1 Run Off ##	4	0.2	Low	Low	Low	
Parah_4a.1 Eff solids ##	2	0.7	Low	Medium	Low	
Parah_4a.1 Run Off ##	2	0.6	Low	Medium	Low	
Apar_2a.1 Eff solids Lease ##	1	0.2	Low	Low	Low	
Fodder Beet	16	1.4	n/a	n/a	n/a	
Other farm sources	122					
Whole farm	333	1.3				

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





N report

Farm N

SOUTH DAIRY LTD - ALEXANDER D

Mark Crawford

Client reference: 913461

Farm name: NB 2016 -17 Consent DSN 31827 (Copy) - UPDATED (2016)

Farm Nitrogen

	Units	Benchmark farm	Current farm
Inputs (farm average)			
Clover N	kg N/ha/yr		94
Fertiliser N	kg N/ha/yr		186
Other N added	kg N/ha/yr		64
Indices			
Average N loss to water	kg N/ha/yr	24-42	34
includes N lost as effluent	kg N/ha/yr		0
N ₂ O emissions	kg N/ha/yr		74.1
For pastoral area of farm:			
Farm N surplus	kg N/ha/yr	123-191	242
N conversion efficiency	%	27-35	30

Block N

SOUTH DAIRY LTD - ALEXANDER D

Mark Crawford

Client reference: 913461

Farm name: NB 2016 -17 Consent DSN 31827 (Copy) - UPDATED (2016)

Block Nitrogen

Block name	Total N lost (kg N/yr)	N lost to water (kg N/ha/yr)	N in drainage * (ppm)	N surplus (kg N/ha/yr)	Added N ** (kg N/ha/yr)
Puke_6a.1 Effluent ##	1083	31	6.8	281	327
Puke_6a.1 Effluent Tile ##	2454	31	6.7	277	327
Puke_6a.1 Effluent Solid Lease ##	1006	27	6.0	243	292
Puke_6a.1 Effluent SolidTile ##	500	27	6.1	243	292
Puke_6a.1Effluent Solid ##	316	27	6.0	243	292
Riparian Areas	4	3	N/A		
Waiki_30a.1 Eff Solids ##	613	36	8.2	238	320
Waiki_30a.1 Run Off ##	719	32	7.3	220	292
Parah_4a.1 Eff solids ##	74	28	6.1	249	292
Parah_4a.1 Run Off ##	79	28	6.1	249	292
Apar_2a.1 Eff solids Lease ##	150	35	7.9	231	292
Fodder Beet	823	69	12.5	-336	112
Other farm sources	602				
Whole farm	8423	34			
Less N removed in wetlands	0				
Farm output	8423	34			

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

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

^{##} Has a fodder crop rotating though, results for pastoral block component only



^{**} Sum of fertiliser and external factory effluent inputs.



Proposed System Pasture Production and Other Values/Effluent Report

SOUTH DAIRY LTD - ALEXANDER D

lark Crawford

Client reference: 913461

Farm name: NB 2016 -17 Consent DSN 31827 (Copy) - UPDATED (2016)

Block Pasture

Block name	On-farm fresh pasture intake (kg DM/ha/yr)	Estimated utilisation (%)	Supplements removed (kg DM/ha/yr)	Pasture growth (kg DM/ha/yr)
Puke_6a.1 Effluent	13191	85	338	15857
Puke_6a.1 Effluent Tile	12837	85	754	15857
Puke_6a.1 Effluent Solid Lease	13478	85	0	15857
Puke_6a.1 Effluent SolidTile	13478	85	0	15857
Puke_6a.1Effluent Solid	13478	85	0	15857
Riparian Areas	0	0	0	0
Waiki_30a.1 Eff Solids	13478	85	0	15857
Waiki_30a.1 Run Off	12723	85	889	15857
Parah_4a.1 Eff solids	13478	85	0	15857
Parah_4a.1 Run Off	13478	85	0	15857
Apar_2a.1 Eff solids Lease	13478	85	0	15857
Fodder Beet	0	0	0	0

This report gives an estimated animal intake for each block based on animal production and supplements brought on to farm information supplied. Estimated annual pasture growth is shown for the animal utilisation value shown. Note: the model is not sensitive to changes in utilisation.

It is recommended that a consultant or software such as StockPol is used to estimate farm pasture production.

SOUTH DAIRY LTD - ALEXANDER D

Mark Crawford

Client reference: 913461

Farm name: NB 2016 -17 Consent DSN 31827 (Copy) - UPDATED (2016)

Other values for farm - NB 2016 -17 Consent

Milking herd size (peak cows/ha grazed)	3.2
Milk solids (kg/ha grazed)	1442
Milk production per cow (kg milk solids / cow)	451.3
Default calving data	06 August
Total liveweight brought (kg/ha grazed)	323
Total liveweight reared (kg/ha grazed)	64
Total liveweight sold (kg/ha grazed)	367
\$ on fertiliser per kg milk solids	\$0.34
\$ on fertiliser per ha	\$482.58
GHG: Allocation to milk	0.89
Dairy stock rate (RSU)	6999
Dairy replacements stock rate (RSU)	0

SOUTH DAIRY LTD - ALEXANDER D Mark Crawford

Client reference: 913461

Farm name: NB 2016 -17 Consent DSN 31827 (Copy) - UPDATED (2016)

Effluent Report

	Units	Current farm
Current effluent area		
Area of effluent blocks	ha	115
% of pastoral farm area	%	50
Area of farm to apply effluent to achieve rates of:		
150 kg N/ha/yr	ha	181
Maintenance K	ha	0
100 kg K/ha/yr	ha	288
Source of N applied to effluent blocks		
Average of N applied to effluent blocks	kg N/ha/yr	72
Effluent from farm dairy	%	42
Effluent from wintering pad	%	58
Effluent from feed pad	%	0
Average fertiliser N	kg N/ha/yr	174
Average other elements	kg N/ha/yr	81

Proposed System Parameter Report

As attached in separate pdf format





Current Farm System (2014/15 to 2016/17 average) Current farm System Whole Farm Nutrient Budget

SOUTH DAIRY LTD - ALEXANDER D Mark Crawford

Client reference: 913461

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2 (2016/17)

Farm Nutrient Budget - Whole farm

	N	Р	K	S	Ca	Mg	Na
		(kg/ha/yr)					
Nutrients added							
Fertiliser, lime & other	190	32	7	46	195	0	0
Rain/clover N fixation	93	0	3	5	3	7	33
Irrigation	0	0	0	0	0	0	0
Supplements imported	53	7	44	6	7	3	4
Nutrients removed							
As products	84	15	19	5	21	2	5
Exported effluent	0	0	0	0	0	0	0
As exported defoliation	14	3	16	4	11	2	8
To atmospheric	129	0	0	0	0	0	0
To water	47	1.3	13	57	64	7	21
Change in internal pools							
Plant material	-4	-1	-5	0	0	0	0
Organic pool	56	12	3	-9	0	0	0
Inorganic mineral	0	1	-27	0	-2	-3	-4
Inorganic soil pool	12	8	35	0	111	3	6

Current farm System Nutrient Loss Indicators

P report

Block P

SOUTH DAIRY LTD - ALEXANDER D

Mark Crawford

Client reference: 913461

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2 (2016/17)

Block Phosphorus

Block name	Total P lost			P loss categories			
	(kg P/yr)	(kg P/ha/yr)	Soil	Fertiliser	Effluent		
Puke_6a.1 Effluent Tile ##	72	1.5	Medium	Low	Extreme		
Puke_6a.1 Non Eff Lease ##	30	0.9	Medium	Medium	n/a		
Puke_6a.1 Non Eff Tile ##	40	1	Medium	Low	n/a		
Puke_6a.1 Non Effluent ##	41	0.9	Medium	Medium	n/a		
Riparian Areas	0	0.1	n/a	n/a	n/a		
Waiki_30a.1 Non Eff	3	0.2	Low	Low	n/a		
Waiki_30a.1 Run Off	3	0.2	Low	Low	n/a		
Parah_4a.1 Non Effluent	2	0.6	Low	Low	n/a		
Parah_4a.1 Run Off	2	0.6	Low	Low	n/a		
Apar_2a.1 Non Eff Lease	1	0.2	Low	Low	n/a		
Swedes (MP)	10	1.5	n/a	n/a	n/a		
Past>FBt (RO)	1	0.4	n/a	n/a	n/a		
FBt>WCCS (RO)	1	0.2	n/a	n/a	n/a		
Past>FBt Lft (MP)	13	1.4	n/a	n/a	n/a		
FBt Lft>Past (MP)	7	0.8	n/a	n/a	n/a		
Other farm sources	105						
Whole farm	331	1.3					

^{##} Has a fodder crop rotating though, results for pastoral block component only





N report

Farm N

SOUTH DAIRY LTD - ALEXANDER D

Mark Crawford

Client reference: 913461

Farm name: NB 2014 -17 Average DSN 31827 (Copy) - copy 2 (2016/17)

Farm Nitrogen

	Units	Benchmark farm	Current farm
Inputs (farm average)			
Clover N	kg N/ha/yr		91
Fertiliser N	kg N/ha/yr		190
Other N added	kg N/ha/yr		55
Indices			
Average N loss to water	kg N/ha/yr	24-42	47
includes N lost as effluent	kg N/ha/yr		0
N ₂ O emissions	kg N/ha/yr		82.8
For pastoral area of farm:			
Farm N surplus	kg N/ha/yr	123-191	239
N conversion efficiency	%	27-35	29

Block N

Client reference: 913461 Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2 (2016/17)

Block Nitrogen

Block name	Total N lost (kg N/yr)	N lost to water (kg N/ha/yr)	N in drainage * (ppm)	N surplus (kg N/ha/yr)	Added N ** (kg N/ha/yr)
Puke_6a.1 Effluent Tile ##	2237	47	9.5	330	332
Puke_6a.1 Non Eff Lease ##	954	28	6.2	214	210
Puke_6a.1 Non Eff Tile ##	1262	30	6.7	229	210
Puke_6a.1 Non Effluent ##	1269	29	6.6	230	210
Riparian Areas	4	3	N/A		
Waiki_30a.1 Non Eff	661	37	8.4	213	210
Waiki_30a.1 Run Off	931	52	11.9	292	210
Parah_4a.1 Non Effluent	87	32	6.9	237	210
Parah_4a.1 Run Off	71	24	5.2	312	210
Apar_2a.1 Non Eff Lease	165	37	8.4	197	210
Swedes (MP)	668	101	18.7	99	87
Past>FBt (RO)	427	147	30.2	130	106
FBt>WCCS (RO)	500	172	31.3	12	155
Past>FBt Lft (MP)	1623	171	32.4	-215	106
FBt Lft>Past (MP)	394	41	8.8	137	208
Other farm sources	431				
Whole farm	11682	47			
Less N removed in wetlands	0				
Farm output	11682	47			
	I				

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

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

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



^{**} Sum of fertiliser and external factory effluent inputs.



Current System Pasture Production and Other Values/Effluent Report

Client reference: 913461 Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2 (2016/17)

Block Pasture

Block name	On-farm fresh pasture intake (kg DM/ha/yr)	Estimated utilisation (%)	Supplements removed (kg DM/ha/yr)	Pasture growth (kg DM/ha/yr)
Puke_6a.1 Effluent Tile	13688	85	0	16104
Puke_6a.1 Non Eff Lease	12642	85	1228	16101
Puke_6a.1 Non Eff Tile	13688	85	0	16104
Puke_6a.1 Non Effluent	13688	85	0	16104
Riparian Areas	0	0	0	0
Waiki_30a.1 Non Eff	13688	85	0	16104
Waiki_30a.1 Run Off	13582	76	1173	18986
Parah_4a.1 Non Effluent	13688	85	0	16104
Parah_4a.1 Run Off	13428	76	1379	18990
Apar_2a.1 Non Eff Lease	12363	85	1556	16100
Swedes (MP)	0	0	0	0
Past>FBt (RO)	0	0	0	0
FBt>WCCS (RO)	2691	77	0	3495
Past>FBt Lft (MP)	0	0	0	0
FBt Lft>Past (MP)	12813	84	0	15163

This report gives an estimated animal intake for each block based on animal production and supplements brought on to farm information supplied. Estimated annual pasture growth is shown for the animal utilisation value shown. Note: the model is not sensitive to changes in utilisation.

It is recommended that a consultant or software such as StockPol is used to estimate farm pasture production.

Client reference: 913461

Farm name: NB 2014 -17 Average DSN 31827 (Copy) - copy 2 (2016/17)

Other values for farm - NB 2014 -17 Average

Milking herd size (peak cows/ha grazed)	2.7
Milk solids (kg/ha grazed)	1255
Milk production per cow (kg milk solids / cow)	459.1
Default calving data	06 Augus
Total liveweight brought (kg/ha grazed)	54
Total liveweight reared (kg/ha grazed)	236
Total liveweight sold (kg/ha grazed)	791
\$ on fertiliser per kg milk solids	\$0.37
\$ on fertiliser per ha	\$453.06
GHG: Allocation to milk	0.86
Dairy stock rate (RSU)	5842
Dairy replacements stock rate (RSU)	800
Beef / dairy grazing stock rate (RSU)	80

SOUTH DAIRY LTD - ALEXANDER D

Mark Crawford

Client reference: 913461

Farm name: NB 2014 -17 Average DSN 31827 {Copy} - copy 2 (2016/17)

Effluent Report

	Units	Current farm
Current effluent area		
Area of effluent blocks	ha	47
% of pastoral farm area	%	22
Area of farm to apply effluent to achieve rates of:		
150 kg N/ha/yr	ha	50
Maintenance K	ha	0
100 kg K/ha/yr	ha	61
Source of N applied to effluent blocks		
Average of N applied to effluent blocks	kg N/ha/yr	158
Effluent from farm dairy	%	100
Effluent from wintering pad	%	0
Effluent from feed pad	%	0
Average fertiliser N	kg N/ha/yr	174
Average other elements	kg N/ha/yr	0

Current System Parameter Report

On request in separate pdf format

