Proposed Overseer Dairy Platform Report

SOUTH DAIRY LTD - ALEXANDER D Mark Crawford

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

FarmParameters

Farm details

Type	Farm type	Full range
Assessment	Assessment year	2016
Region	Region	Southland

Farm blocks

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	352000
Milk volume yield	l/yr	Not entered
Fat yield	kg/yr	Not entered
Lactation length	days	Not entered
Average weight	kg/animal	Not entered
Calving times		
Median calving date		24 August
Drying off		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)	LW end (kg)	CW (kg)	Age (months)	Source	Fate	Sex	Mated
500	0	0	0	0			Female	

Stock management

Dairy - Wintering pad, animal shelter or housing - Dairy

Construction

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

Relative productivity assessment method: No difference between blocks

All blocks have a relative productivity value of 1

FarmParameters

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
Time in storage	months	4
Pond solids		
Pond solids management method		Spread on selected blocks
Pond emptied every	years	4
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	T	80

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

Imported supplements

Supplement information

Conservation type		Silage
Name		Pasture good quality silage
Supplement amount		
Dry weight basis	T	250

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
Name		Palm kernel meal
Supplement amount		
Dry weight basis	T	150

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		Silage
Name		Pasture good quality silage
Supplement amount		
Dry weight basis	T	200
Utilisation		Very good
Destination		Wintering pad, animal shelter or housing
Animal		Dairy

Greenhouse gas emission factors

FarmParameters

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
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	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

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

SOUTH DAIRY LTD - ALEXANDER D Mark Crawford

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

FarmParameters

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 - 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
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		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
38.2	9.6	10	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

SOUTH DAIRY LTD - ALEXANDER D Mark Crawford

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

FarmParameters

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
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

FarmParameters

Effluent application

Liquid effluents		
Receives farm dairy effluent		
Effluent application depth		Low application method
Percentage of block effluent applied to	%	100
Monthy applications of liquid effluent		
January,February,March,April,September,October,November,December		

Block - Puke_6a.1 Effluent Tile

Block name		Puke_6a.1 Effluent Tile
Block type		Pastoral
Area	ha	65.9
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)		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
	> 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
Hydrophobic condition		Use default
Occurence of pugging damage		Occasional
Compacted top soil		False

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	10	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		
Dry weight basis	T	60
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

FarmParameters

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
August		True
September		True
October		True
November		True
December		True

Effluent application

Liquid effluents		
Receives farm dairy effluent		
Effluent application depth		Low application method
Percentage of block effluent applied to	%	100
Monthy applications of liquid effluent		
January,February,March,April,September,October,November,December		

Block - Puke_6a.1 Effluent Solid Lease

Block name		Puke_6a.1 Effluent Solid Lease
Block type		Pastoral
Area	ha	39.5
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
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	Not entered
Top soil horizon chemical and physical parameters		

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FarmParameters

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		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		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
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		

FarmParameters

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

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 - Puke_6a.1 Effluent SolidTile

Block name		Puke_6a.1 Effluent SolidTile
Block type		Pastoral
Area	ha	37.2
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

FarmParameters

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
	> 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
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 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

FarmParameters

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
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

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

FarmParameters

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.1Effluent Solid

Block name		Puke_6a.1Effluent Solid
Block type		Pastoral
Area	ha	36.8
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		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	%	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		

FarmParameters

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		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
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
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

FarmParameters

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 Eff Solids

Block name		Waiki_30a.1 Eff Solids
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
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

SOUTH DAIRY LTD - ALEXANDER D 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		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	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	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

FarmParameters

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

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

SOUTH DAIRY LTD - ALEXANDER D Mark Crawford

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

FarmParameters

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
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		
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
27	9	9	16	10

QT SO4	10
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default
Pasture	
Pasture type	Ryegrass/white clover
Clover levels	Use default
Supplements removed	
Supplement information	
Conservation type	Baleage
Name	
Wrapping	Wrapped in plastic
Supplement amount	

FarmParameters

Dry weight basis	T	20
Destination		Storage
Storage conditions		Average
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
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		
No irrigation entered		
Animals on block		
Animals grazing		
Dairy	%	0
Water connectivity		
Direct access to streams		False
Animal grazing		
January		True
February		True

FarmParameters

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

Effluent application

Solid effluents

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

Block - Parah_4a.1 Eff solids

Block name		Parah_4a.1 Eff solids
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
Depth to impeded layer	cm	Not entered
Top soil horizon 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

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	7	10	20	9

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	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
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

FarmParameters

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 - Parah_4a.1 Run Off

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		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

FarmParameters

		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		
	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		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
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

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		

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

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
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 - 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

SOUTH DAIRY LTD - ALEXANDER D Mark Crawford

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

FarmParameters

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
Soil group (default)			Sedimentary
SMaps			
Sibling			Apar_2a.1
Date downloaded			Unknown
Wilting point	0 - 30cm		23
	30 - 60cm		26
	> 60		1
Field capacity	0 - 30cm		45
	30 - 60cm		42
	> 60		2
Saturation	0 - 30cm		63
	30 - 60cm		53
	> 60		3
Natural drainage class			Imperfect
Depth to impeded layer		cm	Not entered
Top soil horizon chemical and physical parameters			
ASC/PR		%	43
Bulk density		kg/m³	1090
Clay		%	25
Sand		%	6
Sub soil			
Sub soil clay		%	28
Soil profile			
Profile drainage class			Use default
Top soil texture			Silt loam
Maximum rooting depth		m	0.58
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	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

FarmParameters

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
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

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

FarmParameters

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 - Riparian Areas

Block name		Riparian Areas
Block type		Riparian
Area	ha	1.2

Overseer Budget for Existing Environment – No 1

SOUTH DAIRY LTD - ALEXANDER D Mark Crawford

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

FarmParameters

Farm details

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	39.5
Puke_6a.1 Non Eff Tile	Pastoral	48.6
Puke_6a.1 Non Effluent	Pastoral	49.7
Waiki_30a.1 Non Eff	Pastoral	17.9
Waiki_30a.1 Run Off	Pastoral	23.7
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
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	kg/yr	272600
Milk volume yield	l/yr	Not entered
Fat yield	kg/yr	Not entered
Lactation length	days	Not entered
Average weight	kg/animal	Not entered
Calving times		
Median calving date		24 August
Drying off		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	0	406	580	565	560	560	555	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	0			Female	

Stock numbers - Dairy replacements

Class	*Breed*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
HeiferReplacements	F x J cross	0	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	

HeiferReplacements	F x J cross	32	0	0	0	0	0	0	0	0	0	0	0

Max weight (kg)	LW start (kg)	LW end (kg)	CW (kg)	Age (months)	Source	Fate	Sex	Mated
0	480	480	0	0	Brought		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

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 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		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
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

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
Block type		Pastoral
Area	ha	54.5
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
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	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

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	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	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

FarmParameters

Product		Urea
Amount	kg/ha	20

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		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		Pastoral
Area	ha	39.5
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
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	Not entered
Top soil horizon chemical and physical parameters		

FarmParameters

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	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	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
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		

FarmParameters

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
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		True

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	48.6
Relative productivity		1
Pasture block type		No
Topography		Flat
Distance from coast	km	25
Cultivated in last 5 years		False
Fodder rotates through		No

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

SOUTH DAIRY LTD - ALEXANDER D Mark Crawford

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

FarmParameters

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
	> 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
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 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	750
Fertiliser products - August		
Category		Ravensdown cropping

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		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
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

SOUTH DAIRY LTD - ALEXANDER D Mark Crawford

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

FarmParameters

Area		ha	49.7
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			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	%		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
35	8	10	22	8

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

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		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
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

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 Eff

Block name		Waiki_30a.1 Non Eff
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
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		
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
Hydrophobic condition		Use default

SOUTH DAIRY LTD - ALEXANDER D 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 K	QT Ca	QT Mg	QT Na	
30	7	10	20	9	
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	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

FarmParameters

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

FarmParameters

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
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
27	9	9	16	10

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

Pasture

Pasture type	Ryegrass/white clover
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 - 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

FarmParameters

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	%	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
Animal grazing		
January		True
February		True
March		True
April		True
May		True
July		True
November		True
December		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
Area	ha	2.7

SOUTH DAIRY LTD - ALEXANDER D Mark Crawford

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

FarmParameters

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
Depth to impeded layer	cm	Not entered
Top soil horizon 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	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	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

Pasture

FarmParameters

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
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

SOUTH DAIRY LTD - ALEXANDER D 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 - Parah_4a.1 Run Off

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		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		
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	Occasional
Compacted top soil	False

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
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
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

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
No irrigation entered

Animals on block

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

SOUTH DAIRY LTD - ALEXANDER D Mark Crawford

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

FarmParameters

Soil group (default)			Sedimentary
SMaps			
Sibling			Apar_2a.1
Date downloaded			Unknown
Wilting point	0 - 30cm		23
	30 - 60cm		26
	> 60		1
Field capacity	0 - 30cm		45
	30 - 60cm		42
	> 60		2
Saturation	0 - 30cm		63
	30 - 60cm		53
	> 60		3
Natural drainage class			Imperfect
Depth to impeded layer	cm		Not entered
Top soil horizon chemical and physical parameters			
ASC/PR	%		43
Bulk density	kg/m³		1090
Clay	%		25
Sand	%		6
Sub soil			
Sub soil clay	%		28

Soil profile

Profile drainage class		Use default
Top soil texture		Silt loam
Maximum rooting depth	m	0.58
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	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	750
Fertiliser products - August		
Category		Ravensdown cropping
Product		Ammo 36
Amount	kg/ha	100
Fertiliser products - October		

FarmParameters

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
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		True

Effluent application
Receives no liquid or solid effluents

Block - Riparian Areas

Block name		Riparian Areas
Block type		Riparian
Area	ha	1.2

ravensdown

Farm Scenario Plan

Prepared by Mark Crawford
Senior Farm Environmental Consultant
CNMA

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.

Contents

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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 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 m^3. 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 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 milking platform		Yes from weaning	
Imported Feeds		150 T DM of PKE; 250 T DM Silage good quality, 200 T DM Silage to Feed pad, plus 80 T DM Baleage from storage	

		Proposed		
Cows	Av weight kg LW	500 kg LW		
	Median calving Date	24th August, earlier for Heifers		
	Dry-Off date	25th 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 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, trough, crop)**	
	Good quality Silage	250 & 200	On paddocks and on feed pad	
	Straw (Barley)			
	Other PKE	150	In paddocks in trailers	
Supplements Made		**Amount (T/DM)**	**Ha**	**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	Can pump directly from sump or store in pond via weeping wall, which also receives effluent from feed & calving pad		
	Application Depth mm	Low application < 10 mm main season, September to April for Irrigator.		
Replacements	On/off farm when & what age	Off farm from weaning		

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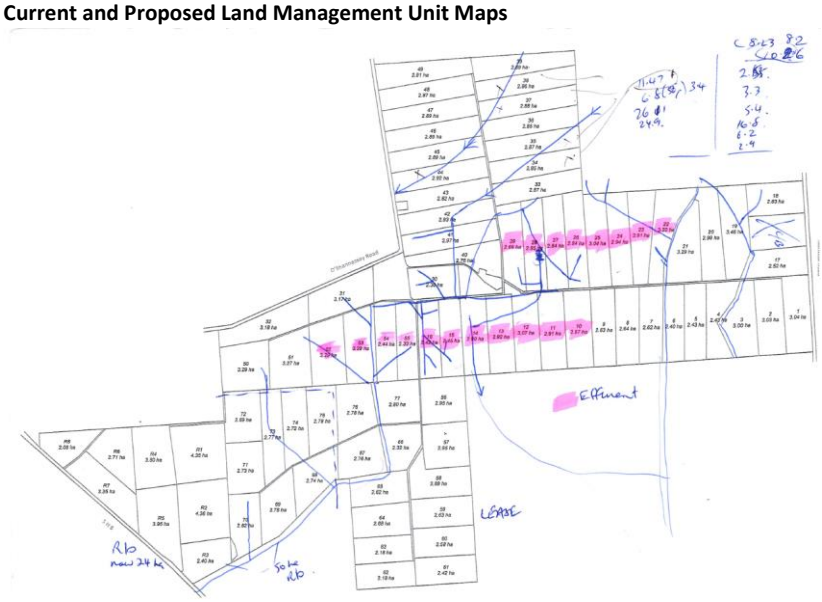
Proposed Land Management Unit details and Soil Information: Table 1

Block Name	Land Use	Block Type	Soil 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
Non productive	Non effective	Non productive				4.0
Whole Farm					**Total**	**249.2**

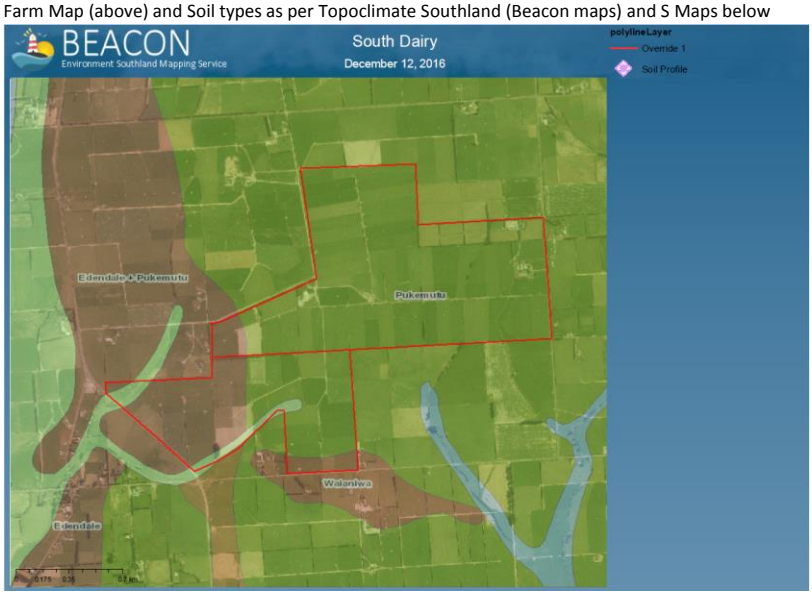
Current Land Management Unit details and Soil Information: Table 1 (b)

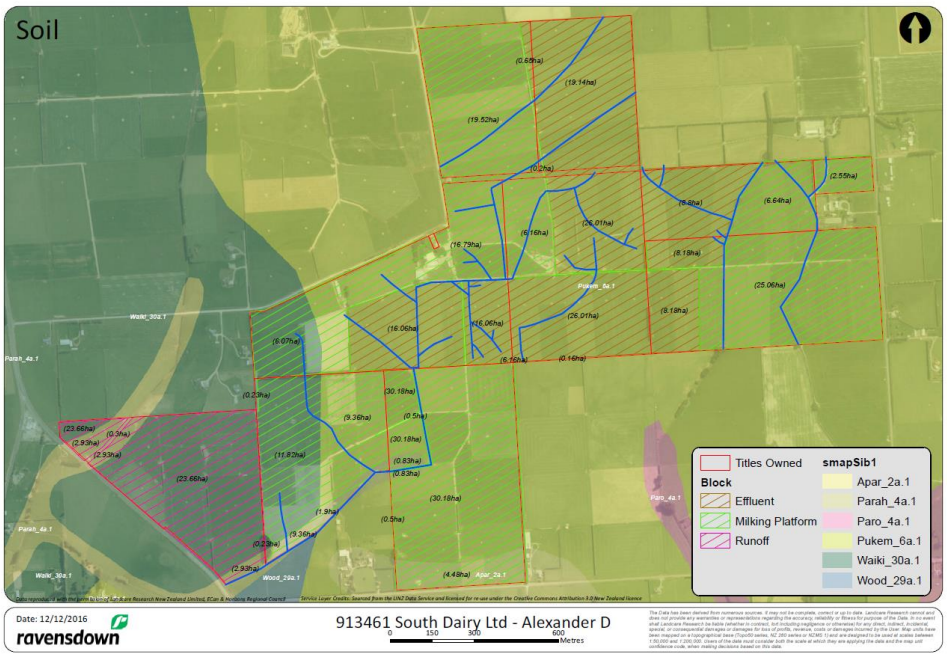
Block Name	Land Use	Block Type	Soil Order	Soil Texture	Drainage Class	Effective Area (ha)
Puke_6a.1 Effluent Tile	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	54.5
Puke_6a.1 Effluent Solid Lease	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	39.5
Puke_6a.1 Effluent Solid Tile	Dairy	Pastoral	Pallic	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

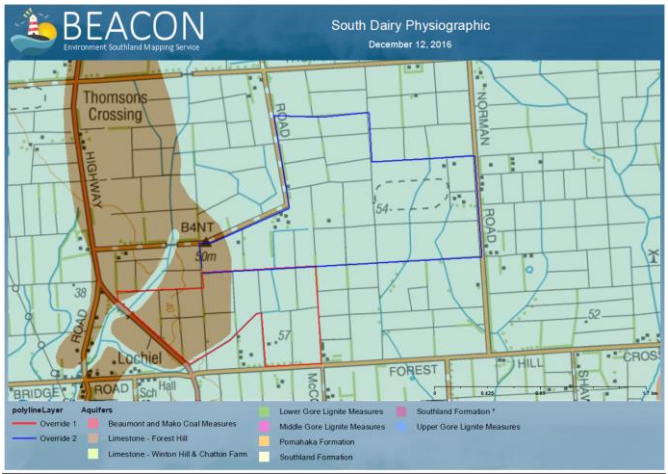


Farm Map (above) and Soil types as per Topoclimate Southland (Beacon maps) and S Maps below

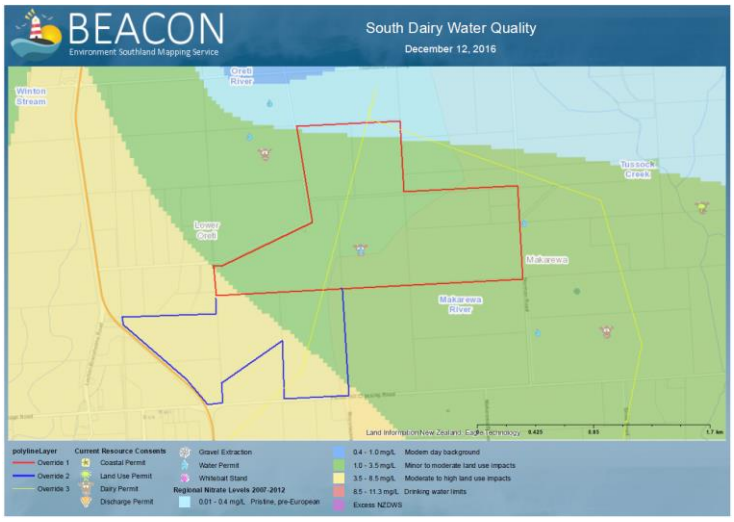




Map of Nutrient Allocation Zone



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/

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.pdfor 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~~ ~~(ii) low or high rate irrigation by slurry tanker 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, 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 consent 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 % (N in products / N inputs)	26	25
Nitrous oxide (N_2O) (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 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							
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							
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

Block name	Total P (kg P/yr)	P lost (kg P/ha/yr)	P loss categories		
			Soil	Fertiliser	Effluent
Puke_6a.1 Effluent	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.1 Effluent SolidTile	38	1	Medium	Medium	Low
Puke_6a.1Effluent Solid	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 includes N lost as effluent	kg N/ha/yr	24-42	34
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 (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	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).

** Sum of fertiliser and external factory effluent inputs.

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

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

OVERSEER

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 achieve 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	

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

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

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

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

Block name	Total P (kg P/yr)	P lost (kg P/ha/yr)	P loss categories		
			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).

** Sum of fertiliser and external factory effluent inputs.

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

Current 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 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

OVERSEER

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 August
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

OVERSEER®

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 achieve 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.

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

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.

Current System Parameter Report

As attached in separate pdf format

Overseer Budget for Existing Environment – No 2

SOUTH DAIRY LTD - ALEXANDER D Mark Crawford

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

FarmParameters

Farm details

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	3.19999999999999

Farm animals

Stock numbers

Stock reconciliation - Dairy

Production

Milk solids	kg/yr	258000
Milk volume yield	l/yr	Not entered
Fat yield	kg/yr	Not entered
Lactation length	days	Not entered
Average weight	kg/animal	Not entered
Calving times		
Median calving date		24 August
Drying off		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	399	406	580	565	560	560	555	555	555	550	500	259

Max weight (kg)	LW start (kg)	LW end (kg)	CW (kg)	Age (months)	Source	Fate	Sex	Mated
520	0	0	0	0			Female	

Stock numbers - Dairy replacements

Class	*Breed*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
HeiferReplacements	F x J cross	0	0	0	0	170	170	170	170	170	170	170	170

Max weight (kg)	LW start (kg)	LW end (kg)	CW (kg)	Age (months)	Source	Fate	Sex	Mated
0	0	230	0	0	Weaned		Female	

Class	*Breed*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
HeiferReplacements	F x J cross	140	140	140	140	140	140	140	140	140	140	140	140

Max weight (kg)	LW start (kg)	LW end (kg)	CW (kg)	Age (months)	Source	Fate	Sex	Mated
0	0	0	0	11	Brought		Female	

Stock reconciliation - Beef / dairy grazing

Stock production

Calving percentage	%	Not entered
Percent replacements	%	Not entered
Mean calving date		Not entered
Mean weaning date		Not entered
Weaning weight	kg	Not entered

Stock numbers

Class	*Breed*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*

SOUTH DAIRY LTD - ALEXANDER D Mark Crawford

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

FarmParameters

DairyMilking	Friesian X jersey	200	174	0	0	0	0	0	0	0	0	0	200

Max weight (kg)	LW start (kg)	LW end (kg)	CW (kg)	Age (months)	Source	Fate	Sex	Mated
500	0	0	0	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 — 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							

SOUTH DAIRY LTD - ALEXANDER D 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
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	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
Block type		Pastoral
Area	ha	54.5
Relative productivity		1
Pasture block type		No
Topography		Flat

SOUTH DAIRY LTD - ALEXANDER D Mark Crawford

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

FarmParameters

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 - 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
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
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	Not entered
TBK reserve K test	Not entered
K reserve status	Use default
Pasture	
Pasture type	Ryegrass/white clover
Clover levels	Use default

FarmParameters

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

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		True

Effluent application
Liquid effluents
Receives farm dairy effluent

FarmParameters

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	35.4
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		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	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	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

FarmParameters

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

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	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		
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
Fertiliser products - December		
Category		Ravensdown other
Product		Potassium chloride
Amount	kg/ha	50

Irrigation

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 - Puke_6a.1 Non Eff Tile

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
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	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

SOUTH DAIRY LTD - ALEXANDER D 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 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	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

FarmParameters

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
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

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

SOUTH DAIRY LTD - ALEXANDER D Mark Crawford

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

FarmParameters

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	%		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
35	8	10	22	8

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	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

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
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
December		True

Effluent application
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		Yes

Climate

Annual average rainfall	mm/yr	1096

SOUTH DAIRY LTD - ALEXANDER D Mark Crawford

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

FarmParameters

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
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		
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	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

FarmParameters

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
Product		Urea
Amount	kg/ha	40

Irrigation

No irrigation entered

Animals on block

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
November		True
December		True
Animals grazing		
Dairy replacements	%	40
Water connectivity		
Direct access to streams		False

FarmParameters

Animal grazing
Dairy replacements graze block all year round

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	19.7
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)		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		
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
Hydrophobic condition	Use default
Occurence of pugging damage	Occasional
Compacted top soil	False

Soil settings
K leaching potential not set
N immobilisation status

FarmParameters

Soil tests

Olsen P	QT K	QT Ca	QT Mg	QT Na
27	9	9	16	10

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

Pasture

Pasture type		Ryegrass/white clover
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
Product		Urea
Amount	kg/ha	40

Irrigation

No irrigation entered

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

FarmParameters

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	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	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	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		

FarmParameters

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	%	40
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
Block type		Pastoral
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

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

FarmParameters

		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		
	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	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
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

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

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
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

SOUTH DAIRY LTD - ALEXANDER D Mark Crawford

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

FarmParameters

Area		ha	4.5
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)			Brown
Soil group (default)			Sedimentary
SMaps			
Sibling			Apar_2a.1
Date downloaded			Unknown
Wilting point	0 - 30cm		23
	30 - 60cm		26
	> 60		1
Field capacity	0 - 30cm		45
	30 - 60cm		42
	> 60		2
Saturation	0 - 30cm		63
	30 - 60cm		53
	> 60		3
Natural drainage class			Imperfect
Depth to impeded layer		cm	Not entered
Top soil horizon chemical and physical parameters			
ASC/PR		%	43
Bulk density		kg/m³	1090
Clay		%	25
Sand		%	6
Sub soil			
Sub soil clay		%	28
Soil profile			
Profile drainage class			Use default
Top soil texture			Silt loam
Maximum rooting depth		m	0.58
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	5
Anion storage capacity or phosphate retention	Not entered
TBK reserve K test	Not entered
K reserve status	Use default

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		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
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

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 - 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		
Crop management	See details below	Defoliation
July - Swedes		
Crop management	See details below	Defoliation
August - Swedes		
Crop management	See details below	Defoliation
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
Crop type		Swedes
Product yield	T/ha dry matter	11
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

Defoliation method		Grazed in-situ

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		True
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
Crop type	Grazed
Source of animals	Not entered

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		Ravensdown other
Product		Urea
Amount	kg/ha	100

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
18	0	0	0	0	0	0

Effluent application

Receives no liquid or solid effluents

Block - Pasture to FB MP

Block name		Pasture to FB MP
Block type		Crop
Area	ha	6.2
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
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

FarmParameters

		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	Not entered
TBK reserve K test	Not entered
K reserve status	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 - 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		

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
Area	ha	6.2
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

FarmParameters

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		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	Not entered
TBK reserve K test	Not entered
K reserve status	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	
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

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

FarmParameters

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

Category		Ravensdown cropping
Product		Cropmaster 15
Amount	kg/ha	300

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
18	0	0	0	0	0	0

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
9	0	0	0	0	0	0

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
36	0	0	10	0	0	0

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
28	0	0	0	0	0	0

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

Urea N	Super P	K	Sulphate S	Ca	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	2
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
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	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

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

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	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 - 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	

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		Ravensdown 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	ha	2
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

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
	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		Not entered
TBK reserve K test		Not entered
K reserve status		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	

FarmParameters

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	

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 - 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
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		True
Source of animal		Farm stock - see Enterprise numbers panes
Percentage of crop eaten by animals		
Dairy replacements	%	100

SOUTH DAIRY LTD - ALEXANDER D Mark Crawford

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

FarmParameters

Crop grazed for	hours/day	Not entered

Crop sowing information - October of the Previous assessment

Crop category		Forages
Crop type		Forage barley (spring)
Yield at final defoliation	T/ha dry matter	8
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

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

Category		Ravensdown cropping
Product		Cropmaster 15
Amount	kg/ha	300

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
18	0	0	0	0	0	0

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
9	0	0	0	0	0	0

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
36	0	0	10	0	0	0

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
28	0	0	0	0	0	0

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
18	0	0	0	0	0	0

Effluent application

Receives no liquid or solid effluents

ravensdown

Farm Supplementary Scenario Plan Report

Prepared by Mark Crawford
Senior Farm Environmental Consultant

CNMA

Customer Name	**SOUTH DAIRY LTD**
Customer Address	**C/- D ALEXANDER;** **11 MCCONACHIE ROAD; RD 1; WINTON, 9781**
Date	**26/10/2017**

optimiser™
Environmental analysis and planning

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.

Contents

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3. This Plan complies with the industry standard "Code of Practice for Nutrient Management (with emphasis on Fertiliser Use)" (hereafter referred to as 'the code'). The Code can be found on-line in full at: http://www.fertiliser.org.nz/Site/code_of_practice

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Mark Crawford
Senior Farm Environmental Consultant
19/12/2016
…….

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 milking platform		Yes from weaning	
Imported Feeds		100 T DM of PKE and 100 T DM brewers grain; 250 T DM Silage good quality, 100 T DM Silage all to Feed pad, plus 80 T DM Baleage from storage onto pastoral blocks, total 550 T DM purchased	

		Proposed		
Cows	Av weight kg LW	500 kg LW		
	Median calving Date	24th August, earlier for Heifers		
	Dry-Off date	25th 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 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, trough, crop)**	
	Good quality Silage	250 & 100	On paddocks and on feed pad	
	Straw (Barley)			
	Other PKE and Brewers Grain	100 & 100	In paddocks in trailers	
Supplements Made		**Amount (T/DM)**	**Ha**	**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	Pump directly from storage in pond via weeping wall, which also receives effluent from feed & calving pad		
	Application Depth mm	Low application < 10 mm main season, September to April for Irrigator.		
Replacements	On/off farm when & what age	Off farm from weaning		

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**

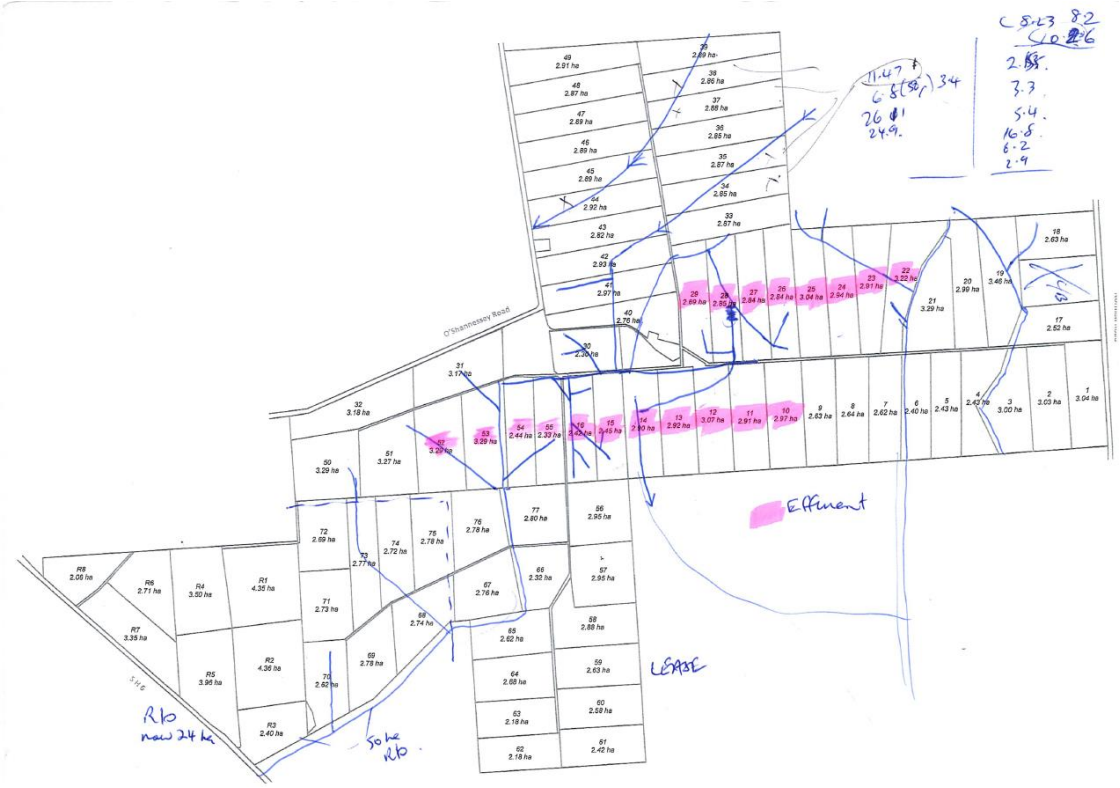
* Areas fodder crop rotates through.

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

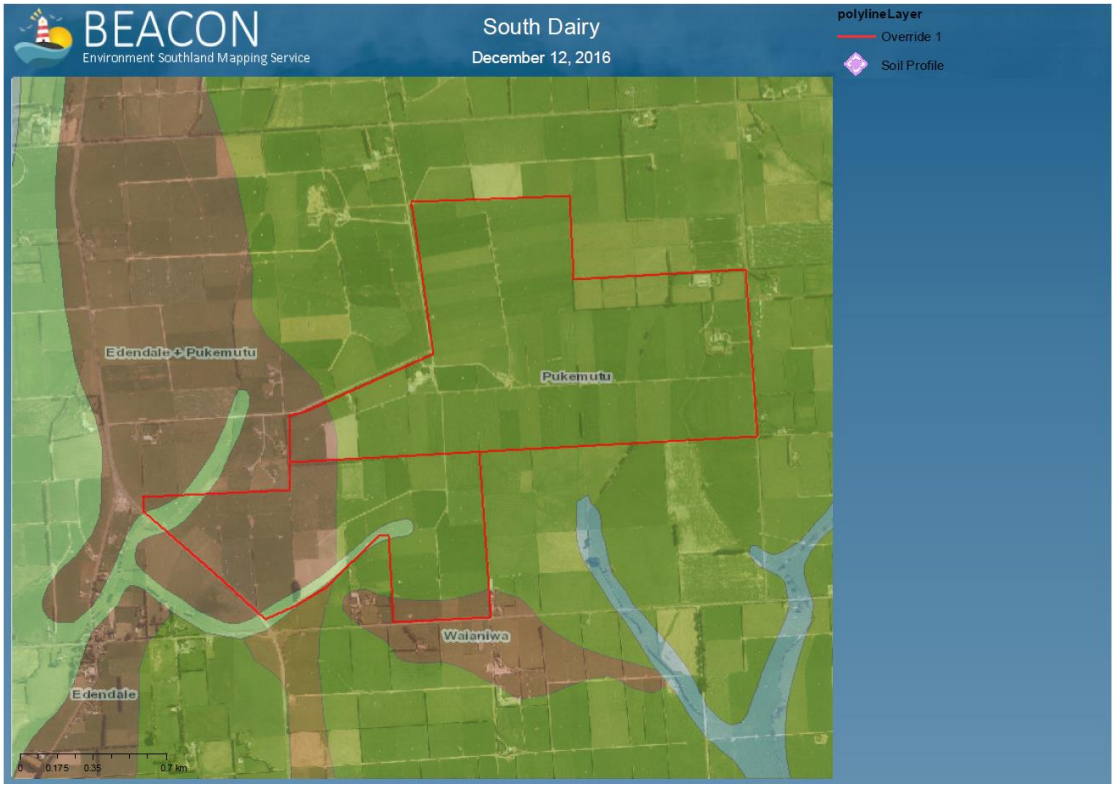
Block Name	Land Use	Block Type	Soil Order	Soil Texture	Drainage Class	Effective Area (ha)
Puke_6a.1 Effluent Tile	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	54.5
Puke_6a.1 Effluent Solid Lease	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	35.4
Puke_6a.1 Effluent Solid Tile	Dairy	Pastoral	Pallic	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**

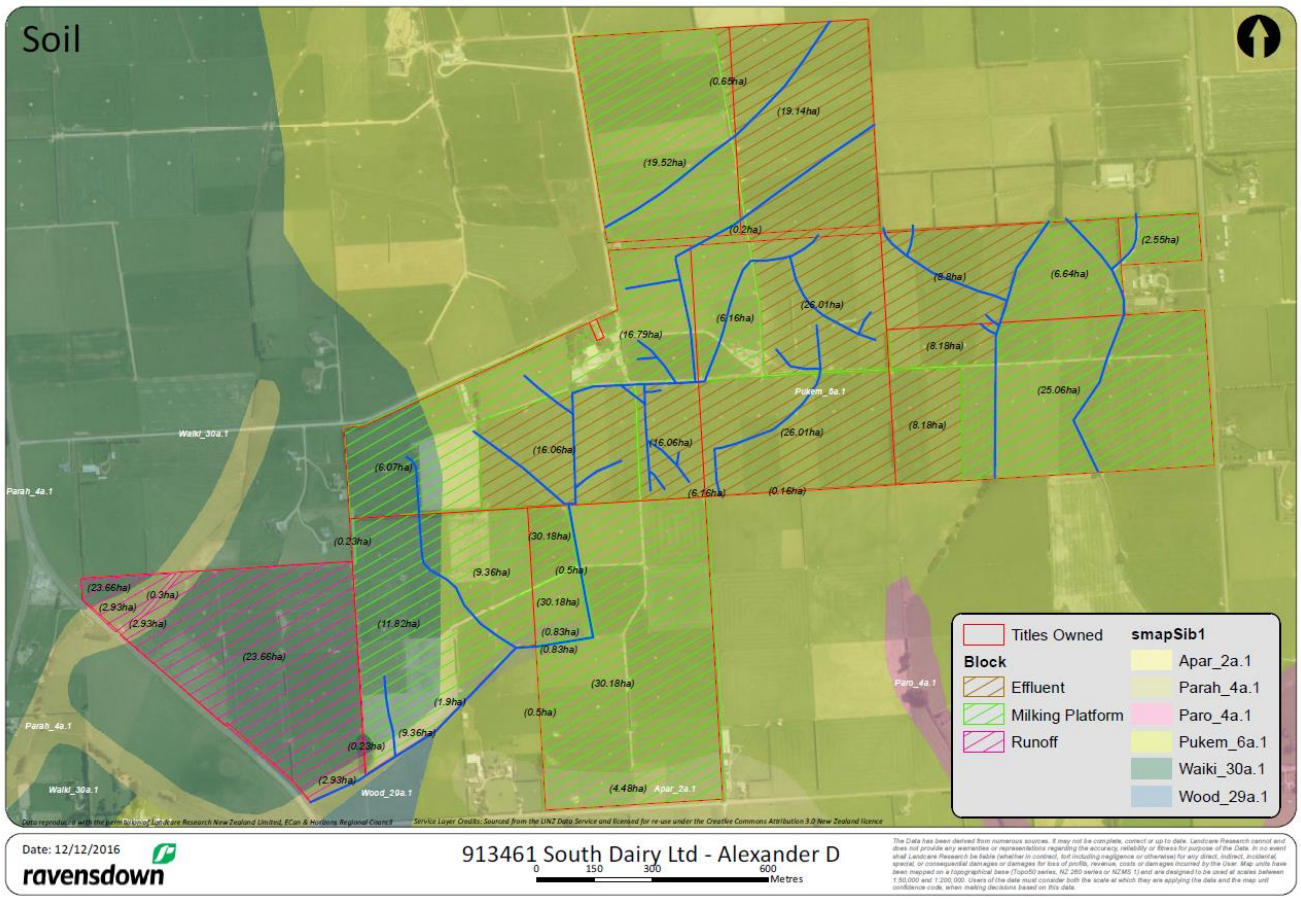
* Fodder crop rotates through these blocks

Current and Proposed Land Management Unit Maps

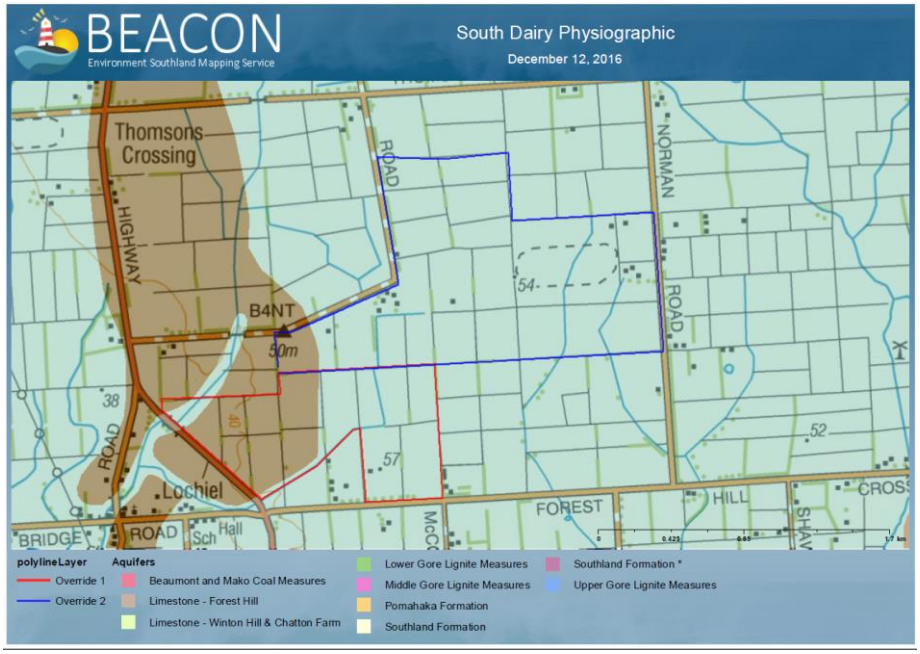


Farm Map (above) and Soil types as per Topoclimate Southland (Beacon maps) and S Maps below

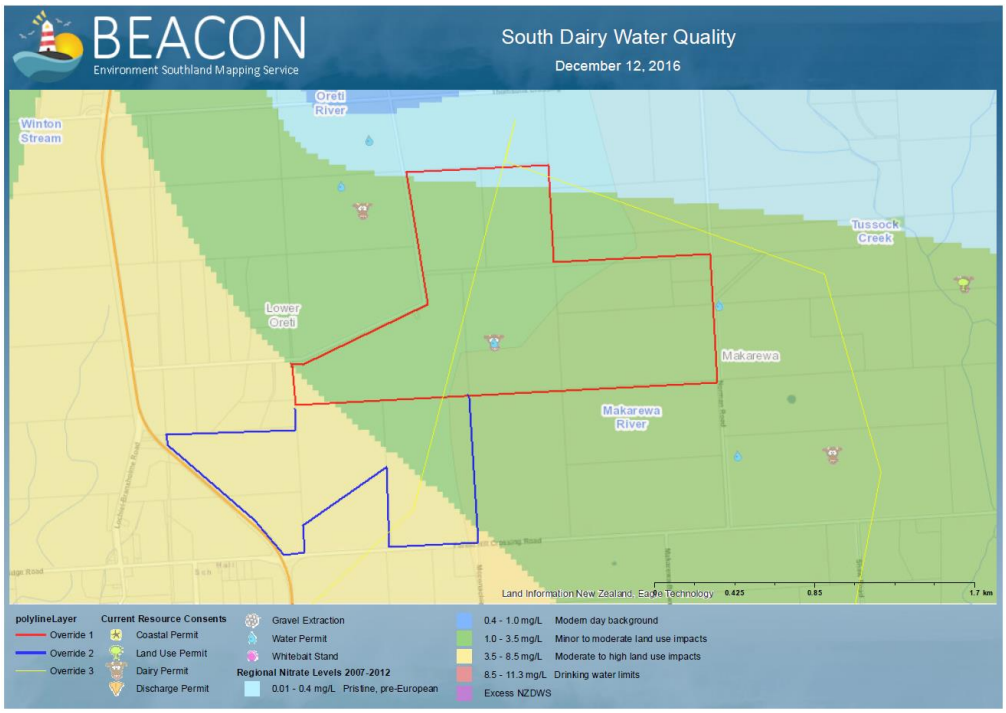




Map of Nutrient Allocation Zone



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 - Support pastures	 15857 n/a	 16579 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 % (N in products / N inputs)	30	27
Nitrous oxide (N_2O) (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	0	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 (kg P/yr)	P lost (kg P/ha/yr)	P loss categories		
			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_2O 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			

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

** Sum of fertiliser and external factory effluent inputs.

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

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

Proposed System Pasture Production and Other Values/Effluent Report

SOUTH DAIRY LTD - ALEXANDER D — Mark 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

SOUTH DAIRY LTD - ALEXANDER D — Mark Crawford

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

Farm Nutrient Budget - Whole farm

	N	P	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

Block name	Total P lost (kg P/yr)	P lost (kg P/ha/yr)	P loss categories		
			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		46
Indices			
Average N loss to water	kg N/ha/yr	24-42	45
includes N lost as effluent	kg N/ha/yr		0
N_2O 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	%	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).

** Sum of fertiliser and external factory effluent inputs.

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

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

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

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

Overseer Budget for Existing Environment – No 3

SOUTH DAIRY LTD - ALEXANDER D Mark Crawford

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	kg/yr	275000
Milk volume yield	l/yr	Not entered
Fat yield	kg/yr	Not entered
Lactation length	days	Not entered
Average weight	kg/animal	Not entered
Calving times		
Median calving date		24 August
Drying off		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	0	438	599	599	599	599	589	589	589	590	540	0

Max weight (kg)	LW start (kg)	LW end (kg)	CW (kg)	Age (months)	Source	Fate	Sex	Mated
520	0	0	0	0			Female	

Stock numbers - Dairy replacements

Class	*Breed*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
HeiferReplacements	F x J cross	0	0	0	0	164	164	164	164	164	164	164	164

Max weight (kg)	LW start (kg)	LW end (kg)	CW (kg)	Age (months)	Source	Fate	Sex	Mated
0	0	230	0	0	Weaned		Female	

Class	*Breed*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
HeiferReplacements	F x J cross	112	112	112	112	112	112	112	112	112	112	112	112

Max weight (kg)	LW start (kg)	LW end (kg)	CW (kg)	Age (months)	Source	Fate	Sex	Mated
0	230	480	0	0	Brought		Female	

Class	*Breed*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
HeiferReplacements	F x J cross	112	0	0	0	0	0	0	0	0	0	0	0

Max weight (kg)	LW start (kg)	LW end (kg)	CW (kg)	Age (months)	Source	Fate	Sex	Mated
520	480	480	0	0	On-farm		Female	

Stock reconciliation - Beef / dairy grazing

Stock production

Calving percentage	%	Not entered
Percent replacements	%	Not entered
Mean calving date		Not entered
Mean weaning date		Not entered
Weaning weight	kg	Not entered

Stock numbers

SOUTH DAIRY LTD - ALEXANDER D Mark Crawford

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

FarmParameters

Class	*Breed*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*
DairyMilking	Friesian X jersey	0	162	26	0	0	0	0	0	0	0	0	0

Max weight (kg)	LW start (kg)	LW end (kg)	CW (kg)	Age (months)	Source	Fate	Sex	Mated
520	0	0	0	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

FarmParameters

No timing of feeding has been specified

Supplement information

Conservation type		User defined
Name		Fodder Beet
Supplement amount		
Dry weight basis	T	10
Fed to animal: Beef / dairy grazing		
No timing of feeding has been specified		

Supplement information

Conservation type		Silage
Name		Baleage
Supplement amount		
Dry weight basis	T	55
Fed on blocks: Swedes (MP),Past>FBt (RO)		
No timing of feeding has been specified		

Supplement information

Conservation type		Silage
Name		Baleage
Supplement amount		
Dry weight basis	T	55
Supplements are distributed evenly across all pastoral blocks		
No timing of feeding has been specified		

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
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

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

Block name		Puke_6a.1 Effluent Tile
Block type		Pastoral
Area	ha	49.1
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		
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	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

FarmParameters

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	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	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

FarmParameters

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		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		Pastoral
Area	ha	35.6
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		
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	Not entered
Top soil horizon chemical and physical parameters		
ASC/PR	%	22
Bulk density	kg/m³	1220

FarmParameters

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	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	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		
Dry weight basis	T	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	T	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
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

FarmParameters

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
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		True

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

SOUTH DAIRY LTD - ALEXANDER D Mark Crawford

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

FarmParameters

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

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		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
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

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		
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	%	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

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 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	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

FarmParameters

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		True

Effluent application
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		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
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		
ASC/PR	%	43
Bulk density	kg/m³	1090
Clay	%	28

FarmParameters

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
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	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	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

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
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
Soil group (default)		Sedimentary
SMaps		
Sibling		Waiki_30a.1
Date downloaded		Unknown
Wilting point	0 - 30cm	21

FarmParameters

		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		
	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
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
27	9	9	16	10

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

Pasture

Pasture type	Ryegrass/white clover
Clover levels	Use default

Supplements removed

Supplement information		
Conservation type		Baleage
Name		
Wrapping		Wrapped in plastic
Supplement amount		
Dry weight basis	T	7
Fed to animal: Dairy		
No timing of feeding has been specified		
Supplement information		
Conservation type		Silage
Name		
Silage stack storage		Stack effluent contained
Supplement amount		
Dry weight basis	T	14
Silage cutting method		Not entered
Fed to animal: Dairy		
No timing of feeding has been specified		

FarmParameters

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
Product		Urea
Amount	kg/ha	40
Irrigation		
No irrigation entered		
Animals on block		
Animals grazing		
Dairy	%	15
Water connectivity		
Direct access to streams		False
Animal grazing		
April		True
May		True
August		True
September		True
October		True
Animals grazing		
Dairy replacements	%	80
Water connectivity		
Direct access to streams		False

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

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
Depth to impeded layer	cm	Not entered
Top soil horizon chemical and physical parameters		
ASC/PR	%	23
Bulk density	kg/m³	1220
Clay	%	34
Sand	%	12

FarmParameters

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		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	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		

FarmParameters

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
December		True

Effluent application

Receives no liquid or solid effluents

Block - Parah_4a.1 Run Off

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		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

FarmParameters

		> 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		
	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	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
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		
Dry weight basis	T	2
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	T	2
Silage cutting method		Not entered
Fed to animal: Dairy replacements		
No timing of feeding has been specified		

FarmParameters

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
Product		Urea
Amount	kg/ha	40

Irrigation

No irrigation entered

Animals on block

Animals grazing		
Dairy	%	15
Water connectivity		
Direct access to streams		False
Animal grazing		
April		True
May		True
August		True
September		True
October		True
Animals grazing		
Dairy replacements	%	80
Water connectivity		
Direct access to streams		False

FarmParameters

Animal grazing		
Dairy replacements graze block all year round		
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
Annual potential evapotranspiration	mm	712
Seasonal variation in PET		Moderate

Soil description

Soil order (default)		Brown
Soil group (default)		Sedimentary
SMaps		
Sibling		Apar_2a.1
Date downloaded		Unknown
Wilting point	0 - 30cm	23
	30 - 60cm	26
	> 60	1
Field capacity	0 - 30cm	45
	30 - 60cm	42
	> 60	2
Saturation	0 - 30cm	63
	30 - 60cm	53
	> 60	3
Natural drainage class		Imperfect
Depth to impeded layer	cm	Not entered
Top soil horizon chemical and physical parameters		
ASC/PR	%	43
Bulk density	kg/m³	1090
Clay	%	25
Sand	%	6
Sub soil		
Sub soil clay	%	28

Soil profile

Profile drainage class		Use default
Top soil texture		Silt loam
Maximum rooting depth	m	0.58
Depth to impeded drainage layer		0

Soil drainage

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	7	10	20	9

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

Supplement information		
Conservation type		Baleage
Name		
Wrapping		Wrapped in plastic
Supplement amount		
Dry weight basis	T	3
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	T	4
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
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

FarmParameters

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
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)
Block type		Fodder Crop
Rotation area	ha	6.6
Low N mineralisation		False
Final grid month		October
Irrigation system type		No Irrigation

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		

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)

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

FarmParameters

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)		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		
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 - Grazed pasture

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		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 2016/17

Defoliation method		Grazed in-situ
Final harvest		True

FarmParameters

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

Fertiliser application

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
18	0	0	0	0	0	0

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
18	0	0	0	0	0	0

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
18	0	0	0	0	0	0

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
18	0	0	0	0	0	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	0	0	0

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
28	0	0	0	0	0	0

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
18	0	0	0	0	0	0

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
9	0	0	0	0	0	0

Fertiliser products - Current assessment - October (N Method: Incorporated)		
Category		Ravensdown cropping
Product		Cropmaster 15
Amount	kg/ha	250
Fertiliser products - Current assessment - October (N Method: Incorporated)		
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>WCCS (RO)

Block name		FBt>WCCS (RO)
Block type		Crop
Area	ha	2.9
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

FarmParameters

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			
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

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		
Crop management	See details below	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
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 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		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 2016/17		
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

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)

Block name		Past>FBt Lft (MP)
Block type		Crop
Area	ha	9.5
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

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			
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

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	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 - 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
May - Grazed pasture	

FarmParameters

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 - Fodder beets		
Crop management	See details below	Defoliation
June - Bare ground		
July - Bare ground		
August - Bare ground		
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	18
Cultivation practice at sowing		Conventional

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

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

Fertiliser application

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
18	0	0	0	0	0	0

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
18	0	0	0	0	0	0

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
18	0	0	0	0	0	0

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
18	0	0	0	0	0	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	0	0	0

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
28	0	0	0	0	0	0

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
18	0	0	0	0	0	0

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
9	0	0	0	0	0	0

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

Category		Ravensdown cropping
Product		Cropmaster 15
Amount	kg/ha	250

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

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
Area	ha	9.5
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
	> 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	%	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

FarmParameters

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	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

FarmParameters

Defoliation information - May of the Previous assessment

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

Crop sowing information - October 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	%	95
Dairy replacements	%	5

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

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
18	0	0	0	0	0	0

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
18	0	0	0	0	0	0

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

Category		Ravensdown super
Product		Superphosphate
Amount	kg/ha	350

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
18	0	0	0	0	0	0

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
18	0	0	0	0	0	0

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
18	0	0	0	0	0	0

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
28	0	0	0	0	0	0

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
18	0	0	0	0	0	0

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

Urea N	Super P	K	Sulphate S	Ca	Mg	Na
9	0	0	0	0	0	0

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

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

ravensdown

Farm Supplementary Scenario Plan Report No 2

Prepared by Mark Crawford
Senior Farm Environmental Consultant

CNMA

Customer Name	**SOUTH DAIRY LTD**
Customer Address	**C/- D ALEXANDER;** **11 MCCONACHIE ROAD; RD 1; WINTON, 9781**
Date	**22/12/2017**

optimiser™
Environmental analysis and planning

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.

Contents

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3. This Plan complies with the industry standard "Code of Practice for Nutrient Management (with emphasis on Fertiliser Use)" (hereafter referred to as 'the code'). The Code can be found on-line in full at: http://www.fertiliser.org.nz/Site/code_of_practice

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Mark Crawford
Senior Farm Environmental Consultant
19/12/2016
……

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 milking platform		Yes from weaning	
Imported Feeds		100 T DM of PKE and 100 T DM brewers grain; 250 T DM Silage good quality, 100 T DM Silage all to Feed pad, plus 80 T DM Baleage from storage onto pastoral blocks, total 550 T DM purchased	

		Proposed		
Cows	Av weight kg LW	500 kg LW		
	Median calving Date	24th August, earlier for Heifers		
	Dry-Off date	25th 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 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, trough, crop)**	
	Good quality Silage	250 & 100	On paddocks and on feed pad	
	Straw (Barley)			
	Other PKE and Brewers Grain	100 & 100	In paddocks in trailers	
Supplements Made		**Amount (T/DM)**	**Ha**	**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	Pump directly from storage in pond via weeping wall, which also receives effluent from feed & calving pad		
	Application Depth mm	Low application < 10 mm main season, September to April for Irrigator.		
Replacements	On/off farm when & what age	Off farm from weaning		

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**

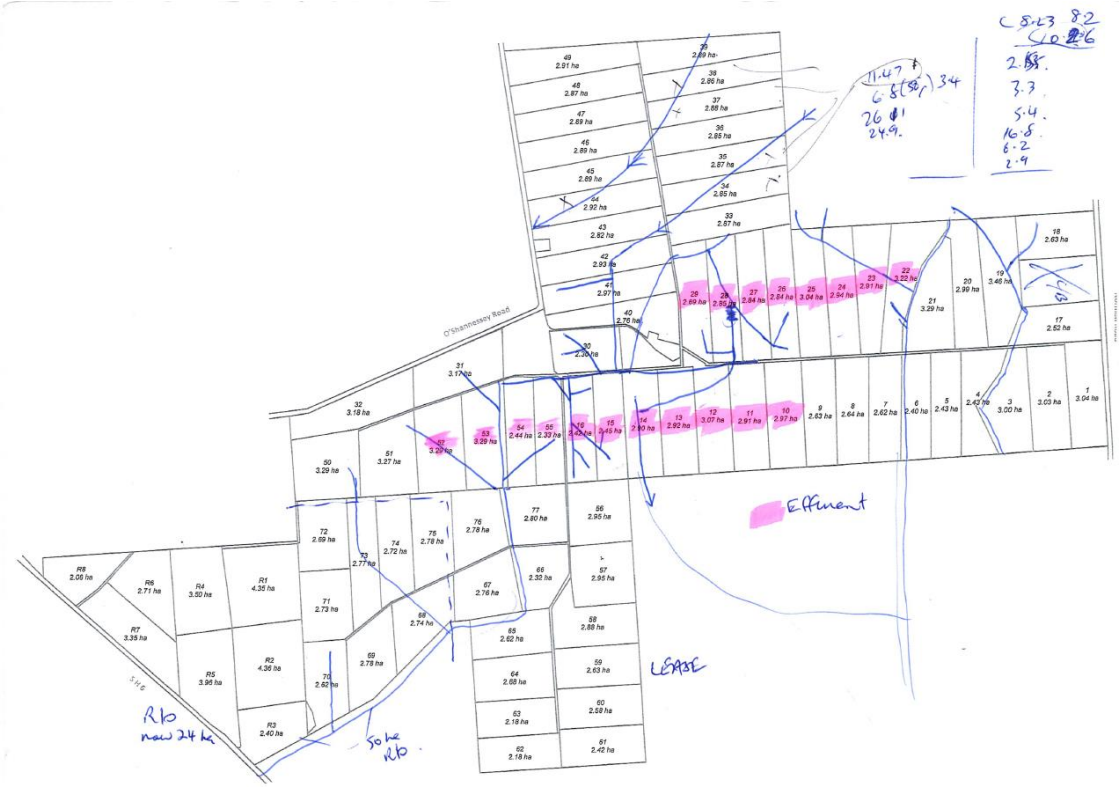
* Areas fodder crop rotates through.

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

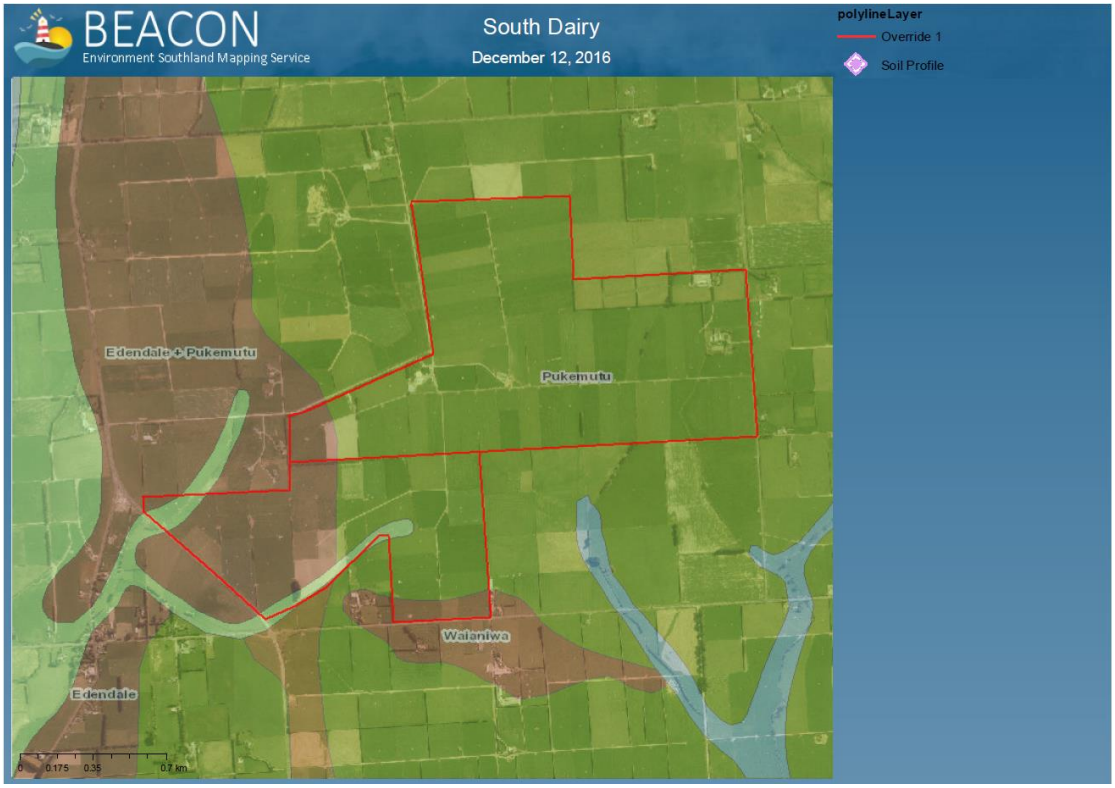
Block Name	Land Use	Block Type	Soil Order	Soil Texture	Drainage Class	Effective Area (ha)
Puke_6a.1 Effluent Tile*	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	49.1
Puke_6a.1 Non Effluent Lease*	Dairy	Pastoral	Pallic	Silt Loam over Clay	Poor	35.6
Puke_6a.1 Non Effluent Tile*	Dairy	Pastoral	Pallic	Silt 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**

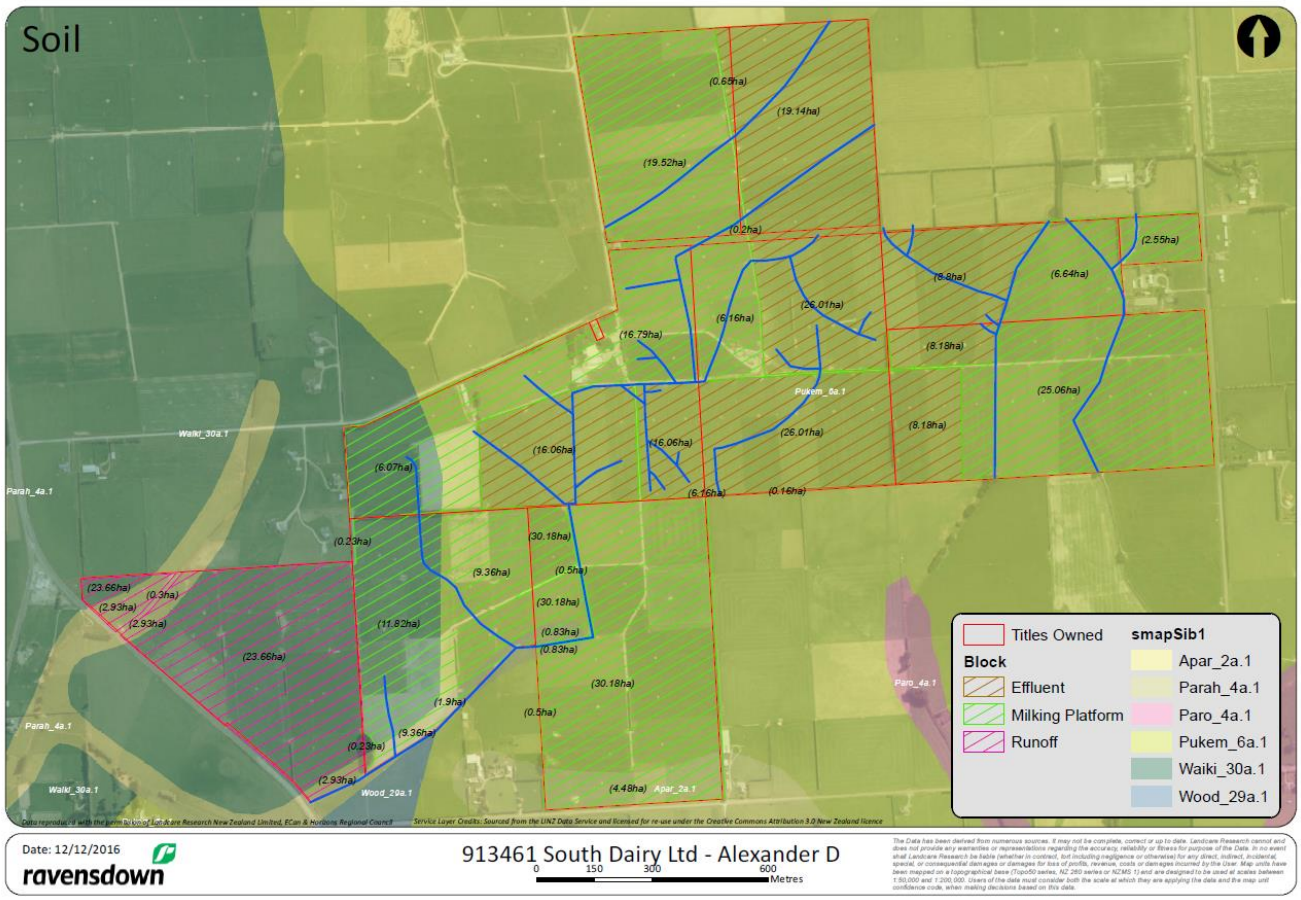
* Fodder crop rotates through these blocks

Current and Proposed Land Management Unit Maps

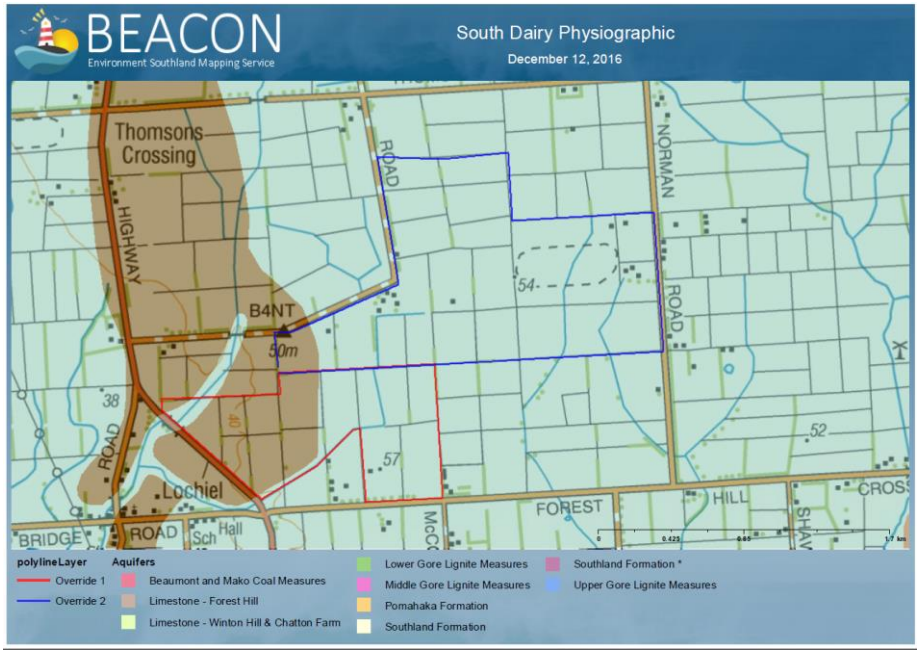


Farm Map (above) and Soil types as per Topoclimate Southland (Beacon maps) and S Maps below

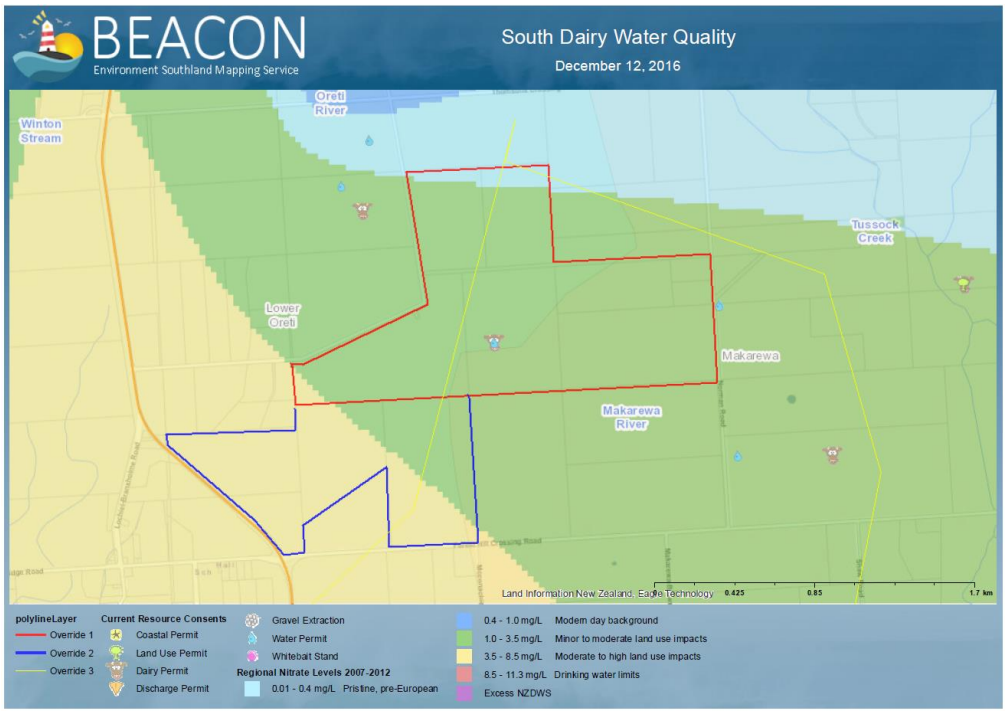




Map of Nutrient Allocation Zone



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 (kg)	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
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	Type	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 - Support pastures	 15857 n/a	 16104 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 % (N in products / N inputs)	30	29
Nitrous oxide (N_2O) (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	0	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 (kg P/yr)	P lost (kg P/ha/yr)	P loss categories		
			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_2O 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			

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

** Sum of fertiliser and external factory effluent inputs.

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

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

Proposed System Pasture Production and Other Values/Effluent Report

SOUTH DAIRY LTD - ALEXANDER D — Mark 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	P	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 (kg P/yr)	P lost (kg P/ha/yr)	P loss categories		
			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_2O 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			

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

** Sum of fertiliser and external factory effluent inputs.

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

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

Current System Pasture Production and Other Values/Effluent Report

SOUTH DAIRY LTD - ALEXANDER D — Mark Crawford

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 August
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