

### AGRICULTURAL SOIL ANALYSIS REPORT

10 samples supplied by Macleay River Meats P/L on 19/10/2021. Lab Job No.M2539  
 Analysis requested by Sarah Jones. Your Job: Pasture soil samples  
 60 Collombatti Rd FREDERICKTON NSW 2440

Parameter	Method reference	Sample ID:	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6
		Client:	Paddock 1 - Sample 1	Paddock 1 - Sample 2	Paddock 1 - Sample 3	Paddock 2	Paddock 3	Paddock 7
		Crop:	Pasture	Pasture	Pasture	Pasture	Pasture	Pasture
		Client:	MRM	MRM	MRM	MRM	MRM	MRM
			M2539/1	M2539/2	M2539/3	M2539/4	M2539/5	M2539/6
Nitrate Nitrogen (mg/kg N)	**Inhouse S37 (KCl)		1.7	3.1	1.8	1.6	4.3	42
Ammonium Nitrogen (mg/kg N)			5.5	4.8	4.1	4.8	6.0	63
pH	Rayment & Lyons 2011 - 4A1 (1:5 Water)		5.61	5.68	5.75	5.94	6.26	5.29
Electrical Conductivity (dS/m)	Rayment & Lyons 2011 - 3A1 (1:5 Water)		0.036	0.074	0.039	0.036	0.065	0.274
Exchangeable Calcium (cmol./kg) (kg/ha) (mg/kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)		1.6	0.25	1.6	1.6	3.0	1.6
			724	113	726	697	1,357	703
		323	50	324	311	606	314	
Exchangeable Magnesium (cmol./kg) (kg/ha) (mg/kg)			2.5	0.99	1.1	2.3	2.6	0.90
			673	268	292	639	712	244
		301	120	130	285	318	109	
Exchangeable Potassium (cmol./kg) (kg/ha) (mg/kg)			0.62	0.21	0.15	0.60	0.19	1.2
			539	187	131	527	170	1,060
		241	84	59	235	76	473	
Exchangeable Sodium (cmol./kg) (kg/ha) (mg/kg)			0.24	0.61	0.36	0.23	0.55	0.99
		124	315	187	118	284	512	
	55	141	83	53	127	229		
Exchangeable Aluminium (cmol./kg) (kg/ha) (mg/kg)	**Inhouse S37 (KCl)		1.2	0.94	1.5	1.3	0.20	0.91
			235	189	309	253	41	184
			105	84	138	113	18	82
Exchangeable Hydrogen (cmol./kg) (kg/ha) (mg/kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)		1.6	1.4	1.9	1.7	1.2	1.9
			35	31	42	37	26	41
			16	14	19	17	12	19
Effective Cation Exchange Capacity (ECEC) (cmol./kg)	**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol./kg)		7.7	4.4	6.6	7.7	7.8	7.4
Calcium (%)	**Base Saturation Calculations - Cation cmol./kg / ECEC x 100		21	5.7	25	20	39	21
Magnesium (%)			32	23	16	31	34	12
Potassium (%)			8.0	4.9	2.3	7.9	2.5	16
Sodium - ESP (%)			3.1	14	5.5	3.0	7.1	13
Aluminium (%)			15	21	23	16	2.6	12
Hydrogen (%)			21	31	28	22	15	25
Calcium/Magnesium Ratio		**Calculation: Calcium / Magnesium (cmol./kg)		0.65	0.25	1.5	0.66	1.2

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	Sample 1 Paddock 1 - Sample 1	Sample 2 Paddock 1 - Sample 2	Sample 3 Paddock 1 - Sample 3	Sample 4 Paddock 2	Sample 5 Paddock 3	Sample 6 Paddock 7	
Sample ID:	Paddock 1 - Sample 1	Paddock 1 - Sample 2	Paddock 1 - Sample 3	Paddock 2	Paddock 3	Paddock 7	
Crop:	Pasture	Pasture	Pasture	Pasture	Pasture	Pasture	
Client:	MRM	MRM	MRM	MRM	MRM	MRM	
<b>Parameter</b>	<b>Method reference</b>	<b>M2539/1</b>	<b>M2539/2</b>	<b>M2539/3</b>	<b>M2539/4</b>	<b>M2539/5</b>	<b>M2539/6</b>

### Notes:

- All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
- Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia*. CSIRO Publishing: Collingwood.
- Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
- 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
- Guidelines for phosphorus have been reduced for Australian soils.
- Indicative guidelines are based on 'Albrecht' and 'Reams' concepts.
- Total Acid Extractable Nutrients indicate a store of nutrients.
- National Environmental Protection (Assessment of Site Contamination) Measure 2013, Schedule B(1) - Guideline on Investigation Levels for Soil and Groundwater. Table 5-A Background Ranges.
- Information relating to testing colour codes is available on sheet 2 - 'Understanding your agricultural soil results'.
- Conversions for 1 cmol<sub>c</sub>/kg = 230 mg/kg Sodium, 390 mg/kg Potassium, 122 mg/kg Magnesium, 200 mg/kg Calcium
- Conversions to kg/ha = mg/kg x 2.24
- The chloride calculation of Cl mg/L = EC x 640 is considered an estimate, and most likely an over-estimate
- \*\* NATA accreditation does not cover the performance of this service.
- Analysis conducted between sample arrival date and reporting date.
- This report is not to be reproduced except in full. Results only relate to the item tested.
- All services undertaken by EAL are covered by the EAL Laboratory Services Terms and Conditions (refer [SCU.edu.au/eal/t&cs](http://SCU.edu.au/eal/t&cs)).
- This report was issued on 29/10/2021.

Quality Checked: Kris Saville  
 Agricultural Co-Ordinator

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Parameter	Method reference	Sample 7	Sample 8	Sample 9	Sample 10	Heavy Soil	Medium Soil
		Paddock 8	Paddock 11-Sample 1	Paddock 11-Sample 2	Paddock 11-Sample 3	Clay	Clay Loam
		Sample ID:	Sample ID:	Sample ID:	Sample ID:		
		Crop:	Crop:	Crop:	Crop:		
		Client:	Client:	Client:	Client:		
		M2539/7	M2539/8	M2539/9	M2539/10	Indicative guidelines -	
Nitrate Nitrogen (mg/kg N)	**Inhouse S37 (KCl)	4.9	3.2	1.6	1.0	15	13
Ammonium Nitrogen (mg/kg N)		17	8.8	7.8	5.5	20	18
pH	Rayment & Lyons 2011 - 4A1 (1:5 Water)	5.02	5.78	6.20	5.79	6.5	6.5
Electrical Conductivity (dS/m)	Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.126	0.049	0.087	0.062	0.200	0.150
Exchangeable Calcium (cmol./kg)	Rayment & Lyons 2011 - 15D3 (Ammonium Acetate)	5.0	7.6	2.0	1.8	15.6	10.8
		(kg/ha)	2,234	3,399	909	797	7000
(mg/kg)		997	1,517	406	356	3125	2150
Exchangeable Magnesium (cmol./kg)		3.8	4.8	2.3	2.6	2.4	1.7
		(kg/ha)	1,025	1,301	630	703	650
(mg/kg)		457	581	281	314	290	200
Exchangeable Potassium (cmol./kg)		0.85	0.30	0.27	0.28	0.60	0.50
		(kg/ha)	748	259	234	248	526
(mg/kg)		334	116	105	111	235	190
Exchangeable Sodium (cmol./kg)		5.3	0.31	1.9	0.89	0.3	0.26
	(kg/ha)	2,710	160	976	459	155	134
(mg/kg)	1,210	72	436	205	69	60	
Exchangeable Aluminium (cmol./kg)	**Inhouse S37 (KCl)	0.12	0.10	0.47	0.96	0.6	0.5
		(kg/ha)	24	21	94	194	121
(mg/kg)		11	9.2	42	86	54	45
Exchangeable Hydrogen (cmol./kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	0.63	0.81	0.76	1.0	0.6	0.5
		(kg/ha)	14	18	17	23	13
(mg/kg)		6.3	8.1	7.6	10	6	5
Effective Cation Exchange Capacity (ECEC) (cmol./kg)	**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol./kg)	16	14	7.7	7.5	20.1	14.3
Calcium (%)	**Base Saturation Calculations - Cation cmol./kg / ECEC x 100	32	55	26	24	77.6	75.7
Magnesium (%)		24	34	30	34	11.9	11.9
Potassium (%)		5.5	2.1	3.5	3.8	3.0	3.5
Sodium - ESP (%)		34	2.2	25	12	1.5	1.8
Aluminium (%)		0.77	0.74	6.0	13	6.0	7.1
Hydrogen (%)		4.0	5.9	9.9	14		
Calcium/Magnesium Ratio	**Calculation: Calcium / Magnesium (cmol./kg)	1.3	1.6	0.87	0.69	6.5	6.4

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	Sample 7	Sample 8	Sample 9	Sample 10	Heavy Soil	Medium Soil
Sample ID:	Paddock 8	Paddock 11-Sample 1	Paddock 11-Sample 2	Paddock 11-Sample 3		
Crop:	Pasture	Pasture	Pasture	Pasture		
Client:	MRM	MRM	MRM	MRM	Clay	Clay Loam
Parameter	Method reference				Indicative guidelines -	
	M2539/7	M2539/8	M2539/9	M2539/10		

- Notes:**
- All results presented as a 40°C oven dried weight. Soil sieved and lightly crushed to < 2 mm.
  - Methods from Rayment and Lyons, 2011. *Soil Chemical Methods - Australasia*. CSIRO Publishing: Collingwo
  - Soluble Salts included in Exchangeable Cations - NO PRE-WASH (unless requested).
  - 'Morgan 1 Extract' adapted from 'Science in Agriculture', 'Non-Toxic Farming' and LaMotte Soil Handbook.
  - Guidelines for phosphorus have been reduced for Australian soils.
  - Indicative guidelines are based on 'Albrecht' and 'Reams' concepts.
  - Total Acid Extractable Nutrients indicate a store of nutrients.
  - National Environmental Protection (Assessment of Site Contamination) Measure 2013, Schedule B(1) - Guideline on Investigation Levels for Soil and Groundwater. Table 5-A Background Ranges.
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		Light Soil	Sandy Soil
Sample ID:			
Crop:			
Client:		Loam	Loamy Sand
Parameter	Method reference	refer to Notes 6 and 8	
Nitrate Nitrogen (mg/kg N)	**Inhouse S37 (KCl)	10	10
Ammonium Nitrogen (mg/kg N)		15	12
pH	Rayment & Lyons 2011 - 4A1 (1:5 Water)	6.3	6.3
Electrical Conductivity (dS/m)	Rayment & Lyons 2011 - 3A1 (1:5 Water)	0.120	0.100
Exchangeable Calcium	(cmol./kg)	5.0	1.9
	(kg/ha)	2240	840
Exchangeable Magnesium	(mg/kg)	1000	375
	(cmol./kg)	1.2	0.60
Exchangeable Potassium	(kg/ha)	325	168
	(mg/kg)	145	75
Exchangeable Sodium	(cmol./kg)	0.40	0.30
	(kg/ha)	396	224
Exchangeable Aluminium	(mg/kg)	150	100
	(cmol./kg)	0.22	0.11
Exchangeable Hydrogen	(kg/ha)	113	57
	(mg/kg)	51	25
Exchangeable Aluminium	(cmol./kg)	0.4	0.2
	(kg/ha)	73	30
Exchangeable Hydrogen	(mg/kg)	32	14
	(cmol./kg)	0.4	0.2
Effective Cation Exchange Capacity (ECEC) (cmol./kg)	**Rayment & Lyons 2011 - 15G1 (Acidity Titration)	8	3
Calcium (%)	**Calculation: Sum of Ca,Mg,K,Na,Al,H (cmol./kg)	4	2
Magnesium (%)		7.8	3.3
Potassium (%)	**Base Saturation Calculations - Cation cmol./kg / ECEC x 100	65.6	57.4
Sodium - ESP (%)		15.7	18.1
Aluminium (%)		5.2	9.1
Hydrogen (%)		2.9	3.3
Calcium/Magnesium Ratio	**Calculation: Calcium / Magnesium (cmol./kg)	10.5	12.1
		4.2	3.2

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			<b>Light Soil</b>	<b>Sandy Soil</b>
		Sample ID:		
		Crop:		
		Client:	Loam	Loamy Sand
	<b>Parameter</b>	<b>Method reference</b>	refer to Notes 6 and 8	

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