

**Moreton Bay Regional Council
Acid Sulfate Soils
Pine Rivers Area**

Volume 2

Appendix 1 MAS Summarised Analytical Data (A3)

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Environment and Resource Management, 41 George Street Brisbane QLD 4000
Published by the Queensland Government, March 2011

ISBN: 9311662191731
June, 2011
Volume 2

Material from this publication may be used providing both the author and the publishers are acknowledged.

Citation of this publication should take the form:
Walton, J.S, Manders J.A, Goulding K.E (2011). *Moreton Bay Regional Council Acid Sulfate Soils - Pine Rivers Area, Volume 2*.
Department of Environment and Resource Management, Queensland, Australia.

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Analytical Data Method Codes

Field Morphology Summary	
Site ID	Borehole or site number
Hor No	Horizon number
Horizon Name ¹	Name of horizon
Upp Depth	Upper depth of horizon (m)
Low Depth	Lower depth of horizon (m)
Colour ²	Colour of horizon
Soil Texture ¹	Soil texture
Jar.	Indicates presence of Jarosite (J) in profile
Gyp.	Indicates presence of Gypsum (Y) in profile
Shell	Indicates presence of Shell (SS) in profile
Field pH	
Depth (m) ³	Depth at which pH _F and pH _{FOX} tests were conducted
pH _F (23Af) ⁴	pH measured in the field on saturated soil sample using pH electrode
pH _{FOX} (23Bf) ⁴	pH measured in the field – 30% peroxide reaction, pH electrode
Action Level pH _F	Indication of actual acidity from field test results A = pH _F ≤ 4, a = pH _F > 4 to ≤ 5
	The depth category of the upper depth of the first horizon where pH _F is less than or equal to 4
Depth 1st Action Level (pH _F)	A0 pH _F < 4 is first exceeded 0–0.5 m below the surface
	A1 pH _F < 4 is first exceeded 0.5–1 m below the surface
	A2 1–2 m, A3 2–3 m, A4 3–4 m, A5 4–5 m
Lab Sample ³	
No.	Sample number of sample taken for analysis
Upp Depth	Upper depth of sample taken for analysis (m)
Low Depth	Lower depth of sample taken for analysis (m)
Action Criteria ³	
Depth 1st Action Level	The depth category of the upper depth of the first horizon where the texture-based ASS action criteria is exceeded. 'S' denotes potential acidity for the respective depth categories.
Action Level Select %S	Pc, Pl or Ps indicates samples that have exceeded 0.1, 0.06 or 0.03 %S (ie. exceeded the ASS action criteria), for clays, loams and sands respectively.
	Note: These figures apply to disturbances up to 1000 tonnes; for disturbances greater than 1000 tonnes, the action criteria is 0.03 %S, regardless of texture

Laboratory Results	Method Code	Units	Description
Suspension Peroxide Oxidation Combined Acidity and Sulfur (SPOCAS) Acid Base Accounting⁴			
s-TAA	%S		S _{POS} + s-TAA WHERE pH _{KCl} ≥ 4.5 AND pH _{KCl} < 6.5 AND s-TPA > 0
s-S _{NAS}	%S		S _{POS} + s-TAA + s-S _{NAS} WHERE pH _{KCl} < 4.5 AND s-TPA > 0 (substitute with s-S _{RAS} where available)
Chromium Suite Acid Base Accounting⁴			
s-TAA	%S		S _{CR} + s-TAA WHERE pH _{KCl} ≥ 5.5 AND pH _{KCl} < 6.5 (s-TAA is not required if the result for S _{CR} is below the action criteria for relevant soil texture)
s-TAA	%S		S _{CR} + s-TAA WHERE pH _{KCl} ≥ 4.5 AND pH _{KCl} < 5.5
s-S _{NAS}	%S		S _{CR} + s-TAA + s-S _{NAS} WHERE pH _{KCl} < 4.5
Potential Acidity⁴			
S _{CR} (Sulfur, chromium reducible)	22B	%S	(from Chromium Reducible Sulfur method)
S _{POS} (Peroxide oxidisable sulfur)	23Ee	%S	= S _P – S _{KCl}
s-TSA (Titratable sulfidic acidity)	s-23H	%S	= (TPA – TAA) / 623.7 (TSA calculated as equivalent % pyrite S)
s-TPA (Titratable peroxide acidity)	s-23G	%S	= (TPA / 623.7) (TPA calculated as equivalent % pyrite S)
Retained Acidity⁴			
s-S _{NAS} (Net acid-soluble sulfur)	s-20J	%S	= (S _{HCl} – S _{KCl}) x 0.75 (S _{NAS} converted to equivalent % pyrite S)
Actual Acidity⁴			
s-TAA (Titratable actual acidity)	s-23F	%S	= (TAA / 623.7) (TAA calculated as equivalent % pyrite S)
S _{HCl}	20Be	%S	Hydrochloric acid extracted sulfur
Suspension Peroxide Oxidation Combined Acidity and Sulfur (SPOCAS)⁴			
pH _{KCl}	23A	%S	pH of soil in potassium chloride (KCl) extract
pH _{OX}	23B	%S	pH of soil after peroxide digestion
S _{KCl}	23Ce	%S	KCl extracted sulfur
S _P	23De	%S	Peroxide sulfur
s-Ca _A	s-23Xh	%S	(Ca _A x 0.800) (Ca _A in equivalent % pyrite S it will neutralise)
s-Mg _A	s-23Um	%S	(Mg _A x 1.319) (Mg _A in equivalent % pyrite S it will neutralise)
s-Ca _A +s-Mg _A	s-23Xh+s-23Um	%S	Addition of Reacted Calcium and Magnesium (in equivalent % pyrite S it will neutralise)
Neutralising Capacity⁴			
s-ANC _{BT}	s-19A2	%S	(ANC _{BT} / 3.121) (ANC _{BT} in equivalent % pyrite S it will neutralise)
s-ANC _E	s-23Q	%S	(ANC _E / 3.121) (ANC _E in equivalent % pyrite S it will neutralise)

Reference

- 1 McDonald RC, Isbell RF, Speight JG, Walker J and Hopkins MS (1990). *Australian Soil and Land Survey Field Handbook*. 2nd Edition, Inkata Press Melbourne Australia
- 2 Munsell (2000). *Munsell Soil Colour Charts*. Gretag Macbeth, Little Britain Road, New Windsor, NY.
- 3 Sample selection and handling is as per Ahern CR, Ahern MR and Powell B (1998). *Guidelines for Sampling and Analysis of Lowland Acid Sulfate Soils (ASS) in Queensland*. Department of Natural Resources, Indooroopilly, Queensland, Australia
- 4 Ahern CR, McElnea AE and Sullivan LA (2004) (Eds). *Acid Sulfate Soils Laboratory Methods Guidelines*. Department of Natural Resources, Mines and Energy, Indooroopilly, Queensland, Australia

Field Morphology Summary										Lab Sample		Action Criteria		SPOCAS ABA			Chromium (S_{CR}) Suite ABA			Potential Acidity				Retained Acidity		Actual Acidity		SPOCAS Method								Neutralising Capacity						
Site ID	Hor No	Horizon Name	Upp Depth	Low Depth	Colour	Soil Texture	Jar.	Gyp.	Shell	Field pH				No	Upp Depth	Low Depth	Depth 1st Action Level (pH _F)	Action Level (pH _F)	<=4.5 pH KCl <6.5		<=4.5 pH KCl <6.5		<=4.5 pH KCl <5.5		pH KCl <4.5		S_{CR}	S_{POS}	S_{TSA}	S_{TPA}	$s-S_{NAS}$	$s-TAA$	S_{HCl}	pH_{KCl}	pH_{OX}	S_{KCl}	S_p	$s-Ca_A$	$s-Mg_A$	$s-Ca_A+s-Mg_A$	$s-ANC_{BT}$	$s-ANC_E$
										Depth (m)	pH _F	pH _{FOX}	Action Level Select %S																													
1	1	A1	0.00	0.10	10YR31	MC				0.10	4.7	2.5	a																													
2	B21	0.10	0.70	2.5Y32	MHC					0.30	4.4	2.6	a																													
3	B22ia	0.70	1.20	10YR51	HC	J				0.80	4.5	2.6	a																													
4	B3ia	1.20	1.60	10YR51	MC					1.00	4.6	2.4	a	4	0.80	1.00			0.147		0.138	< 0.02	0.010	0.000	0.069	0.008	0.13	0.031	3.5	4.5	0.02	0.03	0.001	0.000	0.000							
5	C1i	1.60	2.67	N40	MC					1.25	4.6	2.6	a	5	1.30	1.50						< 0.02				0.18	3.5	0.03														
6	2C2	2.67	3.40	5GY61	KS					1.50	4.4	3.0	a																													
7	3C3	3.40	3.85	N40	LC					1.75	4.6	3.1	a																													
8	4C4u	3.85	5.30	5Y61	LS					2.00	4.6	2.6	a	6	1.80	2.00																										
9	4C5u	5.30	5.97	5Y61	CLS					2.25	4.4	2.0	a																													
10	D1	5.97	6.30	5GY61	LMC					2.50	4.6	1.7	a	7	2.30	2.50	S2	Pc																								
11	D2	6.30	7.50	2.5Y76	SLMC					2.75	5.4	1.7	a																													
2	1	A1	0.00	0.15	2.5Y41	LC				3.00	4.4	1.5	a	9	3.20	3.40			Ps																							
2	B21	0.15	0.55	10YR51	SLMC					3.25	4.3	1.4	a																													
3	B22	0.55	0.85	10YR41	FSLC					3.50	4.3	1.6	a																													
4	B23i	0.85	1.75	2.5Y51	HC					3.75	5.4	1.7	a																													
5	2C1	1.75	2.40	2.5Y72	S					4.00	5.8	2.0	a	10	3.60	3.80			Ps																							
6	2C2	2.40	4.25	2.5Y51	S					4.25	6.2	2.3	a																													
7	D	4.25	4.30	5GY81					4.50	6.2	2.1	a																														
3	1	A1	0.00	0.15	10YR33	CL				4.75	6.7	1.7	a																													
2	B21	0.15	0.40	5Y42	MHC					5.00	7.3	6.7	a																													
3	B22	0.40	0.60	5Y51	FSLC					5.25	6.9	6.5	a																													
4	B23	0.60	0.95	5Y51	HC					5.50	6.8	5.9	a																													
5	B24	0.95	1.55	10Y51	MHC					5.75	7.1	6.9	a																													
6	B25	1.55	2.05	10Y51	SLC					6.00	6.0	1.6	a																													
7	B26	2.05	2.30	10YR51	LMC					6.25	5.9	4.7	a	6	1.60	1.80			Ps																							
8	B27	2.30	2.60	5Y51	SLC					6.50	5.7	4.6	a	7	2.10	2.30																										
9	B28	2.60	3.80	5Y41	SLC					6.75	6.4																															

Field Morphology Summary										Lab Sample		Action Criteria		SPOCAS ABA			Chromium (S_{CR}) Suite ABA			Potential Acidity				Retained Acidity		Actual Acidity		SPOCAS Method						Neutralising Capacity								
Site ID	Hor No	Horizon Name	Upp Depth (m)	Low Depth (m)	Colour	Soil Texture	Jar.	Gyp.	Shell	Field pH				No	Upp Depth (m)	Low Depth (m)	Depth 1st Action Level (pH _F)	Action Level Select %S	<=4.5 pH KCl <4.5		<=5.5 pH KCl <6.5		<=4.5 pH KCl <5.5		pH KCl <4.5		S_{CR}	S_{POS}	S_{TSA}	S_{TPA}	$s-S_{NAS}$	$s-TAA$	s_{HCl}	pH_{KCl}	pH_{OX}	S_{KCl}	S_P	$s-Ca_A$	$s-Mg_A$	$s-Ca_A+s-Mg_A$	$s-ANC_{BT}$	$s-ANC_E$
										Depth (m)	pH _F	pH _{FOX}	Action Level (pH _F)	Depth 1st Action Level (pH _F)					%S	%S	%S	%S	%S	%S	%S	%S	%S	%S	%S	%S	%S	%S										
										23Af	23Bf																															
17	1	A1	0.00	0.05	10YR32	CL				0.10	5.4	3.0																														
	2	B21	0.05	0.40	10YR43	ZCL				0.30	5.8	2.9																														
3	B22	0.40	0.70	10YR43	ZCL				0.60	6.1	3.6					2	0.40	0.70																								
4	B3	0.70	1.00	10YR52	LC				0.80	6.5	3.0					1.00	6.8	4.0																								
5	C1	1.00	1.30	10YR54	S				1.25	6.9	5.0					4	1.00	1.30																								
6	C2	1.30	1.60	10YR64	S				1.50	6.6	4.7																															
7	2C3	1.60	1.80	10YR52	CL				1.75	5.6	4.6					6	1.60	1.80																								
8	3C4	1.80	4.50	10YR63	CS				2.00	6.7	5.7					7	1.80	2.00																								
									3.25	6.9	5.7																															
									3.50	6.8	6.1																															
									3.75	6.8	5.7																															
									4.00	6.7	5.8																															
									4.25	6.8	5.7																															
									4.50	6.8	6.5																															
9	4C5	4.50	7.30	10YR63	KS				4.75	7.0	6.1					5.00	7.0	6.1																								
									5.25	6.9	6.0																															
									5.50	6.9	6.1																															
									5.75	6.9	6.1																															
									6.00	7.1	5.9																															
									6.25	6.8	5.9																															
									6.50	7.0	6.0																															
									6.75	7.0	5.8																															
									7.00	7.0	5.4																															
									7.25	7.1	7.5																															
10	5D	7.30	7.50	5G51	LC				7.50	7.1	8.3					15	7.30	7.50																								
18	1	A11	0.00	0.10	7.5YR32	SCL				0.10	6.4	3.6					1	0.00	0.10																							
2	A12	0.10	0.20	10YR44	CS																																					
3	A2	0.20	0.40	10YR54	CS				0.30	6.4	5.1					2	0.20	0.40																								
4	B21	0.40	0.60	10YR54	ZCL				0.60	5.2	4.6					3	0.40	0.60																								
5	B22	0.60	0.75	2.5Y41	LC											4	0.60	0.75			</																					

Field Morphology Summary										Lab Sample		Action Criteria		SPOCAS ABA		Chromium (S _{CR}) Suite ABA				Potential Acidity				Retained Acidity	Actual Acidity	SPOCAS Method								Neutralising Capacity							
Site ID	Hor No	Horizon Name	Upp Depth	Low Depth	Colour	Soil Texture	Jar.	Gyp.	Shell	Field pH				No	Upp Depth	Depth 1st Action Level	Action Level Select	<=4.5 pH KCl <6.5		<=5.5 pH KCl <6.5		<=4.5 pH KCl <5.5		pH KCl <4.5		S _{CR}	S _{POS}	s-TSA	s-TPA	s-S _{NAS}	s-TAA	S _{HCl}	pH _{KCl}	pH _{Ox}	S _{KCl}	S _P	s-Ca _A	s-Mg _A	s-Ca _A +s-Mg _A	s-ANC _{BT}	s-ANC _E
										Depth	pH _F	pH _{FOX}	Action Level (pH _F)	Depth 1st Action Level (pH _F)																											
			(m)							(m)				(m)				%S		%S		%S		%S		%S		%		%		%		%							
20	1	A11	0.00	0.30	10YR34	CLFS				0.10	5.6	3.6																													
			(m)							0.30	5.8	2.9																													
2	A12	0.30	1.00	10YR43	CLFS					0.60	6.2	3.5																													
			(m)							0.80	6.3	5.4																													
3	B21	1.00	1.90	10YR24	LC					1.25	6.3	5.0																													
			(m)							1.50	6.6	4.7																													
4	B22	1.90	2.45	2.5YR24	LMC					1.75	6.0	3.5																													
			(m)							2.00	6.0	3.8																													
5	B3	2.45	3.00	10Y51	SLC					2.25	5.6	3.4																													
			(m)							2.50	5.4	3.3																													
6	2B2	3.00	3.65	10Y41	CS					2.75	5.6	3.1																													
			(m)							3.00	5.3	3.6																													
7	2Cu	3.65	4.50	10Y41	CS					3.25	5.7	4.6																													
			(m)							3.50	5.2	2.2																													
8	3Cu	4.50	5.65	10Y51	LS					3.75	6.1	2.4																													
			(m)							4.00	6.4	1.9																													
9	4Cu	5.65	6.22	10Y51	LS					4.25	6.8	2.3																													
			(m)							4.50	6.4	1.9																													
10	5D	6.22	6.40	5Y52	KSLC					4.75	6.2	2.2																													
			(m)							5.00	6.4	2.0																													
21	1	A11	0.00	0.10	2.5Y32	ZLC				0.10	5.2	2.6																													
	2	A3	0.10	0.40	2.5Y32	ZLC				0.30	5.3	3.0																													
3	B21	0.40	0.70	2.5Y41	FSLC					0.60	6.2	3.5																													
4	B22	0.70	1.10	2.5Y31	ZCL					0.80	6.4	4.3																													
			(m)							1.00	5.8	3.6																													
5	B23i	1.10	1.65	2.5Y32	ZCL					1.25	4.7	2.8	a																												
			(m)							1.50	4.6	2.0	a																												
6	C1u	1.65	2.20	N2.5/0	ZLC					1.75	5.9	1.7																													
			(m)							2.00	5.4	1.9																													
7	C2u	2.20	2.50	N40	ZLC					2.25	5.3	1.7																													
			(m)							2.50	6.2	3.0																													
8	2C1u	2.50	3.00	N40	CS					2.75	6.3	2.6																													
			(m)							3.00	6.5	2.0																													
9	2C2u	3.00	3.50	N40	SLC					3.25	5.9	1.7																													
			(m)							3.50	6.1	1.8																													
10	3C1u	3.50	4.60	N40	LS					3.75	6.1	2.0																													
			(m)							4.00	6.3	2.4																													
			(m)																																						

Field Morphology Summary										Lab Sample		Action Criteria		SPOCAS ABA		Chromium (S _{CR}) Suite ABA		Potential Acidity				Retained Acidity	Actual Acidity	SPOCAS Method								Neutralising Capacity												
Site ID	Hor No	Horizon Name	Upp Depth	Low Depth	Colour	Soil Texture	Jar.	Gyp.	Shell	Field pH				No	Upp Depth	Depth 1st Action Level	Action Level Select	<=4.5 pH KCl <6.5		<=5.5 pH KCl <6.5		<=4.5 pH KCl <5.5		pH KCl <4.5		S _{CR}	S _{PPOS}	s-TSA	s-TPA	s-S _{NAS}	s-TAA	S _{HCl}	pH _{KCl}	pH _{Ox}	S _{KCl}	S _P	s-Ca _A	s-Mg _A	s-Ca _A +s-Mg _A	s-ANC _{BT}	s-ANC _E			
										(m)	(m)	(m)	(m)					s-TAA	s-S _{NAS}	s-TAA	s-TAA	s-S _{NAS}	s-TAA	s-S _{NAS}	22B	23Ee	s-23H	s-23G	s-20J	s-23F	20Be	23A	23B	23Ce	23De	s-23Xh	s-23Um	s-23Xh+s-23Um	s-19A2	s-23Q				
32	1	A1	0.00	0.05	10YR21	ZLC				0.01	6.1	5.2			1	0.00	0.05							< 0.02																				
2	B21	0.05	0.23	10YR51	ZLC				0.10	6.3	4.9																																	
3	B22	0.23	0.72	2.5Y51	ZLC				0.30	6.6	6.2					3	0.30	0.40								< 0.02																		
4	C1u	0.72	0.85	5Y51	ZLC				0.80	6.2	5.4					5	0.72	0.85								0.027																		
5	C2u	0.85	1.10	5Y41	ZLC				1.00	6.4	4.4					6	0.85	1.05	S1	Pc							0.682																	
6	C3u	1.10	1.40	5Y41	ZLC				1.40	6.6	4.3					7	1.20	1.40		Pc							3.343																	
33	1	A1	0.00	0.20	10YR41	FSCL				0.10	5.4	3.0					2	0.30	0.40							< 0.02																		
2	B21	0.20	0.50	10YR42	FSLC				0.30	5.6	2.8																																	
3	B22	0.50	1.10	10YR43	ZLC				0.60	5.1	3.6	a	a			4	0.80	1.00							< 0.02											0.09	3.9	0.01						
4	B23	1.10	1.40	10YR53	ZLC				1.25	5.0	4.0	a				6	1.60	1.80							< 0.02																			
5	B24	1.40	1.80	10YR62	ZMC				1.50	5.5	5.9					7	1.80	2.00							< 0.02											0.05	4.4	0.01						
6	B25	1.80	2.10	10YR52	ZLMC				2.00	5.1	3.8					8	2.10	2.30							< 0.02											0.06	4.2	0.01						
7	2C1	2.10	2.30	2.5Y51	SLC				2.25	5.6	3.7					9	2.30	2.50	S3	Pl						0.452																		
8	3C2u	2.30	2.60	2.5Y51	SCL				2.50	6.4	4.6					10	2.60	2.70		Ps							0.37																	
9	4C3u	2.60	2.70	2.5Y51	S				2.70	6.5	4.5																																	
34	1	A1	0.00	0.10	10YR31	CL				0.05	5.5	2.4					2	0.10	0.20							< 0.02																		
2	B21	0.10	0.20	5Y51	LMC				0.11	5.5	2.4																																	
3	B22	0.20	0.35	5Y41	LMC				0.30	6.3	2.4					4	0.50	0.70							0.049																			
4	2A1	0.35	0.72	2.5Y31	ZLMC				0.60	6.6	2.8																																	
5	2B1	0.72	1.00	5Y41	ZLC				0.80	6.7	2.9					6	1.00	1.20							0.058																			
6	2B2	1.00	1.28	2.5Y51	ZLC				1.25	6.9	2.6					7	1.40	1.60							0.032																			
7	3Cu	1.28	1.65	10Y51	SLC				1.50	6.6	2.7																																	
35	1	A11	0.00	0.10	7.5YR32	LC				0.01	5.1	3.6					5	1.00	1.20							< 0.02																		
2	A12	0.10	0.35	10YR42	LC				0.30	5.1	4.0																																	
3	B21	0.35	0.55	10YR61	MC																																							
4	B22	0.55	1.00	10YR62	MHC				0.60	5.0	3.6	a	a			3	0.60	0.80							< 0.02											0.04	4.2	0.03						
5	B23	1.00	1.50	10YR62	MHC				1.25	5.1	4.0					5	1.00	1.20							< 0.02																			
6	B24	1.50	2.00	10YR61	HC				1.75	5.9	5.1					7	1.60	1.80							< 0.02																			
7	B25	2.00	2.40	10YR62	SHC				2.25	6.1	5.4																																	
8	B26	2.40	2.70	2.5Y71	SHC				2.50	6.0	5.4																																	
9	2B	2.70	3.20	2.5Y71	SMC				2.75	6.1	5.0					11	2.90	3.10								< 0.02																		
10	3B21	3.20	3.50	2.5Y61	HC				3.25	6.1	4.8					13	3.70	3.90								< 0.02																		
11	3B22	3.50	4.00	2.5Y71	SHC				3.75	5.2	5.0					4.00	5.4	5.1																										
36	1	A11	0.00	0.12	10YR31	IP				0.10	5.2	4.4																																

Field Morphology Summary										Lab Sample		Action Criteria		SPOCAS ABA			Chromium (SCR) Suite ABA			Potential Acidity				Retained Acidity		Actual Acidity		SPOCAS Method						Neutralising Capacity					
Site ID	Hor No	Horizon Name	Upp Depth	Low Depth	Colour	Soil Texture	Jar.	Gyp.	Shell	Field pH				No	Upp Depth	Low Depth	Depth 1st Action Level (pH _F)	Action Level Select %S	<=4.5 pH KCl <6.5	pH KCl <4.5	<=5.5 pH KCl <6.5	<>4.5 pH KCl <5.5	pH KCl <4.5	S _{CR}	S _{POS}	s-TSA	s-TPA	s-S _{NAS}	s-TAA	S _{HCl}	pH _{KCl}	pH _{Ox}	S _{KCl}	S _P	s-Ca _A	s-Mg _A	s-Ca _{A+s-Mg_A}	s-ANC _{BT}	s-ANC _E
										(m)	(m)	(m)	(m)																										
										23Af	23Bf																												
37	1	A1	0.00	0.10	2.5Y43	CL				0.10	5.4	3.9																											
2	B1	0.10	0.30	2.5Y43	CL					0.30	6.1	5.2																											
3	B21	0.30	0.50	2.5Y54	LC					0.60	6.5	5.4																											
4	B22	0.50	1.10	10YR54	MC					0.80	6.7	5.8																											
5	B23	1.10	1.40	10YR58	LMC					1.00	7.0	6.6																											
6	B24	1.40	2.00	10YR58	LC					1.50	7.4	8.1																						0.23					
7	B25	2.00	2.70	10YR58	LC					2.25	7.6	8.4																											
8	2B21	2.70	3.25	10Y61	MC					2.50	7.6	8.1																											
38	1	A11	0.00	0.15	10YR32	LC				0.10	5.3	3.4																											
2	A12	0.15	0.30	10YR22	LMC					0.30	4.5	3.1	a																										
3	B21	0.30	0.60	10YR41	MC					0.60	5.0	2.7	a																										
4	B22	0.60	0.90	2.5Y31	MHC					0.80	5.1	2.8																											
5	B23i	0.90	1.15	2.5Y41	LMC					1.00	5.3	2.6					5	0.90	1.10																				
6	B24i	1.15	1.30	10YR46	MC					1.25	4.6	3.0	a					6	1.15	1.30																			
7	B25	1.30	1.60	2.5Y41	MC					1.50	5.8	3.3						7	1.40	1.60																			
8	C	1.60	2.00	2.5Y51	KSLC					1.75	6.4	3.5						8	1.80	2.00																			
9	2C	2.00	2.70	5Y41	KS					2.25	6.7	3.2					9	2.20	2.40																				
10	3Cu	2.70	4.80	5GY41	KS					2.75	7.0	2.7						10	2.70	3.60	S3	Ps																	
11	4B2	4.80	5.80	5Y61	SHC					5.00	5.7	3.5						12	4.90	5.10																			
39	1	A1	0.00	0.30	10YR42	LC				0.10	5.3	3.0																											
2	B21	0.30	0.95	10YR41	MC					0.60	6.2	3.9						3	0.50	0.60																			
3	B22i	0.95	1.30	2.5Y51	MC					1.00	4.9	2.7	a					5	1.10	1.30																			
4	B23i	1.30	1.70	5Y41	MC					1.25	4.6	2.7	a					6	1.40	1.60																			
5	C11	1.70	1.85	5Y41	ZCL					1.50	4.6	3.0	a					7	1.70	1.85																			
6	C21	1.85	2.20	N40	ZCL					1.75	4.4	2.4	a					8	1.90	2.10	S2	PI																	
7	C3u	2.20	3.95	N40	ZCL					2.25	5.8	1.4						10	2.80	3.00		PI																	
8	2C1u	3.95	4.25	5Y53	KS					4.00	6.8	1.4						12	3.80	3.95		PI																	
9	2C2	4.25	4.50	5Y64	KS					4.25	6.7	5.																											

Field Morphology Summary										Lab Sample			Action Criteria		SPOCAS ABA		Chromium (S_{Cr}) Suite ABA				Potential Acidity				Retained Acidity	Actual Acidity		SPOCAS Method								Neutralising Capacity																		
Site ID	Hor No	Horizon Name	Upp Depth	Low Depth	Colour	Soil Texture	Jar.	Gyp.	Shell	Field pH						No	Upp Depth	Low Depth	Depth 1st Action Level (pH _F)	Action Level (pH _F)	Depth 1st Action Level (pH _F)	Action Criteria		SPOCAS ABA		Chromium (S_{Cr}) Suite ABA				Potential Acidity				s-S _{NAS}	s-TAA	S_{HCl}	pH _{KCl}	pH _{Ox}	S_{KCl}	S _P	s-Ca _A	s-Mg _A	s-Ca _A +s-Mg _A	s-ANC _{B1}	s-ANC _{E1}									
										(m)	(m)	(m)	(m)	(m)	(m)																																							
(m)										Field pH						No	Upp Depth	Low Depth	Depth 1st Action Level (pH _F)	Action Level (pH _F)	Depth 1st Action Level (pH _F)	Action Criteria		SPOCAS ABA		Chromium (S_{Cr}) Suite ABA				Potential Acidity				s-S _{NAS}	s-TAA	S_{HCl}	pH _{KCl}	pH _{Ox}	S_{KCl}	S _P	s-Ca _A	s-Mg _A	s-Ca _A +s-Mg _A	s-ANC _{B1}	s-ANC _{E1}									
(m)										23Af	23Bf	Depth	pH _F	pH _{Ox}	Action Level (pH _F)																																							
41	1	A1	0.00	0.30	10YR42	CL				0.10	6.5	4.7				1	0.00	0.10																																				
										0.30	6.4	6.2																																										
2	B21	0.30	0.70	2.5Y42	LC					0.60	6.3	7.0					3	0.50	0.60																																			
3	B22	0.70	1.05	2.5Y52	LC					0.80	6.3	6.9																																										
4	C1u	1.05	1.40	10Y51	LC					1.25	6.3	1.7					5	1.20	1.40																																			
5	2C2u	1.40	2.00	N40	FSCL					1.50	6.1	2.3					6	1.70	1.90																																			
										1.75	6.1	2.0																																										
6	2C3u	2.00	2.40	N40	CLFS					2.25	6.5	1.5					7	2.10	2.30																																			
7	3C4u	2.40	2.60	5Y41	LS					2.50	7.5	1.5					8	2.40	2.60																																			
8	4C5	2.60	4.00	5Y41	KS					2.75	7.2	1.4					9	2.70	2.90																																			
										3.25	6.7	5.4																																										
										3.75	7.1	5.1					10	3.40	3.80																																			
42	1	M1	0.00	0.95	10YR41	CL				0.10	4.5	3.0	a				2	0.20	0.30																																			
										0.30	4.2	2.1	a																																									
2	2A1	0.95	1.30	N20	ZMC					1.00	5.7	1.9					4	0.95	1.10																																			
3	2A2	1.30	1.55	5Y41	LMC					1.50	4.5	3.0	a				5	1.30	1.50																																			
4	2B2	1.55	2.30	5Y51	MC					1.75	3.8	2.8	A	A2			6	1.80	2.00																																			
5	3B2	2.30	3.00	2.5YR46	MHC					2.50	3.5	2.5	A																																									
										2.75	3.8	2.8	a																																									
										3.00	4.1	3.0	a				8	2.80	3.00																																			
43	1	A11	0.00	0.30	5Y2.5/1	ZCL				0.10	5.2	2.2																																										
2	A12	0.30	0.55	5Y41	SLC					0.40	5.4	2.7																																										
3	2B2	0.55	1.00	10YR62	S					0.60	4.9	1.9	a				4	0.70	0.90																																			
4	3B21	1.00	1.32	2.5Y71	CS					1.25	4.7	2.8	a																																									
5	3B22	1.32	1.85	2.5Y71	SLC					1.50	4.4	2.4	a																																									
6	3B24	1.85	2.90	2.5Y61	MHC					2.25	4.2	2.5	a				7	1.90	2.10																																			

Field Morphology Summary										Lab Sample		Action Criteria		SPOCAS ABA			Chromium (S_{CR}) Suite ABA			Potential Acidity				Retained Acidity		Actual Acidity		SPOCAS Method						Neutralising Capacity															
Site ID	Hor No	Horizon Name	Upp Depth	Low Depth	Colour	Soil Texture	Jar.	Gyp.	Shell	Field pH				No	Upp Depth	Low Depth	Depth	Action Level	1st Action Level Select %S		<=4.5 pH KCl <6.5		<4.5 pH KCl <6.5		pH KCl <4.5		S_{CR}	S_{POS}	S_{TSA}	S_{TPA}	$S-S_{NAS}$	$S-TAA$	S_{HCl}	pH_{KCl}	pH_{Ox}	S_{KCl}	S_P	$s-Ca_A$	$s-Mg_A$	$s-Ca_A+s-Mg_A$	$s-ANC_{BT}$	$s-ANC_E$							
										(m)		(m)								%S		%S		%S																									
										(m)		(m)								s-TAA		s-TAA		s-TAA																									
62	1	A1	0.00	0.20	2.5Y2.5/1	CL				0.10	4.5	3.4	a	1	0.00	0.10							0.120	< 0.02					0.11	4.9	0.18																		
	2	B21	0.20	0.70	2.5Y51	LS				0.30	4.7	3.5	a	2	0.30	0.40							0.003	< 0.02					0.00	5.4	0.04																		
										0.60	5.3	4.3		3	0.60	0.70							< 0.02							6.6	0.04																		
3	C1	0.70	1.30	5Y51	LS					0.80	5.8	4.4		4	0.90	1.00								< 0.02																									
4	C2	1.30	1.95	5Y41	SL		SS			1.50	5.8	2.1		5	1.30	1.50	S2	PI						0.277																									
										1.75	5.9	1.8		6	1.75	1.95		PI						0.396																									
5	C3	1.95	2.50	5Y41	FSLC					2.00	6.0	2.0		7	2.10	2.30		Pc						0.437																									
6	C4	2.50	2.80	5Y41	CLFS					2.75	5.8	2.1		8	2.60	2.80		PI						0.247																									
7	D	2.80	3.00	10YR46	SLC					3.00	5.8	4.9		9	2.80	3.00							< 0.02																										
63	1	A1	0.00	0.22	10YR21	FSLC				0.10	4.5	2.8	a																																				
	2	B2	0.22	1.30	10YR62	LS				0.30	4.7	4.0	a	2	0.50	0.60							0.012	< 0.02					0.002	0.01	0.024	4.7	0.02																
										0.60	4.1	3.3	a	3	0.80	1.00						0.013	< 0.02					0.020	0.01	0.053	4.7	0.03																	
3	C1	1.30	3.25	N40	CS		SS			1.50	6.5	4.8		4	1.50	1.70	S2	Ps						0.151																									
										1.75	6.6	1.7		6	2.50	2.70		Ps						0.193												8.9	4.5	0.05	0.25	0.041	0.018	0.059							
4	C2	3.25	4.00	10Y31	FSLC		SS			3.50	7.6	3.8		8	3.60	3.80		Pc						0.500	0.237											7.9	2.8	0.12	0.62	0.035	0.067	0.102							
5	C3	4.00	4.50	10Y31	ZLMC					4.25	7.4	2.1		9	4.20	4.40		Pc						0.556	0.202											8.2	3.2	0.15	0.70	0.065	0.096	0.161							
64	1	M	0.00	0.25	2.5Y62	MC				0.05	4.3	3.2	a	1	0.00	0.10						0.233	< 0.02					0.026	0.19	0.098	4.0	0.06																	
	2	2A1b	0.25	0.55	7.5YR2.5/1	LC				0.30	4.2	3.1	a	2	0.30	0.40						0.633	0.094					0.071	0.54	0.424	4.6	0.33																	
3	2B21b	0.55	0.85	2.5Y61	MC					0.60	5.3	3.3		3	0.60	0.80						0.296	< 0.02					0.026	0.27	0.131	3.5	0.10																	
4	3B21b	0.85	1.60	2.5Y66	MHC	J				1.00	4.0	2.6	A	4	0.90	1.10						0.314	< 0.02					0.128	0.18	0.212	3.5	0.04																	
5	3B22b	1.60	2.10	2.5Y51	HC	J				1.75	4.5	2.8	a	5	1.30	1.50						0.294	< 0.02					0.056	0.23	0.111	3.4	0.04																	
6	3B23b	2.10	2.40	2.5Y51	HC	J				2.00	4.5	3.0	a	6	1.80	2.00						0.231	< 0.02					0.014	0.21	0.062	3.5	0.04																	
7	3B24b	2.40	2.50	2.5Y51	HC	J				2.25	4.0																																						

Field Morphology Summary										Lab Sample		Action Criteria		SPOCAS ABA		Chromium (S _{CR}) Suite ABA		Potential Acidity				Retained Acidity	Actual Acidity	SPOCAS Method								Neutralising Capacity									
Site ID	Hor No	Horizon Name	Upp Depth	Low Depth	Colour	Soil Texture	Jar.	Gyp.	Shell	Field pH				No	Upp Depth	Depth 1st Action Level	Action Level Select	<=4.5 pH KCl <6.5		<=5.5 pH KCl <6.5		<=4.5 pH KCl <5.5		pH KCl <4.5		S _{CR}	S _{PPOS}	s-TSA	s-TPA	s-S _{NAS}	s-TAA	S _{HCl}	pH _{KCl}	pH _{Ox}	S _{KCl}	S _P	s-Ca _A	s-Mg _A	s-Ca _A +s-Mg _A	s-ANC _{BT}	s-ANC _E
										(m)	(m)	(m)	(m)					%S	s-TAA	s-S _{NAS}	S _{TAA}	s-TAA	s-S _{NAS}	22B	23Ee	s-23H	s-23G														
74	1	A11	0.00	0.10	10YR31	CL				0.10	5.1	3.2			1	0.00	0.10																								
	2	A12	0.10	0.18	2.5Y2.5/1	CLFS				0.30	5.1	3.2			2	0.10	0.18																								
	3	A3	0.18	0.30	2.5Y31	CLFS									3	0.20	0.30																								
	4	B21	0.30	0.43	10YR51	SLC									4	0.30	0.40																								
	5	B22	0.43	0.70	10YR51	SMC					0.60	4.6	2.9	a		5	0.50	0.60																							
	6	B23	0.70	0.90	10YR51	SMHC					0.80	4.5	2.5	a		6	0.70	0.90																							
75	1	A1	0.00	0.20	2.5Y2.5/1	LC				0.05	5.8	2.5																													
	2	B21	0.20	0.40	5Y41	MC				0.30	5.0	3.1	a		2	0.30	0.40																								
	3	B22	0.40	0.80	5Y41	MHC				0.60	4.8	2.8	a		3	0.50	0.70																								
	4	B23	0.80	1.20	5Y41	MHC				1.00	4.7	3.1	a		4	0.90	1.10																								
	5	B24	1.20	1.45	2.5Y41	MC				1.25	4.6	3.3	a		5	1.20	1.40																								
	6	B25	1.45	1.65	2.5Y41	LMC				1.50	4.4	3.2	a																												
	7	C1	1.65	1.85	2.5Y41	LMC				1.75	4.4	3.3	a		7	1.65	1.85																								
	8	C2	1.85	2.00	2.5Y51	LMC				1.95	4.3	3.3	a																												
	9	C3	2.00	2.10	2.5Y41	SLC				2.10	4.4	3.5	a		9	2.00	2.10																								
76	1	A11	0.00	0.09	5Y32	CLS				0.05	5.8	1.8			1	0.00	0.09	S0	PI					0.127																	
	2	A12	0.09	0.20	N2.5/0	CLS				0.10	4.8	1.7	a		2	0.10	0.20		PI					0.061				0.35	4.3	0.03											
	3	A3	0.20	0.30	N2.5/0	SLC				0.25	5.0	1.8	a		3	0.20	0.30							< 0.02			0.35	4.1	0.06												
	4	B21	0.30	0.50	N50	LMC				0.35	4.2	2.3	a		4	0.40	0.50							0.301	< 0.02		0.013	0.29	0.079	3.6	0.06										
	5	B22	0.50	0.70	N50	LMC				0.60	3.9	2.2	A	A0	5	0.50	0.70							0.309	< 0.02		0.013	0.30	0.076	3.4	0.06										
	6	B23	0.70	1.00	N50	LMC				0.80	3.9	2.1	A		6	0.80	1.00							0.315	< 0.02		0.016	0.30	0.071	3.4	0.05										
77	1	A1	0.00	0.18	10YR22	SCL				0.05	4.5	2.6	a											0.029				0.43	4.0	0.10											
	2	B21	0.18	0.35	10YR51	LMC				0.30	4.0	2.8	A	A0	2	0.20	0.30							0.180	< 0.02		0.022	0.15	0.084	3.8	0.06										
	3	B22ia	0.35	0.55	2.5Y51	LMC	J			0.50	3.7	2.7	A		3	0.40	0.50							0.296	< 0.02		0.145	0.15	0.251	3.7	0.06										
	4	C1ia	0.55	0.70	2.5Y41	LMC	J			0.60	3.6	2.5	A					4	0.60	0.70					0.227	< 0.02		0.066	0.16	0.128	3.7	0.04									
	5	C2ia	0.70	1.30	2.5Y41	LMC	J			0.80	3.5	2.1	A		5	0.70	0.90							0.222	< 0.02		0.074	0.15	0.141	3.8	0.04										
	6	C3ia	1.30	1.50	2.5Y51	LC	J			1.40	4.0	2.2	A		7	1.30	1.50							0.351	< 0.02		0.191	0.15	0.302	3.9	0.05										
	7	C4ia	1.50	1.70	2.5Y51	LMC	J			1.55	4.0	2.2	A		10	2.10	2.30							0.187	0.054		0.021	0.11	0.092	3.9	0.06										
	8	C5ia	1.70	2.10	2.5Y51	LMC	J			1.75	3.8	2.7	A					9	1.80	2.10					0.212	< 0.02		0.081	0.12	0.156	3.9	0.05									
	9	C6ia	2.10	2.30	2.5Y31	LMC	J			2.25	4.8	2.0	a					10	2.10	2.30					0.187	0.054		0.021	0.11	0.092	3.9	0.06									
78	1	A1	0.00	0.14	10YR21	ZCL				0.10	4.2	1.8	a		1	0.00	0.10							0.277	< 0.02		0.029	0.23	0.119	4.2	0.08										
	2	B21i	0.14	0.32	2.5Y52	LC				0.25	3.8	3.8	A	A0	2	0.20	0.30							0.090	< 0.02		0.017	0.07	0.088	4.1	0.07										
	3	B22ia	0.32	0.60	2.5Y52	LC	J			0.50	3.5	2.4	A					3	0.50	0.60																					
	4	B23ia	0.60	1.50	2.5YR42	ZLC	J			0.80	3.9	2.4	A		4	0.80	1.00							0.210	< 0.02		0.188	0.02	0.292	4.3	0.04										
	5	B24i	1.50	1.98	2.5Y42	ZLC				1.00	3.7	2.6	A		5	1.30	1.50							0.155	< 0.02		0.135	0.02	0.236	4.4	0.06										
	6	C1u	1.98	2.45	5Y41	ZLC	SS			2.00	7.1	2.9																													

Field Morphology Summary										Lab Sample		Action Criteria		SPOCAS ABA			Chromium (S_{CR}) Suite ABA			Potential Acidity				Retained Acidity		Actual Acidity		SPOCAS Method								Neutralising Capacity							
Site ID	Hor No	Horizon Name	Upp Depth	Low Depth	Colour	Soil Texture	Jar.	Gyp.	Shell	Field pH				No	Upp Depth	Low Depth	Depth 1st Action Level (m)	Action Level (pH _F)	Depth 1st Action Level (pH _F)	<=4.5 pH KCl <6.5		<4.5 pH KCl <5.5		pH KCl <4.5		S_{CR}	S_{POS}	S_{TSA}	S_{TPA}	$S-S_{NAS}$	$S-TAA$	S_{HCl}	pH_{KCl}	pH_{OX}	S_{KCl}	S_P	$s-Ca_A$	$s-Mg_A$	$s-Ca_A+s-Mg_A$	$s-ANC_{BT}$		$s-ANC_E$	
										Depth	pH _F	pH _{FOX}	Action Level Select %S							%S	%S	%S	%S	%S	%S	%S	%S	%S	%S	%S	%S	%S	%S	%S	%S	%S	%S						
		(m)								(m)					(m)																												
85	1	O2	0.00	0.15	10YR42	CL				0.10	5.3	1.4			1	0.00	0.10																										
	2	A11	0.15	0.55	10YR32	CL				0.30	5.9	3.0			2	0.15	0.25																										
	3	A12	0.55	0.75	2.5Y2.5/1	CL				0.60	6.3	3.3			3	0.40	0.50																										
	4	B21u	0.75	1.15	2.5Y41	LC				0.80	6.4	3.9			4	0.60	0.70																										
	5	B22u	1.15	1.30	10Y51	LC				1.25	6.1	2.8			5	0.80	1.00																										
	6	B23u	1.30	1.50	10Y51	SLC				1.50	5.6	2.6			6	1.15	1.30																										
	7	C1u	1.50	1.80	5Y41	MC				1.75	5.9	2.7			8	1.60	1.80																										
	8	C2u	1.80	2.00	5Y41	LMC				2.00	5.7	2.6			9	1.80	2.00																										
	9	Du	2.00	2.15	2.5Y61	MC				2.15	5.4	3.0			10	2.00	2.15																										
86	1	Mia	0.00	0.50	10YR42	ZLMC	J			0.10	3.5	2.0	A	A0	1	0.00	0.10																										
										0.30	3.1	1.4	A		2	0.30	0.40																										
	2	2A11	0.50	0.70	10YR21	CL				0.60	4.7	2.9	a		3	0.60	0.70	S0	PI																								
	3	2A12	0.70	0.90	10YR21	CL				0.80	4.4	3.4	a		4	0.80	0.90																										
	4	2B21	0.90	1.10	2.5Y41	LC				1.00	4.1	2.6	a		5	0.90	1.10																										
	5	3C1ia	1.10	2.45	2.5Y41	ZLMC	J			1.25	3.9	2.5	A		6	1.30	1.50																										
										1.50	3.5	2.4	A																														
										1.75	3.6	2.4	A																														
										2.00	3.7	2.3	A																														
										2.25	4.0	2.2	A		8	2.20	2.40																										
	6	3C2ia	2.45	2.80	5GY41	ZLMC	J			2.50	3.9	2.2	A		9	2.60	2.80	Pc																									
										2.75	4.0	1.9	A		10	2.80	3.00																										
	7	3C3ia	2.80	3.00	2.5Y41	ZMC	J			3.00	4.1	2.2	a																														