

Appendix C

ASS NATA Laboratory Results



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: EB0709935	Page	: 1 of 22
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Project	: HR7906 JILALAN RAIL YARD UPGRADE	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 04-SEP-2007
C-O-C number	: ----	Issue Date	: 13-SEP-2007
Sampler	: MH	No. of samples received	: 51
Site	: Sarina	No. of samples analysed	: 51
Quote number	: BN/212/07		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



WORLD RECOGNISED
ACCREDITATION

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
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General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes.

Key : CAS Number = Chemistry Abstract Services number

LOR = Limit of reporting

^ = Result(s) reported is calculated using analyte detections at or above the LOR. (eg. <5 + 5 + 7 = 12).

- **Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO₃) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from \square kg/t dry weight \square to \square kg/m³ in-situ soil \square , multiply \square reported results \square x \square wet bulk density of soil in t/m³ \square .**
- **Retained Acidity not required because pH KCl greater than or equal to 4.5**



Analytical Results

Sub-Matrix: SOIL				Client sample ID :	ASS 1 0m	ASS 1 0.5m	ASS 1 1.0m	ASS 1 1.5m	ASS 1 2.0m
				Client sampling date / time :	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00
Compound	CAS Number	LOR	Unit	EB0709935-001	EB0709935-002	EB0709935-003	EB0709935-004	EB0709935-005	
EA029-A: pH Measurements									
pH KCl (23A)	----	0.1	pH Unit	5.8	5.7	5.7	5.5	5.7	
pH OX (23B)	----	0.1	pH Unit	6.4	6.6	6.2	6.6	6.0	
EA029-B: Acidity Trail									
Titrateable Actual Acidity (23F)	----	2	mole H+ / t	6	5	6	11	5	
Titrateable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	<2	<2	<2	
Titrateable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	<2	<2	<2	
sulfidic - Titrateable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
sulfidic - Titrateable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
sulfidic - Titrateable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
EA029-C: Sulfur Trail									
KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	<10	<10	<10	
EA029-D: Calcium Values									
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.13	0.14	0.14	0.14	0.13	
Peroxide Calcium (23Wh)	----	0.02	% Ca	0.14	0.16	0.15	0.17	0.15	
Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	0.02	<0.02	0.04	0.03	
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	12	<10	18	14	
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	<0.02	0.03	0.02	
EA029-E: Magnesium Values									
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.04	0.03	0.03	0.03	0.04	
Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.04	0.04	0.04	0.04	0.04	
Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	<0.02	<0.02	<0.02	<0.02	
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	<10	<10	<10	<10	
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
EA029-F: Excess Acid Neutralising Capacity									
Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	----	0.17	----	0.12	----	
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	----	34	----	25	----	
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	----	0.06	----	0.04	----	



Analytical Results

Sub-Matrix: SOIL

Client sample ID :

Client sampling date / time :

				ASS 1 0m	ASS 1 0.5m	ASS 1 1.0m	ASS 1 1.5m	ASS 1 2.0m
				30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00
Compound	CAS Number	LOR	Unit	EB0709935-001	EB0709935-002	EB0709935-003	EB0709935-004	EB0709935-005
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	11	<10
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: SOIL				Client sample ID :	ASS 1 2.5m	ASS 1 3.0m	ASS 1 3.5m	ASS 1 4.0m	ASS 2 0m
				Client sampling date / time :	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00
Compound	CAS Number	LOR	Unit		EB0709935-006	EB0709935-007	EB0709935-008	EB0709935-009	EB0709935-010
EA029-A: pH Measurements									
pH KCl (23A)	----	0.1	pH Unit		5.8	5.6	5.8	5.8	4.9
pH OX (23B)	----	0.1	pH Unit		6.9	6.7	6.8	6.8	3.8
EA029-B: Acidity Trail									
Titrateable Actual Acidity (23F)	----	2	mole H+ / t		4	6	5	4	26
Titrateable Peroxide Acidity (23G)	----	2	mole H+ / t		<2	<2	<2	<2	44
Titrateable Sulfidic Acidity (23H)	----	2	mole H+ / t		<2	<2	<2	<2	18
sulfidic - Titrateable Actual Acidity (s-23F)	----	0.02	% pyrite S		<0.02	<0.02	<0.02	<0.02	0.04
sulfidic - Titrateable Peroxide Acidity (s-23G)	----	0.02	% pyrite S		<0.02	<0.02	<0.02	<0.02	0.07
sulfidic - Titrateable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S		<0.02	<0.02	<0.02	<0.02	0.03
EA029-C: Sulfur Trail									
KCl Extractable Sulfur (23Ce)	----	0.02	% S		<0.02	<0.02	<0.02	<0.02	<0.02
Peroxide Sulfur (23De)	----	0.02	% S		<0.02	<0.02	<0.02	<0.02	<0.02
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S		<0.02	<0.02	<0.02	<0.02	<0.02
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t		<10	<10	<10	<10	<10
EA029-D: Calcium Values									
KCl Extractable Calcium (23Vh)	----	0.02	% Ca		0.10	0.15	0.09	0.10	0.12
Peroxide Calcium (23Wh)	----	0.02	% Ca		0.12	0.17	0.12	0.12	0.15
Acid Reacted Calcium (23X)	----	0.02	% Ca		<0.02	0.02	0.03	0.03	0.03
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t		<10	10	16	14	14
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S		<0.02	<0.02	0.02	0.02	0.02
EA029-E: Magnesium Values									
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg		0.06	0.04	0.07	0.12	0.04
Peroxide Magnesium (23Tm)	----	0.02	% Mg		0.06	0.04	0.09	0.12	0.05
Acid Reacted Magnesium (23U)	----	0.02	% Mg		<0.02	<0.02	<0.02	<0.02	<0.02
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t		<10	<10	15	<10	<10
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S		<0.02	<0.02	0.02	<0.02	<0.02
EA029-F: Excess Acid Neutralising Capacity									
Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3		0.06	0.12	0.12	<0.02	----
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t		11	25	23	<10	----
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S		<0.02	0.04	0.04	<0.02	----



Analytical Results

Sub-Matrix: SOIL

Client sample ID :

ASS 1 2.5m

ASS 1 3.0m

ASS 1 3.5m

ASS 1 4.0m

ASS 2 0m

Client sampling date / time :

30-AUG-2007 15:00

30-AUG-2007 15:00

30-AUG-2007 15:00

30-AUG-2007 15:00

30-AUG-2007 15:00

Compound	CAS Number	LOR	Unit	EB0709935-006	EB0709935-007	EB0709935-008	EB0709935-009	EB0709935-010
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	0.04
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	26
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	2



Analytical Results

Sub-Matrix: SOIL				Client sample ID :	ASS 2 0.5m	ASS 1 1.0m	ASS 2 1.5m	ASS 2 2.0m	ASS 2 2.5m
				Client sampling date / time :	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00
Compound	CAS Number	LOR	Unit	EB0709935-011	EB0709935-012	EB0709935-013	EB0709935-014	EB0709935-015	
EA029-A: pH Measurements									
pH KCl (23A)	----	0.1	pH Unit	4.8	5.0	5.6	5.3	6.3	
pH OX (23B)	----	0.1	pH Unit	4.9	5.7	6.4	6.2	7.4	
EA029-B: Acidity Trail									
Titrateable Actual Acidity (23F)	----	2	mole H+ / t	26	20	9	11	<2	
Titrateable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	<2	<2	<2	
Titrateable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	<2	<2	<2	
sulfidic - Titrateable Actual Acidity (s-23F)	----	0.02	% pyrite S	0.04	0.03	<0.02	<0.02	<0.02	
sulfidic - Titrateable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
sulfidic - Titrateable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
EA029-C: Sulfur Trail									
KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	<10	<10	<10	
EA029-D: Calcium Values									
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.09	0.11	0.10	0.11	0.08	
Peroxide Calcium (23Wh)	----	0.02	% Ca	0.11	0.12	0.12	0.13	0.11	
Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	<0.02	0.02	0.02	0.03	
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	13	11	15	
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	0.02	<0.02	0.02	
EA029-E: Magnesium Values									
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.02	0.03	0.03	0.03	0.11	
Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.03	0.03	0.04	0.04	0.12	
Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	<0.02	<0.02	<0.02	<0.02	
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	<10	<10	<10	12	
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
EA029-F: Excess Acid Neutralising Capacity									
Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	----	----	----	----	0.05	
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	----	----	----	----	<10	
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	----	----	----	----	<0.02	



Analytical Results

Sub-Matrix: SOIL

Client sample ID :

Client sampling date / time :

				ASS 2 0.5m	ASS 1 1.0m	ASS 2 1.5m	ASS 2 2.0m	ASS 2 2.5m
				30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00
Compound	CAS Number	LOR	Unit	EB0709935-011	EB0709935-012	EB0709935-013	EB0709935-014	EB0709935-015
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)	----	0.02	% S	0.04	0.03	<0.02	<0.02	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	26	20	<10	11	<10
Liming Rate	----	1	kg CaCO3/t	2	1	<1	<1	<1



Analytical Results

Sub-Matrix: SOIL				Client sample ID :	ASS 2 3.0m	ASS 2 3.5m	ASS 2 4.0m	ASS 3 0m	ASS 3 0.5m
				Client sampling date / time :	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00
Compound	CAS Number	LOR	Unit	EB0709935-016	EB0709935-017	EB0709935-018	EB0709935-019	EB0709935-020	
EA029-A: pH Measurements									
pH KCl (23A)	----	0.1	pH Unit	6.4	6.5	6.5	5.5	5.5	
pH OX (23B)	----	0.1	pH Unit	7.4	7.4	7.1	5.7	5.6	
EA029-B: Acidity Trail									
Titrateable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	11	11	
Titrateable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	<2	<2	<2	
Titrateable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	<2	<2	<2	
sulfidic - Titrateable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
sulfidic - Titrateable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
sulfidic - Titrateable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
EA029-C: Sulfur Trail									
KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	<10	<10	<10	
EA029-D: Calcium Values									
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.07	0.07	0.06	0.19	0.17	
Peroxide Calcium (23Wh)	----	0.02	% Ca	0.09	0.10	0.08	0.18	0.22	
Acid Reacted Calcium (23X)	----	0.02	% Ca	0.02	0.03	0.03	<0.02	0.04	
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	12	15	13	<10	22	
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	0.02	0.02	<0.02	0.03	
EA029-E: Magnesium Values									
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.09	0.11	0.06	0.04	0.04	
Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.10	0.14	0.07	0.04	0.05	
Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	0.02	<0.02	<0.02	<0.02	
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	12	20	10	<10	<10	
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	0.03	<0.02	<0.02	<0.02	
EA029-F: Excess Acid Neutralising Capacity									
Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	0.17	0.18	0.19	----	----	
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	34	37	37	----	----	
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	0.06	0.06	0.06	----	----	



Analytical Results

Sub-Matrix: SOIL

Client sample ID :

Client sampling date / time :

				ASS 2 3.0m	ASS 2 3.5m	ASS 2 4.0m	ASS 3 0m	ASS 3 0.5m
				30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00
Compound	CAS Number	LOR	Unit	EB0709935-016	EB0709935-017	EB0709935-018	EB0709935-019	EB0709935-020
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	11	11
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: SOIL				Client sample ID :	ASS 3 1.0m	ASS 3 1.5m	ASS 3 2.0m	ASS 3 2.5m	ASS 3 3.0m
				Client sampling date / time :	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00
Compound	CAS Number	LOR	Unit	EB0709935-021	EB0709935-022	EB0709935-023	EB0709935-024	EB0709935-025	
EA029-A: pH Measurements									
pH KCl (23A)	----	0.1	pH Unit	5.3	5.2	5.8	5.4	5.8	
pH OX (23B)	----	0.1	pH Unit	5.2	6.1	6.9	6.2	6.8	
EA029-B: Acidity Trail									
Titrateable Actual Acidity (23F)	----	2	mole H+ / t	14	6	4	7	2	
Titrateable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	<2	<2	<2	
Titrateable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	<2	<2	<2	
sulfidic - Titrateable Actual Acidity (s-23F)	----	0.02	% pyrite S	0.02	<0.02	<0.02	<0.02	<0.02	
sulfidic - Titrateable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
sulfidic - Titrateable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
EA029-C: Sulfur Trail									
KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	<10	<10	<10	
EA029-D: Calcium Values									
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.18	0.17	0.10	0.11	0.08	
Peroxide Calcium (23Wh)	----	0.02	% Ca	0.20	0.20	0.13	0.13	0.10	
Acid Reacted Calcium (23X)	----	0.02	% Ca	0.02	0.03	0.03	0.02	0.02	
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	12	17	16	11	11	
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	0.02	0.03	0.02	<0.02	<0.02	
EA029-E: Magnesium Values									
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.04	0.04	0.04	0.03	0.06	
Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.05	0.05	0.06	0.04	0.07	
Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	<0.02	<0.02	<0.02	<0.02	
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	13	13	<10	10	
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	0.02	0.02	<0.02	<0.02	
EA029-F: Excess Acid Neutralising Capacity									
Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	----	----	0.10	----	0.09	
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	----	----	20	----	17	
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	----	----	0.03	----	0.03	



Analytical Results

Sub-Matrix: SOIL

Client sample ID :

Client sampling date / time :

				ASS 3 1.0m	ASS 3 1.5m	ASS 3 2.0m	ASS 3 2.5m	ASS 3 3.0m
				30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00
Compound	CAS Number	LOR	Unit	EB0709935-021	EB0709935-022	EB0709935-023	EB0709935-024	EB0709935-025
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)	----	0.02	% S	0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	14	<10	<10	<10	<10
Liming Rate	----	1	kg CaCO3/t	1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: SOIL				Client sample ID :	ASS 3 3.5m	ASS 3 4.0m	ASS 4 0m	ASS 4 0.5m	ASS 4 1.0m
				Client sampling date / time :	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00
Compound	CAS Number	LOR	Unit		EB0709935-026	EB0709935-027	EB0709935-028	EB0709935-029	EB0709935-030
EA029-A: pH Measurements									
pH KCl (23A)	----	0.1	pH Unit		4.9	5.1	5.4	6.4	6.4
pH OX (23B)	----	0.1	pH Unit		7.2	2.6	5.6	6.8	6.9
EA029-B: Acidity Trail									
Titrateable Actual Acidity (23F)	----	2	mole H+ / t		9	16	9	<2	<2
Titrateable Peroxide Acidity (23G)	----	2	mole H+ / t		<2	437	<2	<2	<2
Titrateable Sulfidic Acidity (23H)	----	2	mole H+ / t		<2	421	<2	<2	<2
sulfidic - Titrateable Actual Acidity (s-23F)	----	0.02	% pyrite S		<0.02	0.02	<0.02	<0.02	<0.02
sulfidic - Titrateable Peroxide Acidity (s-23G)	----	0.02	% pyrite S		<0.02	0.70	<0.02	<0.02	<0.02
sulfidic - Titrateable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S		<0.02	0.67	<0.02	<0.02	<0.02
EA029-C: Sulfur Trail									
KCl Extractable Sulfur (23Ce)	----	0.02	% S		<0.02	0.03	<0.02	<0.02	<0.02
Peroxide Sulfur (23De)	----	0.02	% S		<0.02	0.92	<0.02	<0.02	<0.02
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S		<0.02	0.89	<0.02	<0.02	<0.02
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t		<10	555	<10	<10	<10
EA029-D: Calcium Values									
KCl Extractable Calcium (23Vh)	----	0.02	% Ca		0.07	0.09	0.17	0.15	0.19
Peroxide Calcium (23Wh)	----	0.02	% Ca		0.09	0.11	0.19	0.17	0.22
Acid Reacted Calcium (23X)	----	0.02	% Ca		0.02	<0.02	0.02	0.02	0.02
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t		12	<10	12	10	12
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S		<0.02	<0.02	<0.02	<0.02	<0.02
EA029-E: Magnesium Values									
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg		0.12	0.12	0.04	0.03	0.04
Peroxide Magnesium (23Tm)	----	0.02	% Mg		0.15	0.14	0.05	0.04	0.06
Acid Reacted Magnesium (23U)	----	0.02	% Mg		0.02	<0.02	<0.02	<0.02	<0.02
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t		19	14	<10	<10	10
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S		0.03	0.02	<0.02	<0.02	<0.02
EA029-F: Excess Acid Neutralising Capacity									
Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3		0.18	----	----	0.12	0.25
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t		36	----	----	25	49
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S		0.06	----	----	0.04	0.08



Analytical Results

Sub-Matrix: SOIL

Client sample ID :

Client sampling date / time :

				ASS 3 3.5m	ASS 3 4.0m	ASS 4 0m	ASS 4 0.5m	ASS 4 1.0m
				30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00
Compound	CAS Number	LOR	Unit	EB0709935-026	EB0709935-027	EB0709935-028	EB0709935-029	EB0709935-030
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)	----	0.02	% S	<0.02	0.92	<0.02	<0.02	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	<10	571	<10	<10	<10
Liming Rate	----	1	kg CaCO3/t	<1	43	<1	<1	<1



Analytical Results

Sub-Matrix: SOIL				Client sample ID :	ASS 4 1.5m	ASS 4 2.0m	ASS 4 2.5m	ASS 4 3.0m	ASS 4 3.5m
				Client sampling date / time :	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00
Compound	CAS Number	LOR	Unit	EB0709935-031	EB0709935-032	EB0709935-033	EB0709935-034	EB0709935-035	
EA029-A: pH Measurements									
pH KCl (23A)	----	0.1	pH Unit	7.3	6.1	5.7	5.6	5.7	
pH OX (23B)	----	0.1	pH Unit	6.8	6.8	6.8	6.8	6.0	
EA029-B: Acidity Trail									
Titrateable Actual Acidity (23F)	----	2	mole H+ / t	<2	4	9	4	9	
Titrateable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	<2	<2	<2	
Titrateable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	<2	<2	<2	
sulfidic - Titrateable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
sulfidic - Titrateable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
sulfidic - Titrateable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
EA029-C: Sulfur Trail									
KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	<10	<10	<10	
EA029-D: Calcium Values									
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.30	0.19	0.13	0.12	0.15	
Peroxide Calcium (23Wh)	----	0.02	% Ca	0.31	0.22	0.17	0.15	0.19	
Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	0.03	0.04	0.03	0.04	
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	16	18	14	20	
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	0.03	0.03	0.02	0.03	
EA029-E: Magnesium Values									
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.05	0.05	0.06	0.07	0.05	
Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.06	0.06	0.08	0.08	0.07	
Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	<0.02	0.02	<0.02	0.02	
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	13	18	16	17	
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	0.02	0.03	0.02	0.03	
EA029-F: Excess Acid Neutralising Capacity									
Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	0.12	0.18	<0.02	0.08	----	
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	25	37	<10	16	----	
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	0.04	0.06	<0.02	0.02	----	



Analytical Results

Sub-Matrix: SOIL

Client sample ID :

Client sampling date / time :

				ASS 4 1.5m	ASS 4 2.0m	ASS 4 2.5m	ASS 4 3.0m	ASS 4 3.5m
				30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00
Compound	CAS Number	LOR	Unit	EB0709935-031	EB0709935-032	EB0709935-033	EB0709935-034	EB0709935-035
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: SOIL				Client sample ID :	ASS 4 4.0m	ASS 4 4.5m	ASS 4 5.0m	ASS 4 5.5m	ASS 5 0m
				Client sampling date / time :	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00
Compound	CAS Number	LOR	Unit	EB0709935-036	EB0709935-037	EB0709935-038	EB0709935-039	EB0709935-040	
EA029-A: pH Measurements									
pH KCl (23A)	----	0.1	pH Unit	6.2	6.4	6.4	6.2	4.8	
pH OX (23B)	----	0.1	pH Unit	6.5	6.5	6.3	2.7	3.9	
EA029-B: Acidity Trail									
Titrateable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	<2	<2	26	
Titrateable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	<2	265	35	
Titrateable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	<2	265	9	
sulfidic - Titrateable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	0.04	
sulfidic - Titrateable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	0.42	0.06	
sulfidic - Titrateable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	0.42	<0.02	
EA029-C: Sulfur Trail									
KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	<0.02	0.04	<0.02	
Peroxide Sulfur (23De)	----	0.02	% S	<0.02	0.02	0.03	0.63	<0.02	
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	0.02	0.03	0.60	<0.02	
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	14	19	373	<10	
EA029-D: Calcium Values									
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.06	0.04	0.05	0.06	0.02	
Peroxide Calcium (23Wh)	----	0.02	% Ca	0.07	0.06	0.06	0.08	0.03	
Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	<0.02	<0.02	<0.02	<0.02	
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	<10	<10	<10	
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
EA029-E: Magnesium Values									
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.09	0.08	0.08	0.09	<0.02	
Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.10	0.10	0.10	0.10	<0.02	
Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	<0.02	<0.02	<0.02	<0.02	
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	10	11	12	<10	
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	<0.02	<0.02	0.02	<0.02	
EA029-H: Acid Base Accounting									
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5	
Net Acidity (sulfur units)	----	0.02	% S	<0.02	0.02	0.03	0.60	0.04	
Net Acidity (acidity units)	----	10	mole H+ / t	<10	14	19	373	26	
Liming Rate	----	1	kg CaCO3/t	<1	1	1	28	2	



Analytical Results

Sub-Matrix: SOIL				Client sample ID :	ASS 5 0.5m	ASS 5 1.0m	ASS 5 1.5m	ASS 5 2.0m	ASS 5 2.5m
				Client sampling date / time :	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00
Compound	CAS Number	LOR	Unit	EB0709935-041	EB0709935-042	EB0709935-043	EB0709935-044	EB0709935-045	
EA029-A: pH Measurements									
pH KCl (23A)	----	0.1	pH Unit	4.9	5.3	6.0	5.8	6.4	
pH OX (23B)	----	0.1	pH Unit	4.3	6.3	6.1	6.2	7.6	
EA029-B: Acidity Trail									
Titrateable Actual Acidity (23F)	----	2	mole H+ / t	24	16	9	6	<2	
Titrateable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	<2	<2	<2	
Titrateable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	<2	<2	<2	
sulfidic - Titrateable Actual Acidity (s-23F)	----	0.02	% pyrite S	0.04	0.02	<0.02	<0.02	<0.02	
sulfidic - Titrateable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
sulfidic - Titrateable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
EA029-C: Sulfur Trail									
KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	<10	<10	<10	
EA029-D: Calcium Values									
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.03	0.14	0.12	0.13	0.08	
Peroxide Calcium (23Wh)	----	0.02	% Ca	0.04	0.15	0.13	0.13	0.08	
Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	<0.02	<0.02	<0.02	<0.02	
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	<10	<10	<10	
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
EA029-E: Magnesium Values									
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	<0.02	0.05	0.05	0.05	0.03	
Peroxide Magnesium (23Tm)	----	0.02	% Mg	<0.02	0.06	0.05	0.06	0.04	
Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	<0.02	<0.02	<0.02	<0.02	
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	<10	<10	<10	<10	
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
EA029-F: Excess Acid Neutralising Capacity									
Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	----	----	----	----	0.18	
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	----	----	----	----	37	
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	----	----	----	----	0.06	



Analytical Results

Sub-Matrix: SOIL

Client sample ID :

Client sampling date / time :

				ASS 5 0.5m	ASS 5 1.0m	ASS 5 1.5m	ASS 5 2.0m	ASS 5 2.5m
				30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00
Compound	CAS Number	LOR	Unit	EB0709935-041	EB0709935-042	EB0709935-043	EB0709935-044	EB0709935-045
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)	----	0.02	% S	0.04	0.02	<0.02	<0.02	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	24	16	<10	<10	<10
Liming Rate	----	1	kg CaCO3/t	2	1	<1	<1	<1



Analytical Results

Sub-Matrix: SOIL				Client sample ID :	ASS 5 3.0m	ASS 5 3.5m	ASS 5 4.0m	ASS 5 4.5m	ASS 5 5.0m
				Client sampling date / time :	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00
Compound	CAS Number	LOR	Unit	EB0709935-046	EB0709935-047	EB0709935-048	EB0709935-049	EB0709935-050	
EA029-A: pH Measurements									
pH KCl (23A)	----	0.1	pH Unit	6.0	6.5	6.4	6.5	6.5	
pH OX (23B)	----	0.1	pH Unit	6.8	7.2	7.6	7.2	7.4	
EA029-B: Acidity Trail									
Titrateable Actual Acidity (23F)	----	2	mole H+ / t	6	<2	<2	<2	<2	
Titrateable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	<2	<2	<2	
Titrateable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	<2	<2	<2	
sulfidic - Titrateable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
sulfidic - Titrateable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
sulfidic - Titrateable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02	
EA029-C: Sulfur Trail									
KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	<10	<10	<10	
EA029-D: Calcium Values									
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.10	0.08	0.08	0.10	0.07	
Peroxide Calcium (23Wh)	----	0.02	% Ca	0.10	0.10	0.10	0.11	0.09	
Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	<0.02	<0.02	<0.02	<0.02	
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	<10	<10	<10	
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
EA029-E: Magnesium Values									
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.04	0.03	0.03	0.04	0.03	
Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.05	0.04	0.04	0.05	0.04	
Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	<0.02	<0.02	<0.02	<0.02	
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	10	10	<10	11	
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02	
EA029-F: Excess Acid Neutralising Capacity									
Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	0.17	0.16	0.22	0.25	0.19	
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	34	32	44	49	38	
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	0.06	0.05	0.07	0.08	0.06	



Analytical Results

Sub-Matrix: SOIL

Client sample ID :

Client sampling date / time :

				ASS 5 3.0m	ASS 5 3.5m	ASS 5 4.0m	ASS 5 4.5m	ASS 5 5.0m
				30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00	30-AUG-2007 15:00
Compound	CAS Number	LOR	Unit	EB0709935-046	EB0709935-047	EB0709935-048	EB0709935-049	EB0709935-050
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: SOIL		Client sample ID : ASS 1 4.5m					
		Client sampling date / time : 30-AUG-2007 15:00					
Compound	CAS Number	LOR	Unit	EB0709935-051			
EA029-A: pH Measurements							
pH KCl (23A)	----	0.1	pH Unit	6.1			
pH OX (23B)	----	0.1	pH Unit	6.3			
EA029-B: Acidity Trail							
Titrate Actual Acidity (23F)	----	2	mole H+ / t	4			
Titrate Peroxide Acidity (23G)	----	2	mole H+ / t	<2			
Titrate Sulfidic Acidity (23H)	----	2	mole H+ / t	<2			
sulfidic - Titrate Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02			
sulfidic - Titrate Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02			
sulfidic - Titrate Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02			
EA029-C: Sulfur Trail							
KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02			
Peroxide Sulfur (23De)	----	0.02	% S	<0.02			
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02			
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10			
EA029-D: Calcium Values							
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.07			
Peroxide Calcium (23Wh)	----	0.02	% Ca	0.03			
Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02			
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10			
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02			
EA029-E: Magnesium Values							
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.11			
Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.05			
Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02			
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10			
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02			
EA029-H: Acid Base Accounting							
ANC Fineness Factor	----	0.5	-	1.5			
Net Acidity (sulfur units)	----	0.02	% S	<0.02			
Net Acidity (acidity units)	----	10	mole H+ / t	<10			
Liming Rate	----	1	kg CaCO3/t	<1			



Environmental Division

QUALITY CONTROL REPORT

Work Order	: EB0709935	Page	: 1 of 11
Client	: CONNELL WAGNER PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: MS MONIQUE HARRISON	Contact	: Tim Kilmister
Address	: LOCKED BAG 1800 SPRING HILL QLD AUSTRALIA 4004	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: harrisonm@conwag.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 32461000	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 32461001	Facsimile	: +61-7-3243 7218
Project	: HR7906 JILALAN RAIL YARD UPGRADE	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: Sarina	Date Samples Received	: 04-SEP-2007
C-O-C number	: ----	Issue Date	: 13-SEP-2007
Sampler	: MH	No. of samples received	: 51
Order number	: ----	No. of samples analysed	: 51
Quote number	: BN/212/07		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Cass Sealby	Senior Chemist - Acid Sulphate Soils	Inorganics

Environmental Division Brisbane

Part of the **ALS Laboratory Group**

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A Campbell Brothers Limited Company



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key :
Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = Chemistry Abstract Services number
LOR = Limit of reporting
RPD = Relative Percentage Difference
= Indicates failed QC



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA029-A: pH Measurements (QC Lot: 485641)									
EB0709935-001	ASS 1 0m	EA029: pH KCl (23A)	----	0.1	pH Unit	5.8	5.7	1.7	0% - 20%
		EA029: pH OX (23B)	----	0.1	pH Unit	6.4	6.4	0.0	0% - 20%
EB0709935-011	ASS 2 0.5m	EA029: pH KCl (23A)	----	0.1	pH Unit	4.8	4.8	0.0	0% - 20%
		EA029: pH OX (23B)	----	0.1	pH Unit	4.9	4.9	0.0	0% - 20%
EA029-A: pH Measurements (QC Lot: 485642)									
EB0709935-021	ASS 3 1.0m	EA029: pH KCl (23A)	----	0.1	pH Unit	5.3	5.2	1.9	0% - 20%
		EA029: pH OX (23B)	----	0.1	pH Unit	5.2	5.2	0.0	0% - 20%
EB0709935-031	ASS 4 1.5m	EA029: pH KCl (23A)	----	0.1	pH Unit	7.3	7.4	1.4	0% - 20%
		EA029: pH OX (23B)	----	0.1	pH Unit	6.8	6.8	0.0	0% - 20%
EA029-A: pH Measurements (QC Lot: 485643)									
EB0709935-041	ASS 5 0.5m	EA029: pH KCl (23A)	----	0.1	pH Unit	4.9	4.9	0.0	0% - 20%
		EA029: pH OX (23B)	----	0.1	pH Unit	4.3	4.2	2.4	0% - 20%
EB0709935-051	ASS 1 4.5m	EA029: pH KCl (23A)	----	0.1	pH Unit	6.1	6.1	0.0	0% - 20%
		EA029: pH OX (23B)	----	0.1	pH Unit	6.3	6.4	1.6	0% - 20%
EA029-B: Acidity Trail (QC Lot: 485641)									
EB0709935-001	ASS 1 0m	EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	0.0	----
		EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	0.0	----
		EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	0.0	----
		EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	6	6	0.0	No Limit
		EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	0.0	----
		EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	0.0	----
EB0709935-011	ASS 2 0.5m	EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	0.04	0.04	0.0	No Limit
		EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	0.0	----
		EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	0.0	----
		EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	26	25	4.8	0% - 50%
		EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	0.0	----
		EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	0.0	----
EA029-B: Acidity Trail (QC Lot: 485642)									
EB0709935-021	ASS 3 1.0m	EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	0.02	0.02	0.0	No Limit
		EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	0.0	----



Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA029-B: Acidity Trail (QC Lot: 485642) - continued									
EB0709935-021	ASS 3 1.0m	EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	0.0	----
		EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	14	16	16.8	No Limit
		EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	0.0	----
		EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	0.0	----
EB0709935-031	ASS 4 1.5m	EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	0.0	----
		EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	0.0	----
		EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	0.0	----
		EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	0.0	----
		EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	0.0	----
		EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	0.0	----
EA029-B: Acidity Trail (QC Lot: 485643)									
EB0709935-041	ASS 5 0.5m	EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	0.04	0.04	0.0	No Limit
		EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	0.0	----
		EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	0.0	----
		EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	24	26	10.2	0% - 50%
		EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	0.0	----
EB0709935-051	ASS 1 4.5m	EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	0.0	----
		EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	0.0	----
		EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	0.0	----
		EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	0.0	----
		EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	4	4	0.0	No Limit
EA029-C: Sulfur Trail (QC Lot: 485641)									
EB0709935-001	ASS 1 0m	EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	0.0	----
		EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	0.0	----
		EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	0.0	----
EB0709935-011	ASS 2 0.5m	EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	0.0	----
		EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	0.0	----



Sub-Matrix: SOIL				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA029-C: Sulfur Trail (QC Lot: 485641) - continued									
EB0709935-011	ASS 2 0.5m	EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	0.0	----
EA029-C: Sulfur Trail (QC Lot: 485642)									
EB0709935-021	ASS 3 1.0m	EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	0.0	----
EB0709935-031	ASS 4 1.5m	EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	0.0	----
EA029-C: Sulfur Trail (QC Lot: 485643)									
EB0709935-041	ASS 5 0.5m	EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	0.0	----
EB0709935-051	ASS 1 4.5m	EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	0.0	----
EA029-D: Calcium Values (QC Lot: 485641)									
EB0709935-001	ASS 1 0m	EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.13	0.14	0.0	No Limit
		EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	0.14	0.16	10.8	No Limit
		EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	<0.02	0.0	----
		EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	0.0	----
EB0709935-011	ASS 2 0.5m	EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.09	0.09	0.0	No Limit
		EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	0.11	0.10	0.0	No Limit
		EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	<0.02	0.0	----
		EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	0.0	----
EA029-D: Calcium Values (QC Lot: 485642)									
EB0709935-021	ASS 3 1.0m	EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.18	0.17	0.0	No Limit
		EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	0.20	0.20	0.0	0% - 50%
		EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	0.02	0.02	0.0	No Limit
		EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	0.02	<0.02	0.0	----



Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA029-D: Calcium Values (QC Lot: 485642) - continued									
EB0709935-021	ASS 3 1.0m	EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	12	12	0.0	No Limit
EB0709935-031	ASS 4 1.5m	EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.30	0.29	0.0	0% - 50%
		EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	0.31	0.32	5.7	0% - 50%
		EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	0.04	59.9	No Limit
		EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	0.03	0.0	No Limit
		EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	18	59.7	No Limit
EA029-D: Calcium Values (QC Lot: 485643)									
EB0709935-041	ASS 5 0.5m	EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.03	0.03	0.0	No Limit
		EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	0.04	0.04	0.0	No Limit
		EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	<0.02	0.0	----
		EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	0.0	----
EB0709935-051	ASS 1 4.5m	EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.07	0.07	0.0	No Limit
		EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	0.03	0.08	90.4	No Limit
		EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	<0.02	0.0	----
		EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	0.0	----
EA029-E: Magnesium Values (QC Lot: 485641)									
EB0709935-001	ASS 1 0m	EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.04	0.04	0.0	No Limit
		EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.04	0.04	0.0	No Limit
		EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	<0.02	0.0	----
		EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	<10	0.0	----
EB0709935-011	ASS 2 0.5m	EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.02	0.03	0.0	No Limit
		EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.03	0.03	0.0	No Limit
		EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	<0.02	0.0	----
		EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	<10	0.0	----
EA029-E: Magnesium Values (QC Lot: 485642)									
EB0709935-021	ASS 3 1.0m	EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.04	0.04	0.0	No Limit
		EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.05	0.04	0.0	No Limit
		EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	<0.02	0.0	----
		EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	<10	0.0	----



Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA029-E: Magnesium Values (QC Lot: 485642) - continued									
EB0709935-031	ASS 4 1.5m	EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.05	0.05	0.0	No Limit
		EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.06	0.07	0.0	No Limit
		EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	<0.02	0.0	----
		EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	0.02	0.0	No Limit
		EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	15	38.4	No Limit
EA029-E: Magnesium Values (QC Lot: 485643)									
EB0709935-041	ASS 5 0.5m	EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	<0.02	<0.02	0.0	----
		EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	<0.02	<0.02	0.0	----
		EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	<0.02	0.0	----
		EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	<10	0.0	----
EB0709935-051	ASS 1 4.5m	EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.11	0.11	0.0	No Limit
		EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.05	0.12	84.9	No Limit
		EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	<0.02	0.0	----
		EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	<0.02	0.0	----
		EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	<10	0.0	----
EA029-F: Excess Acid Neutralising Capacity (QC Lot: 485642)									
EB0709935-031	ASS 4 1.5m	EA029: Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	0.12	0.12	0.0	No Limit
		EA029: sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	0.04	0.04	0.0	No Limit
		EA029: acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	25	25	0.0	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: SOIL

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) Report				
		LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EA029-B: Acidity Trail (QCLot: 485641)									
EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	----	----	----	----	
EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	----	----	----	----	
EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	----	----	----	----	
EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	----	----	
EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	----	----	----	----	
EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	----	----	----	----	
EA029-B: Acidity Trail (QCLot: 485642)									
EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	----	----	----	----	
EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	----	----	----	----	
EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	----	----	----	----	
EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	----	----	
EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	----	----	----	----	
EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	----	----	----	----	
EA029-B: Acidity Trail (QCLot: 485643)									
EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	----	----	----	----	
EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	----	----	----	----	
EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	----	----	----	----	
EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	----	----	
EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	----	----	----	----	
EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	----	----	----	----	
EA029-C: Sulfur Trail (QCLot: 485641)									
EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	----	----	----	----	
EA029: Peroxide Sulfur (23De)	----	0.02	% S	<0.02	----	----	----	----	
EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	----	----	----	----	
EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	----	----	----	----	
EA029-C: Sulfur Trail (QCLot: 485642)									
EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	----	----	----	----	
EA029: Peroxide Sulfur (23De)	----	0.02	% S	<0.02	----	----	----	----	
EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	----	----	----	----	
EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	----	----	----	----	
EA029-C: Sulfur Trail (QCLot: 485643)									
EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	----	----	----	----	
EA029: Peroxide Sulfur (23De)	----	0.02	% S	<0.02	----	----	----	----	
EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	----	----	----	----	



Sub-Matrix: SOIL		Method Blank (MB) Report			Laboratory Control Spike (LCS) Report			
		LOR	Unit	Result	Spike Concentration	Spike Recovery (%) LCS	Recovery Limits (%)	
Method: Compound	CAS Number						Low	High
EA029-C: Sulfur Trail (QCLot: 485643) - continued								
EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	----	----	----	----
EA029-D: Calcium Values (QCLot: 485641)								
EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	<0.02	----	----	----	----
EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	<0.02	----	----	----	----
EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	----	----	----	----
EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	----	----	----	----
EA029-D: Calcium Values (QCLot: 485642)								
EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	<0.02	----	----	----	----
EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	<0.02	----	----	----	----
EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	----	----	----	----
EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	----	----	----	----
EA029-D: Calcium Values (QCLot: 485643)								
EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	<0.02	----	----	----	----
EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	<0.02	----	----	----	----
EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	----	----	----	----
EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	----	----	----	----
EA029-E: Magnesium Values (QCLot: 485641)								
EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	<0.02	----	----	----	----
EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	<0.02	----	----	----	----
EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	----	----	----	----
EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	----	----	----	----
EA029-E: Magnesium Values (QCLot: 485642)								
EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	<0.02	----	----	----	----
EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	<0.02	----	----	----	----
EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	----	----	----	----
EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	----	----	----	----
EA029-E: Magnesium Values (QCLot: 485643)								
EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	<0.02	----	----	----	----
EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	<0.02	----	----	----	----
EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	----	----	----	----
EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	----	----	----	----
EA029-F: Excess Acid Neutralising Capacity (QCLot: 485641)								



Sub-Matrix: **SOIL**

		Method Blank (MB) Report			Laboratory Control Spike (LCS) Report			
		LOR	Unit	Result	Spike	Spike Recovery (%)	Recovery Limits (%)	
Concentration	LCS				Low	High		
<i>Method: Compound</i>	<i>CAS Number</i>							
EA029-F: Excess Acid Neutralising Capacity (QCLot: 485641) - continued								
EA029: Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	<0.02	----	----	----	----
EA029: acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	<10	----	----	----	----
EA029: sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	<0.02	----	----	----	----



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) Results are required to be reported.**



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: EB0709935	Page	: 1 of 12
Client	: CONNELL WAGNER PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: MS MONIQUE HARRISON	Contact	: Tim Kilmister
Address	: LOCKED BAG 1800 SPRING HILL QLD AUSTRALIA 4004	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: harrisonm@conwag.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 32461000	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 32461001	Facsimile	: +61-7-3243 7218
Project	: HR7906 JILALAN RAIL YARD UPGRADE	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: Sarina	Date Samples Received	: 04-SEP-2007
C-O-C number	: ----	Issue Date	: 13-SEP-2007
Sampler	: MH	No. of samples received	: 51
Order number	: ----	No. of samples analysed	: 51
Quote number	: BN/212/07		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

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Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis									
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation							
EA029-A: pH Measurements														
Snap Lock Bag - frozen														
ASS 1 0m, ASS 1 0.5m,	30-AUG-2007	04-SEP-2007	29-AUG-2008	✓	10-SEP-2007	09-DEC-2007	✓							
ASS 1 1.0m, ASS 1 1.5m,														
ASS 1 2.0m, ASS 1 2.5m,														
ASS 1 3.0m, ASS 1 3.5m,														
ASS 1 4.0m, ASS 2 0m,														
ASS 2 0.5m, ASS 1 1.0m,														
ASS 2 1.5m, ASS 2 2.0m,														
ASS 2 2.5m, ASS 2 3.0m,														
ASS 2 3.5m, ASS 2 4.0m,														
ASS 3 0m, ASS 3 0.5m,														
ASS 3 1.0m, ASS 3 1.5m,														
ASS 3 2.0m, ASS 3 2.5m,														
ASS 3 3.0m, ASS 3 3.5m,														
ASS 3 4.0m, ASS 4 0m,														
ASS 4 0.5m, ASS 4 1.0m,														
ASS 4 1.5m, ASS 4 2.0m,														
ASS 4 2.5m, ASS 4 3.0m,														
ASS 4 3.5m, ASS 4 4.0m,														
ASS 4 4.5m, ASS 4 5.0m,														
ASS 4 5.5m, ASS 5 0m,														
ASS 5 0.5m, ASS 5 1.0m,														
ASS 5 1.5m, ASS 5 2.0m,														
ASS 5 2.5m, ASS 5 3.0m,														
ASS 5 3.5m, ASS 5 4.0m,														
ASS 5 4.5m, ASS 5 5.0m,														
ASS 1 4.5m														



Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA029-B: Acidity Trail								
Snap Lock Bag - frozen								
ASS 1 0m,	ASS 1 0.5m,	30-AUG-2007	04-SEP-2007	29-AUG-2008	✓	10-SEP-2007	09-DEC-2007	✓
ASS 1 1.0m,	ASS 1 1.5m,							
ASS 1 2.0m,	ASS 1 2.5m,							
ASS 1 3.0m,	ASS 1 3.5m,							
ASS 1 4.0m,	ASS 2 0m,							
ASS 2 0.5m,	ASS 1 1.0m,							
ASS 2 1.5m,	ASS 2 2.0m,							
ASS 2 2.5m,	ASS 2 3.0m,							
ASS 2 3.5m,	ASS 2 4.0m,							
ASS 3 0m,	ASS 3 0.5m,							
ASS 3 1.0m,	ASS 3 1.5m,							
ASS 3 2.0m,	ASS 3 2.5m,							
ASS 3 3.0m,	ASS 3 3.5m,							
ASS 3 4.0m,	ASS 4 0m,							
ASS 4 0.5m,	ASS 4 1.0m,							
ASS 4 1.5m,	ASS 4 2.0m,							
ASS 4 2.5m,	ASS 4 3.0m,							
ASS 4 3.5m,	ASS 4 4.0m,							
ASS 4 4.5m,	ASS 4 5.0m,							
ASS 4 5.5m,	ASS 5 0m,							
ASS 5 0.5m,	ASS 5 1.0m,							
ASS 5 1.5m,	ASS 5 2.0m,							
ASS 5 2.5m,	ASS 5 3.0m,							
ASS 5 3.5m,	ASS 5 4.0m,							
ASS 5 4.5m,	ASS 5 5.0m,							
ASS 1 4.5m								



Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA029-C: Sulfur Trail								
Snap Lock Bag - frozen								
ASS 1 0m, ASS 1 1.0m, ASS 1 2.0m, ASS 1 3.0m, ASS 1 4.0m, ASS 2 0.5m, ASS 2 1.5m, ASS 2 2.5m, ASS 2 3.5m, ASS 3 0m, ASS 3 1.0m, ASS 3 2.0m, ASS 3 3.0m, ASS 3 4.0m, ASS 4 0.5m, ASS 4 1.5m, ASS 4 2.5m, ASS 4 3.5m, ASS 4 4.5m, ASS 4 5.5m, ASS 5 0.5m, ASS 5 1.5m, ASS 5 2.5m, ASS 5 3.5m, ASS 5 4.5m, ASS 1 4.5m	ASS 1 0.5m, ASS 1 1.5m, ASS 1 2.5m, ASS 1 3.5m, ASS 2 0m, ASS 2 1.0m, ASS 2 2.0m, ASS 2 3.0m, ASS 2 4.0m, ASS 3 0.5m, ASS 3 1.5m, ASS 3 2.5m, ASS 3 3.5m, ASS 4 0m, ASS 4 1.0m, ASS 4 2.0m, ASS 4 3.0m, ASS 4 4.0m, ASS 4 5.0m, ASS 5 1.0m, ASS 5 2.0m, ASS 5 3.0m, ASS 5 4.0m, ASS 5 5.0m	30-AUG-2007	04-SEP-2007	29-AUG-2008	✓	10-SEP-2007	09-DEC-2007	✓



Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA029-D: Calcium Values							
Snap Lock Bag - frozen							
ASS 1 0m, ASS 1 0.5m,	30-AUG-2007	04-SEP-2007	29-AUG-2008	✓	10-SEP-2007	09-DEC-2007	✓
ASS 1 1.0m, ASS 1 1.5m,							
ASS 1 2.0m, ASS 1 2.5m,							
ASS 1 3.0m, ASS 1 3.5m,							
ASS 1 4.0m, ASS 2 0m,							
ASS 2 0.5m, ASS 1 1.0m,							
ASS 2 1.5m, ASS 2 2.0m,							
ASS 2 2.5m, ASS 2 3.0m,							
ASS 2 3.5m, ASS 2 4.0m,							
ASS 3 0m, ASS 3 0.5m,							
ASS 3 1.0m, ASS 3 1.5m,							
ASS 3 2.0m, ASS 3 2.5m,							
ASS 3 3.0m, ASS 3 3.5m,							
ASS 3 4.0m, ASS 4 0m,							
ASS 4 0.5m, ASS 4 1.0m,							
ASS 4 1.5m, ASS 4 2.0m,							
ASS 4 2.5m, ASS 4 3.0m,							
ASS 4 3.5m, ASS 4 4.0m,							
ASS 4 4.5m, ASS 4 5.0m,							
ASS 4 5.5m, ASS 5 0m,							
ASS 5 0.5m, ASS 5 1.0m,							
ASS 5 1.5m, ASS 5 2.0m,							
ASS 5 2.5m, ASS 5 3.0m,							
ASS 5 3.5m, ASS 5 4.0m,							
ASS 5 4.5m, ASS 5 5.0m,							
ASS 1 4.5m							



Matrix: SOIL

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA029-E: Magnesium Values							
Snap Lock Bag - frozen							
ASS 1 0m, ASS 1 0.5m,	30-AUG-2007	04-SEP-2007	29-AUG-2008	✓	10-SEP-2007	09-DEC-2007	✓
ASS 1 1.0m, ASS 1 1.5m,							
ASS 1 2.0m, ASS 1 2.5m,							
ASS 1 3.0m, ASS 1 3.5m,							
ASS 1 4.0m, ASS 2 0m,							
ASS 2 0.5m, ASS 1 1.0m,							
ASS 2 1.5m, ASS 2 2.0m,							
ASS 2 2.5m, ASS 2 3.0m,							
ASS 2 3.5m, ASS 2 4.0m,							
ASS 3 0m, ASS 3 0.5m,							
ASS 3 1.0m, ASS 3 1.5m,							
ASS 3 2.0m, ASS 3 2.5m,							
ASS 3 3.0m, ASS 3 3.5m,							
ASS 3 4.0m, ASS 4 0m,							
ASS 4 0.5m, ASS 4 1.0m,							
ASS 4 1.5m, ASS 4 2.0m,							
ASS 4 2.5m, ASS 4 3.0m,							
ASS 4 3.5m, ASS 4 4.0m,							
ASS 4 4.5m, ASS 4 5.0m,							
ASS 4 5.5m, ASS 5 0m,							
ASS 5 0.5m, ASS 5 1.0m,							
ASS 5 1.5m, ASS 5 2.0m,							
ASS 5 2.5m, ASS 5 3.0m,							
ASS 5 3.5m, ASS 5 4.0m,							
ASS 5 4.5m, ASS 5 5.0m,							
ASS 1 4.5m							



Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA029-F: Excess Acid Neutralising Capacity								
Snap Lock Bag - frozen								
ASS 1 0m, ASS 1 1.0m, ASS 1 2.0m, ASS 1 3.0m, ASS 1 4.0m, ASS 2 0.5m, ASS 2 1.5m, ASS 2 2.5m, ASS 2 3.5m, ASS 3 0m, ASS 3 1.0m, ASS 3 2.0m, ASS 3 3.0m, ASS 3 4.0m, ASS 4 0.5m, ASS 4 1.5m, ASS 4 2.5m, ASS 4 3.5m, ASS 4 4.5m, ASS 4 5.5m, ASS 5 0.5m, ASS 5 1.5m, ASS 5 2.5m, ASS 5 3.5m, ASS 5 4.5m, ASS 1 4.5m	ASS 1 0.5m, ASS 1 1.5m, ASS 1 2.5m, ASS 1 3.5m, ASS 2 0m, ASS 2 1.0m, ASS 2 2.0m, ASS 2 3.0m, ASS 2 4.0m, ASS 3 0.5m, ASS 3 1.5m, ASS 3 2.5m, ASS 3 3.5m, ASS 4 0m, ASS 4 1.0m, ASS 4 2.0m, ASS 4 3.0m, ASS 4 4.0m, ASS 4 5.0m, ASS 5 1.0m, ASS 5 2.0m, ASS 5 3.0m, ASS 5 4.0m, ASS 5 5.0m	30-AUG-2007	04-SEP-2007	29-AUG-2008	✓	10-SEP-2007	09-DEC-2007	✓



Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA029-G: Retained Acidity								
Snap Lock Bag - frozen								
ASS 1 0m,	ASS 1 0.5m,	30-AUG-2007	04-SEP-2007	29-AUG-2008	✓	10-SEP-2007	09-DEC-2007	✓
ASS 1 1.0m,	ASS 1 1.5m,							
ASS 1 2.0m,	ASS 1 2.5m,							
ASS 1 3.0m,	ASS 1 3.5m,							
ASS 1 4.0m,	ASS 2 0m,							
ASS 2 0.5m,	ASS 1 1.0m,							
ASS 2 1.5m,	ASS 2 2.0m,							
ASS 2 2.5m,	ASS 2 3.0m,							
ASS 2 3.5m,	ASS 2 4.0m,							
ASS 3 0m,	ASS 3 0.5m,							
ASS 3 1.0m,	ASS 3 1.5m,							
ASS 3 2.0m,	ASS 3 2.5m,							
ASS 3 3.0m,	ASS 3 3.5m,							
ASS 3 4.0m,	ASS 4 0m,							
ASS 4 0.5m,	ASS 4 1.0m,							
ASS 4 1.5m,	ASS 4 2.0m,							
ASS 4 2.5m,	ASS 4 3.0m,							
ASS 4 3.5m,	ASS 4 4.0m,							
ASS 4 4.5m,	ASS 4 5.0m,							
ASS 4 5.5m,	ASS 5 0m,							
ASS 5 0.5m,	ASS 5 1.0m,							
ASS 5 1.5m,	ASS 5 2.0m,							
ASS 5 2.5m,	ASS 5 3.0m,							
ASS 5 3.5m,	ASS 5 4.0m,							
ASS 5 4.5m,	ASS 5 5.0m,							
ASS 1 4.5m								



Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA029-H: Acid Base Accounting								
Snap Lock Bag - frozen								
ASS 1 0m, ASS 1 1.0m, ASS 1 2.0m, ASS 1 3.0m, ASS 1 4.0m, ASS 2 0.5m, ASS 2 1.5m, ASS 2 2.5m, ASS 2 3.5m, ASS 3 0m, ASS 3 1.0m, ASS 3 2.0m, ASS 3 3.0m, ASS 3 4.0m, ASS 4 0.5m, ASS 4 1.5m, ASS 4 2.5m, ASS 4 3.5m, ASS 4 4.5m, ASS 4 5.5m, ASS 5 0.5m, ASS 5 1.5m, ASS 5 2.5m, ASS 5 3.5m, ASS 5 4.5m, ASS 1 4.5m	ASS 1 0.5m, ASS 1 1.5m, ASS 1 2.5m, ASS 1 3.5m, ASS 2 0m, ASS 2 1.0m, ASS 2 2.0m, ASS 2 3.0m, ASS 2 4.0m, ASS 3 0.5m, ASS 3 1.5m, ASS 3 2.5m, ASS 3 3.5m, ASS 4 0m, ASS 4 1.0m, ASS 4 2.0m, ASS 4 3.0m, ASS 4 4.0m, ASS 4 5.0m, ASS 5 1.0m, ASS 5 2.0m, ASS 5 3.0m, ASS 5 4.0m, ASS 5 5.0m	30-AUG-2007	04-SEP-2007	29-AUG-2008	✓	10-SEP-2007	09-DEC-2007	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	6	51	11.8	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	3	51	5.9	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	SOIL	Ahern et al 2004 - a suspension peroxide oxidation method following the 'sulfur trail' by determining the level of 1M KCL extractable sulfur and the sulfur level after oxidation of soil sulphides. The 'acidity trail' is followed by measurement of TAA, TPA and TSA. Liming Rate is based on results for samples as submitted and incorporates a minimum safety factor of 1.5.
<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). "Anonymous" Client Sample IDs refer to samples which are not specifically part of this work order but formed part of the QC process lot. This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control data available for this section.



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: EB0713369	Page	: 1 of 6
Client	: CONNELL WAGNER PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: MS MONIQUE HARRISON	Contact	: Tim Kilmister
Address	: LOCKED BAG 1800 SPRING HILL QLD AUSTRALIA 4004	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: harrisonm@conwag.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 32461000	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 32461001	Facsimile	: +61-7-3243 7218
Project	: 30420 JILALAN RAIL YARD UPGRADE	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: SARINA	Date Samples Received	: 14-NOV-2007
C-O-C number	: ----	Issue Date	: 27-NOV-2007
Sampler	: ----	No. of samples received	: 25
Order number	: ----	No. of samples analysed	: 20
Quote number	: BN/212/07		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Environmental Division Brisbane

Part of the **ALS Laboratory Group**

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Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: SOIL

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA029-A: pH Measurements								
Snap Lock Bag - frozen ASS7 0.0m, ASS7 1m, ASS7 2.0m, ASS7 3.0m	ASS7 0.5m, ASS7 1.5m, ASS7 2.5m,	12-NOV-2007	14-NOV-2007	11-NOV-2008	✓	19-NOV-2007	17-FEB-2008	✓
EA029-B: Acidity Trail								
Snap Lock Bag - frozen ASS7 0.0m, ASS7 1m, ASS7 2.0m, ASS7 3.0m	ASS7 0.5m, ASS7 1.5m, ASS7 2.5m,	12-NOV-2007	14-NOV-2007	11-NOV-2008	✓	19-NOV-2007	17-FEB-2008	✓
EA029-C: Sulfur Trail								
Snap Lock Bag - frozen ASS7 0.0m, ASS7 1m, ASS7 2.0m, ASS7 3.0m	ASS7 0.5m, ASS7 1.5m, ASS7 2.5m,	12-NOV-2007	14-NOV-2007	11-NOV-2008	✓	19-NOV-2007	17-FEB-2008	✓
EA029-D: Calcium Values								
Snap Lock Bag - frozen ASS7 0.0m, ASS7 1m, ASS7 2.0m, ASS7 3.0m	ASS7 0.5m, ASS7 1.5m, ASS7 2.5m,	12-NOV-2007	14-NOV-2007	11-NOV-2008	✓	19-NOV-2007	17-FEB-2008	✓
EA029-E: Magnesium Values								
Snap Lock Bag - frozen ASS7 0.0m, ASS7 1m, ASS7 2.0m, ASS7 3.0m	ASS7 0.5m, ASS7 1.5m, ASS7 2.5m,	12-NOV-2007	14-NOV-2007	11-NOV-2008	✓	19-NOV-2007	17-FEB-2008	✓



Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA029-F: Excess Acid Neutralising Capacity								
Snap Lock Bag - frozen ASS7 0.0m, ASS7 1m, ASS7 2.0m, ASS7 3.0m	ASS7 0.5m, ASS7 1.5m, ASS7 2.5m	12-NOV-2007	14-NOV-2007	11-NOV-2008	✓	19-NOV-2007	17-FEB-2008	✓
EA029-G: Retained Acidity								
Snap Lock Bag - frozen ASS7 0.0m, ASS7 1m, ASS7 2.0m, ASS7 3.0m	ASS7 0.5m, ASS7 1.5m, ASS7 2.5m	12-NOV-2007	14-NOV-2007	11-NOV-2008	✓	19-NOV-2007	17-FEB-2008	✓
EA029-H: Acid Base Accounting								
Snap Lock Bag - frozen ASS7 0.0m, ASS7 1m, ASS7 2.0m, ASS7 3.0m	ASS7 0.5m, ASS7 1.5m, ASS7 2.5m	12-NOV-2007	14-NOV-2007	11-NOV-2008	✓	19-NOV-2007	17-FEB-2008	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	1	7	14.3	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	1	7	14.3	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	SOIL	Ahern et al 2004 - a suspension peroxide oxidation method following the 'sulfur trail' by determining the level of 1M KCL extractable sulfur and the sulfur level after oxidation of soil sulphides. The 'acidity trail' is followed by measurement of TAA, TPA and TSA. Liming Rate is based on results for samples as submitted and incorporates a minimum safety factor of 1.5.
Emerson Aggregate Testing	EME-SOL	SOIL	Emerson Aggregate Testing per AS1289.3.8.1 performed by Subcontractor Laboratory.
<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.



Environmental Division

QUALITY CONTROL REPORT

Work Order	: EB0713369	Page	: 1 of 5
Client	: CONNELL WAGNER PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: MS MONIQUE HARRISON	Contact	: Tim Kilmister
Address	: LOCKED BAG 1800 SPRING HILL QLD AUSTRALIA 4004	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: harrisonm@conwag.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 32461000	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 32461001	Facsimile	: +61-7-3243 7218
Project	: 30420 JILALAN RAIL YARD UPGRADE	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: SARINA	Date Samples Received	: 14-NOV-2007
C-O-C number	: ----	Issue Date	: 27-NOV-2007
Sampler	: ----	No. of samples received	: 25
Order number	: ----	No. of samples analysed	: 20
Quote number	: BN/212/07		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



WORLD RECOGNISED
ACCREDITATION

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Jessica Garwood	Supervisor - Acid Sulphate Soils	Inorganics

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General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key :
Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = Chemistry Abstract Services number
LOR = Limit of reporting
RPD = Relative Percentage Difference
= Indicates failed QC



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

					Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA029-A: pH Measurements (QC Lot: 536841)									
EB0713369-001		EA029: pH KCl (23A)	----	0.1	pH Unit	6.2	6.1	1.6	0% - 20%
		EA029: pH OX (23B)	----	0.1	pH Unit	5.8	5.2	10.9	0% - 20%
EA029-B: Acidity Trail (QC Lot: 536841)									
EB0713369-001		EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	0.0	No Limit
		EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	0.0	No Limit
		EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	0.0	No Limit
EA029-C: Sulfur Trail (QC Lot: 536841)									
EB0713369-001		EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	0.0	No Limit
EA029-D: Calcium Values (QC Lot: 536841)									
EB0713369-001		EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.07	0.07	0.0	No Limit
		EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	0.08	0.07	0.0	No Limit
		EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	<0.02	0.0	No Limit
		EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	0.0	No Limit
EA029-E: Magnesium Values (QC Lot: 536841)									
EB0713369-001		EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.02	0.02	0.0	No Limit
		EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.02	0.02	0.0	No Limit
		EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	<0.02	0.0	No Limit
		EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	<10	0.0	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: SOIL

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) Report				
		LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EA029-B: Acidity Trail (QCLot: 536841)									
EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	----	----	----	----	
EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	----	----	----	----	
EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	----	----	----	----	
EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	----	----	
EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	----	----	----	----	
EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	----	----	----	----	
EA029-C: Sulfur Trail (QCLot: 536841)									
EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	----	----	----	----	
EA029: Peroxide Sulfur (23De)	----	0.02	% S	<0.02	----	----	----	----	
EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	----	----	----	----	
EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	----	----	----	----	
EA029-D: Calcium Values (QCLot: 536841)									
EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	<0.02	----	----	----	----	
EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	<0.02	----	----	----	----	
EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	----	----	----	----	
EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	----	----	----	----	
EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	----	----	----	----	
EA029-E: Magnesium Values (QCLot: 536841)									
EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	<0.02	----	----	----	----	
EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	<0.02	----	----	----	----	
EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	----	----	----	----	
EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	----	----	----	----	
EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	----	----	----	----	
EA029-F: Excess Acid Neutralising Capacity (QCLot: 536841)									
EA029: Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	<0.02	----	----	----	----	
EA029: acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	<10	----	----	----	----	
EA029: sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	<0.02	----	----	----	----	



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) Results are required to be reported.**



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: EB0713369	Page	: 1 of 5
Client	: CONNELL WAGNER PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: MS MONIQUE HARRISON	Contact	: Tim Kilmister
Address	: LOCKED BAG 1800 SPRING HILL QLD AUSTRALIA 4004	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: harrisonm@conwag.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 32461000	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 32461001	Facsimile	: +61-7-3243 7218
Project	: 30420 JILALAN RAIL YARD UPGRADE	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 14-NOV-2007
C-O-C number	: ----	Issue Date	: 27-NOV-2007
Sampler	: ----	No. of samples received	: 25
Site	: SARINA	No. of samples analysed	: 20
Quote number	: BN/212/07		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



WORLD RECOGNISED
ACCREDITATION

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Jessica Garwood	Supervisor - Acid Sulphate Soils	Inorganics

Environmental Division Brisbane

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General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes.

Key : CAS Number = Chemistry Abstract Services number

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- **Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO₃) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from kg/t dry weight to kg/m³ in-situ soil, multiply reported results x wet bulk density of soil in t/m³.**
- **Retained Acidity not required because pH KCl greater than or equal to 4.5**



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	ASS7 0.0m	ASS7 0.5m	ASS7 1m	ASS7 1.5m	ASS7 2.0m
				12-NOV-2007 15:00	12-NOV-2007 15:00	12-NOV-2007 15:00	12-NOV-2007 15:00	12-NOV-2007 15:00
				EB0713369-001	EB0713369-002	EB0713369-003	EB0713369-004	EB0713369-005
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	6.2	6.3	5.7	5.9	5.6
pH OX (23B)	----	0.1	pH Unit	5.8	7.1	6.6	6.5	5.4
EA029-B: Acidity Trail								
Titrate Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	4	2	4
Titrate Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	<2	<2	<2
Titrate Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	<2	<2	<2
sulfidic - Titrate Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02
sulfidic - Titrate Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02
sulfidic - Titrate Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	<10	<10	<10
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.07	0.06	0.05	0.06	0.05
Peroxide Calcium (23Wh)	----	0.02	% Ca	0.08	0.07	0.06	0.06	0.06
Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	<0.02	<0.02	<0.02	<0.02
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	<10	<10	<10
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.02	<0.02	0.02	0.03	0.03
Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.02	0.02	0.02	0.03	0.03
Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	0.02	<0.02	<0.02	<0.02
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	18	<10	<10	<10
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	0.03	<0.02	<0.02	<0.02
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	----	0.11	0.05	----	----
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	----	22	11	----	----
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	----	0.04	<0.02	----	----
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				ASS7 0.0m	ASS7 0.5m	ASS7 1m	ASS7 1.5m	ASS7 2.0m
				12-NOV-2007 15:00	12-NOV-2007 15:00	12-NOV-2007 15:00	12-NOV-2007 15:00	12-NOV-2007 15:00
Compound	CAS Number	LOR	Unit	EB0713369-001	EB0713369-002	EB0713369-003	EB0713369-004	EB0713369-005
EA029-H: Acid Base Accounting - Continued								
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: SOIL

				Client sample ID				
				ASS7 2.5m	ASS7 3.0m	---	---	---
				12-NOV-2007 15:00	12-NOV-2007 15:00	---	---	---
				Client sampling date / time	Client sampling date / time	---	---	---
Compound	CAS Number	LOR	Unit	EB0713369-006	EB0713369-007	---	---	---
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	5.0	5.4	---	---	---
pH OX (23B)	----	0.1	pH Unit	5.3	4.5	---	---	---
EA029-B: Acidity Trail								
Titrateable Actual Acidity (23F)	----	2	mole H+ / t	10	5	---	---	---
Titrateable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	---	---	---
Titrateable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	---	---	---
sulfidic - Titrateable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	---	---	---
sulfidic - Titrateable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	---	---	---
sulfidic - Titrateable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	---	---	---
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	---	---	---
Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	---	---	---
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	---	---	---
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	---	---	---
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.05	0.05	---	---	---
Peroxide Calcium (23Wh)	----	0.02	% Ca	0.05	0.06	---	---	---
Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	<0.02	---	---	---
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	---	---	---
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	---	---	---
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.02	0.02	---	---	---
Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.02	0.02	---	---	---
Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	<0.02	---	---	---
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	<10	---	---	---
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	<0.02	---	---	---
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	---	---	---
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	---	---	---
Net Acidity (acidity units)	----	10	mole H+ / t	10	<10	---	---	---
Liming Rate	----	1	kg CaCO3/t	<1	<1	---	---	---



Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: EB0713369	Page	: 1 of 6
Client	: CONNELL WAGNER PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: MS MONIQUE HARRISON	Contact	: Tim Kilmister
Address	: LOCKED BAG 1800 SPRING HILL QLD AUSTRALIA 4004	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: harrisonm@conwag.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 32461000	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 32461001	Facsimile	: +61-7-3243 7218
Project	: 30420 JILALAN RAIL YARD UPGRADE	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: SARINA	Date Samples Received	: 14-NOV-2007
C-O-C number	: ----	Issue Date	: 27-NOV-2007
Sampler	: ----	No. of samples received	: 25
Order number	: ----	No. of samples analysed	: 20
Quote number	: BN/212/07		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers

Environmental Division Brisbane

Part of the **ALS Laboratory Group**

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Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: SOIL

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA029-A: pH Measurements								
Snap Lock Bag - frozen ASS7 0.0m, ASS7 1m, ASS7 2.0m, ASS7 3.0m	ASS7 0.5m, ASS7 1.5m, ASS7 2.5m,	12-NOV-2007	14-NOV-2007	11-NOV-2008	✓	19-NOV-2007	17-FEB-2008	✓
EA029-B: Acidity Trail								
Snap Lock Bag - frozen ASS7 0.0m, ASS7 1m, ASS7 2.0m, ASS7 3.0m	ASS7 0.5m, ASS7 1.5m, ASS7 2.5m,	12-NOV-2007	14-NOV-2007	11-NOV-2008	✓	19-NOV-2007	17-FEB-2008	✓
EA029-C: Sulfur Trail								
Snap Lock Bag - frozen ASS7 0.0m, ASS7 1m, ASS7 2.0m, ASS7 3.0m	ASS7 0.5m, ASS7 1.5m, ASS7 2.5m,	12-NOV-2007	14-NOV-2007	11-NOV-2008	✓	19-NOV-2007	17-FEB-2008	✓
EA029-D: Calcium Values								
Snap Lock Bag - frozen ASS7 0.0m, ASS7 1m, ASS7 2.0m, ASS7 3.0m	ASS7 0.5m, ASS7 1.5m, ASS7 2.5m,	12-NOV-2007	14-NOV-2007	11-NOV-2008	✓	19-NOV-2007	17-FEB-2008	✓
EA029-E: Magnesium Values								
Snap Lock Bag - frozen ASS7 0.0m, ASS7 1m, ASS7 2.0m, ASS7 3.0m	ASS7 0.5m, ASS7 1.5m, ASS7 2.5m,	12-NOV-2007	14-NOV-2007	11-NOV-2008	✓	19-NOV-2007	17-FEB-2008	✓



Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA029-F: Excess Acid Neutralising Capacity								
Snap Lock Bag - frozen ASS7 0.0m, ASS7 1m, ASS7 2.0m, ASS7 3.0m	ASS7 0.5m, ASS7 1.5m, ASS7 2.5m	12-NOV-2007	14-NOV-2007	11-NOV-2008	✓	19-NOV-2007	17-FEB-2008	✓
EA029-G: Retained Acidity								
Snap Lock Bag - frozen ASS7 0.0m, ASS7 1m, ASS7 2.0m, ASS7 3.0m	ASS7 0.5m, ASS7 1.5m, ASS7 2.5m	12-NOV-2007	14-NOV-2007	11-NOV-2008	✓	19-NOV-2007	17-FEB-2008	✓
EA029-H: Acid Base Accounting								
Snap Lock Bag - frozen ASS7 0.0m, ASS7 1m, ASS7 2.0m, ASS7 3.0m	ASS7 0.5m, ASS7 1.5m, ASS7 2.5m	12-NOV-2007	14-NOV-2007	11-NOV-2008	✓	19-NOV-2007	17-FEB-2008	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	1	7	14.3	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	1	7	14.3	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	SOIL	Ahern et al 2004 - a suspension peroxide oxidation method following the 'sulfur trail' by determining the level of 1M KCL extractable sulfur and the sulfur level after oxidation of soil sulphides. The 'acidity trail' is followed by measurement of TAA, TPA and TSA. Liming Rate is based on results for samples as submitted and incorporates a minimum safety factor of 1.5.
Emerson Aggregate Testing	EME-SOL	SOIL	Emerson Aggregate Testing per AS1289.3.8.1 performed by Subcontractor Laboratory.
<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.



Environmental Division

QUALITY CONTROL REPORT

Work Order	: EB0713369	Page	: 1 of 5
Client	: CONNELL WAGNER PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: MS MONIQUE HARRISON	Contact	: Tim Kilmister
Address	: LOCKED BAG 1800 SPRING HILL QLD AUSTRALIA 4004	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: harrisonm@conwag.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 32461000	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 32461001	Facsimile	: +61-7-3243 7218
Project	: 30420 JILALAN RAIL YARD UPGRADE	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: SARINA	Date Samples Received	: 14-NOV-2007
C-O-C number	: ----	Issue Date	: 27-NOV-2007
Sampler	: ----	No. of samples received	: 25
Order number	: ----	No. of samples analysed	: 20
Quote number	: BN/212/07		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits



WORLD RECOGNISED
ACCREDITATION

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Jessica Garwood	Supervisor - Acid Sulphate Soils	Inorganics

Environmental Division Brisbane

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General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Key :
Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
CAS Number = Chemistry Abstract Services number
LOR = Limit of reporting
RPD = Relative Percentage Difference
= Indicates failed QC



Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR:- No Limit; Result between 10 and 20 times LOR:- 0% - 50%; Result > 20 times LOR:- 0% - 20%.

Sub-Matrix: **SOIL**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA029-A: pH Measurements (QC Lot: 536841)									
EB0713369-001		EA029: pH KCl (23A)	----	0.1	pH Unit	6.2	6.1	1.6	0% - 20%
		EA029: pH OX (23B)	----	0.1	pH Unit	5.8	5.2	10.9	0% - 20%
EA029-B: Acidity Trail (QC Lot: 536841)									
EB0713369-001		EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	0.0	No Limit
		EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	0.0	No Limit
		EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	0.0	No Limit
		EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	0.0	No Limit
EA029-C: Sulfur Trail (QC Lot: 536841)									
EB0713369-001		EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	0.0	No Limit
EA029-D: Calcium Values (QC Lot: 536841)									
EB0713369-001		EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.07	0.07	0.0	No Limit
		EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	0.08	0.07	0.0	No Limit
		EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	<0.02	0.0	No Limit
		EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	0.0	No Limit
EA029-E: Magnesium Values (QC Lot: 536841)									
EB0713369-001		EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.02	0.02	0.0	No Limit
		EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.02	0.02	0.0	No Limit
		EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	<0.02	0.0	No Limit
		EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	<0.02	0.0	No Limit
		EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	<10	0.0	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: SOIL

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) Report				
		LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EA029-B: Acidity Trail (QCLot: 536841)									
EA029: Titratable Actual Acidity (23F)	----	2	mole H+ / t	<2	----	----	----	----	
EA029: Titratable Peroxide Acidity (23G)	----	2	mole H+ / t	<2	----	----	----	----	
EA029: Titratable Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	----	----	----	----	
EA029: sulfidic - Titratable Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	----	----	----	----	
EA029: sulfidic - Titratable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	----	----	----	----	
EA029: sulfidic - Titratable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	----	----	----	----	
EA029-C: Sulfur Trail (QCLot: 536841)									
EA029: KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	----	----	----	----	
EA029: Peroxide Sulfur (23De)	----	0.02	% S	<0.02	----	----	----	----	
EA029: Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	----	----	----	----	
EA029: acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	----	----	----	----	
EA029-D: Calcium Values (QCLot: 536841)									
EA029: KCl Extractable Calcium (23Vh)	----	0.02	% Ca	<0.02	----	----	----	----	
EA029: Peroxide Calcium (23Wh)	----	0.02	% Ca	<0.02	----	----	----	----	
EA029: Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	----	----	----	----	
EA029: acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	----	----	----	----	
EA029: sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	----	----	----	----	
EA029-E: Magnesium Values (QCLot: 536841)									
EA029: KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	<0.02	----	----	----	----	
EA029: Peroxide Magnesium (23Tm)	----	0.02	% Mg	<0.02	----	----	----	----	
EA029: Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	----	----	----	----	
EA029: Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	----	----	----	----	
EA029: sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	----	----	----	----	
EA029-F: Excess Acid Neutralising Capacity (QCLot: 536841)									
EA029: Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	<0.02	----	----	----	----	
EA029: acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	<10	----	----	----	----	
EA029: sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	<0.02	----	----	----	----	



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

- **No Matrix Spike (MS) Results are required to be reported.**



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: EB0713369	Page	: 1 of 5
Client	: CONNELL WAGNER PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: MS MONIQUE HARRISON	Contact	: Tim Kilmister
Address	: LOCKED BAG 1800 SPRING HILL QLD AUSTRALIA 4004	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: harrisonm@conwag.com	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 32461000	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 32461001	Facsimile	: +61-7-3243 7218
Project	: 30420 JILALAN RAIL YARD UPGRADE	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 14-NOV-2007
C-O-C number	: ----	Issue Date	: 27-NOV-2007
Sampler	: ----	No. of samples received	: 25
Site	: SARINA	No. of samples analysed	: 20
Quote number	: BN/212/07		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results



WORLD RECOGNISED
ACCREDITATION

NATA Accredited Laboratory 825

This document is issued in accordance with NATA accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Jessica Garwood	Supervisor - Acid Sulphate Soils	Inorganics

Environmental Division Brisbane

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General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes.

Key : CAS Number = Chemistry Abstract Services number

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- **Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO₃) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from \square kg/t dry weight \square to \square kg/m³ in-situ soil \square , multiply \square reported results \square x \square wet bulk density of soil in t/m³ \square .**
- **Retained Acidity not required because pH KCl greater than or equal to 4.5**



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

Compound	CAS Number	LOR	Unit	ASS7 0.0m	ASS7 0.5m	ASS7 1m	ASS7 1.5m	ASS7 2.0m
				12-NOV-2007 15:00	12-NOV-2007 15:00	12-NOV-2007 15:00	12-NOV-2007 15:00	12-NOV-2007 15:00
				EB0713369-001	EB0713369-002	EB0713369-003	EB0713369-004	EB0713369-005
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	6.2	6.3	5.7	5.9	5.6
pH OX (23B)	----	0.1	pH Unit	5.8	7.1	6.6	6.5	5.4
EA029-B: Acidity Trail								
Titrate Actual Acidity (23F)	----	2	mole H+ / t	<2	<2	4	2	4
Titrate Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	<2	<2	<2
Titrate Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	<2	<2	<2
sulfidic - Titrate Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02
sulfidic - Titrate Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02
sulfidic - Titrate Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	<0.02	<0.02	<0.02
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	<10	<10	<10
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.07	0.06	0.05	0.06	0.05
Peroxide Calcium (23Wh)	----	0.02	% Ca	0.08	0.07	0.06	0.06	0.06
Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	<0.02	<0.02	<0.02	<0.02
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	<10	<10	<10
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.02	<0.02	0.02	0.03	0.03
Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.02	0.02	0.02	0.03	0.03
Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	0.02	<0.02	<0.02	<0.02
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	18	<10	<10	<10
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	0.03	<0.02	<0.02	<0.02
EA029-F: Excess Acid Neutralising Capacity								
Excess Acid Neutralising Capacity (23Q)	----	0.02	% CaCO3	----	0.11	0.05	----	----
acidity - Excess Acid Neutralising Capacity (a-23Q)	----	10	mole H+ / t	----	22	11	----	----
sulfidic - Excess Acid Neutralising Capacity (s-23Q)	----	0.02	% S	----	0.04	<0.02	----	----
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				ASS7 0.0m	ASS7 0.5m	ASS7 1m	ASS7 1.5m	ASS7 2.0m
				12-NOV-2007 15:00	12-NOV-2007 15:00	12-NOV-2007 15:00	12-NOV-2007 15:00	12-NOV-2007 15:00
Compound	CAS Number	LOR	Unit	EB0713369-001	EB0713369-002	EB0713369-003	EB0713369-004	EB0713369-005
EA029-H: Acid Base Accounting - Continued								
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
Net Acidity (acidity units)	----	10	mole H+ / t	<10	<10	<10	<10	<10
Liming Rate	----	1	kg CaCO3/t	<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: SOIL

Client sample ID
 Client sampling date / time

Compound	CAS Number	LOR	Unit	ASS7 2.5m	ASS7 3.0m	---	---	---
				12-NOV-2007 15:00	12-NOV-2007 15:00	---	---	---
				EB0713369-006	EB0713369-007	---	---	---
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	5.0	5.4	---	---	---
pH OX (23B)	----	0.1	pH Unit	5.3	4.5	---	---	---
EA029-B: Acidity Trail								
Titrate Actual Acidity (23F)	----	2	mole H+ / t	10	5	---	---	---
Titrate Peroxide Acidity (23G)	----	2	mole H+ / t	<2	<2	---	---	---
Titrate Sulfidic Acidity (23H)	----	2	mole H+ / t	<2	<2	---	---	---
sulfidic - Titrate Actual Acidity (s-23F)	----	0.02	% pyrite S	<0.02	<0.02	---	---	---
sulfidic - Titrate Peroxide Acidity (s-23G)	----	0.02	% pyrite S	<0.02	<0.02	---	---	---
sulfidic - Titrate Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	<0.02	<0.02	---	---	---
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	---	---	---
Peroxide Sulfur (23De)	----	0.02	% S	<0.02	<0.02	---	---	---
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	<0.02	<0.02	---	---	---
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	<10	<10	---	---	---
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.05	0.05	---	---	---
Peroxide Calcium (23Wh)	----	0.02	% Ca	0.05	0.06	---	---	---
Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	<0.02	---	---	---
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	---	---	---
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	---	---	---
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.02	0.02	---	---	---
Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.02	0.02	---	---	---
Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	<0.02	---	---	---
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	<10	---	---	---
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	<0.02	---	---	---
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	---	---	---
Net Acidity (sulfur units)	----	0.02	% S	<0.02	<0.02	---	---	---
Net Acidity (acidity units)	----	10	mole H+ / t	10	<10	---	---	---
Liming Rate	----	1	kg CaCO3/t	<1	<1	---	---	---