ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2123297**	Page	: 1 of 4
Client	: **WARRUMBUNGLE SHIRE COUNCIL**	Laboratory	: Environmental Division Sydney
Contact	:	Contact	: Customer Services ES
Address	: 59 Binnia St, COOLAH NSW	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 0268492000	Telephone	: +61-2-8784 8555
Project	: Coolah STP - EPL 4445	Date Samples Received	: 23-Jun-2021 09:25
Order number	: 31024	Date Analysis Commenced	: 28-Jun-2021
C-O-C number	: ----	Issue Date	: 07-Jul-2021 14:36
Sampler			
Site	:		
Quote number	: EN/333		
No. of samples received	: 8		
No. of samples analysed	: 8		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

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

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Mark Hallas	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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 sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- ALS is not NATA accredited for the analysis of Exchangeable Cations on Alkaline Soils when performed under ALS Method ED006.
- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity (H+ + Al3+).
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	Ingram's PADDDOCK CLH 1- 380mm	Ingram's PADDOCK CLH 2- 400	Ingram's PADDOCK CLH 3- 450mm	Ingram's PADDOCK CLH 4- 500mm	RLPB PADDOCK CLH 1- 360mm
			Sampling date / time	22-Jun-2021 13:45	22-Jun-2021 13:50	22-Jun-2021 13:55	22-Jun-2021 14:00	22-Jun-2021 13:20
Compound	CAS Number	LOR	Unit	ES2123297-001	ES2123297-002	ES2123297-003	ES2123297-004	ES2123297-005
				Result	Result	Result	Result	Result
EA006: Sodium Adsorption Ratio (SAR)								
Sodium Adsorption Ratio	----	0.01	-	5.14	25.8	2.26	1.68	2.70
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	23.7	25.3	26.8	29.4	32.4
ED006: Exchangeable Cations on Alkaline Soils								
Exchangeable Calcium	----	0.2	meq/100g	17.2	11.2	17.6	14.2	19.2
Exchangeable Magnesium	----	0.2	meq/100g	12.1	12.5	8.5	8.1	13.7
Exchangeable Potassium	----	0.2	meq/100g	0.8	0.4	1.6	0.8	1.1
Exchangeable Sodium	----	0.2	meq/100g	1.7	6.1	0.3	0.4	0.8
Cation Exchange Capacity	----	0.2	meq/100g	31.8	30.2	28.0	23.6	34.9
Exchangeable Sodium Percent	----	0.2	%	5.3	20.2	1.0	1.6	2.4
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	10.9	71.2	2.7	2.1	2.7
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	2640	980	2800	3020	1290
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	20	mg/kg	2650	1050	2800	3020	1290
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	941	992	1140	1200	988

Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)			Sample ID	RLPB PADDOCK CLH 2- 400mm	RLPB PADDOCK CLH 3- 500mm	RLPB PADDOCK CLH 4- 450mm	----	----
			Sampling date / time	22-Jun-2021 13:30	22-Jun-2021 13:36	22-Jun-2021 13:40	----	----
Compound	CAS Number	LOR	Unit	ES2123297-006	ES2123297-007	ES2123297-008	--------	--------
				Result	Result	Result	----	----
EA006: Sodium Adsorption Ratio (SAR)								
Sodium Adsorption Ratio	----	0.01	-	6.51	4.88	2.42	----	----
EA055: Moisture Content (Dried @ 105-110°C)								
Moisture Content	----	1.0	%	24.9	20.5	21.7	----	----
ED006: Exchangeable Cations on Alkaline Soils								
Exchangeable Calcium	----	0.2	meq/100g	11.4	12.2	15.0	----	----
Exchangeable Magnesium	----	0.2	meq/100g	9.2	9.7	8.6	----	----
Exchangeable Potassium	----	0.2	meq/100g	0.4	0.4	0.8	----	----
Exchangeable Sodium	----	0.2	meq/100g	1.4	1.0	0.5	----	----
Cation Exchange Capacity	----	0.2	meq/100g	22.4	23.4	25.0	----	----
Exchangeable Sodium Percent	----	0.2	%	6.5	4.3	2.2	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N (Sol.)	----	0.1	mg/kg	2.9	3.8	4.5	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	20	mg/kg	560	490	900	----	----
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	20	mg/kg	560	490	900	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	2	mg/kg	847	756	834	----	----

Inter-Laboratory Testing

Analysis conducted by ALS Brisbane, NATA accreditation no. 825, site no. 818 (Chemistry) 18958 (Biology).

(SOIL) EA006: Sodium Adsorption Ratio (SAR)