# CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| **Work Order** | : **ES2139833** | Page | : 1 of 5 |
| Client | : **Paraway Pastoral Company Limited** | Laboratory | : Environmental Division Sydney |
| Contact | : Emma Hart | Contact | : Customer Services ES |
| Address | : 70 McNamara Street Orange 2800 | Address | : 277-289 Woodpark Road Smithfield NSW Australia 2164 |
| Telephone | : ---- | Telephone | : +61-2-8784 8555 |
| Project | : NLM EPL 21/1 | Date Samples Received | : 04-Nov-2021 10:35 |
| Order number | : ---- | Date Analysis Commenced | : 04-Nov-2021 |
| C-O-C number | : ---- | Issue Date | : 15-Nov-2021 13:07 |
| Sampler | : Emma Hart | | |
| Site | : ---- | | |
| Quote number | : SY/485/20 | | |
| No. of samples received | : 16 | | |
| No. of samples analysed | : 13 | | |

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 |
| Dian Dao | Senior Chemist - Inorganics | Sydney Inorganics, Smithfield, NSW |
| Ivan Taylor | Analyst | Sydney Inorganics, Smithfield, NSW |
| Kim McCabe | Senior Inorganic Chemist | Brisbane Inorganics, Stafford, QLD |

## 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.

- EK057G/EK059G:Nitrite and NOx results confirmed for SAMPLE # 9

- 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 | **Point 6** Soil 1 | **Point 7** Soil 2 | **Point 8** Soil 3 | ---- | ---- |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | | | Sampling date / time | 02-Nov-2021 00:00 | 02-Nov-2021 00:00 | 02-Nov-2021 00:00 | ---- | ---- |
| *Compound* | *CAS Number* | *LOR* | *Unit* | **ES2139833-006** | **ES2139833-007** | **ES2139833-008** | -------- | -------- |
| | | | | Result | Result | Result | ---- | ---- |
| **EA006: Sodium Adsorption Ratio (SAR)** | | | | | | | | |
| Sodium Adsorption Ratio | ---- | 0.01 | - | **0.75** | **1.35** | **0.68** | ---- | ---- |
| **ED007: Exchangeable Cations** | | | | | | | | |
| Exchangeable Calcium | ---- | 0.1 | meq/100g | **24.3** | **25.2** | **19.3** | ---- | ---- |
| Exchangeable Magnesium | ---- | 0.1 | meq/100g | **33.2** | **26.7** | **16.8** | ---- | ---- |
| Exchangeable Potassium | ---- | 0.1 | meq/100g | **0.4** | **0.6** | **0.7** | ---- | ---- |
| Exchangeable Sodium | ---- | 0.1 | meq/100g | **0.2** | **0.5** | **0.2** | ---- | ---- |
| Cation Exchange Capacity | ---- | 0.1 | meq/100g | **58.2** | **53.0** | **37.0** | ---- | ---- |
| Exchangeable Sodium Percent | ---- | 0.1 | % | **0.4** | **1.0** | **0.4** | ---- | ---- |

## Analytical Results

| Sub-Matrix: WATER (Matrix: WATER) | Sample ID | | | Point 1 GW1 | Point 2 GW2 | Point 3 SWTG | Point 4 SWFC | Point 5 SWFC Upstream |
|---|---|---|---|---|---|---|---|---|
| | Sampling date / time | | | 02-Nov-2021 00:00 | 02-Nov-2021 00:00 | 02-Nov-2021 00:00 | 02-Nov-2021 00:00 | 02-Nov-2021 00:00 |
| Compound | CAS Number | LOR | Unit | ES2139833-001 | ES2139833-002 | ES2139833-003 | ES2139833-004 | ES2139833-005 |
| | | | | Result | Result | Result | Result | Result |
| **EA025: Total Suspended Solids dried at 104 ± 2°C** | | | | | | | | |
| Suspended Solids (SS) | ---- | 5 | mg/L | ---- | ---- | 13 | <5 | <5 |
| **ED045G: Chloride by Discrete Analyser** | | | | | | | | |
| Chloride | 16887-00-6 | 1 | mg/L | ---- | ---- | 178 | 144 | 148 |
| **ED093F: Dissolved Major Cations** | | | | | | | | |
| Potassium | 7440-09-7 | 1 | mg/L | 5 | 2 | 7 | 4 | 8 |
| **ED093F: SAR and Hardness Calculations** | | | | | | | | |
| ^ Sodium Adsorption Ratio | ---- | 0.01 | - | 2.05 | 1.71 | ---- | ---- | ---- |
| **EK055G: Ammonia as N by Discrete Analyser** | | | | | | | | |
| Ammonia as N | 7664-41-7 | 0.01 | mg/L | 0.21 | 6.44 | 0.03 | 0.02 | 0.04 |
| **EK057G: Nitrite as N by Discrete Analyser** | | | | | | | | |
| Nitrite as N | 14797-65-0 | 0.01 | mg/L | 0.14 | 0.15 | <0.01 | <0.01 | <0.01 |
| **EK058G: Nitrate as N by Discrete Analyser** | | | | | | | | |
| Nitrate as N | 14797-55-8 | 0.01 | mg/L | 13.9 | 60.4 | 0.02 | 0.02 | 0.02 |
| **EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser** | | | | | | | | |
| Nitrite + Nitrate as N | ---- | 0.01 | mg/L | 14.0 | 60.6 | 0.02 | 0.02 | 0.02 |
| **EK061G: Total Kjeldahl Nitrogen By Discrete Analyser** | | | | | | | | |
| Total Kjeldahl Nitrogen as N | ---- | 0.1 | mg/L | 7.3 | 7.4 | 0.7 | 0.6 | 0.7 |
| **EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser** | | | | | | | | |
| ^ Total Nitrogen as N | ---- | 0.1 | mg/L | 21.3 | 68.0 | 0.7 | 0.6 | 0.7 |
| **EK067G: Total Phosphorus as P by Discrete Analyser** | | | | | | | | |
| Total Phosphorus as P | ---- | 0.01 | mg/L | 0.73 | 0.11 | 0.11 | 0.04 | 0.04 |
| **EK071G: Reactive Phosphorus as P by discrete analyser** | | | | | | | | |
| Reactive Phosphorus as P | 14265-44-2 | 0.01 | mg/L | 0.11 | 0.03 | 0.02 | <0.01 | <0.01 |

## Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

| Compound | CAS Number | LOR | Unit | Point 9 Holding Pond 2 02-Nov-2021 00:00 ES2139833-009 Result | Point 10 Clean Water Storage 02-Nov-2021 00:00 ES2139833-010 Result | Point 13 Catch Pond 1 02-Nov-2021 00:00 ES2139833-011 Result | Point 14 Catch Pond 2 02-Nov-2021 00:00 ES2139833-012 Result | Point 15 Holding Pond 1 02-Nov-2021 00:00 ES2139833-013 Result |
|---|---|---|---|---|---|---|---|---|
| **EA025: Total Suspended Solids dried at 104 ± 2°C** | | | | | | | | |
| Suspended Solids (SS) | ---- | 5 | mg/L | 131 | 26 | 17 | 18 | 123 |
| **ED045G: Chloride by Discrete Analyser** | | | | | | | | |
| Chloride | 16887-00-6 | 1 | mg/L | 396 | 37 | 14 | 34 | 449 |
| **ED093F: Dissolved Major Cations** | | | | | | | | |
| Potassium | 7440-09-7 | 1 | mg/L | 278 | 10 | 15 | 34 | 397 |
| **EK055G: Ammonia as N by Discrete Analyser** | | | | | | | | |
| Ammonia as N | 7664-41-7 | 0.01 | mg/L | 53.5 | 0.37 | 4.17 | 1.72 | 91.9 |
| **EK057G: Nitrite as N by Discrete Analyser** | | | | | | | | |
| Nitrite as N | 14797-65-0 | 0.01 | mg/L | 0.22 | 0.07 | 0.04 | 0.04 | <0.01 |
| **EK058G: Nitrate as N by Discrete Analyser** | | | | | | | | |
| Nitrate as N | 14797-55-8 | 0.01 | mg/L | <0.01 | 0.57 | 0.04 | 0.02 | 0.02 |
| **EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser** | | | | | | | | |
| Nitrite + Nitrate as N | ---- | 0.01 | mg/L | 0.05 | 0.64 | 0.08 | 0.06 | 0.02 |
| **EK061G: Total Kjeldahl Nitrogen By Discrete Analyser** | | | | | | | | |
| Total Kjeldahl Nitrogen as N | ---- | 0.1 | mg/L | 69.1 | 2.6 | 7.3 | 4.8 | 108 |
| **EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser** | | | | | | | | |
| ^ Total Nitrogen as N | ---- | 0.1 | mg/L | 69.2 | 3.2 | 7.4 | 4.9 | 108 |
| **EK067G: Total Phosphorus as P by Discrete Analyser** | | | | | | | | |
| Total Phosphorus as P | ---- | 0.01 | mg/L | 12.6 | 0.51 | 0.21 | 0.50 | 39.9 |
| **EK071G: Reactive Phosphorus as P by discrete analyser** | | | | | | | | |
| Reactive Phosphorus as P | 14265-44-2 | 0.01 | mg/L | 7.97 | 0.08 | <0.01 | 0.19 | 23.2 |

## Inter-Laboratory Testing

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

(SOIL) EA006: Sodium Adsorption Ratio (SAR)