ALS Environmental

# CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| **Work Order** | : **EM2212384** | Page | : 1 of 7 |
| Client | : **Dept for Environment & Water** | Laboratory | : Environmental Division Melbourne |
| Contact | : DARCY MORRIS | Contact | : Kieren Burns |
| Address | : GPO BOX 2834<br>ADELAIDE SA, AUSTRALIA 5001 | Address | : 4 Westall Rd Springvale VIC Australia 3171 |
| Telephone | : ---- | Telephone | : +61881625130 |
| Project | : HCHB Monitoring Program | Date Samples Received | : 01-Jul-2022 11:40 |
| Order number | : - | Date Analysis Commenced | : 01-Jul-2022 |
| C-O-C number | : 39418 | Issue Date | : 11-Jul-2022 17:53 |
| Sampler | : DARCY MORRIS, ROWLAND BOXALL | | |
| Site | : HCHB Boat - 29-30 June 2022 | | |
| Quote number | : AD/052/20 V2 | | |
| No. of samples received | : 10 | | |
| No. of samples analysed | : 10 | | |

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 | Senior Chemist - Inorganics | Sydney Inorganics, Smithfield, NSW |
| Dilani Fernando | Laboratory Coordinator | Melbourne Inorganics, Springvale, VIC |
| Jarwis Nheu | Senior Inorganic Chemist | Melbourne Inorganics, Springvale, VIC |
| Nikki Stepniewski | Senior Inorganic Instrument Chemist | Melbourne Inorganics, Springvale, VIC |

## 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 Contract 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.

- EP002:EP005:It is recognised that total organic carbon is less than dissolved organic carbon for samples EM2212384 #1. However, the difference is within experimental variation of the methods.
- EP008, Chlorophyll-a standard does not contained Pheophytin-a standard.
- EP008, LOR raised for Chlorophyll-b due to sample matrix.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.
- Total Algae Count (MB010) is conducted by ALS Scoresby NATA accreditation no. 992, site no. 989.

## Analytical Results

| Sub-Matrix: MARINE WATER (Matrix: WATER) | | | Sample ID | Murray Mouth | Mark Point | Parnka Point | Villa De Yumpa | Stoney Well |
|---|---|---|---|---|---|---|---|---|
| | | | Sampling date / time | 29-Jun-2022 12:51 | 29-Jun-2022 14:14 | 30-Jun-2022 10:38 | 30-Jun-2022 10:17 | 30-Jun-2022 10:00 |
| Compound | CAS Number | LOR | Unit | EM2212384-001 | EM2212384-002 | EM2212384-003 | EM2212384-004 | EM2212384-005 |
| | | | | Result | Result | Result | Result | Result |
| **EA015: Total Dissolved Solids dried at 180 ± 5 °C** | | | | | | | | |
| Total Dissolved Solids @180°C | ---- | 10 | mg/L | 20100 | ---- | 43600 | 59400 | 60400 |
| **EA045: Turbidity** | | | | | | | | |
| Turbidity | ---- | 0.1 | NTU | 28.4 | ---- | 14.2 | 13.7 | 20.5 |
| **ED037P: Alkalinity by PC Titrator** | | | | | | | | |
| Hydroxide Alkalinity as CaCO3 | DMO-210-001 | 1 | mg/L | <1 | ---- | <1 | <1 | <1 |
| Carbonate Alkalinity as CaCO3 | 3812-32-6 | 1 | mg/L | <1 | ---- | <1 | <1 | <1 |
| Bicarbonate Alkalinity as CaCO3 | 71-52-3 | 1 | mg/L | 107 | ---- | 172 | 188 | 189 |
| Total Alkalinity as CaCO3 | ---- | 1 | mg/L | 107 | ---- | 172 | 188 | 189 |
| **ED045G: Chloride by Discrete Analyser** | | | | | | | | |
| Chloride | 16887-00-6 | 1 | mg/L | 11700 | ---- | 29000 | 35500 | 36300 |
| **EG052G: Silica by Discrete Analyser** | | | | | | | | |
| Reactive Silica | ---- | 0.05 | mg/L | 1.29 | ---- | 1.80 | 2.85 | 3.30 |
| **EK055G-SW: Ammonia as N by Discrete Analyser in Saline Water** | | | | | | | | |
| Ammonia as N | 7664-41-7 | 0.02 | mg/L | 0.13 | ---- | <0.02 | <0.02 | <0.02 |
| **EK057G: Nitrite as N by Discrete Analyser** | | | | | | | | |
| Nitrite as N | 14797-65-0 | 0.01 | mg/L | <0.01 | ---- | <0.01 | <0.01 | <0.01 |
| **EK058G: Nitrate as N by Discrete Analyser** | | | | | | | | |
| Nitrate as N | 14797-55-8 | 0.01 | mg/L | 0.04 | ---- | <0.01 | <0.01 | <0.01 |
| **EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser** | | | | | | | | |
| Nitrite + Nitrate as N | ---- | 0.01 | mg/L | 0.04 | ---- | <0.01 | <0.01 | <0.01 |
| **EK061G: Total Kjeldahl Nitrogen By Discrete Analyser** | | | | | | | | |
| Total Kjeldahl Nitrogen as N | ---- | 0.1 | mg/L | 1.9 | ---- | 5.3 | 4.5 | 4.8 |
| **EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser** | | | | | | | | |
| ^ Total Nitrogen as N | ---- | 0.1 | mg/L | 1.9 | ---- | 5.3 | 4.5 | 4.8 |
| **EK067G: Total Phosphorus as P by Discrete Analyser** | | | | | | | | |
| Total Phosphorus as P | ---- | 0.01 | mg/L | 0.26 | ---- | 0.38 | 0.24 | 0.32 |
| **EP002: Dissolved Organic Carbon (DOC)** | | | | | | | | |
| Dissolved Organic Carbon | ---- | 1 | mg/L | 9 | ---- | 25 | 27 | 28 |
| **EP005: Total Organic Carbon (TOC)** | | | | | | | | |
| Total Organic Carbon | ---- | 1 | mg/L | 6 | ---- | 28 | 31 | 32 |
| **EP008: Chlorophyll** | | | | | | | | |
| Chlorophyll a | ---- | 1 | mg/m³ | 4 | 24 | 13 | 13 | 12 |
| Chlorophyll b | ---- | 1 | mg/m³ | <2 | 6 | 2 | 3 | 3 |

## Analytical Results

| Sub-Matrix: **MARINE WATER** (Matrix: **WATER**) | | | | Sample ID | **Murray Mouth** | **Mark Point** | **Parnka Point** | **Villa De Yumpa** | **Stoney Well** |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Sampling date / time | 29-Jun-2022 12:51 | 29-Jun-2022 14:14 | 30-Jun-2022 10:38 | 30-Jun-2022 10:17 | 30-Jun-2022 10:00 |
| *Compound* | *CAS Number* | *LOR* | *Unit* | | **EM2212384-001** | **EM2212384-002** | **EM2212384-003** | **EM2212384-004** | **EM2212384-005** |
| | | | | | Result | Result | Result | Result | Result |
| **EP008: Chlorophyll - Continued** | | | | | | | | | |
| **Pheophytin a** | ---- | 1 | mg/m³ | | **4** | **7** | **4** | **2** | **2** |

## Analytical Results

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

| Compound | CAS Number | LOR | Unit | Sample ID | North Jacks Point | South Policeman Point | Snipe Point | Salt Creek Outlet | 1.8km west of Salt Creek |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Sampling date / time | 30-Jun-2022 09:35 | 30-Jun-2022 09:19 | 30-Jun-2022 09:05 | 30-Jun-2022 08:06 | 30-Jun-2022 08:40 |
| | | | | | EM2212384-006 | EM2212384-007 | EM2212384-008 | EM2212384-009 | EM2212384-010 |
| | | | | | Result | Result | Result | Result | Result |
| **EA015: Total Dissolved Solids dried at 180 ± 5 °C** | | | | | | | | | |
| **Total Dissolved Solids @180°C** | ---- | 10 | mg/L | | **65400** | **67300** | **62400** | **65700** | **71000** |
| **EA045: Turbidity** | | | | | | | | | |
| **Turbidity** | ---- | 0.1 | NTU | | **9.1** | **23.0** | **9.7** | **12.8** | **12.8** |
| **ED037P: Alkalinity by PC Titrator** | | | | | | | | | |
| **Hydroxide Alkalinity as CaCO3** | DMO-210-001 | 1 | mg/L | | <1 | <1 | <1 | <1 | <1 |
| **Carbonate Alkalinity as CaCO3** | 3812-32-6 | 1 | mg/L | | <1 | <1 | <1 | <1 | <1 |
| **Bicarbonate Alkalinity as CaCO3** | 71-52-3 | 1 | mg/L | | **188** | **190** | **190** | **193** | **190** |
| **Total Alkalinity as CaCO3** | ---- | 1 | mg/L | | **188** | **190** | **190** | **193** | **190** |
| **ED045G: Chloride by Discrete Analyser** | | | | | | | | | |
| **Chloride** | 16887-00-6 | 1 | mg/L | | **37100** | **39400** | **40200** | **39700** | **40000** |
| **EG052G: Silica by Discrete Analyser** | | | | | | | | | |
| **Reactive Silica** | ---- | 0.05 | mg/L | | **3.42** | **3.77** | **3.82** | **3.69** | **3.86** |
| **EK055G-SW: Ammonia as N by Discrete Analyser in Saline Water** | | | | | | | | | |
| **Ammonia as N** | 7664-41-7 | 0.02 | mg/L | | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 |
| **EK057G: Nitrite as N by Discrete Analyser** | | | | | | | | | |
| **Nitrite as N** | 14797-65-0 | 0.01 | mg/L | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| **EK058G: Nitrate as N by Discrete Analyser** | | | | | | | | | |
| **Nitrate as N** | 14797-55-8 | 0.01 | mg/L | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| **EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser** | | | | | | | | | |
| **Nitrite + Nitrate as N** | ---- | 0.01 | mg/L | | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| **EK061G: Total Kjeldahl Nitrogen By Discrete Analyser** | | | | | | | | | |
| **Total Kjeldahl Nitrogen as N** | ---- | 0.1 | mg/L | | **4.1** | **5.2** | **5.9** | **5.6** | **5.4** |
| **EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser** | | | | | | | | | |
| **^ Total Nitrogen as N** | ---- | 0.1 | mg/L | | **4.1** | **5.2** | **5.9** | **5.6** | **5.4** |
| **EK067G: Total Phosphorus as P by Discrete Analyser** | | | | | | | | | |
| **Total Phosphorus as P** | ---- | 0.01 | mg/L | | **0.42** | **0.31** | **0.35** | **0.33** | **0.35** |
| **EP002: Dissolved Organic Carbon (DOC)** | | | | | | | | | |
| **Dissolved Organic Carbon** | ---- | 1 | mg/L | | **29** | **30** | **29** | **31** | **30** |
| **EP005: Total Organic Carbon (TOC)** | | | | | | | | | |
| **Total Organic Carbon** | ---- | 1 | mg/L | | **35** | **34** | **37** | **36** | **35** |
| **EP008: Chlorophyll** | | | | | | | | | |
| **Chlorophyll a** | ---- | 1 | mg/m³ | | **16** | **18** | **17** | **18** | **18** |
| **Chlorophyll b** | ---- | 1 | mg/m³ | | **3** | **4** | **5** | **5** | **4** |

## Analytical Results

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

| Compound | CAS Number | LOR | Unit | Sample ID | North Jacks Point | South Policeman Point | Snipe Point | Salt Creek Outlet | 1.8km west of Salt Creek |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Sampling date / time | 30-Jun-2022 09:35 | 30-Jun-2022 09:19 | 30-Jun-2022 09:05 | 30-Jun-2022 08:06 | 30-Jun-2022 08:40 |
| | | | | | EM2212384-006 | EM2212384-007 | EM2212384-008 | EM2212384-009 | EM2212384-010 |
| | | | | | Result | Result | Result | Result | Result |
| **EP008: Chlorophyll - Continued** | | | | | | | | | |
| **Pheophytin a** | ---- | 1 | mg/m³ | | **3** | **3** | **3** | **6** | **5** |

## Analytical Results

| Sub-Matrix: SEAWATER (Matrix: WATER) | | | | Sample ID | Mark Point | ---- | ---- | ---- | ---- |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Sampling date / time | 29-Jun-2022 14:14 | ---- | ---- | ---- | ---- |
| Compound | CAS Number | LOR | Unit | | EM2212384-002 | -------- | -------- | -------- | -------- |
| | | | | | Result | ---- | ---- | ---- | ---- |
| **EA015: Total Dissolved Solids dried at 180 ± 5 °C** | | | | | | | | | |
| **Total Dissolved Solids @180°C** | ---- | 10 | mg/L | | **5710** | ---- | ---- | ---- | ---- |
| **EA045: Turbidity** | | | | | | | | | |
| **Turbidity** | ---- | 0.1 | NTU | | **13.4** | ---- | ---- | ---- | ---- |
| **ED037P: Alkalinity by PC Titrator** | | | | | | | | | |
| **Hydroxide Alkalinity as CaCO3** | DMO-210-001 | 1 | mg/L | | <1 | ---- | ---- | ---- | ---- |
| **Carbonate Alkalinity as CaCO3** | 3812-32-6 | 1 | mg/L | | <1 | ---- | ---- | ---- | ---- |
| **Bicarbonate Alkalinity as CaCO3** | 71-52-3 | 1 | mg/L | | **101** | ---- | ---- | ---- | ---- |
| **Total Alkalinity as CaCO3** | ---- | 1 | mg/L | | **101** | ---- | ---- | ---- | ---- |
| **ED045G: Chloride by Discrete Analyser** | | | | | | | | | |
| **Chloride** | 16887-00-6 | 1 | mg/L | | **3240** | ---- | ---- | ---- | ---- |
| **EG052G: Silica by Discrete Analyser** | | | | | | | | | |
| **Reactive Silica** | ---- | 0.05 | mg/L | | **1.99** | ---- | ---- | ---- | ---- |
| **EK055G-SW: Ammonia as N by Discrete Analyser in Saline Water** | | | | | | | | | |
| **Ammonia as N** | 7664-41-7 | 0.02 | mg/L | | **0.37** | ---- | ---- | ---- | ---- |
| **EK057G: Nitrite as N by Discrete Analyser** | | | | | | | | | |
| **Nitrite as N** | 14797-65-0 | 0.01 | mg/L | | <0.01 | ---- | ---- | ---- | ---- |
| **EK058G: Nitrate as N by Discrete Analyser** | | | | | | | | | |
| **Nitrate as N** | 14797-55-8 | 0.01 | mg/L | | **0.06** | ---- | ---- | ---- | ---- |
| **EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser** | | | | | | | | | |
| **Nitrite + Nitrate as N** | ---- | 0.01 | mg/L | | **0.06** | ---- | ---- | ---- | ---- |
| **EK061G: Total Kjeldahl Nitrogen By Discrete Analyser** | | | | | | | | | |
| **Total Kjeldahl Nitrogen as N** | ---- | 0.1 | mg/L | | **1.1** | ---- | ---- | ---- | ---- |
| **EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser** | | | | | | | | | |
| **^ Total Nitrogen as N** | ---- | 0.1 | mg/L | | **1.2** | ---- | ---- | ---- | ---- |
| **EK067G: Total Phosphorus as P by Discrete Analyser** | | | | | | | | | |
| **Total Phosphorus as P** | ---- | 0.01 | mg/L | | **0.08** | ---- | ---- | ---- | ---- |
| **EP002: Dissolved Organic Carbon (DOC)** | | | | | | | | | |
| **Dissolved Organic Carbon** | ---- | 1 | mg/L | | **10** | ---- | ---- | ---- | ---- |
| **EP005: Total Organic Carbon (TOC)** | | | | | | | | | |
| **Total Organic Carbon** | ---- | 1 | mg/L | | **10** | ---- | ---- | ---- | ---- |

## Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) EP008: Chlorophyll