

CERTIFICATE OF ANALYSIS

Work Order : **EM2111820**
Client : **Dept for Environment & Water**
Contact : **Mr FRANK MANGERUCA**
Address : **GPO BOX 2834**
ADELAIDE SA, AUSTRALIA 5001
Telephone : **----**
Project : **HCHB**
Order number : **----**
C-O-C number : **----**
Sampler : **DM**
Site : **----**
Quote number : **AD/052/20 V2**
No. of samples received : **20**
No. of samples analysed : **20**

Page : 1 of 10
Laboratory : Environmental Division Melbourne
Contact : Kieren Burns
Address : 4 Westall Rd Springvale VIC Australia 3171
Telephone : +61881625130
Date Samples Received : 23-Jun-2021 10:40
Date Analysis Commenced : 23-Jun-2021
Issue Date : 30-Jun-2021 15:09



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
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Kim McCabe		Townsville Inorganics, Townsville, 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.

- EP002,EP005: EM2111820: It is recognised that total organic carbon is less than dissolved organic carbon for sample #15. However, the difference is within experimental variation of the methods.
- It is recognised that TOC is less than DOC for sample #15. However, the difference is within experimental variation of the methods.
- EP008, LOR raised for Chlorophyll-b due to sample matrix.
- EP008, Chlorophyll-a standard does not contained Pheophytin-a standard.
- Sample 1-5,7-9,16-20 ; TDS by method EA-015 may bias high due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- EK061G: EM2111820 #12, Poor duplicate precision for TKN due to sample heterogeneity. Confirmed by re-extraction and re-analysis.
- EK057G: EM2111820-002 Poor matrix spike recovery for Nitrite as N due to matrix effects.
- NRind - Reported in separate COA
- Total Algae Count (MB010) is conducted by ALS Scoresby NATA accreditation no. 992, site no. 989.

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

Stony Well	North Jacks Point	South Policeman Point/ Seagull Island	Snipe Point	Morella Basin @ Outlet Regulator
21-Jun-2021 14:00	21-Jun-2021 13:20	21-Jun-2021 12:55	21-Jun-2021 12:35	21-Jun-2021 13:10
EM2111820-001	EM2111820-002	EM2111820-003	EM2111820-004	EM2111820-005
Result	Result	Result	Result	Result
95900	96000	106000	100000	13500
9.9	8.4	7.9	7.1	6.0
<1	<1	<1	<1	<1
<1	<1	<1	<1	42
203	192	199	199	346
203	192	199	199	387
51800	48900	54200	46700	5000
0.77	1.17	1.75	1.83	15.5
<0.02	<0.02	<0.02	<0.02	<0.02
<0.01	<0.01	<0.01	<0.01	<0.01
0.01	<0.01	<0.01	0.02	<0.01
0.01	<0.01	<0.01	0.02	<0.01
2.5	2.2	2.9	3.6	1.8
2.5	2.2	2.9	3.6	1.8
1.17	0.35	1.26	1.08	0.08
<0.01	<0.01	<0.01	<0.01	<0.01
31	31	34	34	10
38	38	38	40	12



Analytical Results

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

Sample ID

				Stony Well	North Jacks Point	South Policeman Point/ Seagull Island	Snipe Point	Morella Basin @ Outlet Regulator
Sampling date / time				21-Jun-2021 14:00	21-Jun-2021 13:20	21-Jun-2021 12:55	21-Jun-2021 12:35	21-Jun-2021 13:10
Compound	CAS Number	LOR	Unit	EM2111820-001	EM2111820-002	EM2111820-003	EM2111820-004	EM2111820-005
				Result	Result	Result	Result	Result
EP008: Chlorophyll - Continued								
Chlorophyll a	----	1	mg/m ³	11	12	15	19	33
Chlorophyll b	----	1	mg/m ³	<1	<1	<1	<1	10
Pheophytin a	----	1	mg/m ³	2	7	4	10	8



Analytical Results

Sub-Matrix: WATER
 (Matrix: WATER)

Sample ID

				Morella Basin @ Gauge	Salt Creek Outlet	1.8km West of Salt Creek	3.2km South of Salt Creek (Land)	Tilley Swamp Drain U/S Morella
Sampling date / time				21-Jun-2021 12:45	21-Jun-2021 12:05	21-Jun-2021 12:20	21-Jun-2021 12:20	21-Jun-2021 13:50
Compound	CAS Number	LOR	Unit	EM2111820-006	EM2111820-007	EM2111820-008	EM2111820-009	EM2111820-010
				Result	Result	Result	Result	Result
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	8970	109000	104000	114000	4580
EA045: Turbidity								
Turbidity	----	0.1	NTU	3.5	5.9	7.4	6.5	3.6
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	63	<1	<1	<1	12
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	334	200	200	191	352
Total Alkalinity as CaCO3	----	1	mg/L	397	200	200	191	365
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	5230	51600	61600	53800	2020
EG052G: Silica by Discrete Analyser								
Reactive Silica	----	0.05	mg/L	12.6	1.79	1.76	1.42	9.71
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	0.02	0.02	<0.01	0.05
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.02	0.02	<0.01	0.06
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.0	2.8	3.1	4.4	0.8
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	1.0	2.8	3.1	4.4	0.9
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.10	1.62	0.26	1.12	0.02
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EP002: Dissolved Organic Carbon (DOC)								
Dissolved Organic Carbon	----	1	mg/L	9	32	34	32	2
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	9	38	40	37	2



Analytical Results

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

Sample ID

				Morella Basin @ Gauge	Salt Creek Outlet	1.8km West of Salt Creek	3.2km South of Salt Creek (Land)	Tilley Swamp Drain U/S Morella
Sampling date / time				21-Jun-2021 12:45	21-Jun-2021 12:05	21-Jun-2021 12:20	21-Jun-2021 12:20	21-Jun-2021 13:50
Compound	CAS Number	LOR	Unit	EM2111820-006	EM2111820-007	EM2111820-008	EM2111820-009	EM2111820-010
				Result	Result	Result	Result	Result
EP008: Chlorophyll								
Chlorophyll a	----	1	mg/m ³	21	22	21	9	2
Chlorophyll b	----	1	mg/m ³	6	<1	<1	<1	<1
Pheophytin a	----	1	mg/m ³	3	2	6	4	<1

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Murray Mouth	US Tauwitschere	DS Tauwitschere	Mark Point	Long Point
Sampling date / time				22-Jun-2021 09:45	22-Jun-2021 08:45	22-Jun-2021 08:50	22-Jun-2021 08:05	22-Jun-2021 07:10	
Compound	CAS Number	LOR	Unit	EM2111820-011	EM2111820-012	EM2111820-013	EM2111820-014	EM2111820-015	
				Result	Result	Result	Result	Result	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	34000	1440	12500	27200	28700	
EA045: Turbidity									
Turbidity	----	0.1	NTU	5.0	75.4	48.3	3.1	2.4	
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	119	84	98	117	122	
Total Alkalinity as CaCO3	----	1	mg/L	119	84	98	117	122	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	16900	773	6960	15000	15400	
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L	0.27	0.06	0.56	2.18	0.87	
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	0.06	0.04	0.01	0.03	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.06	0.04	0.01	0.03	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	2.5	1.4	0.4	0.2	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	<0.1	2.6	1.4	0.4	0.2	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.08	0.19	0.16	0.13	0.39	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.12	<0.01	<0.01	
EP002: Dissolved Organic Carbon (DOC)									
Dissolved Organic Carbon	----	1	mg/L	<1	5	4	3	5	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	<1	6	6	3	4	
EP008: Chlorophyll									



Analytical Results

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

Sample ID

				Murray Mouth	US Tauwitchere	DS Tauwitchere	Mark Point	Long Point
Sampling date / time				22-Jun-2021 09:45	22-Jun-2021 08:45	22-Jun-2021 08:50	22-Jun-2021 08:05	22-Jun-2021 07:10
Compound	CAS Number	LOR	Unit	EM2111820-011	EM2111820-012	EM2111820-013	EM2111820-014	EM2111820-015
				Result	Result	Result	Result	Result
EP008: Chlorophyll - Continued								
Chlorophyll a	----	1	mg/m ³	2	41	22	8	2
Chlorophyll b	----	1	mg/m ³	<1	<7	<5	<1	<1
Pheophytin a	----	1	mg/m ³	<1	19	9	<1	<1

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Noonameena	Bonneys	McGrath Flat North	Parnka Point	Villa de Yumpa
Sampling date / time				21-Jun-2021 16:35	21-Jun-2021 16:10	21-Jun-2021 15:00	21-Jun-2021 15:10	21-Jun-2021 14:25	
Compound	CAS Number	LOR	Unit	EM2111820-016	EM2111820-017	EM2111820-018	EM2111820-019	EM2111820-020	
				Result	Result	Result	Result	Result	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	36100	39300	78300	64200	94600	
EA045: Turbidity									
Turbidity	----	0.1	NTU	2.3	7.0	15.2	7.5	11.2	
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	15	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	121	172	189	168	191	
Total Alkalinity as CaCO3	----	1	mg/L	137	172	189	168	191	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	17100	19700	42000	33400	50000	
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L	<0.05	1.57	0.40	0.45	0.46	
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	0.03	0.03	<0.01	<0.01	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.03	0.03	<0.01	<0.01	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.3	1.9	3.0	2.3	2.7	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	1.3	1.9	3.0	2.3	2.7	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.07	0.18	2.44	1.70	4.10	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.06	0.04	0.04	0.03	
EP002: Dissolved Organic Carbon (DOC)									
Dissolved Organic Carbon	----	1	mg/L	8	11	24	19	27	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	8	12	29	22	32	
EP008: Chlorophyll									



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Noonameena	Bonneys	McGrath Flat North	Parnka Point	Villa de Yumpa
Sampling date / time					21-Jun-2021 16:35	21-Jun-2021 16:10	21-Jun-2021 15:00	21-Jun-2021 15:10	21-Jun-2021 14:25
Compound	CAS Number	LOR	Unit		EM2111820-016	EM2111820-017	EM2111820-018	EM2111820-019	EM2111820-020
					Result	Result	Result	Result	Result
EP008: Chlorophyll - Continued									
Chlorophyll a	----	1	mg/m ³		8	9	11	6	14
Chlorophyll b	----	1	mg/m ³		<1	<2	<1	<1	<1
Pheophytin a	----	1	mg/m ³		<1	9	5	1	5

Inter-Laboratory Testing

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

(WATER) EP008: Chlorophyll

Analysis conducted by ALS Townsville, NATA accreditation no. 825, site no. 23472 (Chemistry) 23313 (Biology).

(WATER) ED037P: Alkalinity by PC Titrator