

## CERTIFICATE OF ANALYSIS

**Work Order** : **EM2018692**  
**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** : JOSHUA CASTLE  
**Site** : ----  
**Quote number** : AD/052/20 V2  
**No. of samples received** : 19  
**No. of samples analysed** : 19

**Page** : 1 of 10  
**Laboratory** : Environmental Division Melbourne  
**Contact** : Kieren Burns  
**Address** : 4 Westall Rd Springvale VIC Australia 3171  
**Telephone** : +61881625130  
**Date Samples Received** : 22-Oct-2020 11:25  
**Date Analysis Commenced** : 22-Oct-2020  
**Issue Date** : 02-Nov-2020 17:13



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. 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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Samantha Smith	Laboratory Coordinator	WRG Subcontracting, 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 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.

- EP005, EP002: EM2018692 It is recognised that total organic carbon is less than dissolved organic carbon for sample #18 However, the difference is within experimental variation of the methods.
- EP008, Chlorophyll-a standard does not contained Pheophytin-a standard.
- EP008, LOR raised for Pheophytin -a due to samples matrix.
- EA015H: EM2018692 #11 and 12: 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.
- EA015H: EM2018692 #2, 14, 16 and 19: 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.
- ED045G: The presence of thiocyanate can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.
- EK067G: EM2018663 #1 Poor matrix spike recovery for TP due to sample matrix. Confirmed by re-extraction and re-analysis.
- Reported in separate COA
- Algal Count (BM010) has been performed by ALS Water Resources Group, NATA Accreditation no. 992, Site no. 989.

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Stony Well	North Jacks Point	South Policeman Point/Seagull Island	Snipe Point	Salt Creek Outlet
Client sampling date / time				21-Oct-2020 10:20	21-Oct-2020 09:50	21-Oct-2020 09:30	21-Oct-2020 09:15	21-Oct-2020 08:45	
Compound	CAS Number	LOR	Unit	EM2018692-001	EM2018692-002	EM2018692-003	EM2018692-004	EM2018692-005	
				Result	Result	Result	Result	Result	
BM010: Algal Count									
Algal Count	----	-	-	NR	NR	NR	NR	NR	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	72800	82800	83500	86800	80800	
EA045: Turbidity									
Turbidity	----	0.1	NTU	12.6	10.1	8.2	7.0	8.0	
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	226	235	238	243	257	
Total Alkalinity as CaCO3	----	1	mg/L	226	235	238	243	257	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	40100	41800	42500	41800	39500	
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L	0.35	0.25	0.38	0.58	1.88	
EK055G-SW: Ammonia as N by Discrete Analyser in Sea 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	4.4	4.3	4.5	4.3	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	4.1	4.4	4.3	4.5	4.3	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	1.31	1.47	1.67	1.81	0.88	
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	28	28	28	28	27	
EP005: Total Organic Carbon (TOC)									



## Analytical Results

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

Client sample ID

				Stony Well	North Jacks Point	South Policeman Point/Seagull Island	Snipe Point	Salt Creek Outlet
Client sampling date / time				21-Oct-2020 10:20	21-Oct-2020 09:50	21-Oct-2020 09:30	21-Oct-2020 09:15	21-Oct-2020 08:45
Compound	CAS Number	LOR	Unit	EM2018692-001	EM2018692-002	EM2018692-003	EM2018692-004	EM2018692-005
				Result	Result	Result	Result	Result
<b>EP005: Total Organic Carbon (TOC) - Continued</b>								
Total Organic Carbon	----	1	mg/L	35	37	35	34	33
<b>EP008: Chlorophyll</b>								
Chlorophyll a	----	1	mg/m <sup>3</sup>	6	7	6	7	6
Chlorophyll b	----	1	mg/m <sup>3</sup>	<1	<1	<1	<1	<1
Pheophytin a	----	1	mg/m <sup>3</sup>	3	2	2	<1	2

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	1.8km West of Salt Creek	Murray Mouth	US Tauwitschere	DS Tauwitschere	Mark Point
Client sampling date / time					21-Oct-2020 09:00	20-Oct-2020 14:30	20-Oct-2020 15:45	20-Oct-2020 15:45	20-Oct-2020 18:30
Compound	CAS Number	LOR	Unit	EM2018692-006	EM2018692-007	EM2018692-008	EM2018692-009	EM2018692-010	
				Result	Result	Result	Result	Result	
BM010: Algal Count									
Algal Count	----	-	-	NR	NR	NR	NR	NR	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	81700	7550	458	4100	30800	
EA045: Turbidity									
Turbidity	----	0.1	NTU	8.3	9.1	21.7	18.7	2.8	
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	239	125	102	107	153	
Total Alkalinity as CaCO3	----	1	mg/L	239	125	102	107	153	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	42800	4530	206	1970	15100	
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L	0.70	1.24	0.39	0.69	1.93	
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water									
Ammonia as N	7664-41-7	0.02	mg/L	<0.02	0.10	0.03	0.08	0.03	
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	0.03	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.03	0.02	0.04	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	4.3	1.0	1.3	1.6	2.2	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	4.3	1.0	1.3	1.6	2.2	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	1.82	0.08	0.10	0.14	0.10	
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	29	7	7	7	12	
EP005: Total Organic Carbon (TOC)									



## Analytical Results

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

Client sample ID

				1.8km West of Salt Creek	Murray Mouth	US Tauwitchere	DS Tauwitchere	Mark Point
Client sampling date / time				21-Oct-2020 09:00	20-Oct-2020 14:30	20-Oct-2020 15:45	20-Oct-2020 15:45	20-Oct-2020 18:30
Compound	CAS Number	LOR	Unit	EM2018692-006	EM2018692-007	EM2018692-008	EM2018692-009	EM2018692-010
				Result	Result	Result	Result	Result
<b>EP005: Total Organic Carbon (TOC) - Continued</b>								
Total Organic Carbon	----	1	mg/L	34	7	6	7	12
<b>EP008: Chlorophyll</b>								
Chlorophyll a	----	1	mg/m³	9	5	11	14	3
Chlorophyll b	----	1	mg/m³	<1	<1	<1	<1	<1
Pheophytin a	----	1	mg/m³	2	<2	4	<5	<1

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Long Point	Noonameena	Bonneys	Parnka Point	Villa de Yumpa
Client sampling date / time				20-Oct-2020 17:35	20-Oct-2020 18:20	20-Oct-2020 18:45	21-Oct-2020 12:25	21-Oct-2020 10:40	
Compound	CAS Number	LOR	Unit	EM2018692-011	EM2018692-012	EM2018692-013	EM2018692-014	EM2018692-015	
				Result	Result	Result	Result	Result	
BM010: Algal Count									
Algal Count	----	-	-	NR	NR	NR	NR	NR	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	44200	57000	62000	82400	72200	
EA045: Turbidity									
Turbidity	----	0.1	NTU	5.6	1.9	2.5	17.6	13.9	
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	29	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	175	180	221	247	248	
Total Alkalinity as CaCO3	----	1	mg/L	175	209	221	247	248	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	21800	31000	33900	40900	41300	
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L	0.88	0.09	0.44	0.12	0.41	
EK055G-SW: Ammonia as N by Discrete Analyser in Sea 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	2.1	2.2	2.3	4.5	4.7	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	2.1	2.2	2.3	4.5	4.7	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.11	0.27	0.31	1.40	1.30	
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	14	18	19	26	27	
EP005: Total Organic Carbon (TOC)									



## Analytical Results

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

Client sample ID

				Long Point	Noonameena	Bonneys	Parnka Point	Villa de Yumpa
Client sampling date / time				20-Oct-2020 17:35	20-Oct-2020 18:20	20-Oct-2020 18:45	21-Oct-2020 12:25	21-Oct-2020 10:40
Compound	CAS Number	LOR	Unit	EM2018692-011	EM2018692-012	EM2018692-013	EM2018692-014	EM2018692-015
				Result	Result	Result	Result	Result
<b>EP005: Total Organic Carbon (TOC) - Continued</b>								
Total Organic Carbon	----	1	mg/L	15	18	20	34	34
<b>EP008: Chlorophyll</b>								
Chlorophyll a	----	1	mg/m³	4	<1	3	8	8
Chlorophyll b	----	1	mg/m³	<1	<1	<1	<1	<1
Pheophytin a	----	1	mg/m³	<1	<1	1	1	3



Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Morella Creek @ gauge	3.2km south of Salt Creek (land)	Tilley Swamp Drain U/S Morella	McGrath Flat North	----
Client sampling date / time				21-Oct-2020 08:15	21-Oct-2020 07:45	21-Oct-2020 09:10	21-Oct-2020 11:50	----	
Compound	CAS Number	LOR	Unit	EM2018692-016	EM2018692-017	EM2018692-018	EM2018692-019	-----	
				Result	Result	Result	Result	----	
BM010: Algal Count									
Algal Count	----	-	-	NR	NR	NR	NR	----	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	18600	85400	13200	84000	----	
EA045: Turbidity									
Turbidity	----	0.1	NTU	12.7	8.7	9.8	10.3	----	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	8	<1	----	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	108	<1	<1	<1	----	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	284	234	<1	232	----	
Total Alkalinity as CaCO3	----	1	mg/L	393	234	453	232	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	4860	45300	6620	39200	----	
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L	14.8	0.26	9.94	<0.05	----	
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water									
Ammonia as N	7664-41-7	0.02	mg/L	0.20	<0.02	0.08	<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	<0.01	<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	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.7	2.6	1.1	4.2	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	1.7	2.6	1.1	4.2	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.07	2.95	0.02	1.61	----	
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	----	
EP002: Dissolved Organic Carbon (DOC)									
Dissolved Organic Carbon	----	1	mg/L	11	29	8	28	----	
EP005: Total Organic Carbon (TOC)									



## Analytical Results

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

Client sample ID

				Morella Creek @ gauge	3.2km south of Salt Creek (land)	Tilley Swamp Drain U/S Morella	McGrath Flat North	----
Client sampling date / time				21-Oct-2020 08:15	21-Oct-2020 07:45	21-Oct-2020 09:10	21-Oct-2020 11:50	----
Compound	CAS Number	LOR	Unit	EM2018692-016	EM2018692-017	EM2018692-018	EM2018692-019	-----
				Result	Result	Result	Result	----
<b>EP005: Total Organic Carbon (TOC) - Continued</b>								
Total Organic Carbon	----	1	mg/L	12	32	5	32	----
<b>EP008: Chlorophyll</b>								
Chlorophyll a	----	1	mg/m <sup>3</sup>	1	2	2	6	----
Chlorophyll b	----	1	mg/m <sup>3</sup>	<1	<1	<1	<1	----
Pheophytin a	----	1	mg/m <sup>3</sup>	<1	<1	<1	3	----