

## CERTIFICATE OF ANALYSIS

**Work Order** : **EM2013637**  
**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** : 06-Aug-2020 12:50  
**Date Analysis Commenced** : 06-Aug-2020  
**Issue Date** : 12-Aug-2020 12:47



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.

Signatories	Position	Accreditation Category
Arenie Vijayaratham	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Ashesh Patel	Senior Chemist	Sydney Inorganics, Smithfield, NSW
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Nikki Stepniewski	Senior Inorganic Instrument 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: EM2013637 : It is recognised that total organic carbon is less than dissolved organic carbon for sample #11. 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 and Chlorophyll-b for various due to sample matrix.
- EA015H: EM2013637 #4, #7-8, #17: 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.
- NR - 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	Morella Creek @ gauge
Client sampling date / time				05-Aug-2020 09:25	05-Aug-2020 08:55	05-Aug-2020 08:40	05-Aug-2020 08:25	05-Aug-2020 08:40	
Compound	CAS Number	LOR	Unit	EM2013637-001	EM2013637-002	EM2013637-003	EM2013637-004	EM2013637-005	
				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	79800	81600	85100	98600	10700	
EA045: Turbidity									
Turbidity	----	0.1	NTU	8.3	7.4	8.9	10.0	3.2	
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	<1	<1	<1	<1	71	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	209	195	222	223	351	
Total Alkalinity as CaCO3	----	1	mg/L	209	195	222	223	422	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	46700	45000	49800	49900	6110	
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L	<0.05	0.08	0.71	0.89	15.6	
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	3.7	3.7	3.9	4.0	1.6	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	3.7	3.7	3.9	4.0	1.6	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	2.05	1.57	2.17	2.32	0.05	
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	25	27	28	26	11	
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	Morella Creek @ gauge
Client sampling date / time				05-Aug-2020 09:25	05-Aug-2020 08:55	05-Aug-2020 08:40	05-Aug-2020 08:25	05-Aug-2020 08:40
Compound	CAS Number	LOR	Unit	EM2013637-001	EM2013637-002	EM2013637-003	EM2013637-004	EM2013637-005
				Result	Result	Result	Result	Result
<b>EP005: Total Organic Carbon (TOC) - Continued</b>								
Total Organic Carbon	----	1	mg/L	31	32	35	34	14
<b>EP008: Chlorophyll</b>								
Chlorophyll a	----	1	mg/m <sup>3</sup>	6	7	11	14	9
Chlorophyll b	----	1	mg/m <sup>3</sup>	<1	<1	<1	<1	<1
Pheophytin a	----	1	mg/m <sup>3</sup>	2	2	2	6	4



## Analytical Results

Sub-Matrix: WATER  
 (Matrix: WATER)

Client sample ID

				Salt Creek Outlet	1.8km west of Salt Creek	3.2km south of Salt Creek (land)	Tilley Swamp Drain U/S Morella	Murray Mouth
Client sampling date / time				05-Aug-2020 08:00	05-Aug-2020 08:15	05-Aug-2020 08:20	05-Aug-2020 09:10	04-Aug-2020 15:40
Compound	CAS Number	LOR	Unit	EM2013637-006	EM2013637-007	EM2013637-008	EM2013637-009	EM2013637-010
				Result	Result	Result	Result	Result
<b>BM010: Algal Count</b>								
Algal Count	----	-	-	NR	NR	NR	NR	NR
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>								
Total Dissolved Solids @180°C	----	10	mg/L	71100	92900	98800	8490	6420
<b>EA045: Turbidity</b>								
Turbidity	----	0.1	NTU	6.9	8.6	8.6	1.7	26.9
<b>ED037P: Alkalinity by PC Titrator</b>								
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	16	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	268	223	224	424	124
Total Alkalinity as CaCO3	----	1	mg/L	268	223	224	440	124
<b>ED045G: Chloride by Discrete Analyser</b>								
Chloride	16887-00-6	1	mg/L	39200	49900	49600	4370	3940
<b>EG052G: Silica by Discrete Analyser</b>								
Reactive Silica	----	0.05	mg/L	2.90	1.04	0.58	13.0	0.90
<b>EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water</b>								
Ammonia as N	7664-41-7	0.02	mg/L	<0.02	<0.02	<0.02	0.06	0.05
<b>EK057G: Nitrite as N by Discrete Analyser</b>								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	0.03	0.01
<b>EK058G: Nitrate as N by Discrete Analyser</b>								
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	<0.01	0.56	<0.01
<b>EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser</b>								
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	<0.01	0.59	0.01
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	3.8	4.1	3.8	0.6	1.2
<b>EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser</b>								
^ Total Nitrogen as N	----	0.1	mg/L	3.8	4.1	3.8	1.2	1.2
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>								
Total Phosphorus as P	----	0.01	mg/L	0.80	1.92	2.24	<0.01	0.06
<b>EK071G: Reactive Phosphorus as P by discrete analyser</b>								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
<b>EP002: Dissolved Organic Carbon (DOC)</b>								
Dissolved Organic Carbon	----	1	mg/L	24	28	28	2	7



## Analytical Results

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

Client sample ID

				Salt Creek Outlet	1.8km west of Salt Creek	3.2km south of Salt Creek (land)	Tilley Swamp Drain U/S Morella	Murray Mouth
Client sampling date / time				05-Aug-2020 08:00	05-Aug-2020 08:15	05-Aug-2020 08:20	05-Aug-2020 09:10	04-Aug-2020 15:40
Compound	CAS Number	LOR	Unit	EM2013637-006	EM2013637-007	EM2013637-008	EM2013637-009	EM2013637-010
				Result	Result	Result	Result	Result
<b>EP005: Total Organic Carbon (TOC)</b>								
Total Organic Carbon	----	1	mg/L	31	35	35	2	8
<b>EP008: Chlorophyll</b>								
Chlorophyll a	----	1	mg/m <sup>3</sup>	8	11	8	<1	7
Chlorophyll b	----	1	mg/m <sup>3</sup>	<1	<1	<1	<1	<3
Pheophytin a	----	1	mg/m <sup>3</sup>	2	5	5	<1	<3

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	US Tauwitchere	DS Tauwitchere	Mark Point	Long Point	Noonameena
Client sampling date / time				04-Aug-2020 16:50	04-Aug-2020 16:50	04-Aug-2020 17:30	05-Aug-2020 12:20	05-Aug-2020 11:50	
Compound	CAS Number	LOR	Unit	EM2013637-011	EM2013637-012	EM2013637-013	EM2013637-014	EM2013637-015	
				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	826	1320	21600	30100	51400	
EA045: Turbidity									
Turbidity	----	0.1	NTU	55.6	55.5	6.4	3.6	1.9	
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	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	108	108	138	148	173	
Total Alkalinity as CaCO3	----	1	mg/L	108	108	138	148	173	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	254	714	13200	18100	25400	
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L	0.40	0.46	0.96	0.81	<0.05	
EK055G-SW: Ammonia as N by Discrete Analyser in Sea Water									
Ammonia as N	7664-41-7	0.02	mg/L	0.04	0.04	0.05	0.18	0.04	
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	1.0	0.6	1.2	1.4	1.8	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	1.0	0.6	1.2	1.4	1.8	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.06	0.04	0.04	0.07	0.12	
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	5	5	7	7	9	
EP005: Total Organic Carbon (TOC)									



## Analytical Results

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

Client sample ID

				US Tauwitchere	DS Tauwitchere	Mark Point	Long Point	Noonameena
Client sampling date / time				04-Aug-2020 16:50	04-Aug-2020 16:50	04-Aug-2020 17:30	05-Aug-2020 12:20	05-Aug-2020 11:50
Compound	CAS Number	LOR	Unit	EM2013637-011	EM2013637-012	EM2013637-013	EM2013637-014	EM2013637-015
				Result	Result	Result	Result	Result
<b>EP005: Total Organic Carbon (TOC) - Continued</b>								
Total Organic Carbon	----	1	mg/L	4	5	7	8	10
<b>EP008: Chlorophyll</b>								
Chlorophyll a	----	1	mg/m³	12	17	10	3	2
Chlorophyll b	----	1	mg/m³	<8	<5	3	<1	<1
Pheophytin a	----	1	mg/m³	<8	9	5	2	<1



Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Bonneys	McGrath Flat North	Parnka Point	Villa de Yumpa	----
Client sampling date / time				05-Aug-2020 11:25	05-Aug-2020 10:20	05-Aug-2020 10:30	05-Aug-2020 09:45	----	
Compound	CAS Number	LOR	Unit	EM2013637-016	EM2013637-017	EM2013637-018	EM2013637-019	-----	
				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	51200	85900	83700	85400	----	
EA045: Turbidity									
Turbidity	----	0.1	NTU	3.3	16.0	12.0	8.2	----	
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	4	<1	<1	<1	----	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	182	198	202	213	----	
Total Alkalinity as CaCO3	----	1	mg/L	187	198	202	213	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	31100	40600	45100	47600	----	
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L	0.09	<0.05	<0.05	<0.05	----	
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	0.03	<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	2.1	3.1	3.3	3.6	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	2.1	3.1	3.3	3.6	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.22	0.87	1.21	1.38	----	
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	14	20	24	24	----	
EP005: Total Organic Carbon (TOC)									



## Analytical Results

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

Client sample ID

				Bonneys	McGrath Flat North	Parnka Point	Villa de Yumpa	----
Client sampling date / time				05-Aug-2020 11:25	05-Aug-2020 10:20	05-Aug-2020 10:30	05-Aug-2020 09:45	----
Compound	CAS Number	LOR	Unit	EM2013637-016	EM2013637-017	EM2013637-018	EM2013637-019	-----
				Result	Result	Result	Result	----
<b>EP005: Total Organic Carbon (TOC) - Continued</b>								
Total Organic Carbon	----	1	mg/L	15	23	27	29	----
<b>EP008: Chlorophyll</b>								
Chlorophyll a	----	1	mg/m <sup>3</sup>	2	4	2	9	----
Chlorophyll b	----	1	mg/m <sup>3</sup>	<1	<1	<1	<1	----
Pheophytin a	----	1	mg/m <sup>3</sup>	1	<1	<1	3	----