

## CERTIFICATE OF ANALYSIS

**Work Order** : **EM2021368**  
**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** : **JC**  
**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** : 02-Dec-2020 10:20  
**Date Analysis Commenced** : 02-Dec-2020  
**Issue Date** : 09-Dec-2020 14:16



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
Arenie Vijayaratnam	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
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: EM2021368 It is recognised that total organic carbon is less than dissolved organic carbon for samples #9,#12 and #13. However, the difference is within experimental variation of the methods.
- EP008, Chlorophyll-a standard does not contain Pheophytin-a standard.
- EP008, LOR raised for Chlorophyll-a, b and Pheophytin-a due to sample matrix.
- EA015H: EM2021368 #11, #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.
- EP002:EP005: EM2021368 #15 sample results for total organic carbon and dissolved organic carbon confirmed by re-extraction and re-analysis.
- NRind - 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)				Sample ID	Stony Well		North Jacks Point		South Policeman Point/ Seagull Island		Snipe Point		Morella Creek @ gauge	
				Sampling date / time	01-Dec-2020 08:20		30-Nov-2020 16:35		30-Nov-2020 16:10		30-Nov-2020 15:50		30-Nov-2020 16:15	
Compound		CAS Number	LOR	Unit	EM2021368-001		EM2021368-002		EM2021368-003		EM2021368-004		EM2021368-005	
					Result		Result		Result		Result		Result	
BM010: Algal Count														
Algal Count		----	-	-	NRind		NRind		NRind		NRind		NRind	
EA015: Total Dissolved Solids dried at 180 ± 5 °C														
Total Dissolved Solids @180°C		----	10	mg/L	87300		85100		90000		83500		13400	
EA045: Turbidity														
Turbidity		----	0.1	NTU	28.8		17.5		13.6		12.4		2.6	
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	<1		<1		<1		<1		182	
Bicarbonate Alkalinity as CaCO3		71-52-3	1	mg/L	236		251		235		240		146	
Total Alkalinity as CaCO3		----	1	mg/L	236		251		235		240		329	
ED045G: Chloride by Discrete Analyser														
Chloride		16887-00-6	1	mg/L	48800		49100		43800		43800		6770	
EG052G: Silica by Discrete Analyser														
Reactive Silica		----	0.05	mg/L	1.22		1.13		0.86		0.86		9.45	
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	4.2		4.8		3.1		5.0		1.7	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser														
^ Total Nitrogen as N		----	0.1	mg/L	4.2		4.8		3.1		5.0		1.7	
EK067G: Total Phosphorus as P by Discrete Analyser														
Total Phosphorus as P		----	0.01	mg/L	3.94		4.03		0.44		0.96		0.07	
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	49		32		30		31		17	
EP005: Total Organic Carbon (TOC)														



## Analytical Results

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

Sample ID

				Stony Well	North Jacks Point	South Policeman Point/ Seagull Island	Snipe Point	Morella Creek @ gauge
Sampling date / time				01-Dec-2020 08:20	30-Nov-2020 16:35	30-Nov-2020 16:10	30-Nov-2020 15:50	30-Nov-2020 16:15
Compound	CAS Number	LOR	Unit	EM2021368-001	EM2021368-002	EM2021368-003	EM2021368-004	EM2021368-005
				Result	Result	Result	Result	Result
<b>EP005: Total Organic Carbon (TOC) - Continued</b>								
Total Organic Carbon	----	1	mg/L	47	46	43	39	17
<b>EP008: Chlorophyll</b>								
Chlorophyll a	----	1	mg/m <sup>3</sup>	21	19	16	24	<1
Chlorophyll b	----	1	mg/m <sup>3</sup>	<3	<2	<2	4	<1
Pheophytin a	----	1	mg/m <sup>3</sup>	7	6	5	14	<1



## Analytical Results

Sub-Matrix: WATER  
 (Matrix: WATER)

Sample ID

				Salt Creek Outlet	1.8km west pf Salt Creek	3.2km south of Salt Creek (land)	Tilley Swamp Drain U/S Morella	Murray Mouth
Sampling date / time				30-Nov-2020 15:10	30-Nov-2020 15:30	30-Nov-2020 15:50	30-Nov-2020 16:45	30-Nov-2020 11:15
Compound	CAS Number	LOR	Unit	EM2021368-006	EM2021368-007	EM2021368-008	EM2021368-009	EM2021368-010
				Result	Result	Result	Result	Result
<b>BM010: Algal Count</b>								
Algal Count	----	-	-	NRind	NRind	NRind	NRind	NRind
<b>EA015: Total Dissolved Solids dried at 180 ± 5 °C</b>								
Total Dissolved Solids @180°C	----	10	mg/L	78600	89700	87200	10100	15900
<b>EA045: Turbidity</b>								
Turbidity	----	0.1	NTU	11.6	11.9	11.1	1.3	5.3
<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	96	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	240	237	224	382	127
Total Alkalinity as CaCO3	----	1	mg/L	240	237	224	477	127
<b>ED045G: Chloride by Discrete Analyser</b>								
Chloride	16887-00-6	1	mg/L	48600	51200	52500	5360	9030
<b>EG052G: Silica by Discrete Analyser</b>								
Reactive Silica	----	0.05	mg/L	1.07	0.91	0.88	11.8	0.70
<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	<0.02	<0.02
<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	<0.01	<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	<0.01	<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	<0.01	<0.01
<b>EK061G: Total Kjeldahl Nitrogen By Discrete Analyser</b>								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	5.6	5.2	4.0	1.0	0.3
<b>EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser</b>								
^ Total Nitrogen as N	----	0.1	mg/L	5.6	5.2	4.0	1.0	0.3
<b>EK067G: Total Phosphorus as P by Discrete Analyser</b>								
Total Phosphorus as P	----	0.01	mg/L	0.99	1.06	0.48	0.03	0.10
<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	31	30	33	3	6



## Analytical Results

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

Sample ID

				Salt Creek Outlet	1.8km west pf Salt Creek	3.2km south of Salt Creek (land)	Tilley Swamp Drain U/S Morella	Murray Mouth
Sampling date / time				30-Nov-2020 15:10	30-Nov-2020 15:30	30-Nov-2020 15:50	30-Nov-2020 16:45	30-Nov-2020 11:15
Compound	CAS Number	LOR	Unit	EM2021368-006	EM2021368-007	EM2021368-008	EM2021368-009	EM2021368-010
				Result	Result	Result	Result	Result
<b>EP005: Total Organic Carbon (TOC)</b>								
Total Organic Carbon	----	1	mg/L	42	40	42	2	6
<b>EP008: Chlorophyll</b>								
Chlorophyll a	----	1	mg/m <sup>3</sup>	12	16	12	<1	2
Chlorophyll b	----	1	mg/m <sup>3</sup>	1	3	2	<1	<1
Pheophytin a	----	1	mg/m <sup>3</sup>	3	14	2	<1	<1

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	US Tauwitchere	DS Tauwitchere	Mark Point	Long Point	Noonameena
Sampling date / time				01-Dec-2020 11:35	01-Dec-2020 11:30	30-Nov-2020 13:05	01-Dec-2020 10:40	01-Dec-2020 10:15	
Compound	CAS Number	LOR	Unit	EM2021368-011	EM2021368-012	EM2021368-013	EM2021368-014	EM2021368-015	
				Result	Result	Result	Result	Result	
BM010: Algal Count									
Algal Count	----	-	-	NRind	NRind	NRind	NRind	NRind	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	1180	474	18600	26300	48700	
EA045: Turbidity									
Turbidity	----	0.1	NTU	63.9	69.6	6.2	25.2	10.2	
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	3	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	92	94	127	136	190	
Total Alkalinity as CaCO3	----	1	mg/L	95	94	127	136	190	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	224	193	9720	13800	25400	
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L	<0.05	<0.05	0.22	0.89	0.16	
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	2.5	2.5	0.3	<0.1	0.7	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	2.5	2.5	0.3	<0.1	0.7	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.15	0.19	0.11	0.12	0.37	
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	6	7	7	8	18	
EP005: Total Organic Carbon (TOC)									



## Analytical Results

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

Sample ID

				US Tauwitchere	DS Tauwitchere	Mark Point	Long Point	Noonameena
Sampling date / time				01-Dec-2020 11:35	01-Dec-2020 11:30	30-Nov-2020 13:05	01-Dec-2020 10:40	01-Dec-2020 10:15
Compound	CAS Number	LOR	Unit	EM2021368-011	EM2021368-012	EM2021368-013	EM2021368-014	EM2021368-015
				Result	Result	Result	Result	Result
<b>EP005: Total Organic Carbon (TOC) - Continued</b>								
Total Organic Carbon	----	1	mg/L	7	6	8	8	18
<b>EP008: Chlorophyll</b>								
Chlorophyll a	----	1	mg/m <sup>3</sup>	39	36	15	<3	1
Chlorophyll b	----	1	mg/m <sup>3</sup>	<9	<20	<1	<3	<1
Pheophytin a	----	1	mg/m <sup>3</sup>	19	<20	5	5	2



Sub-Matrix: WATER (Matrix: WATER)				Sample ID	Bonneys	McGrath Flat North	Parnka Point	Villa de Yumpa	----
Sampling date / time				01-Dec-2020 09:50	01-Dec-2020 09:20	01-Dec-2020 08:50	01-Dec-2020 07:50	-----	
Compound	CAS Number	LOR	Unit	EM2021368-016	EM2021368-017	EM2021368-018	EM2021368-019	-----	
				Result	Result	Result	Result	----	
BM010: Algal Count									
Algal Count	----	-	-	NRind	NRind	NRind	NRind	----	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	56300	82200	86200	102000	----	
EA045: Turbidity									
Turbidity	----	0.1	NTU	21.0	13.8	79.8	23.0	----	
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	206	214	191	222	----	
Total Alkalinity as CaCO3	----	1	mg/L	206	214	191	222	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	30500	39400	42900	50700	----	
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L	0.36	<0.05	0.86	0.09	----	
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	----	
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	2.8	4.6	5.0	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	1.7	2.8	4.6	5.0	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.28	0.57	0.96	0.81	----	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.02	<0.01	<0.01	<0.01	----	
EP002: Dissolved Organic Carbon (DOC)									
Dissolved Organic Carbon	----	1	mg/L	22	25	28	32	----	
EP005: Total Organic Carbon (TOC)									



## Analytical Results

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

Sample ID

				Bonneys	McGrath Flat North	Parnka Point	Villa de Yumpa	----
Sampling date / time				01-Dec-2020 09:50	01-Dec-2020 09:20	01-Dec-2020 08:50	01-Dec-2020 07:50	----
Compound	CAS Number	LOR	Unit	EM2021368-016	EM2021368-017	EM2021368-018	EM2021368-019	-----
				Result	Result	Result	Result	----
<b>EP005: Total Organic Carbon (TOC) - Continued</b>								
Total Organic Carbon	----	1	mg/L	24	31	36	44	----
<b>EP008: Chlorophyll</b>								
Chlorophyll a	----	1	mg/m <sup>3</sup>	18	7	22	14	----
Chlorophyll b	----	1	mg/m <sup>3</sup>	<2	<2	<10	2	----
Pheophytin a	----	1	mg/m <sup>3</sup>	7	2	21	12	----