

CERTIFICATE OF ANALYSIS

Work Order : **EM2014780**
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 : 27-Aug-2020 10:25
Date Analysis Commenced : 27-Aug-2020
Issue Date : 03-Sep-2020 14:32



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.

- ED037-P: EM2014780 #16. Alkalinity has been confirmed via re-preparation and re-analysis.
- It is recognised that TOC is less than DOC for samples #12, #13, #16 and #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 sample matrix.
- EA015H: EM2014780 #1-3, #6, #9, #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.
- 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	Seagull Island	Snipe Point	Morella Creek @ gauge
Client sampling date / time				26-Aug-2020 09:45	26-Aug-2020 08:55	26-Aug-2020 08:30	26-Aug-2020 08:10	26-Aug-2020 08:00	
Compound	CAS Number	LOR	Unit	EM2014780-001	EM2014780-002	EM2014780-003	EM2014780-004	EM2014780-006	
				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	152000	116000	84200	82100	15800	
EA045: Turbidity									
Turbidity	----	0.1	NTU	6.3	7.5	7.7	8.1	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	115	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	203	211	240	241	341	
Total Alkalinity as CaCO3	----	1	mg/L	203	211	240	241	456	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	40900	43600	46700	47800	5060	
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L	<0.05	<0.05	0.28	0.37	13.7	
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	0.12	
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	3.0	3.8	3.9	4.2	1.4	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	3.0	3.8	3.9	4.2	1.4	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.56	0.76	1.26	1.35	0.03	
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	30	29	31	32	3	
EP005: Total Organic Carbon (TOC)									



Analytical Results

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

Client sample ID

				Stony Well	North Jacks Point	Seagull Island	Snipe Point	Morella Creek @ gauge
Client sampling date / time				26-Aug-2020 09:45	26-Aug-2020 08:55	26-Aug-2020 08:30	26-Aug-2020 08:10	26-Aug-2020 08:00
Compound	CAS Number	LOR	Unit	EM2014780-001	EM2014780-002	EM2014780-003	EM2014780-004	EM2014780-006
				Result	Result	Result	Result	Result
EP005: Total Organic Carbon (TOC) - Continued								
Total Organic Carbon	----	1	mg/L	30	34	37	36	6
EP008: Chlorophyll								
Chlorophyll a	----	1	mg/m³	4	5	8	9	5
Chlorophyll b	----	1	mg/m³	<1	<1	<1	<1	<1
Pheophytin a	----	1	mg/m³	<1	<1	3	1	<1



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				26-Aug-2020 07:25	26-Aug-2020 07:50	26-Aug-2020 07:30	26-Aug-2020 08:30	25-Aug-2020 14:45
Compound	CAS Number	LOR	Unit	EM2014780-007	EM2014780-008	EM2014780-009	EM2014780-010	EM2014780-011
				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	79700	78000	97900	8780	10500
EA045: Turbidity								
Turbidity	----	0.1	NTU	8.5	8.3	8.6	2.9	17.8
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	39	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	258	249	240	416	129
Total Alkalinity as CaCO3	----	1	mg/L	258	249	240	455	129
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	46200	48000	47800	4210	5890
EG052G: Silica by Discrete Analyser								
Reactive Silica	----	0.05	mg/L	1.03	0.52	0.11	9.06	0.79
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	0.10	0.15
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	0.02	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	0.33	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	0.35	0.02
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	3.7	3.7	3.8	0.6	1.1
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	3.7	3.7	3.8	1.0	1.1
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.88	1.01	0.66	<0.01	0.06
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	31	31	31	<1	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				26-Aug-2020 07:25	26-Aug-2020 07:50	26-Aug-2020 07:30	26-Aug-2020 08:30	25-Aug-2020 14:45
Compound	CAS Number	LOR	Unit	EM2014780-007	EM2014780-008	EM2014780-009	EM2014780-010	EM2014780-011
				Result	Result	Result	Result	Result
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	34	37	36	<1	7
EP008: Chlorophyll								
Chlorophyll a	----	1	mg/m ³	10	15	10	1	8
Chlorophyll b	----	1	mg/m ³	<1	<1	<1	<1	<1
Pheophytin a	----	1	mg/m ³	<1	1	1	<1	<1

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	US Tauwitchere	DS Tauwitchere	Mark Point	Long Point	Noonameena
Client sampling date / time				25-Aug-2020 16:15	25-Aug-2020 16:20	25-Aug-2020 16:55	26-Aug-2020 13:00	26-Aug-2020 12:30	
Compound	CAS Number	LOR	Unit	EM2014780-012	EM2014780-013	EM2014780-014	EM2014780-015	EM2014780-016	
				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	842	14100	20200	24600	43100	
EA045: Turbidity									
Turbidity	----	0.1	NTU	50.2	28.9	3.6	3.1	2.1	
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	115	115	140	145	156	
Total Alkalinity as CaCO3	----	1	mg/L	115	115	140	145	156	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	251	7290	13400	13700	19500	
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L	0.38	0.22	0.56	<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	0.05	0.23	0.42	0.04	0.05	
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	0.04	0.04	0.04	0.02	0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.04	0.05	0.05	0.02	0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.5	1.5	0.9	0.9	2.4	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	1.5	1.6	1.0	0.9	2.4	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.09	0.08	0.02	0.03	0.06	
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	4	3	4	10	
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				25-Aug-2020 16:15	25-Aug-2020 16:20	25-Aug-2020 16:55	26-Aug-2020 13:00	26-Aug-2020 12:30
Compound	CAS Number	LOR	Unit	EM2014780-012	EM2014780-013	EM2014780-014	EM2014780-015	EM2014780-016
				Result	Result	Result	Result	Result
EP005: Total Organic Carbon (TOC) - Continued								
Total Organic Carbon	----	1	mg/L	5	3	3	4	9
EP008: Chlorophyll								
Chlorophyll a	----	1	mg/m³	21	14	4	5	2
Chlorophyll b	----	1	mg/m³	<1	<1	<1	<1	<1
Pheophytin a	----	1	mg/m³	<6	<6	1	1	<1

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	Bonneys	McGrath Flat North	Parnka Point	Villa de Yumpa	----
Client sampling date / time				26-Aug-2020 12:10	26-Aug-2020 10:00	26-Aug-2020 11:10	26-Aug-2020 10:15	----	
Compound	CAS Number	LOR	Unit	EM2014780-017	EM2014780-018	EM2014780-019	EM2014780-020	-----	
				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	40000	63300	61800	59900	----	
EA045: Turbidity									
Turbidity	----	0.1	NTU	2.0	10.5	6.5	5.6	----	
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	16	<1	<1	<1	----	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	175	226	203	204	----	
Total Alkalinity as CaCO3	----	1	mg/L	191	226	203	204	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	23700	34800	36400	37300	----	
EG052G: Silica by Discrete Analyser									
Reactive Silica	----	0.05	mg/L	0.07	0.44	<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	0.03	0.03	<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	1.9	2.6	2.9	3.1	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	1.9	2.6	2.9	3.1	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.09	0.20	0.30	0.28	----	
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	10	19	17	17	----	
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				26-Aug-2020 12:10	26-Aug-2020 10:00	26-Aug-2020 11:10	26-Aug-2020 10:15	----
Compound	CAS Number	LOR	Unit	EM2014780-017	EM2014780-018	EM2014780-019	EM2014780-020	-----
				Result	Result	Result	Result	----
EP005: Total Organic Carbon (TOC) - Continued								
Total Organic Carbon	----	1	mg/L	10	17	19	19	----
EP008: Chlorophyll								
Chlorophyll a	----	1	mg/m ³	3	5	4	5	----
Chlorophyll b	----	1	mg/m ³	<1	<1	<1	<1	----
Pheophytin a	----	1	mg/m ³	<1	2	<1	1	----