ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **EM2011705**	Page	: 1 of 7
Client	: **Dept of Environment, Water & Natural Resources**	Laboratory	: Environmental Division Melbourne
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Project	: HCHB	Date Samples Received	: 08-Jul-2020
Order number	: ----	Date Analysis Commenced	: 08-Jul-2020
C-O-C number	: ----	Issue Date	: 15-Jul-2020
Sampler	: , JOSHUA CASTLE		
Site	: ----		
Quote number	: AD/052/20 V2		
No. of samples received	: 19		
No. of samples analysed	: 19		

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 Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

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 Vijayaratnam	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
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

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
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
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 3128083)									
EM2011568-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	283	282	0.00	0% - 20%
EM2011701-006	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	14400	14700	1.98	0% - 20%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 3128085)									
EM2011705-002	US Tauwitchere	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	926	933	0.710	0% - 20%
EM2011705-011	Stony Well	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	75000	77600	3.37	0% - 20%
EA045: Turbidity (QC Lot: 3130065)									
EM2011654-001	Anonymous	EA045: Turbidity	----	0.1	NTU	6.3	6.4	0.00	0% - 20%
EM2011705-006	Noonameena	EA045: Turbidity	----	0.1	NTU	1.6	1.7	7.23	0% - 50%
EA045: Turbidity (QC Lot: 3130066)									
EM2011705-018	1.8km west of Salt Creek	EA045: Turbidity	----	0.1	NTU	7.6	7.3	3.91	0% - 20%
EM2011801-003	Anonymous	EA045: Turbidity	----	0.1	NTU	76.9	74.9	2.64	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 3128266)									
EM2011701-007	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	64	69	8.12	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	64	69	8.12	0% - 20%
EM2011703-005	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	66	62	5.37	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	66	62	5.37	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 3128269)									
EM2011705-010	Villa de Yumpa	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	200	196	1.84	0% - 20%

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
ED037P: Alkalinity by PC Titrator (QC Lot: 3128269) - continued									
EM2011705-010	Villa de Yumpa	ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	200	196	1.84	0% - 20%
EM2011716-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	52	49	7.02	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	52	49	7.02	0% - 20%
EG052G: Silica by Discrete Analyser (QC Lot: 3128150)									
EM2011705-001	Murray Mouth	EG052G: Reactive Silica	----	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EM2011705-011	Stony Well	EG052G: Reactive Silica	----	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 3127681)									
EM2011700-008	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.16	0.15	0.00	0% - 50%
EM2011705-005	Long Point	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.19	0.18	9.27	0% - 50%
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 3127683)									
EM2011705-017	Salt Creek Outlet	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.02	0.00	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 3128149)									
EM2011701-005	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EM2011705-008	McGrath Flat North	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 3128151)									
EM2011705-010	Villa de Yumpa	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EM2011705-020	Tilley Swamp Drain U/S Morella	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.02	0.02	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 3127680)									
EM2011700-003	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EM2011702-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	6.52	6.54	0.173	0% - 20%
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 3127682)									
EM2011705-011	Stony Well	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EM2011712-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 3127771)									
EM2011685-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.9	2.0	0.00	0% - 50%
EM2011705-001	Murray Mouth	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.4	0.4	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 3127773)									
EM2011705-008	McGrath Flat North	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.8	2.7	4.24	0% - 20%
EM2011705-018	1.8km west of Salt Creek	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	4.1	4.0	0.00	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 3127772)									
EM2011685-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.62	0.63	0.00	0% - 20%
EM2011705-001	Murray Mouth	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.07	0.07	0.00	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 3127774)									
EM2011706-002	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	5.06	4.86	3.98	0% - 20%
EM2011705-018	1.8km west of Salt Creek	EK067G: Total Phosphorus as P	----	0.01	mg/L	2.38	2.60	9.15	0% - 20%

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Client sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Recovery Limits (%)*
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 3128145)									
EM2011705-008	McGrath Flat North	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EM2011688-004	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 3128152)									
EM2011705-020	Tilley Swamp Drain U/S Morella	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP002: Dissolved Organic Carbon (DOC) (QC Lot: 3128178)									
EM2011705-001	Murray Mouth	EP002: Dissolved Organic Carbon	----	1	mg/L	4	3	29.9	No Limit
EM2011705-010	Villa de Yumpa	EP002: Dissolved Organic Carbon	----	1	mg/L	27	26	0.00	0% - 20%
EP005: Total Organic Carbon (TOC) (QC Lot: 3128177)									
EM2011705-001	Murray Mouth	EP005: Total Organic Carbon	----	1	mg/L	3	3	0.00	No Limit
EM2011705-010	Villa de Yumpa	EP005: Total Organic Carbon	----	1	mg/L	25	24	5.97	0% - 20%

Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 3128083)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	98.1	93.7	107
				<10	293 mg/L	102	90.0	110
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 3128085)								
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	102	93.7	107
				<10	293 mg/L	108	90.0	110
EA045: Turbidity (QCLot: 3130065)								
EA045: Turbidity	----	0.1	NTU	<0.1	40 NTU	100	88.1	110
EA045: Turbidity (QCLot: 3130066)								
EA045: Turbidity	----	0.1	NTU	<0.1	40 NTU	100	88.1	110
ED037P: Alkalinity by PC Titrator (QCLot: 3128266)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	93.5	88.0	112
ED037P: Alkalinity by PC Titrator (QCLot: 3128269)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	106	88.0	112
EG052G: Silica by Discrete Analyser (QCLot: 3128150)								
EG052G: Reactive Silica	----	0.05	mg/L	<0.05	5 mg/L	98.8	78.9	128
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3127681)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	104	88.0	116
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3127683)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	115	88.0	116
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3128149)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	107	90.9	112
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3128151)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	107	90.9	112
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3127680)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	106	90.0	117
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3127682)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	104	90.0	117
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3127771)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	5 mg/L	103	70.0	117
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3127773)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	5 mg/L	77.8	70.0	117
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3127772)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Recovery Limits (%): Low	Recovery Limits (%): High
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3127772) - continued								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	2.21 mg/L	77.7	71.9	114
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3127774)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	2.21 mg/L	87.0	71.9	114
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3128145)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	116	92.7	119
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3128152)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	113	92.7	119
EP002: Dissolved Organic Carbon (DOC) (QCLot: 3128178)								
EP002: Dissolved Organic Carbon	----	1	mg/L	<1	100 mg/L	89.0	83.0	115
EP005: Total Organic Carbon (TOC) (QCLot: 3128177)								
EP005: Total Organic Carbon	----	1	mg/L	<1	100 mg/L	95.6	81.2	109
EP008: Chlorophyll (QCLot: 3133195)								
EP008: Chlorophyll a	----	1	mg/m³	<1	20 mg/m³	86.9	70.0	130
EP008: Pheophytin a	----	1	mg/m³	<1	----	----	----	----
EP008: Chlorophyll (QCLot: 3133197)								
EP008B: Chlorophyll b	----	1	mg/m³	<1	----	----	----	----

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Recovery Limits (%): Low	Recovery Limits (%): High
EG052G: Silica by Discrete Analyser (QCLot: 3128150)							
EM2011705-002	US Tauwitchere	EG052G: Reactive Silica	----	5 mg/L	97.6	80.0	120
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3127681)							
EM2011700-009	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	126	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3127683)							
EM2011705-018	1.8km west of Salt Creek	EK055G: Ammonia as N	7664-41-7	1 mg/L	119	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3128149)							
EM2011701-006	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	93.6	80.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3128151)							
EM2011712-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	94.6	80.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3127680)							
EM2011700-006	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	83.3	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3127682)							
EM2011705-012	North Jacks Point	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	87.0	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3127771)							
EM2011686-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	107	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3127773)							
EM2011705-013	South Policeman Point	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	104	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3127772)							
EM2011686-001	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	96.4	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3127774)							
EM2011705-013	South Policeman Point	EK067G: Total Phosphorus as P	----	1 mg/L	84.4	70.0	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3128145)							
EM2011688-005	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	102	79.0	123
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 3128152)							
EM2011712-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	99.5	79.0	123
EP002: Dissolved Organic Carbon (DOC) (QCLot: 3128178)							
EM2011705-002	US Tauwitchere	EP002: Dissolved Organic Carbon	----	100 mg/L	95.7	75.0	117
EP005: Total Organic Carbon (TOC) (QCLot: 3128177)							
EM2011705-002	US Tauwitchere	EP005: Total Organic Carbon	----	100 mg/L	102	80.0	114