

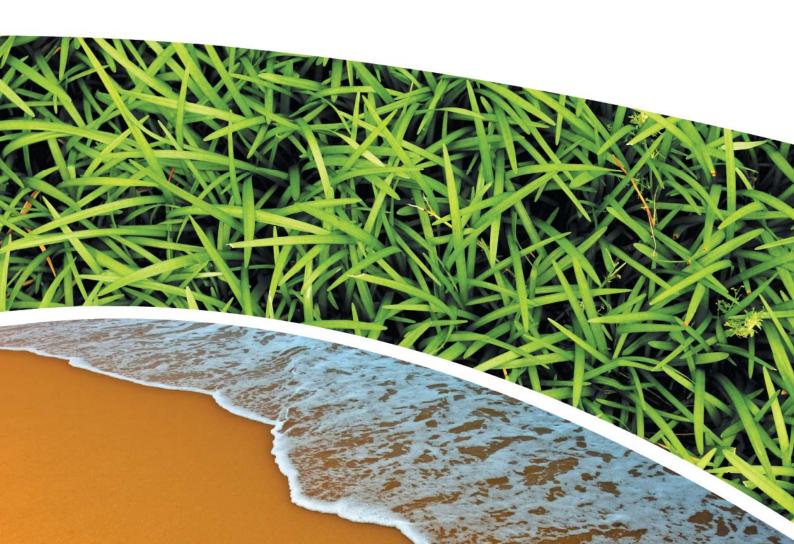
DISCHARGE WATER MONITORING UNDERTAKEN DURING OCTOBER

KOORAGANG ISLAND FACILITY

Prepared for INCITEC PIVOT LTD
Prepared by RCA AUSTRALIA
RCA Ref 6919-1347/1

NOVEMBER 2021





RCA ref 6919-1347/1

RCA AUSTRALIA GEOTECHNICAL • ENVIRONMENTAL

Geotechnical Engineering

Engineering Geology

Environmental Engineering

Hydrogeology

Construction Materials Testing

Environmental Monitoring

Noise & Vibration

Occupational Hygiene

26 November 2021

Incitec Pivot Limited PO Box 148 MAYFIELD NSW 2304

Attention: Mr Anthony Peters

REPORT COMPILED FOR INCITEC PIVOT PTY LTD DETAILING THE DISCHARGE WATER MONITORING AT THE KOORAGANG ISLAND FACILITY DURING OCTOBER 2021

This report must not be reproduced except in full.

Results or figures from this report must not be used without acknowledgment.

1 GENERAL COMMENTS

Job number: 6919.

Client Order Number: 46027674.

Date Samples Received: During October 2021.

Samples received were sampled by RCA Laboratories – Environmental staff.

Note: Sampling of Surface and Ground Waters by the client and/or by RCA Laboratories - Environmental staff is not covered by our NATA Scope of Accreditation.

This report has been revised to correct results within **Table 3**.

2 PROCEDURES

The analytical procedures used by RCA Laboratories - Environmental are based on established internationally recognised procedures such as APHA and Australian Standards. Analytical test methods are detailed in **Table 1**.

 Table 1
 Analytical Test Methods

Analysis	Method	Units	Analysing Laboratory	NATA Status
рН	ENV-LAB006	pH unit	RCA Laboratories - Environmental	NATA
Total Suspended Solids	ENV-LAB009	mg/L	RCA Laboratories - Environmental	NATA
Sulfur as S	ED043	mg/L	ALS	Non-NATA; NATA
Sulfate as SO4	ED041G	mg/L	ALS	NATA
Dissolved As, Cd, Pb & Zn	EG020F	mg/L	ALS	NATA
Total As, Cd, Pb & Zn	EG020T	mg/L	ALS	NATA
Total & Dissolved Mercury	EG035T/EG035F	mg/L	ALS	NATA
Ammonia as N	EK055G	mg/L	ALS	NATA
Nitrite as N	EK057G	mg/L	ALS	NATA
Nitrate as N	EK058G	mg/L	ALS	NATA
Nitrite and Nitrate as N	EK059G	mg/L	ALS	Non-NATA; NATA
Total Kjeldahl Nitrogen as N	EK061G	mg/L	ALS	NATA
Total Nitrogen as N	EK062G	mg/L	ALS	NATA
Phosphorus (Total) as P	EK067G	mg/L	ALS	Non-NATA; NATA
Phosphorus (Reactive) as P	EK071G	mg/L	ALS	NATA
Phosphate (Calculation from Total Phosphorus)	EK067G	mg/L	ALS	Non-NATA; NATA
Sulfide (Total) as S ²⁻	EK084	mg/L	ALS	NATA
Sulfide (Dissolved) as S ²⁻	EK085M	mg/L	ALS	NATA

When an external testing laboratory is used to obtain the analysis of samples which become a part of this report, then the details of that laboratory's NATA accreditation and their official report will be attached as an appendix. Refer to ALS Environmental (NATA accreditation number 825) reports in **Appendix B**.



3 WATER ANALYSIS RESULTS

3.1 GENERAL COMMENTS

An automated ISCO water sampler is located on the central stormwater drainage line within the Incitec site. This central drainage line has recently undergone improvement works and carries the entire site's stormwater. The northern ISCO water sampler has been decommissioned

The central automated water sampler is connected to a rain gauge. A magnetic flow meter is also located at the central drainage line. Stormwater samples are automatically collected by the ISCO water sampler when the following two (2) conditions are met:

- A minimum of 2mm of rainfall in a 60-minute period is recorded; and
- Flow is detected over the weir plate inside the stormwater pit.

Samples are collected every 15 minutes provided that these two (2) conditions are continued to be satisfied. Samples are composited per rainfall event. A rainfall event is defined as the continuous length of time the rainfall and flow conditions are met, that is if one sample is collected every 15 minutes. The cessation of these conditions being satisfied indicates the end of a rainfall event.

Stormwater discharge quality monitoring is undertaken by RCA Australia in accordance with the site's Environment Protection Licence (EPL) 11781. Stormwater monitoring is undertaken at EPA identification site 7 (Central Drain).

The central stormwater drains were checked for samples and reset by RCA Laboratories – Environmental staff on two (2) occasions during this reporting period. RCA checked and reset the drain ISCO on the 11 and 14 October 2021. It is noted that the ISCO was without power upon site attendance 8:15am 11 October; bottles had been filled by earlier rainfall and these were collected later that day. Power was restored by 8:05am 13 October.

3.2 CENTRAL DRAIN WATER ANALYSIS RESULTS

Two (2) composite samples corresponding to two (2) days of rainfall events were collected from the Central drain during October 2021 as shown in **Table 2** below.



Table 2 Central Drain Water Quality Results: October 2021

ANALYSIS	UNITS	Centra	l Drain
Sample Number	-	10216919002	10216919003
Date Sampled	-	10/11/2021	14/11/2021
Rainfall period (time)	-	17:31-20:59	14:24-15:03
pH	pH unit	8.97	7.75
Total Suspended Solids	mg/L	121	16
Sulfur as S	mg/L	910	90
Sulfate as SO ₄	mg/L	973	13
Total Zinc	mg/L	0.72	0.181
Ammonia as N	mg/L	893	53.9
Nitrite as N	mg/L	5.38	1.33
Nitrate as N	mg/L	23.4	10.1
Nitrite and Nitrate as N	mg/L	28.8	11.4
Total Kjeldahl Nitrogen as N	mg/L	1750	80.6
Total Nitrogen as N	mg/L	1780	92
Phosphorus (Total) as P	mg/L	99	16
Phosphorus (Reactive) as P	mg/L	93.1	14.1
Phosphate (Calculation from Total Phosphorus)	mg/L	304	49.1

4 RAINFALL AND FLOW DATA

No flow rate information has been provided to RCA; however, it is understood that flow data is currently being recorded at the Central stormwater drainage line.

A rainfall gauge independent to the ISCO samplers is also located on site however data has not yet been downloaded; an attempt in October 2021 was unsuccessful. RCA have therefore utilised the data from the Bureau of Meteorology as shown in **Figure 1** below.



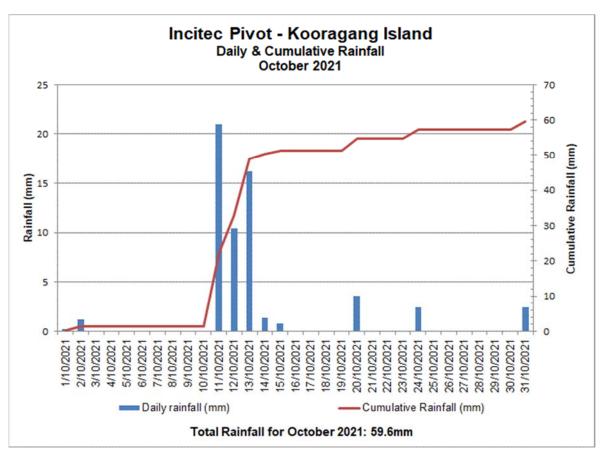


Figure 1 October 2021 Rainfall

5 BENEFICIAL REUSE SAMPLING

Two (2) samples were collected from the wheel wash during October 2021, one (1) sample was analysed for nutrients only due to an error with the analytical request and as such a second sample was collected. Results are shown in **Table 3**. Laboratory report sheets are attached in **Appendix A** and **Appendix B**, noting that there are analytes included which have not been reported.



Table 3 Reuse Analysis Results

Sample Location		Wheel	Wash
Date	Units	5/10/2021	29/10/2021
Time	Units	11:58	12:37
pН	pH units	8.91	8.44
Nitrite as N	mg/L	12.7	13.5
Nitrate as N	mg/L	159	132
TKN	mg/L	9820	18400
Total Nitrogen	mg/L	9990	18600
Total Phosphorus	mg/L	1020	2000
Arsenic (dissolved)	mg/L	-	0.293
Cadmium (dissolved)	mg/L	-	0.0012
Copper (dissolved)	mg/L	-	0.214
Lead (dissolved)	mg/L	-	<0.001
Molybdenum (dissolved)	mg/L	-	0.189
Nickel (dissolved)	mg/L	-	0.069
Zinc (dissolved)	mg/L		0.435
Mercury (dissolved)	mg/L		<0.0001
Chromium (total)	mg/L		0.01

6 LIMITATIONS

This report has been prepared for Incitec Pivot in accordance with an agreement with RCA Australia (RCA). The services performed by RCA have been conducted in a manner consistent with that generally exercised by members of its profession and consulting practice.

This report has been prepared for the sole use of Incitec Pivot. The report may not contain sufficient information for purposes of other uses or for parties other than Incitec Pivot. This report shall only be presented in full and may not be used to support objectives other than those stated in the report without written permission from RCA Australia.

The information in this report is considered accurate at the date of issue with regard to the current conditions of the site.

Yours faithfully RCA AUSTRALIA



Fiona Brooker Manager of Environmental Services



Appendix A

Internal NATA Analysis Reports



Incitec Pivot Limited PO Box 148 MAYFIELD NSW 2304

Project: RCA ref 6919-1347/0

Date: 2/11/2021

Client reference: Kooragang Island ISCO Water Sampling

Received date: 5/10/2021, 11/10/2021, 14/10/2021, Number of samples: 4

29/10/2021

Client order number: 45987323 Testing commenced: 5/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/2021, 12/10/

14/10/2021, 29/10/2021

CERTIFICATE OF ANALYSIS

1 ANALYTICAL TEST METHODS

ANALYSIS	METHOD	UNITS	ANALYSING LABORATORY	NATA ANALYSIS / NON NATA	Measurement of Uncertainty Coverage Factor 2
рН	ENV-LAB006*	рН	RCA Laboratories - Environmental	NATA	±0.54
Total Suspended Solids	ENV-LAB009*	mg/L	RCA Laboratories - Environmental	NATA	±6.41

^{*} The analytical procedures used by RCA Laboratories - Environmental are based on established internationally recognised procedures such as APHA and Australian Standards.



Robert Carr & Associates Pty Ltd Trading as RCA Laboratories – Environmental 92 Hill Street PO Box 175, Carrington NSW 2294
ABN 53 063 515 711 Ph 02 4902 9200 – Fax 02 4902 9299
Email: administrator@rca.com.au Web www.rca.com.au

2 **RESULTS**

ANALYSIS	UNITS	Central	Central
Water			
Sample Number	-	10216919002	10216919003
Date Sampled	-	10/11/2021	14/11/2021
Sampled By	-	ISCO-SK	ISCO-SK
pH Value	pH unit	8.97	7.75
Total Suspended Solids	mg/L	121	16

ANALYSIS	UNITS	Wheel Wash	Wheel Wash
Water			
Sample Number	-	10216919001	10216919004
Date Sampled	-	5/10/2021	29/10/2021
Sampled By	-	SK	LS
pH Value	pH unit	8.91	8.44
Total Suspended Solids	mg/L		

QUALITY CONTROL RESULTS 3

W ater Quality Control Sample Results

DATE	ANALYSIS	METHOD	UNITS	QUALITY CONTROL STANDARD VALUE	QUALITY CONTROL ACCEPTANCE CRITERIA	QUALITY CONTROL STANDARD RESULT
5/10//2021	рН	ENV-LAB006	рН	7.00	6.95 - 7.05	7.01
12/10/2021	рН	ENV-LAB006	рН	7.00	6.95 - 7.05	7.02
14/10/2021	рН	ENV-LAB006	рН	7.00	6.95 - 7.05	7.02
29/10/2021	pН	ENV-LAB006	рН	7.00	6.95 - 7.05	7.02
22/10/2021	Total Suspended Solids	ENV-LAB009	mg/L	75	67.5 – 82.5	70



Water Duplicate Analysis Results

SAMPLE NUMBER	DATE	ANALYSIS	METHOD	UNITS	LOR	SAMPLE RESULT	SAMPLE DUPLICATE RESULT
10216919001	5/10//2021	рН	ENV-LAB006	рН	-	8.91	8.94
10216919002	12/10/2021	рН	ENV-LAB006	рН	-	8.97	8.95
10216919003	14/10/2021	рН	ENV-LAB006	рН	-	7.75	7.77
10216919004	29/10/2021	рН	ENV-LAB006	рН	-	8.44	8.47
102114302001 BATCH	22/10/2021	Total Suspended Solids	ENV-LAB009	mg/L	5	<5	<5

Please contact the undersigned if you have any queries.

Yours sincerely

Laura Schofield Environmental Laboratory Manager Robert Carr & Associates Pty Ltd Trading as RCA Laboratories -Environmental

Approved Signatory

Neena Tewari Environmental Scientist Robert Carr & Associates Pty Ltd Trading as RCA Laboratories -Environmental



RCA Internal Quality Review

General

- Laboratory QC results for Method Blanks, Duplicates and Laboratory Control Samples are included in this QC report where applicable. Additional QC data may be available on 1. request. RCA QC Acceptance / Rejection Criteria are available on request.
- 2.
- Proficiency Trial results are available on request.
- Actual PQLs are matrix dependant. Quoted PQLs may be raised where sample extracts are diluted due to interferences.
- When individual results are qualified in the body of a report, refer to the qualifier descriptions that follow
- Samples were analysed on an 'as received' basis.
- Sampled dates in this report are those listed on the COC or sample jars, if no sample dates are noted, the date the samples are received at the laboratory have been used.
- All soil results are reported on a dry basis, unless otherwise stated. (ACID SULPHATE SOILS)
- This report replaces any interim results previously issued.

Holding Times.

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the Sample Receipt Acknowledgment.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

##NOTE: pH duplicates are reported as a range NOT as RPD

QC - ACCEPTANCE CRITERIA

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR: RPD must lie between 0-30%

QC DATA GENERAL COMMENTS

- 1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
- 2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
- 3. Duplicate RPD's are calculated from raw analytical data thus it is possible to have two sets of data.

Glossary

UNITS

mg/kg: milligrams per Kilogram

ug/L: micrograms per litre

ppm: Parts per million

ppb: Parts per billion

%: Percentage

org/100ml: Organisms per 100 millilitres

NTU: Units

MPN/100mL: Most Probable Number of organisms per 100 millilitres

mg/L: milligrams per Litre

TERMS

Dry Where moisture has been determined on a solid sample the result is expressed on a dry basis.

LOR Limit of Reporting.

RPD Relative Percent Difference between two Duplicate pieces of analysis can be obtained upon request.

QCS Quality Control Sample - reported as value recovery

Method Blank In the case of solid samples these are performed on laboratory certified clean sands.

In the case of water samples these are performed on de-ionised water.

Duplicate A second piece of analysis from the same sample and reported in the same units as the result to show comparison.

Batch Duplicate A second piece of analysis from a sample outside of the clients batch of samples but run within the laboratory batch of analysis.

USEPA United States Environment Protection Authority

APHA American Public Health Association

COC Chain of Custody

CP Client Parent - QC was performed on samples pertaining to this report

IS insufficient sample for analysis

NCP Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within

< indicates less than

> Indicates greater than

ND Not Detected



Ph: (02) 4902 9200 Fax: 02 4902 9299 92 Hill Street, Carrington NSW 2294 www.rca.com.au Email: labenviro@rca.com.au

ENV-F103-4

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Ph: (02) 4902 9200 Fax: 02 4902 9299 92 Hill Street, Carrington NSW 2294 www.rca.com.au Email: labenviro@rca.com.au

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Ph: (02) 4902 9200 Fax: 02 4902 9299 92 Hill Street, Carrington NSW 2294 www.rca.com.au Email: labenviro@rca.com.au

ENV-F103-4 Email Report To: enviro@rca.com.au Contact Name: Anthony Peters Project Manager: Adeleh Khoshzaban Client Name: Incited Phone Number: 02 4923 5466 Client Site: Kooragang Island **Expected Reporting Date:** (Laboratory Use Only) Date Required: ☐ Urgent Turnaround Required: Page 1 of 1 ANALYSIS REQUIRED RCA Job Number: 6919 External Analysis SAMPLE INFORMATION **ISCO Water Samples** Total Matrix **RCA Laboratories** Date Samples Client ID / Description **Environmental Sample** Number 12/10/21 Central 10216919003 Laboratory use only (circle appropriate) RECEIVED BY No Received in good condition: Yes RELINQUISHED BY Date 14.10.21 Yes No Name Chilled: Date 14.10.21 Time: Name S King Of: RCALE Time: 15.30 Of: RCALE



Ph: (02) 4902 9200 Fax: 02 4902 9299 92 Hill Street, Carrington NSW 2294 www.rca.com.au Email: labenviro@rca.com.au

ENV-F103-4

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Appendix B

External Laboratory Reports



CERTIFICATE OF ANALYSIS

Work Order : WN2111438

Client : ROBERT CARR & ASSOCIATES P/L

Contact : MS LAURA SCHOFIELD

Address : 92 HILL STREET

CARRINGTON NSW 2294

Telephone : +61 02 49029200
Project : 6919 ISCOs

 Order number
 : ---

 C-O-C number
 : ---

 Sampler
 : SK

Sampler : SK Site : ----

Quote number : WN/087/16v2

No. of samples received : 1

No. of samples analysed : 1

Page

Laboratory : ALS Water - Newcastle

: 1 of 3

Contact : Hayley Worthington

Address : 5/585 Maitland Road Newcastle West NSW Australia 2304

Telephone : +612 4014 2500

Date Samples Received : 05-Oct-2021 14:16

Date Analysis Commenced : 06-Oct-2021

Issue Date : 12-Oct-2021 14:45



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

Ivan TaylorAnalystSydney Inorganics, Smithfield, NSWNeil MartinTeam Leader - ChemistryChemistry, Newcastle West, NSW

Page : 2 of 3 Work Order : WN2111438

Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 ISCOs

ALS

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.
- EA043, and EG020T conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.

Page : 3 of 3 Work Order : WN2111438

Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 ISCOs

Analytical Results



Sub-Matrix: WATER (Matrix: WATER)			Sample ID	10216919001	 	
		Sampli	ng date / time	05-Oct-2021 00:00	 	
Compound	CAS Number	LOR	Unit	WN2111438-001	 	
				Result	 	
ED041: Sulfate (Turbidimetric) as SO4 2-						
Sulfate as SO4 - Turbidimetric	14808-79-8	2	mg/L	8260	 	
ED043: Total Oxidised Sulfur as SO4 2-						
Total Oxidised Sulfur as SO4 2-		10	mg/L	3140	 	
EG020T: Total Metals by ICP-MS						
Zinc	7440-66-6	0.005	mg/L	4.82	 	
EK055A: Ammonia as N						
Ammonia as N	7664-41-7	0.05	mg/L	8210	 	
EK057A: Nitrite as N						
Nitrite as N	14797-65-0	0.05	mg/L	12.7	 	
EK058A: Nitrate as N						
Nitrate as N	14797-55-8	0.05	mg/L	159	 	
EK059A: Nitrite and Nitrate as N (NOx)						
Nitrite + Nitrate as N		0.05	mg/L	172	 	
EK061A: Total Kjeldahl Nitrogen as N						
Total Kjeldahl Nitrogen as N		0.1	mg/L	9820	 	
EK062A: Total Nitrogen as N			, and the second			
Total Nitrogen as N		0.1	mg/L	9990	 	
EK067A: Total Phosphorus as P			3			
Total Phosphorus as P		0.05	mg/L	1020	 	
Total Phosphate		0.20	mg/L	3130	 	
EK071A: Reactive Phosphorus as P			J. J			
Reactive Phosphorus as P	14265-44-2	0.05	mg/L	1020	 	
Reactive Phosphorus as P	14200-44-2	0.00	mg/L	1020	 	

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) ED043: Total Oxidised Sulfur as SO4 2-(WATER) EG020T: Total Metals by ICP-MS



QUALITY CONTROL REPORT

Work Order : WN2111438

: ROBERT CARR & ASSOCIATES P/L

Contact : MS LAURA SCHOFIELD

Address : 92 HILL STREET

CARRINGTON NSW 2294

Telephone : +61 02 49029200
Project : 6919 ISCOs

 Order number
 : ---

 C-O-C number
 : ---

 Sampler
 : SK

 Site
 : ---

Quote number : WN/087/16v2

No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 5

Laboratory : ALS Water - Newcastle

Contact : Hayley Worthington

Address : 5/585 Maitland Road Newcastle West NSW Australia 2304

 Telephone
 : +612 4014 2500

 Date Samples Received
 : 05-Oct-2021

 Date Analysis Commenced
 : 06-Oct-2021

 Issue Date
 : 12-Oct-2021



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 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

Client

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

Ivan TaylorAnalystSydney Inorganics, Smithfield, NSWNeil MartinTeam Leader - ChemistryChemistry, Newcastle West, NSW

Page : 2 of 5 Work Order : WN2111438

Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 ISCOs



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.

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%.

Laboratory sample ID Sample ID ED041: Sulfate (Turbidimetric) WN2111051-005 Anonymo WN2111702-001 Anonymo ED043: Total Oxidised Sulfur a WN2111438-001 1021691 EG020T: Total Metals by ICP-I) as SO4 2- (QC Lot: 3948130) Dus ED041A: S ED041A: S as SO4 2- (QC Lot: 3947193) 9001 ED043: Tot MS (QC Lot: 3945920)		14808-79-8 14808-79-8	2 2	Unit mg/L mg/L	Original Result 2190 14	Duplicate Result 2120 16	3.3 9.1	Acceptable RPD (%) 0% - 20% No Limit
WN2111051-005 Anonymo WN2111702-001 Anonymo ED043: Total Oxidised Sulfur a WN2111438-001 1021691 EG020T: Total Metals by ICP-I	Dus ED041A: S Dus ED041A: S as SO4 2- (QC Lot: 3947193) 9001 ED043: Tot MS (QC Lot: 3945920)	sulfate as SO4 - Turbidimetric sulfate as SO4 - Turbidimetric	14808-79-8		0		-		7.1 = 7.1
WN2111702-001 Anonymo ED043: Total Oxidised Sulfur a WN2111438-001 1021691 EG020T: Total Metals by ICP-I	DUS ED041A: S as SO4 2- (QC Lot: 3947193) 9001 ED043: Tot MS (QC Lot: 3945920)	dulfate as SO4 - Turbidimetric	14808-79-8		0		-		7.1 = 7.1
ED043: Total Oxidised Sulfur a WN2111438-001 1021691 EG020T: Total Metals by ICP-N	as SO4 2- (QC Lot: 3947193) 9001 ED043: Tot MS (QC Lot: 3945920)			2	mg/L	14	16	9.1	No Limit
WN2111438-001 1021691 EG020T: Total Metals by ICP-I	9001 ED043: Tot MS (QC Lot: 3945920)	tal Oxidised Sulfur as SO4 2-							INO LITTIE
EG020T: Total Metals by ICP-I	MS (QC Lot: 3945920)	tal Oxidised Sulfur as SO4 2-							
				10	mg/L	3140	3640	14.7	0% - 20%
	ous EG020A-T:								
ES2135810-002 Anonymo		: Zinc	7440-66-6	0.005	mg/L	0.040	0.038	5.7	No Limit
WN2111414-001 Anonymo	ous EG020A-T:	: Zinc	7440-66-6	0.005	mg/L	0.052	0.051	2.2	0% - 50%
EK055A: Ammonia as N (QC	Lot: 3941160)								
WN2111394-004 Anonymo	ous EK055A: A	mmonia as N	7664-41-7	0.05	mg/L	62.6	61.8	1.3	0% - 20%
WN2111398-001 Anonymo	ous EK055A: A	mmonia as N	7664-41-7	0.05	mg/L	<0.05	<0.05	0.0	No Limit
EK057A: Nitrite as N (QC Lot	: 3940172)								
WN2111415-001 Anonymo	ous EK057A: N	litrite as N	14797-65-0	0.03	mg/L	0.10	0.24	81.3	No Limit
EK059A: Nitrite and Nitrate as	N (NOx) (QC Lot: 3941161)								
WN2111398-001 Anonymo	ous EK059A: N	litrite + Nitrate as N		0.05	mg/L	1.15	1.15	0.0	0% - 20%
WN2111453-001 Anonymo	ous EK059A: N	litrite + Nitrate as N		0.05	mg/L	5.23	5.48	4.7	0% - 20%
EK062A: Total Nitrogen as N	(QC Lot: 3944936)								
WN2111399-001 Anonymo	ous EK062A: To	otal Nitrogen as N		0.1	mg/L	2.6	2.8	6.2	0% - 20%
WN2111453-001 Anonymo	ous EK062A: To	otal Nitrogen as N		0.1	mg/L	8.0	8.3	3.3	0% - 20%
EK067A: Total Phosphorus as	P (QC Lot: 3942616)								
WN2111402-001 Anonymo	ous EK067A: To	otal Phosphorus as P		0.05	mg/L	8.67	9.14	5.2	0% - 20%
WN2111562-001 Anonymo	ous EK067A: To	otal Phosphorus as P		0.05	mg/L	0.34	0.33	5.0	No Limit
EK071A: Reactive Phosphorus	s as P (QC Lot: 3940677)								

Page : 3 of 5
Work Order : WN2111438

Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 ISCOs



Sub-Matrix: WATER			Laboratory Duplicate (DUP) Report							
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)	
EK071A: Reactive Ph	osphorus as P (QC Lot: 394	10677) - continued								
WN2111059-015	Anonymous	EK071A: Reactive Phosphorus as P	14265-44-2	0.05	mg/L	7.50	7.46	0.5	0% - 20%	
WN2111402-001	Anonymous	EK071A: Reactive Phosphorus as P	14265-44-2	0.05	mg/L	5.70	5.72	0.3	0% - 20%	

Page : 4 of 5 Work Order : WN2111438

Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 ISCOs



Method Blank (MB) and Laboratory Control Sample (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 Sample (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)	Laboratory Control Spike (LCS) Report					
				Report	Spike	Spike Recovery (%)	Acceptable	Limits (%)		
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High		
ED041: Sulfate (Turbidimetric) as SO4 2- (QCLot: 394813	30)									
ED041A: Sulfate as SO4 - Turbidimetric	14808-79-8	2	mg/L	<2	20 mg/L	91.8	90.0	110		
ED043: Total Oxidised Sulfur as SO4 2- (QCLot: 3947193	3)									
ED043: Total Oxidised Sulfur as SO4 2-		10	mg/L	<10	500 mg/L	80.6	80.0	120		
EG020T: Total Metals by ICP-MS (QCLot: 3945920)										
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	90.4	79.0	117		
EK055A: Ammonia as N (QCLot: 3941160)										
EK055A: Ammonia as N	7664-41-7	0.05	mg/L	<0.05	2 mg/L	103	90.0	110		
EK057A: Nitrite as N (QCLot: 3940172)										
EK057A: Nitrite as N	14797-65-0	0.03	mg/L	<0.03	1 mg/L	96.6	90.0	110		
EK059A: Nitrite and Nitrate as N (NOx) (QCLot: 3941161)										
EK059A: Nitrite + Nitrate as N		0.05	mg/L	<0.05	2 mg/L	110	90.0	110		
EK062A: Total Nitrogen as N (QCLot: 3944936)										
EK062A: Total Nitrogen as N		0.1	mg/L	<0.1	5 mg/L	105	90.0	110		
EK067A: Total Phosphorus as P (QCLot: 3942616)										
EK067A: Total Phosphorus as P		0.05	mg/L	<0.05	5 mg/L	97.5	90.0	110		
EK071A: Reactive Phosphorus as P (QCLot: 3940677)										
EK071A: Reactive Phosphorus as P	14265-44-2	0.05	mg/L	<0.05	5 mg/L	98.1	90.0	110		

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				Ма	trix Spike (MS) Repor	t			
				Spike	SpikeRecovery(%)	Acceptable L	imits (%)		
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High		
ED041: Sulfate (Tu	rbidimetric) as SO4 2- (QCLot: 3948130)								
WN2111057-002	Anonymous	ED041A: Sulfate as SO4 - Turbidimetric	14808-79-8	20 mg/L	118	80.0	120		
ED043: Total Oxidi	sed Sulfur as SO4 2- (QCLot: 3947193)								
WN2111456-010	Anonymous	ED043: Total Oxidised Sulfur as SO4 2-		500 mg/L	91.0	70.0	130		
EG020T: Total Meta	als by ICP-MS (QCLot: 3945920)								
EW2104083-001	V2104083-001 Anonymous EG020A-T: Zinc 7440-66-6 1 mg/L 93.6 70.0 130								
EK055A: Ammonia	as N (QCLot: 3941160)								

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Work Order : WN2111438

Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 ISCOs



Sub-Matrix: WATER				Ма	trix Spike (MS) Repor	t	
				Spike	SpikeRecovery(%)	Acceptable I	_imits (%)
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK055A: Ammonia	a as N (QCLot: 3941160) - continued						
WN2111399-001	Anonymous	EK055A: Ammonia as N	7664-41-7	2 mg/L	96.8	80.0	120
EK057A: Nitrite as	s N (QCLot: 3940172)						
WN2111454-001	Anonymous	EK057A: Nitrite as N	1 mg/L	90.8	80.0	120	
EK059A: Nitrite an	d Nitrate as N (NOx) (QCLot: 3941161)						
WN2111454-001	Anonymous	EK059A: Nitrite + Nitrate as N		2 mg/L	81.8	80.0	120
EK062A: Total Niti	rogen as N (QCLot: 3944936)						
WN2111400-002	Anonymous	EK062A: Total Nitrogen as N		20 mg/L	97.4	80.0	120
EK067A: Total Pho	osphorus as P (QCLot: 3942616)						
WN2111402-002	Anonymous	EK067A: Total Phosphorus as P		5 mg/L	90.0	80.0	120
EK071A: Reactive	Phosphorus as P (QCLot: 3940677)						
WN2111077-001	Anonymous	EK071A: Reactive Phosphorus as P	2 mg/L	# Not Determined	80.0	120	



QA/QC Compliance Assessment to assist with Quality Review

Work Order : WN2111438 Page : 1 of 7

Client : ROBERT CARR & ASSOCIATES P/L Laboratory : ALS Water - Newcastle

 Contact
 : MS LAURA SCHOFIELD
 Telephone
 : +612 4014 2500

 Project
 : 6919 ISCOs
 Date Samples Received
 : 05-Oct-2021

Site : --- Issue Date : 12-Oct-2021

Sampler : SK No. of samples received : 1
Order number : ---- No. of samples analysed : 1

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers: Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- NO Method Blank value outliers occur.
- NO Duplicate outliers occur.
- NO Laboratory Control outliers occur.
- Matrix Spike outliers exist please see following pages for full details.
- For all regular sample matrices, NO surrogate recovery outliers occur.

Outliers: Analysis Holding Time Compliance

• NO Analysis Holding Time Outliers exist.

Outliers: Frequency of Quality Control Samples

NO Quality Control Sample Frequency Outliers exist.

Page : 2 of 7
Work Order : WN2111438

Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 ISCOs

Outliers: Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: WATER

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EK071A: Reactive Phosphorus as P	WN2111077001	Anonymous	Reactive Phosphorus	14265-44-2	Not		MS recovery not determined,
			as P		Determined		background level greater than or
							equal to 4x spike level.

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for <u>VOC in soils</u> vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: WATER				Evaluation	: x = Holding time	breach ; ✓ = Withi	n holding time.
Method	Sample Date	Ex	traction / Preparation			Analysis	
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED041: Sulfate (Turbidimetric) as SO4 2-							
Clear Plastic Bottle - Natural (ED041A) 10216919001	05-Oct-2021				11-Oct-2021	02-Nov-2021	✓
ED043: Total Oxidised Sulfur as SO4 2-							
Clear Plastic Bottle - Natural (ED043) 10216919001	05-Oct-2021	11-Oct-2021	02-Nov-2021	✓	11-Oct-2021	02-Nov-2021	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) 10216919001	05-Oct-2021	08-Oct-2021	03-Apr-2022	✓	08-Oct-2021	03-Apr-2022	✓
EK055A: Ammonia as N							
Clear Plastic Bottle - Sulfuric Acid (EK055A) 10216919001	05-Oct-2021				07-Oct-2021	02-Nov-2021	✓
EK057A: Nitrite as N							
Clear Plastic Bottle - Natural (EK057A) 10216919001	05-Oct-2021				07-Oct-2021	07-Oct-2021	✓
EK059A: Nitrite and Nitrate as N (NOx)							
Clear Plastic Bottle - Sulfuric Acid (EK059A) 10216919001	05-Oct-2021				07-Oct-2021	02-Nov-2021	✓
EK062A: Total Nitrogen as N							
Clear Plastic Bottle - Sulfuric Acid (EK062A) 10216919001	05-Oct-2021	11-Oct-2021	02-Nov-2021	1	11-Oct-2021	02-Nov-2021	✓

Page : 3 of 7
Work Order : WN2111438

Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 ISCOs



Matrix: WATER				Evaluation	: × = Holding time	breach ; ✓ = Withi	n holding time.
Method	Sample Date Extraction / Preparation				Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK067A: Total Phosphorus as P							
Clear Plastic Bottle - Sulfuric Acid (EK067A) 10216919001	05-Oct-2021	08-Oct-2021	02-Nov-2021	1	08-Oct-2021	02-Nov-2021	✓
EK071A: Reactive Phosphorus as P							
Clear Plastic Bottle - Natural (EK071A) 10216919001	05-Oct-2021				06-Oct-2021	07-Oct-2021	✓

Page : 4 of 7
Work Order : WN2111438

Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 ISCOs



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

the expected rate. A listing of breaches is provided in the Sumr	nary of Outliers.				0 111 0		
Matrix: WATER				Evaluatio		ntrol frequency	not within specification; ✓ = Quality Control frequency within specification
Quality Control Sample Type	Mathad		ount		Rate (%)	Evaluation	Quality Control Specification
Analytical Methods	Method	OC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)			00	40.00	40.00		NEDM 0040 D0 0 At 0 00 Otroderd
Ammonia as N	EK055A	2	20	10.00	10.00	<u> </u>	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)	EK059A	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N	EK057A	1	7	14.29	10.00	√	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P	EK071A	2	20	10.00	10.00	√	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric)	ED041A	2	13	15.38	10.00	√	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	7	28.57	10.00	√	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen as N	EK062A	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Oxidised Sulfur as SO4 2-	ED043	1	3	33.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P	EK067A	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N	EK055A	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)	EK059A	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N	EK057A	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P	EK071A	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric)	ED041A	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen as N	EK062A	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Oxidised Sulfur as SO4 2-	ED043	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P	EK067A	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N	EK055A	1	20	5.00	5.00	1	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)	EK059A	1	19	5.26	5.00	1	NEPM 2013 B3 & ALS QC Standard
Nitrite as N	EK057A	1	7	14.29	5.00	√	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P	EK071A	1	20	5.00	5.00	√	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric)	ED041A	1	13	7.69	5.00	1	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	7	14.29	5.00	1	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen as N	EK062A	1	13	7.69	5.00	<u>√</u>	NEPM 2013 B3 & ALS QC Standard
Total Oxidised Sulfur as SO4 2-	ED043	1	3	33.33	5.00	√	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P	EK067A	1	20	5.00	5.00	√	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N	EK055A	1	20	5.00	5.00	√	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)	EK059A	1	19	5.26	5.00	√	NEPM 2013 B3 & ALS QC Standard
Nitrite as N	EK057A	1	7	14.29	5.00	√	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P	EK071A	1	20	5.00	5.00	√	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric)	ED041A	1	13	7.69	5.00	√	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	7	14.29	5.00	√	NEPM 2013 B3 & ALS QC Standard

Page : 5 of 7
Work Order : WN2111438

Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 ISCOs



Matrix: WATER		Evaluation: x = Quality Control frequency not within specification; ✓ = Quality Control frequency within specification						
Quality Control Sample Type		Co	unt		Rate (%)		Quality Control Specification	
Analytical Methods	Method	QC	Reaular	Actual	Expected	Evaluation		
Matrix Spikes (MS) - Continued								
Total Nitrogen as N	EK062A	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard	
Total Oxidised Sulfur as SO4 2-	ED043	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard	
Total Phosphorus as P	EK067A	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard	

Page : 6 of 7
Work Order : WN2111438

Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 ISCOs



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Sulfate (Turbidimetric)	ED041A	WATER	In house: referenced to Lachat QuikChem 10-116-10-1-A. This method covers the determination of sulfate in drinking, ground and surface waters, and domestic and industrial wastes. Sulfate in the sample is precipitated with barium chloride. The precipitation scatters light at 420nm to produce a signal proportional to sulfate concentration. The precipitate is suspended as a colloid with gelatin and polyvinyl alcohol.
Total Oxidised Sulfur as SO4 2-	ED043	WATER	In house: The sample is treated with Peroxide to convert all Sulfur species to Sulfate. Sulfate in the sample can then be determined by ICPAES and reported as TOS as SO4 2
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ammonia as N	EK055A	WATER	In house: referenced to APHA 4500 - NH3 H. This method is based on the Berthelot react. Ammonia reacts in alkaline solution with hypochlorite to form monochlormine which, in the presence of phenol, catalytic amounts of nitroprusside and excess hypochlorite, gives indophenol blue. This colour formation requires a pH between 8.0 - 11.5 and is measured @ 630nm.
Nitrite as N	EK057A	WATER	In house: referenced to APHA 4500 - NO3 I (no reduction). Nitrite (NO2-) is determined through the formation of a reddish purple azo dye produced at pH 2.0 to 2.5 by coupling diazotised acid with N-(1-naphthyl) -ethylenediamine dihydrochloride which is measured at 520 nm.
Nitrate as N	EK058A	WATER	In house: referenced to APHA 4500 - NO3 I. This automated procedure for the determination of TON (NO2- + NO3-) utilises the procedure whereby (NO3-) is reduced to nitrite (NO2-) at a pH 7.5 in a copper-cadmium reductor cell. The NO2- reduced from NO3- plus any free NO2- present reacts under acidic conditions with sulfanilamide to form a diazo compound that then couples with N-(1-naphthyl)-ethylenediamine dihydrochloride to form a reddish purple azo dye which is measured at 520 nm.
Nitrite and Nitrate as N (NOx)	EK059A	WATER	In house: referenced to APHA 4500 - NO3 I. This automated procedure for the determination of TON (NO2- + NO3-) utilises the procedure whereby (NO3-) is reduced to nitrite (NO2-) at a pH 7.5 in a copper-cadmium reductor cell. The NO2- reduced from NO3- plus any free NO2- present reacts under acidic conditions with sulfanilamide to form a diazo compound that then couples with N-(1-naphthyl)-ethylenediamine dihydrochloride to form a reddish purple azo dye which is measured at 520 nm.
Total Kjeldahl Nitrogen as N	EK061A	WATER	In house 6. TKN is calculated by difference from Total Nitrogen and NOx. Contributing method parameters are determined by FIA
Total Nitrogen as N	EK062A	WATER	In house 13. The persulfate method determines Total Nitrogen by oxidation of all nitrogenous compounds to nitrate. Alkaline oxidation at 100 to 1100C using an autoclave converts organic and inorganic nitrogen to nitrate. Total Nitrogen is determined by analysing the nitrate in the digestate using Automated Cadmium reduction method.

Page : 7 of 7
Work Order : WN2111438

Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 ISCOs



Analytical Methods	Method	Matrix	Method Descriptions
Total Phosphorus as P	EK067A	WATER	In house: referenced to APHA 4500 - P G. The Total Phosphorus content of a sample includes all the orthophosphates and condensed phosphates, both soluble insoluble and the organic and inorganic species of Phosphorus in the sample. The more complex forms of phosphorus must be converted to the simple orthophosphate species before analysis is possible and this is achieved by digesting the sample with ammonium persulphate and sulphuric acid.
Reactive Phosphorus as P	EK071A	WATER	In house: referenced to APHA 4500 - P G. This automated procedure for the determination of Ortho Phosphorus is based on the colorimetric method in which a blue colour is formed by the reaction of ortho phosphorus and molybdate ion followed by reduction with ascorbic acid at an acidic pH. The reduced blue phosphomolybdenum complex is read at 660 nm.
Preparation Methods	Method	Matrix	Method Descriptions
Total Oxidisable Sulfur as SO4 2- Prep	ED043-PR	WATER	In house
Basic Persulfate Digestion for TN with FIA finish.	EK062-PA	WATER	In house: Referenced to APHA 24500 P - J.
Acid Persulfate Digestion for TP with FIA finish.	EK067-PA	WATER	#
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)

CHAIN OF CUSTODY

LIADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adetaide@alsglobai.com

- BMACKAY 78 Harbour Road Mackey Cit.D 4740 Ph: 07 4944 0177 E. mackay@alsglobal.com

□MELBOURNE 2-4 Westell Road Springyale VIC 3171 Ph. 03 8549 9600 E: samples metbourne@alsglobal.com

CISYDBETVSC/ASSITYORGEORAFRAND ROUNILLANDSWYZESTNSW 2004 Ph 02/8702 0075 tooone benevers receives the passition of con-

TOVENSOLUTE 1916 GEORGE PROGRESSON DE ARRY 2541
Ph. 07 Ph/9809506 Englis Service and attained all the com-

ALS Laboratory: please tick >

LS) Water

GBRISBANE 2 Byth Street Stafford GLD 4053 Phr 67 3248 7022 Et samples briebane@elsglobal.com ⊔GLADSTONE 48 Callemondah Drive Clinton QLD 4690 Ph: 07 7471 5600 €: gladstone@alsglobal.com

UMUDGEE 1/29 Sydney Road MudgeellaiShStEBSGONi6:09/ayrilaylabcell/AY/6690jong NSW 2500 Ph; 02 6372 6735 E: mudgee mail@elssic@868820812615 Exitiassparageballofibilistications com

CLIENT: RCA (ROBCAR)				TURNAROUND REQUIREMENTS: Standard TAT (List due date): (Standard TAT may be longer for some tests No. Standard or urgent TAT (List due date):							FOR LABORATORY USE ONLY (Circle)								
OFFICE: Carrington				e.g Ultra Trace Organics)				st due						Custody Seal Intact? Yes No Fige Text frozen ice bricks present upon No receipt?				₹VÃ	
PROJECT: 6919 ISCOs				OTE NO.: WN/087/16v2							EQUENCE	NUMBER (Circle)	·					No	N/A
PURCHASE ORDER NO				COUNTRY OF ORIGIN:					COC: 1					Random Sample Temperature on Receipt: 'C					
PROJECT MANAGER: Laura Schofield CONTACT PH:				l:					OF: 1					Other Committee.					
SAMPLER: SK SAMPLER MOD			MOBILE: 04	OBILE: 0412 686 411 RELINQUISHED BY:					RECEIVED BY:				RELI	ELINQUISHED BY:			RECEIVED B	Υ:	
COC Emailed to ALS? (I	NO)	EDD FORI	MAT (or defa	nult):	SK							ACCOUNT OF THE PARTY OF THE PAR							
Email Reports to (will default to PM If no other eddresses are listed): lauras@rca.com.au; enviro@rca.com.au				DATE/TIME:					5.10.2 2:16			DATE	DATE/TIME:			DATE/TIME:			
Email Invoice to lauras@	@rca.com.au; administrator@rca.com	.au; enviro@rca.com.au			5/10/21				S.	(0	.24	2.00	<u> </u>						
COMMENTS/SPECIAL H	HANDLING/STORAGE OR DISPOSAL	-:																	
ALS USE ONLY SAMPLE DETAILS MATRIX: Sclic(S) Water(W)				CONTAINER INFORMATION			"ANALYSIS REQUIRED including SUITES (NB. Suite Codes Where Metals are required, specify Total (unfiltered bottle required) or Diss									Additional	Informatio	on	
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE codes below)	frefor to	TOTAL BOTTLES	NT-68A.WN (TP, TON, TKN, Reactive Phos, NO2, NO3, NH3)	ED041A - Sulfate	ED043 - Suiphur - Total	Total Zinc	EK067A PO4 - Phosphate						Comments on likely co dilutions, or samples re analysis etc.		
	10216919001	5/10/2021	. w	1 x 500ml P, 1 x 125ml P, 1 x 125ml	ISP, 1 x 60ml N	4	×	х	×	×	x						Whe	el wash	
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					TOTAL	-													
Water Container Codes: P	= Unpreserved Plastic; N = Nitric Preserved Plastic; ORC =	Nitric Preserved ORC; SH = Sodium Hydrox	ide/Cd Preserved; S	= Sodium Hydroxide Preserved Plastic; AG = An	nber Glass Unpreserv	ed; AP - Airfreight Ur	preserved Plastic												

V = VOA Vial Solding Preserved Bottles; ST = Sterile Bottles; ASS = Plastic Beg for Acid Sulphate Solls; B = Unpreserved Bottles; ST = Sterile Solding Preserved Bottles; ST = Sterile Solding Preserved Solls; B = Unpreserved Bottles; ST = Sterile Solding Preserved Bottles; ST = Sterile Solding Preserved Solls; B = Unpreserved Bottles; ST = Sterile Solding Preserved Solls; B = Unpreserved Bottles; ST = Sterile Solding Preserved Sterile Sterile Solding Preserved Sterile Ster



CARRINGTON NSW 2294

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : WN2111438

Client : ROBERT CARR & ASSOCIATES P/L Laboratory : ALS Water - Newcastle Contact : MS LAURA SCHOFIELD Contact : Hayley Worthington

Address : 92 HILL STREET Address : 5/585 Maitland Road Newcastle West

NSW Australia 2304

Telephone : +61 02 49029200 Telephone : +612 4014 2500 Facsimile : +61 02 4036 99112 Facsimile : +61 2 4967 7382

Project : 6919 ISCOs Page : 1 of 2

 Order number
 : --- Quote number
 : WN2016ROBCAR0005 (WN/087/16v2)

 C-O-C number
 : --- QC Level
 : NEPM 2013 B3 & ALS QC Standard

Site : ----Sampler : SK

Dates

Date

Delivery Details

 Mode of Delivery
 : Client Drop Off
 Security Seal
 : Not Available

 No. of coolers/boxes
 : -- Temperature
 : 8.4 - Ice present

Receipt Detail : No. of samples received / analysed : 1 / 1

General Comments

This report contains the following information:

- Sample Container(s)/Preservation Non-Compliances
- Summary of Sample(s) and Requested Analysis
- Proactive Holding Time Report
- Requested Deliverables
- EA043, and EG020T conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.
- Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.

: 06-Oct-2021 Issue Date

Page

2 of 2 WN2111438 Amendment 0 Work Order

Client : ROBERT CARR & ASSOCIATES P/L



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

• No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory					
process necessary for the execution of client requested					
tasks. Packages may contain additional analyses, such					+
as the determination of moisture content and preparation					
tasks, that are included in the package.					ļ Ē.
If no sampling time is provided, the sampling time will					+NH3 + Total P
default 00:00 on the date of sampling. If no sampling date		1.2-	te A		
is provided, the sampling date will be assumed by the		S04	Suite		NO NO NO NO NO
laboratory and displayed in brackets without a time	4	ras	· S	9	+
component	041A Sulfate	Suffu Suffu	3020A-T by ICPMS	¥ 。	8A.Wh + NO2
Matrix: WATER	- ED(ER - ED043 Oxidised Sulfur	- EG	- EK067, osphate	Oden
Laboratory sample Sampling date / Sample ID	E Pipi	NATER Fotal Ox	122	rer-	띮
ID time	WATI	WATE	WATE	WAT	WATER -
WN2111438-001 05-Oct-2021 00:00 10216919001	1	1	1	1	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ADMINISTRATOR

- A4 - AU Tax Invoice (INV)	Email	administrator@rca.com.au
ENVIRO		
 *AU Certificate of Analysis - NATA (COA) 	Email	enviro@rca.com.au
 *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) 	Email	enviro@rca.com.au
 *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) 	Email	enviro@rca.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	enviro@rca.com.au
- A4 - AU Tax Invoice (INV)	Email	enviro@rca.com.au
- Chain of Custody (CoC) (COC)	Email	enviro@rca.com.au
- EDI Format - ENMRG (ENMRG)	Email	enviro@rca.com.au
- EDI Format - ESDAT (ESDAT)	Email	enviro@rca.com.au
LAURA SCHOFIELD		
 *AU Certificate of Analysis - NATA (COA) 	Email	lauras@rca.com.au
 *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) 	Email	lauras@rca.com.au
 *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) 	Email	lauras@rca.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	lauras@rca.com.au
- A4 - AU Tax Invoice (INV)	Email	lauras@rca.com.au
- Chain of Custody (CoC) (COC)	Email	lauras@rca.com.au
- EDI Format - ENMRG (ENMRG)	Email	lauras@rca.com.au
- EDI Format - ESDAT (ESDAT)	Email	lauras@rca.com.au



CERTIFICATE OF ANALYSIS

Work Order : WN2111827

Client ROBERT CARR & ASSOCIATES P/L

Contact : MS LAURA SCHOFIELD

Address : 92 HILL STREET

CARRINGTON NSW 2294

Telephone : +61 02 49029200 : 6919 ISCOs Project

Order number C-O-C number

Sampler : SK Site

Quote number : WN/087/16v2

No. of samples received : 1 No. of samples analysed : 1 Page : 1 of 3

Date Samples Received

Laboratory : ALS Water - Newcastle Contact : Hayley Worthington

Address : 5/585 Maitland Road Newcastle West NSW Australia 2304

: 12-Oct-2021 16:02

Telephone : +612 4014 2500

Date Analysis Commenced : 13-Oct-2021

Issue Date : 20-Oct-2021 09:31



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

Gregory Towers Technical Officer Chemistry, Newcastle West, NSW Ivan Taylor Sydney Inorganics, Smithfield, NSW Analyst Neil Martin Team Leader - Chemistry Chemistry, Newcastle West, NSW

Page : 2 of 3
Work Order : WN2111827

Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 ISCOs

ALS

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.
- EA043, and EG020T conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.

Page : 3 of 3 Work Order : WN2111827

Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 ISCOs

Analytical Results



Sub-Matrix: WATER (Matrix: WATER)			Sample ID	10216919002	 		
		Sampli	ng date / time	10-Oct-2021 00:00	 		
Compound	CAS Number	LOR	Unit	WN2111827-001	 		
				Result	 		
ED041: Sulfate (Turbidimetric) as SO4 2-							
Sulfate as SO4 - Turbidimetric	14808-79-8	2	mg/L	973	 		
ED043: Total Oxidised Sulfur as SO4 2-							
Total Oxidised Sulfur as SO4 2-		10	mg/L	910	 		
EG020T: Total Metals by ICP-MS							
Zinc	7440-66-6	0.005	mg/L	0.720	 		
EK055A: Ammonia as N							
Ammonia as N	7664-41-7	0.05	mg/L	893	 		
EK057A: Nitrite as N							
Nitrite as N	14797-65-0	0.05	mg/L	5.38	 		
EK058A: Nitrate as N							
Nitrate as N	14797-55-8	0.05	mg/L	23.4	 		
EK059A: Nitrite and Nitrate as N (NOx)							
Nitrite + Nitrate as N		0.05	mg/L	28.8	 		
EK061A: Total Kjeldahl Nitrogen as N							
Total Kjeldahl Nitrogen as N		0.1	mg/L	1750	 		
EK062A: Total Nitrogen as N							
Total Nitrogen as N		0.1	mg/L	1780	 		
EK067A: Total Phosphorus as P							
Total Phosphorus as P		0.05	mg/L	99.0	 		
Total Phosphate		0.20	mg/L	304	 		
EK071A: Reactive Phosphorus as P			, and the second				
Reactive Phosphorus as P	14265-44-2	0.05	mg/L	93.1	 		
ntor Laboratory Tosting	14200 44-2		3. =			<u> </u>	

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) ED043: Total Oxidised Sulfur as SO4 2-(WATER) EG020T: Total Metals by ICP-MS



QUALITY CONTROL REPORT

Work Order : WN2111827 Page : 1 of 5

Client : ROBERT CARR & ASSOCIATES P/L Laboratory : ALS Water - Newcastle
Contact : MS LAURA SCHOFIELD Contact : Hayley Worthington

Address : 92 HILL STREET Address : 5/585 Maitland Road Newcastle West NSW Australia 2304

CARRINGTON NSW 2294

 Telephone
 : +61 02 49029200
 Telephone
 : +612 4014 2500

 Project
 : 6919 ISCOs
 Date Samples Received
 : 12-Oct-2021

Order number : ---- Date Analysis Commenced : 13-Oct-2021
C-O-C number ---- Issue Date : 20-Oct-2021

Sampler : SK

No. of samples analysed : 1

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

Accreditation No. 825

Accredited for compliance with ISO/IEC 17025 - Testing

This Quality Control Report contains the following information:

: 1

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

: WN/087/16v2

Signatories

No. of samples received

not be reproduced, except in full.

Site
Quote number

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

Gregory Towers Technical Officer Chemistry, Newcastle West, NSW Ivan Taylor Analyst Sydney Inorganics, Smithfield, NSW Neil Martin Team Leader - Chemistry Chemistry, Newcastle West, NSW

Page : 2 of 5 Work Order : WN2111827

Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 ISCOs



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.

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 L	Ouplicate (DUP) Report		
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED041: Sulfate (Turbi	dimetric) as SO4 2- (QC Lo	t: 3960329)							
WN2111051-014	Anonymous	ED041A: Sulfate as SO4 - Turbidimetric	14808-79-8	2	mg/L	19	19	0.0	No Limit
WN2112004-001	Anonymous	ED041A: Sulfate as SO4 - Turbidimetric	14808-79-8	2	mg/L	115	111	2.8	0% - 20%
ED043: Total Oxidise	d Sulfur as SO4 2- (QC Lot:	3956805)							
WN2111745-001	Anonymous	ED043: Total Oxidised Sulfur as SO4 2-		10	mg/L	2820	2690	4.5	0% - 20%
EG020T: Total Metals	by ICP-MS (QC Lot: 39600	33)							
ES2136844-001	Anonymous	EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
ES2136847-001	Anonymous	EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.020	0.020	0.0	No Limit
EK055A: Ammonia as	N (QC Lot: 3952536)								
WN2111827-001	10216919002	EK055A: Ammonia as N	7664-41-7	0.05	mg/L	893	886	0.8	0% - 20%
WN2111440-001	Anonymous	EK055A: Ammonia as N	7664-41-7	0.05	mg/L	17.9	17.6	1.8	0% - 20%
EK057A: Nitrite as N	(QC Lot: 3950391)								
WN2111745-001	Anonymous	EK057A: Nitrite as N	14797-65-0	0.03	mg/L	<0.05	<0.05	0.0	No Limit
EK059A: Nitrite and N	litrate as N (NOx) (QC Lot:	3950807)							
WN2111788-001	Anonymous	EK059A: Nitrite + Nitrate as N		0.05	mg/L	<0.05	<0.05	0.0	No Limit
WN2111440-001	Anonymous	EK059A: Nitrite + Nitrate as N		0.05	mg/L	<0.05	0.06	19.3	No Limit
EK062A: Total Nitrog	en as N (QC Lot: 3957281)								
WN2111788-001	Anonymous	EK062A: Total Nitrogen as N		0.1	mg/L	179	181	1.1	0% - 20%
WN2111856-001	Anonymous	EK062A: Total Nitrogen as N		0.1	mg/L	9.6	8.6	11.0	0% - 20%
EK067A: Total Phosp	horus as P (QC Lot: 39550	15)							
WN2111787-002	Anonymous	EK067A: Total Phosphorus as P		0.05	mg/L	29.3	30.5	4.0	0% - 20%
WN2111856-001	Anonymous	EK067A: Total Phosphorus as P		0.05	mg/L	0.55	0.51	7.4	0% - 50%
EK071A: Reactive Ph	osphorus as P (QC Lot: 39	53205)							

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Client : ROBERT CARR & ASSOCIATES P/L



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EK071A: Reactive Ph	nosphorus as P (QC Lot: 39	53205) - continued							
WN2111775-001	Anonymous	EK071A: Reactive Phosphorus as P	14265-44-2	0.05	mg/L	1.79	1.79	0.0	0% - 20%

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Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 ISCOs



Method Blank (MB) and Laboratory Control Sample (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 Sample (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)		Laboratory Control Spike (LC	S) Report	
				Report	Spike	Spike Recovery (%)	Acceptable	Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
ED041: Sulfate (Turbidimetric) as SO4 2- (QCLot: 396032	9)							
ED041A: Sulfate as SO4 - Turbidimetric	14808-79-8	2	mg/L	<2	20 mg/L	96.8	90.0	110
ED043: Total Oxidised Sulfur as SO4 2- (QCLot: 3956805)							
ED043: Total Oxidised Sulfur as SO4 2-		10	mg/L	<10	500 mg/L	81.4	80.0	120
EG020T: Total Metals by ICP-MS (QCLot: 3960033)								
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	92.4	79.0	117
EK055A: Ammonia as N (QCLot: 3952536)								
EK055A: Ammonia as N	7664-41-7	0.05	mg/L	<0.05	2 mg/L	104	90.0	110
EK057A: Nitrite as N (QCLot: 3950391)								
EK057A: Nitrite as N	14797-65-0	0.03	mg/L	<0.03	1 mg/L	94.3	90.0	110
EK059A: Nitrite and Nitrate as N (NOx) (QCLot: 3950807)								
EK059A: Nitrite + Nitrate as N		0.05	mg/L	<0.05	2 mg/L	104	90.0	110
EK062A: Total Nitrogen as N (QCLot: 3957281)								
EK062A: Total Nitrogen as N		0.1	mg/L	<0.1	5 mg/L	106	90.0	110
EK067A: Total Phosphorus as P (QCLot: 3955015)								
EK067A: Total Phosphorus as P		0.05	mg/L	<0.05	5 mg/L	94.9	90.0	110
EK071A: Reactive Phosphorus as P (QCLot: 3953205)								
EK071A: Reactive Phosphorus as P	14265-44-2	0.05	mg/L	<0.05	5 mg/L	94.8	90.0	110

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				Ma	trix Spike (MS) Report		
				Spike	SpikeRecovery(%)	Acceptable l	Limits (%)
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041: Sulfate (Tu	rbidimetric) as SO4 2- (QCLot: 3960329)						
WN2111440-001	Anonymous	ED041A: Sulfate as SO4 - Turbidimetric	14808-79-8	20 mg/L	105	80.0	120
ED043: Total Oxidi	sed Sulfur as SO4 2- (QCLot: 3956805)						
WN2111827-001	10216919002	ED043: Total Oxidised Sulfur as SO4 2-		500 mg/L	74.2	70.0	130
EG020T: Total Meta	als by ICP-MS (QCLot: 3960033)						
ES2136844-002	Anonymous	EG020A-T: Zinc	7440-66-6	1 mg/L	90.0	70.0	130
EK055A: Ammonia	as N (QCLot: 3952536)						

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Client : ROBERT CARR & ASSOCIATES P/L



Sub-Matrix: WATER				Ма	trix Spike (MS) Report	f	
				Spike	SpikeRecovery(%)	Acceptable Li	mits (%)
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK055A: Ammonia	as N (QCLot: 3952536) - continued						
WN2111439-014	Anonymous	EK055A: Ammonia as N	7664-41-7	2 mg/L	# Not Determined	80.0	120
EK057A: Nitrite as	N (QCLot: 3950391)						
WN2111827-001	10216919002	EK057A: Nitrite as N	14797-65-0	1 mg/L	# Not Determined	80.0	120
EK059A: Nitrite and	l Nitrate as N (NOx) (QCLot: 3950807)						
WN2111790-001	Anonymous	EK059A: Nitrite + Nitrate as N		2 mg/L	104	80.0	120
EK062A: Total Nitro	ogen as N (QCLot: 3957281)						
WN2111790-001	Anonymous	EK062A: Total Nitrogen as N		20 mg/L	# Not Determined	80.0	120
EK067A: Total Pho	sphorus as P (QCLot: 3955015)						
WN2111788-001	Anonymous	EK067A: Total Phosphorus as P		5 mg/L	# Not Determined	80.0	120
EK071A: Reactive	Phosphorus as P (QCLot: 3953205)						
WN2111779-001	Anonymous	EK071A: Reactive Phosphorus as P	14265-44-2	2 mg/L	97.5	80.0	120



QA/QC Compliance Assessment to assist with Quality Review

Work Order : WN2111827 Page : 1 of 7

Client : ROBERT CARR & ASSOCIATES P/L Laboratory : ALS Water - Newcastle

 Contact
 : MS LAURA SCHOFIELD
 Telephone
 : +612 4014 2500

 Project
 : 6919 ISCOs
 Date Samples Received
 : 12-Oct-2021

 Site
 : -- Issue Date
 : 20-Oct-2021

 Sampler
 : SK
 No. of samples received
 : 1

Sampler : SK No. or samples received : 1
Order number : ---- No. of samples analysed : 1

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers: Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- NO Method Blank value outliers occur.
- NO Duplicate outliers occur.
- NO Laboratory Control outliers occur.
- Matrix Spike outliers exist please see following pages for full details.
- For all regular sample matrices, NO surrogate recovery outliers occur.

Outliers: Analysis Holding Time Compliance

• Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers: Frequency of Quality Control Samples

NO Quality Control Sample Frequency Outliers exist.

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ROBERT CARR & ASSOCIATES P/L Client

Project 6919 ISCOs

Outliers: Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: WATER

WIGHTAL WATER							
Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EK055A: Ammonia as N	WN2111439014	Anonymous	Ammonia as N	7664-41-7	Not		MS recovery not determined,
					Determined		background level greater than or
							equal to 4x spike level.
EK057A: Nitrite as N	WN2111827001	10216919002	Nitrite as N	14797-65-0	Not		MS recovery not determined,
					Determined		background level greater than or
							equal to 4x spike level.
EK062A: Total Nitrogen as N	WN2111790001	Anonymous	Total Nitrogen as N		Not		MS recovery not determined,
					Determined		background level greater than or
							equal to 4x spike level.
EK067A: Total Phosphorus as P	WN2111788001	Anonymous	Total Phosphorus as P		Not		MS recovery not determined,
					Determined		background level greater than or
							equal to 4x spike level.

Outliers: Analysis Holding Time Compliance

Matrix: WATER

Method	E)	traction / Preparation			Analysis	
Container / Client Sample ID(s)	Date extracted	Due for extraction	Days	Date analysed	Due for analysis	Days
			overdue			overdue
EK057A: Nitrite as N						
Clear Plastic Bottle - Natural						
10216919002				13-Oct-2021	12-Oct-2021	1
EK071A: Reactive Phosphorus as P						
Clear Plastic Bottle - Natural						
10216919002				13-Oct-2021	12-Oct-2021	1

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not quarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: WATER

Wattis. Water				Lvaiuation	. ~ - Holding time	breach, • - within	i noluling time.
Method	Sample Date	Extraction / Preparation		Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED041: Sulfate (Turbidimetric) as SO4 2-							
Clear Plastic Bottle - Natural (ED041A)							
10216919002	10-Oct-2021				18-Oct-2021	07-Nov-2021	✓

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Client : ROBERT CARR & ASSOCIATES P/L



Matrix: WATER				Evaluation	: × = Holding time	breach ; ✓ = Withi	n holding time
Method	Sample Date	Ex	traction / Preparation			Analysis	
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED043: Total Oxidised Sulfur as SO4 2-							
Clear Plastic Bottle - Natural (ED043) 10216919002	10-Oct-2021	15-Oct-2021	07-Nov-2021	✓	15-Oct-2021	07-Nov-2021	√
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) 10216919002	10-Oct-2021	18-Oct-2021	08-Apr-2022	✓	18-Oct-2021	08-Apr-2022	✓
EK055A: Ammonia as N							
Clear Plastic Bottle - Sulfuric Acid (EK055A) 10216919002	10-Oct-2021				13-Oct-2021	07-Nov-2021	✓
EK057A: Nitrite as N							
Clear Plastic Bottle - Natural (EK057A) 10216919002	10-Oct-2021				13-Oct-2021	12-Oct-2021	3c
EK059A: Nitrite and Nitrate as N (NOx)							
Clear Plastic Bottle - Sulfuric Acid (EK059A) 10216919002	10-Oct-2021				13-Oct-2021	07-Nov-2021	✓
EK062A: Total Nitrogen as N							
Clear Plastic Bottle - Sulfuric Acid (EK062A) 10216919002	10-Oct-2021	15-Oct-2021	07-Nov-2021	✓	15-Oct-2021	07-Nov-2021	✓
EK067A: Total Phosphorus as P							
Clear Plastic Bottle - Sulfuric Acid (EK067A) 10216919002	10-Oct-2021	15-Oct-2021	07-Nov-2021	1	15-Oct-2021	07-Nov-2021	✓
EK071A: Reactive Phosphorus as P							
Clear Plastic Bottle - Natural (EK071A) 10216919002	10-Oct-2021				13-Oct-2021	12-Oct-2021	JC

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Work Order : WN2111827

Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 ISCOs



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Quality Control Sample Type		Count			Rate (%)		Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
aboratory Duplicates (DUP)							
Ammonia as N	EK055A	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
litrite and Nitrate as N (NOx)	EK059A	2	11	18.18	10.00	✓	NEPM 2013 B3 & ALS QC Standard
litrite as N	EK057A	1	2	50.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P	EK071A	1	4	25.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
ulfate (Turbidimetric)	ED041A	2	11	18.18	10.00	✓	NEPM 2013 B3 & ALS QC Standard
otal Metals by ICP-MS - Suite A	EG020A-T	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
otal Nitrogen as N	EK062A	2	10	20.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
otal Oxidised Sulfur as SO4 2-	ED043	1	2	50.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
otal Phosphorus as P	EK067A	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
aboratory Control Samples (LCS)							
Ammonia as N	EK055A	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
litrite and Nitrate as N (NOx)	EK059A	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
itrite as N	EK057A	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
eactive Phosphorus as P	EK071A	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric)	ED041A	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
otal Metals by ICP-MS - Suite A	EG020A-T	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
otal Nitrogen as N	EK062A	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
otal Oxidised Sulfur as SO4 2-	ED043	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
otal Phosphorus as P	EK067A	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
mmonia as N	EK055A	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
litrite and Nitrate as N (NOx)	EK059A	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
litrite as N	EK057A	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P	EK071A	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric)	ED041A	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
otal Metals by ICP-MS - Suite A	EG020A-T	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
otal Nitrogen as N	EK062A	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
otal Oxidised Sulfur as SO4 2-	ED043	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
otal Phosphorus as P	EK067A	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
latrix Spikes (MS)							
mmonia as N	EK055A	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
litrite and Nitrate as N (NOx)	EK059A	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
itrite as N	EK057A	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
eactive Phosphorus as P	EK071A	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric)	ED041A	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
otal Metals by ICP-MS - Suite A	EG020A-T	1	13	7.69	5.00	1	NEPM 2013 B3 & ALS QC Standard

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Client : ROBERT CARR & ASSOCIATES P/L



Matrix: WATER			Evaluation: × = Quality Control frequency not within specification; ✓ = Quality Control frequency within						
ality Control Sample Type		Co	unt	Rate (%)			Quality Control Specification		
Analytical Methods	Method	QC	Reaular	Actual	Expected	Evaluation			
Matrix Spikes (MS) - Continued									
Total Nitrogen as N	EK062A	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Total Oxidised Sulfur as SO4 2-	ED043	1	2	50.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Total Phosphorus as P	EK067A	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		

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Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 ISCOs



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Sulfate (Turbidimetric)	ED041A	WATER	In house: referenced to Lachat QuikChem 10-116-10-1-A. This method covers the determination of sulfate in drinking, ground and surface waters, and domestic and industrial wastes. Sulfate in the sample is precipitated with barium chloride. The precipitation scatters light at 420nm to produce a signal proportional to sulfate concentration. The precipitate is suspended as a colloid with gelatin and polyvinyl alcohol.
Total Oxidised Sulfur as SO4 2-	ED043	WATER	In house: The sample is treated with Peroxide to convert all Sulfur species to Sulfate. Sulfate in the sample can then be determined by ICPAES and reported as TOS as SO4 2
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ammonia as N	EK055A	WATER	In house: referenced to APHA 4500 - NH3 H. This method is based on the Berthelot react. Ammonia reacts in alkaline solution with hypochlorite to form monochlormine which, in the presence of phenol, catalytic amounts of nitroprusside and excess hypochlorite, gives indophenol blue. This colour formation requires a pH between 8.0 - 11.5 and is measured @ 630nm.
Nitrite as N	EK057A	WATER	In house: referenced to APHA 4500 - NO3 I (no reduction). Nitrite (NO2-) is determined through the formation of a reddish purple azo dye produced at pH 2.0 to 2.5 by coupling diazotised acid with N-(1-naphthyl) -ethylenediamine dihydrochloride which is measured at 520 nm.
Nitrate as N	EK058A	WATER	In house: referenced to APHA 4500 - NO3 I. This automated procedure for the determination of TON (NO2- + NO3-) utilises the procedure whereby (NO3-) is reduced to nitrite (NO2-) at a pH 7.5 in a copper-cadmium reductor cell. The NO2- reduced from NO3- plus any free NO2- present reacts under acidic conditions with sulfanilamide to form a diazo compound that then couples with N-(1-naphthyl)-ethylenediamine dihydrochloride to form a reddish purple azo dye which is measured at 520 nm.
Nitrite and Nitrate as N (NOx)	EK059A	WATER	In house: referenced to APHA 4500 - NO3 I. This automated procedure for the determination of TON (NO2- + NO3-) utilises the procedure whereby (NO3-) is reduced to nitrite (NO2-) at a pH 7.5 in a copper-cadmium reductor cell. The NO2- reduced from NO3- plus any free NO2- present reacts under acidic conditions with sulfanilamide to form a diazo compound that then couples with N-(1-naphthyl)-ethylenediamine dihydrochloride to form a reddish purple azo dye which is measured at 520 nm.
Total Kjeldahl Nitrogen as N	EK061A	WATER	In house 6. TKN is calculated by difference from Total Nitrogen and NOx. Contributing method parameters are determined by FIA
Total Nitrogen as N	EK062A	WATER	In house 13. The persulfate method determines Total Nitrogen by oxidation of all nitrogenous compounds to nitrate. Alkaline oxidation at 100 to 1100C using an autoclave converts organic and inorganic nitrogen to nitrate. Total Nitrogen is determined by analysing the nitrate in the digestate using Automated Cadmium reduction method.

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Client : ROBERT CARR & ASSOCIATES P/L



Analytical Methods	Method	Matrix	Method Descriptions
Total Phosphorus as P	EK067A	WATER	In house: referenced to APHA 4500 - P G. The Total Phosphorus content of a sample includes all the orthophosphates and condensed phosphates, both soluble insoluble and the organic and inorganic species of Phosphorus in the sample. The more complex forms of phosphorus must be converted to the simple orthophosphate species before analysis is possible and this is achieved by digesting the sample with ammonium persulphate and sulphuric acid.
Reactive Phosphorus as P	EK071A	WATER	In house: referenced to APHA 4500 - P G. This automated procedure for the determination of Ortho Phosphorus is based on the colorimetric method in which a blue colour is formed by the reaction of ortho phosphorus and molybdate ion followed by reduction with ascorbic acid at an acidic pH. The reduced blue phosphomolybdenum complex is read at 660 nm.
Preparation Methods	Method	Matrix	Method Descriptions
Total Oxidisable Sulfur as SO4 2- Prep	ED043-PR	WATER	In house
Basic Persulfate Digestion for TN with FIA finish.	EK062-PA	WATER	In house: Referenced to APHA 24500 P - J.
Acid Persulfate Digestion for TP with FIA finish.	EK067-PA	WATER	#
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)

CHAIN OF CUSTODY

Email Invoice to : lauras@rca.com.au; administrator@rca.com.au; enviro@rca.com.au

DIADELATOR 21 Hurma Road Popraka SA 5095 Ph: 08 8359 0890 F: adelaide@a:sglobal.com

DMACKAY 78 Harbour Road Mackay Qt D 4740 Ph; 07 4944 0177 E: mackay@alaglobal.com

ÚMELBOURNE 2-4 Westall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples melbourne@elscrobal.com

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Ph: 67 4P86 0500 23 1000 Eilleownei@ishenblichatonbal.com

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ALS Laboratory: please tick >

QBRISBANE 2 Byth Street Stafford QuD 4053 Ph: 07 3243 7222 E: samples brisbane@alsolobat.com

LIGI ADSTONE 48 Callemondati Drive Clinton OLD 4680

DMUDGEE 1/29 Sydnoy Road Mudgee **ப் இடு DRSMG ON Glos Parynylataget Walthol**gong NSW 2500 Ph. 02 63/2 6735 E. mudgee mail@elss/80b3/80**829/2019/6**55/8/lisecon/e/aastif@alschroel.com Ph: 07 7471 5600 E: uladstone@alsolobal.com CLIENT: RCA (ROBCAR) TURNAROUND REQUIREMENTS: FOR LABORATORY USE ONLY (Circle) Standard TAT (List due date): (Standard TAT may be longer for some tests.) (N/A) OFFICE: Carrington ☐ Non Standard or urgent TAT (List due date): Custody Seal Intact? e.g., Ultra Trace Organics) Free ice Drozen ice bricks present upon PROJECT: 6919 ISCOs ALS QUOTE NO.: WN/087/16v2 COC SEQUENCE NUMBER (Circle) N/A COUNTRY OF ORIGIN: coc: PURCHASE ORDER NO.: Random Sample Temperature on Receipt: PROJECT MANAGER: Laura Schofield CONTACT PH: OF: Other comment: SAMPLER: SK SAMPLER MOBILE: 0412 686 411 RELINQUISHED BY: RECEIVED BY: RELINQUISHED BY: RECEIVED BY: sĸ COC Emailed to ALS? (NO) EDD FORMAT (or default): DATE/TIME: DATE/TIME: Email Reports to (will default to PM if no other addresses are listed): lauras@rca.com.au; enviro@rca.com.au DATE/TIME: DATE/TIME: 16:02 16:01 12.10.21

12/10/21

ALS USE ONLY		DETAILS id(S) Water(W)		CONTAINER INFORMATION			"ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required)."								Additional Information				
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE codes below)		TOTAL BOTTLES	NT-08A.WN (TP, TON, TKN, Reactive Phos, NO2, NO3, NH3)	ED041A - Sulfate	ED043 - Sulphur - Total	Total Zinc	EK067A PO4 - Phosphate								Comments on likely contaminant levels, dilutions, or samples requiring specific Quanalysis etc.
1	10216919002	10/10/2021	w	1 x 500ml P, 1 x 125ml P, 1 x 125ml SP, 1 x	c 60ml N	4	×	×	x	х	x								ISCOS
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						7.									_		Work 0 \/\/\	rder Re 21	ference 11827
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		<u> </u>		•	TOTAL			 				\dashv							

V = VOA Vial HCI Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved Av = Airfreight Unpreserved Glass; H = HCI preserved Plastic; HS = HCI preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugois Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles



CARRINGTON NSW 2294

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : WN2111827

Client : ROBERT CARR & ASSOCIATES P/L Laboratory : ALS Water - Newcastle Contact : MS LAURA SCHOFIELD Contact : Hayley Worthington

Address : 92 HILL STREET Address : 5/585 Maitland Road Newcastle West

NSW Australia 2304

Telephone : +61 02 49029200 Telephone : +612 4014 2500 Facsimile : +61 02 4036 99112 Facsimile : +61 2 4967 7382

Project : 6919 ISCOs Page : 1 of 2

 Order number
 : --- Quote number
 : WN2016ROBCAR0005 (WN/087/16v2)

 C-O-C number
 : --- QC Level
 : NEPM 2013 B3 & ALS QC Standard

Site : ----Sampler : SK

Dates

Date

Delivery Details

 Mode of Delivery
 : Client Drop Off
 Security Seal
 : Not Available

 No. of coolers/boxes
 : -- Temperature
 : 5.4 - Ice present

Receipt Detail : No. of samples received / analysed : 1 / 1

General Comments

• This report contains the following information:

- Sample Container(s)/Preservation Non-Compliances
- Summary of Sample(s) and Requested Analysis
- Proactive Holding Time Report
- Requested Deliverables
- EA043, and EG020T conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.
- Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.

: 12-Oct-2021 Issue Date

Page

: 2 of 2 : WN2111827 Amendment 0 Work Order

Client : ROBERT CARR & ASSOCIATES P/L



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

• No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such otal Nitrogen + NO2 + NO3 +NH3 + Total P + as the determination of moisture content and preparation tasks, that are included in the package. If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date Oxidised Sulfur as SO4 2is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time VATER - EG020A-T otal Metals by ICPMS -/ATER - NT-08A.WN component VATER - ED041A otal Phosphate Matrix: WATER Laboratory sample Sampling date / Sample ID otal (ID time 10216919002 WN2111827-001 10-Oct-2021 00:00

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ALL INVOICES

- A4 - AU Tax Invoice (INV)	Email	administrator@rca.com.au
ENVIRO		
- *AU Certificate of Analysis - NATA (COA)	Email	enviro@rca.com.au
 *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) 	Email	enviro@rca.com.au
 *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) 	Email	enviro@rca.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	enviro@rca.com.au
- A4 - AU Tax Invoice (INV)	Email	enviro@rca.com.au
- Chain of Custody (CoC) (COC)	Email	enviro@rca.com.au
- EDI Format - ENMRG (ENMRG)	Email	enviro@rca.com.au
- EDI Format - ESDAT (ESDAT)	Email	enviro@rca.com.au
LAURA SCHOFIELD		
 *AU Certificate of Analysis - NATA (COA) 	Email	lauras@rca.com.au
 *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) 	Email	lauras@rca.com.au
 *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) 	Email	lauras@rca.com.au
 A4 - AU Sample Receipt Notification - Environmental HT (SRN) 	Email	lauras@rca.com.au
- A4 - AU Tax Invoice (INV)	Email	lauras@rca.com.au
- Chain of Custody (CoC) (COC)	Email	lauras@rca.com.au
- EDI Format - ENMRG (ENMRG)	Email	lauras@rca.com.au
- EDI Format - ESDAT (ESDAT)	Email	lauras@rca.com.au



CERTIFICATE OF ANALYSIS

Work Order : WN2111951

Client ROBERT CARR & ASSOCIATES P/L

Contact : MS LAURA SCHOFIELD

Address : 92 HILL STREET

CARRINGTON NSW 2294

Telephone : +61 02 49029200 : 6919 ISCOs **Project**

Order number C-O-C number

Sampler : SK Site

Quote number : WN/087/16v2

No. of samples received : 1 No. of samples analysed : 1 Page : 1 of 3

> Laboratory : ALS Water - Newcastle

Contact : Hayley Worthington

Address : 5/585 Maitland Road Newcastle West NSW Australia 2304

Telephone : +612 4014 2500 **Date Samples Received** : 14-Oct-2021 15:48

Date Analysis Commenced : 15-Oct-2021

Issue Date : 19-Oct-2021 13:04



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

Gregory Towers Technical Officer Chemistry, Newcastle West, NSW Ivan Taylor Sydney Inorganics, Smithfield, NSW Analyst Neil Martin Team Leader - Chemistry Chemistry, Newcastle West, NSW

Page : 2 of 3 Work Order : WN2111951

Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 ISCOs

ALS

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.
- EA043, and EG020T conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.

Page : 3 of 3 Work Order : WN2111951

Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 ISCOs

Analytical Results



Sub-Matrix: WATER (Matrix: WATER)			Sample ID	10216919003	 	
		Sampli	ing date / time	12-Oct-2021 00:00	 	
Compound	CAS Number	LOR	Unit	WN2111951-001	 	
				Result	 	
ED041: Sulfate (Turbidimetric) as SO4 2-						
Sulfate as SO4 - Turbidimetric	14808-79-8	2	mg/L	13	 	
ED043: Total Oxidised Sulfur as SO4 2-						
Total Oxidised Sulfur as SO4 2-		10	mg/L	90	 	
EG020T: Total Metals by ICP-MS						
Zinc	7440-66-6	0.005	mg/L	0.181	 	
EK055A: Ammonia as N						
Ammonia as N	7664-41-7	0.05	mg/L	53.9	 	
EK057A: Nitrite as N						
Nitrite as N	14797-65-0	0.05	mg/L	1.33	 	
EK058A: Nitrate as N						
Nitrate as N	14797-55-8	0.05	mg/L	10.1	 	
EK059A: Nitrite and Nitrate as N (NOx)						
Nitrite + Nitrate as N		0.05	mg/L	11.4	 	
EK061A: Total Kjeldahl Nitrogen as N						
Total Kjeldahl Nitrogen as N		0.1	mg/L	80.6	 	
EK062A: Total Nitrogen as N						
Total Nitrogen as N		0.1	mg/L	92.0	 	
EK067A: Total Phosphorus as P						
Total Phosphorus as P		0.05	mg/L	16.0	 	
Total Phosphate		0.20	mg/L	49.1	 	
EK071A: Reactive Phosphorus as P						
Reactive Phosphorus as P	14265-44-2	0.05	mg/L	14.1	 	
Inter-Laboratory Testing	=		-			

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) ED043: Total Oxidised Sulfur as SO4 2-(WATER) EG020T: Total Metals by ICP-MS



QUALITY CONTROL REPORT

: 1 of 4

Accreditation No. 825

Accredited for compliance with ISO/IEC 17025 - Testing

Work Order : WN2111951 Page

Client : ROBERT CARR & ASSOCIATES P/L Laboratory : ALS Water - Newcastle
Contact : MS LAURA SCHOFIELD Contact : Hayley Worthington

Address : 92 HILL STREET Address : 5/585 Maitland Road Newcastle West NSW Australia 2304

CARRINGTON NSW 2294

 Telephone
 : +61 02 49029200
 Telephone
 : +612 4014 2500

 Project
 : 6919 ISCOs
 Date Samples Received
 : 14-Oct-2021

 Order number
 : --- Date Analysis Commenced
 : 15-Oct-2021

 C-O-C number
 : --- Issue Date
 : 19-Oct-2021

Sampler : SK

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 Quality Control Report contains the following information:

: 1

: 1

- 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

: WN/087/16v2

Signatories

No. of samples received

No. of samples analysed

Site
Quote number

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

Gregory Towers Technical Officer Chemistry, Newcastle West, NSW Ivan Taylor Analyst Sydney Inorganics, Smithfield, NSW Neil Martin Team Leader - Chemistry Chemistry, Newcastle West, NSW

RIGHT SOLUTIONS | RIGHT PARTNER

Page : 2 of 4 Work Order : WN2111951

Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 ISCOs



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.

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 L	Duplicate (DUP) Report			
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
ED041: Sulfate (Turk	oidimetric) as SO4 2- (QC Lo	ot: 3960329)							
WN2111051-014	Anonymous	ED041A: Sulfate as SO4 - Turbidimetric	14808-79-8	2	mg/L	19	19	0.0	No Limit
WN2112004-001	Anonymous	ED041A: Sulfate as SO4 - Turbidimetric	14808-79-8	2	mg/L	115	111	2.8	0% - 20%
ED043: Total Oxidise	ed Sulfur as SO4 2- (QC Lot	: 3960373)							
ES2137179-001	Anonymous	ED043: Total Oxidised Sulfur as SO4 2-		10	mg/L	170	160	0.0	0% - 50%
EG020T: Total Metal	s by ICP-MS (QC Lot: 39600	33)							
ES2136844-001	Anonymous	EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit
ES2136847-001	Anonymous	EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.020	0.020	0.0	No Limit
EK055A: Ammonia a	s N (QC Lot: 3955652)								
WN2111835-001	Anonymous	EK055A: Ammonia as N	7664-41-7	0.05	mg/L	108	109	1.0	0% - 20%
WN2111913-002	Anonymous	EK055A: Ammonia as N	7664-41-7	0.05	mg/L	1.17	1.18	0.0	0% - 20%
EK057A: Nitrite as N	(QC Lot: 3955653)								
WN2111835-001	Anonymous	EK057A: Nitrite as N	14797-65-0	0.03	mg/L	<0.05	0.09	53.8	No Limit
EK059A: Nitrite and	Nitrate as N (NOx) (QC Lot:	3955651)							
WN2111835-001	Anonymous	EK059A: Nitrite + Nitrate as N		0.05	mg/L	134	134	0.1	0% - 20%
WN2111913-002	Anonymous	EK059A: Nitrite + Nitrate as N		0.05	mg/L	3.56	3.58	0.5	0% - 20%
EK062A: Total Nitrog	gen as N (QC Lot: 3957281)								
WN2111788-001	Anonymous	EK062A: Total Nitrogen as N		0.1	mg/L	179	181	1.1	0% - 20%
WN2111856-001	Anonymous	EK062A: Total Nitrogen as N		0.1	mg/L	9.6	8.6	11.0	0% - 20%
EK067A: Total Phos	phorus as P (QC Lot: 39572	02)							
WN2111917-001	Anonymous	EK067A: Total Phosphorus as P		0.05	mg/L	5.12	5.19	1.4	0% - 20%
EK071A: Reactive Pl	hosphorus as P (QC Lot: 39	57731)							
WN2111835-001	Anonymous	EK071A: Reactive Phosphorus as P	14265-44-2	0.05	mg/L	<0.05	<0.05	0.0	No Limit

Page : 3 of 4 Work Order : WN2111951

Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 ISCOs



Method Blank (MB) and Laboratory Control Sample (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 Sample (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)		Laboratory Control Spike (LC	S) Report	
				Report	Spike	Spike Recovery (%)	Acceptable	Limits (%)
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
ED041: Sulfate (Turbidimetric) as SO4 2- (QCLot: 3960329)								
ED041A: Sulfate as SO4 - Turbidimetric	14808-79-8	2	mg/L	<2	20 mg/L	96.8	90.0	110
ED043: Total Oxidised Sulfur as SO4 2- (QCLot: 3960373)								
ED043: Total Oxidised Sulfur as SO4 2-		10	mg/L	<10	500 mg/L	80.1	80.0	120
EG020T: Total Metals by ICP-MS (QCLot: 3960033)								
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	92.4	79.0	117
EK055A: Ammonia as N (QCLot: 3955652)								
EK055A: Ammonia as N	7664-41-7	0.05	mg/L	<0.05	2 mg/L	98.5	90.0	110
EK057A: Nitrite as N (QCLot: 3955653)								
EK057A: Nitrite as N	14797-65-0	0.03	mg/L	<0.03	1 mg/L	102	90.0	110
EK059A: Nitrite and Nitrate as N (NOx) (QCLot: 3955651)								
EK059A: Nitrite + Nitrate as N		0.05	mg/L	<0.05	2 mg/L	104	90.0	110
EK062A: Total Nitrogen as N (QCLot: 3957281)								
EK062A: Total Nitrogen as N		0.1	mg/L	<0.1	5 mg/L	106	90.0	110
EK067A: Total Phosphorus as P (QCLot: 3957202)								
EK067A: Total Phosphorus as P		0.05	mg/L	<0.05	5 mg/L	96.3	90.0	110
EK071A: Reactive Phosphorus as P (QCLot: 3957731)								
EK071A: Reactive Phosphorus as P	14265-44-2	0.05	mg/L	<0.05	5 mg/L	94.8	90.0	110

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				Matrix Spike (MS) Report					
				Spike	SpikeRecovery(%)	Acceptable L	imits (%)		
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High		
ED041: Sulfate (Tu	rbidimetric) as SO4 2- (QCLot: 3960329)								
WN2111440-001	Anonymous	ED041A: Sulfate as SO4 - Turbidimetric	14808-79-8	20 mg/L	105	80.0	120		
ED043: Total Oxidi	sed Sulfur as SO4 2- (QCLot: 3960373)								
ES2137180-001	Anonymous	ED043: Total Oxidised Sulfur as SO4 2-		500 mg/L	79.4	70.0	130		
EG020T: Total Met	als by ICP-MS (QCLot: 3960033)								
ES2136844-002	Anonymous	EG020A-T: Zinc	7440-66-6	1 mg/L	90.0	70.0	130		
EK055A: Ammonia	as N (QCLot: 3955652)								

Page : 4 of 4
Work Order : WN2111951

Client : ROBERT CARR & ASSOCIATES P/L



Sub-Matrix: WATER		Ма	trix Spike (MS) Report	•			
				Spike	SpikeRecovery(%)	Acceptable L	imits (%)
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK055A: Ammonia	as N (QCLot: 3955652) - continued						
WN2111886-001	Anonymous	EK055A: Ammonia as N	7664-41-7	2 mg/L	# Not Determined	80.0	120
EK057A: Nitrite as	N (QCLot: 3955653)						
WN2111886-001	Anonymous	EK057A: Nitrite as N	14797-65-0	1 mg/L	93.1	80.0	120
EK059A: Nitrite an	d Nitrate as N (NOx) (QCLot: 3955651)						
WN2111886-001	Anonymous	EK059A: Nitrite + Nitrate as N		2 mg/L	# Not Determined	80.0	120
EK062A: Total Niti	ogen as N (QCLot: 3957281)						
WN2111790-001	Anonymous	EK062A: Total Nitrogen as N		20 mg/L	# Not Determined	80.0	120
EK067A: Total Pho	osphorus as P (QCLot: 3957202)						
WN2111918-001	Anonymous	EK067A: Total Phosphorus as P		5 mg/L	94.5	80.0	120
EK071A: Reactive	Phosphorus as P (QCLot: 3957731)						
WN2111886-001	Anonymous	EK071A: Reactive Phosphorus as P	14265-44-2	2 mg/L	97.5	80.0	120



QA/QC Compliance Assessment to assist with Quality Review

Work Order : WN2111951 Page : 1 of 7

Client : ROBERT CARR & ASSOCIATES P/L Laboratory : ALS Water - Newcastle

 Contact
 : MS LAURA SCHOFIELD
 Telephone
 : +612 4014 2500

 Project
 : 6919 ISCOs
 Date Samples Received
 : 14-Oct-2021

Site :--- Issue Date : 19-Oct-2021

Sampler : SK No. of samples received : 1
Order number : ---- No. of samples analysed : 1

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers: Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- NO Method Blank value outliers occur.
- NO Duplicate outliers occur.
- NO Laboratory Control outliers occur.
- Matrix Spike outliers exist please see following pages for full details.
- For all regular sample matrices, NO surrogate recovery outliers occur.

Outliers: Analysis Holding Time Compliance

• Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers: Frequency of Quality Control Samples

NO Quality Control Sample Frequency Outliers exist.

Page : 2 of 7

Work Order : WN2111951

Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 ISCOs

Outliers: Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: WATER

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EK055A: Ammonia as N	WN2111886001	Anonymous	Ammonia as N	7664-41-7	Not		MS recovery not determined,
					Determined		background level greater than or
							equal to 4x spike level.
EK059A: Nitrite and Nitrate as N (NOx)	WN2111886001	Anonymous	Nitrite + Nitrate as N		Not		MS recovery not determined,
					Determined		background level greater than or
							equal to 4x spike level.
EK062A: Total Nitrogen as N	WN2111790001	Anonymous	Total Nitrogen as N		Not		MS recovery not determined,
			_		Determined		background level greater than or
							equal to 4x spike level.

Outliers: Analysis Holding Time Compliance

Matrix: WATER

Method	Ex	traction / Preparation			Analysis	
Container / Client Sample ID(s)	Date extracted	Due for extraction	Days	Date analysed	Due for analysis	Days
			overdue			overdue
EK057A: Nitrite as N						
Clear Plastic Bottle - Natural						
10216919003				15-Oct-2021	14-Oct-2021	1
EK071A: Reactive Phosphorus as P						
Clear Plastic Bottle - Natural						
10216919003				15-Oct-2021	14-Oct-2021	1

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for <u>VOC in soils</u> vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive <u>or</u> Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: WATER Evaluation: ▼ = Holding time breach; ✓ = Within holding time.

Method	Sample Date	Ex	traction / Preparation				
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED041: Sulfate (Turbidimetric) as SO4 2-							
Clear Plastic Bottle - Natural (ED041A) 10216919003	12-Oct-2021				18-Oct-2021	09-Nov-2021	✓
ED043: Total Oxidised Sulfur as SO4 2-							
Clear Plastic Bottle - Natural (ED043) 10216919003	12-Oct-2021	18-Oct-2021	09-Nov-2021	✓	18-Oct-2021	09-Nov-2021	✓

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Client : ROBERT CARR & ASSOCIATES P/L



Matrix: WATER				Evaluation	: × = Holding time	breach ; ✓ = Within	n holding time		
Method	Sample Date	Ex	traction / Preparation		Analysis				
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation		
EG020T: Total Metals by ICP-MS									
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) 10216919003	12-Oct-2021	18-Oct-2021	10-Apr-2022	1	18-Oct-2021	10-Apr-2022	✓		
EK055A: Ammonia as N									
Clear Plastic Bottle - Sulfuric Acid (EK055A) 10216919003	12-Oct-2021				15-Oct-2021	09-Nov-2021	✓		
EK057A: Nitrite as N									
Clear Plastic Bottle - Natural (EK057A) 10216919003	12-Oct-2021				15-Oct-2021	14-Oct-2021	*		
EK059A: Nitrite and Nitrate as N (NOx)									
Clear Plastic Bottle - Sulfuric Acid (EK059A) 10216919003	12-Oct-2021				15-Oct-2021	09-Nov-2021	✓		
EK062A: Total Nitrogen as N									
Clear Plastic Bottle - Sulfuric Acid (EK062A) 10216919003	12-Oct-2021	15-Oct-2021	09-Nov-2021	1	15-Oct-2021	09-Nov-2021	✓		
EK067A: Total Phosphorus as P									
Clear Plastic Bottle - Sulfuric Acid (EK067A) 10216919003	12-Oct-2021	15-Oct-2021	09-Nov-2021	1	15-Oct-2021	09-Nov-2021	√		
EK071A: Reactive Phosphorus as P									
Clear Plastic Bottle - Natural (EK071A) 10216919003	12-Oct-2021				15-Oct-2021	14-Oct-2021	æ		

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Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 ISCOs

Total Metals by ICP-MS - Suite A



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Quality Control Sample Type		C	ount		Rate (%)		not within specification; ✓ = Quality Control frequency with Quality Control Specification
Analytical Methods	Method	OC O	Regular	Actual	Expected	Evaluation	Quality Control Opecinication
aboratory Duplicates (DUP)							
Ammonia as N	EK055A	2	16	12.50	10.00	1	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)	EK059A	2	10	20.00	10.00		NEPM 2013 B3 & ALS QC Standard
litrite as N	EK057A	1	3	33.33	10.00		NEPM 2013 B3 & ALS QC Standard
teactive Phosphorus as P	EK071A	1	3	33.33	10.00		NEPM 2013 B3 & ALS QC Standard
ulfate (Turbidimetric)	ED041A	2	11	18.18	10.00		NEPM 2013 B3 & ALS QC Standard
otal Metals by ICP-MS - Suite A	EG020A-T	2	13	15.38	10.00	<u> </u>	NEPM 2013 B3 & ALS QC Standard
otal Nitrogen as N	EK062A	2	10	20.00	10.00	√	NEPM 2013 B3 & ALS QC Standard
otal Oxidised Sulfur as SO4 2-	ED043	1	8	12.50	10.00	√	NEPM 2013 B3 & ALS QC Standard
otal Phosphorus as P	EK067A	1	3	33.33	10.00	<u>√</u>	NEPM 2013 B3 & ALS QC Standard
aboratory Control Samples (LCS)							
Ammonia as N	EK055A	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
litrite and Nitrate as N (NOx)	EK059A	1	10	10.00	5.00	√	NEPM 2013 B3 & ALS QC Standard
litrite as N	EK057A	1	3	33.33	5.00	√	NEPM 2013 B3 & ALS QC Standard
teactive Phosphorus as P	EK071A	1	3	33.33	5.00	1	NEPM 2013 B3 & ALS QC Standard
ulfate (Turbidimetric)	ED041A	1	11	9.09	5.00	√	NEPM 2013 B3 & ALS QC Standard
otal Metals by ICP-MS - Suite A	EG020A-T	1	13	7.69	5.00	√	NEPM 2013 B3 & ALS QC Standard
otal Nitrogen as N	EK062A	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
otal Oxidised Sulfur as SO4 2-	ED043	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
otal Phosphorus as P	EK067A	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
lethod Blanks (MB)							
mmonia as N	EK055A	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
itrite and Nitrate as N (NOx)	EK059A	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
litrite as N	EK057A	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P	EK071A	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric)	ED041A	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
otal Metals by ICP-MS - Suite A	EG020A-T	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
otal Nitrogen as N	EK062A	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
otal Oxidised Sulfur as SO4 2-	ED043	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
otal Phosphorus as P	EK067A	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N	EK055A	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
litrite and Nitrate as N (NOx)	EK059A	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
litrite as N	EK057A	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P	EK071A	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric)	ED041A	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Tatal Matala Iso IOD MO Ocita A		4	10				NEDM 0040 DO 0 ALO OO Ober deed

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EG020A-T

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5.00

NEPM 2013 B3 & ALS QC Standard

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Work Order : WN2111951

Client : ROBERT CARR & ASSOCIATES P/L



atrix: WATER Evaluation: × = Quality Control frequency not within specification; ✓ = Quality Control frequency within specification.									
Quality Control Sample Type		Co	ount		Rate (%)		Quality Control Specification		
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation			
Matrix Spikes (MS) - Continued									
Total Nitrogen as N	EK062A	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Total Oxidised Sulfur as SO4 2-	ED043	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard		
Total Phosphorus as P	EK067A	1	3	33.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard		

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Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 ISCOs

ALS

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Sulfate (Turbidimetric)	ED041A	WATER	In house: referenced to Lachat QuikChem 10-116-10-1-A. This method covers the determination of sulfate in drinking, ground and surface waters, and domestic and industrial wastes. Sulfate in the sample is precipitated with barium chloride. The precipitation scatters light at 420nm to produce a signal proportional to sulfate concentration. The precipitate is suspended as a colloid with gelatin and polyvinyl alcohol.
Total Oxidised Sulfur as SO4 2-	ED043	WATER	In house: The sample is treated with Peroxide to convert all Sulfur species to Sulfate. Sulfate in the sample can then be determined by ICPAES and reported as TOS as SO4 2
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ammonia as N	EK055A	WATER	In house: referenced to APHA 4500 - NH3 H. This method is based on the Berthelot react. Ammonia reacts in alkaline solution with hypochlorite to form monochlormine which, in the presence of phenol, catalytic amounts of nitroprusside and excess hypochlorite, gives indophenol blue. This colour formation requires a pH between 8.0 - 11.5 and is measured @ 630nm.
Nitrite as N	EK057A	WATER	In house: referenced to APHA 4500 - NO3 I (no reduction). Nitrite (NO2-) is determined through the formation of a reddish purple azo dye produced at pH 2.0 to 2.5 by coupling diazotised acid with N-(1-naphthyl) -ethylenediamine dihydrochloride which is measured at 520 nm.
Nitrate as N	EK058A	WATER	In house: referenced to APHA 4500 - NO3 I. This automated procedure for the determination of TON (NO2- + NO3-) utilises the procedure whereby (NO3-) is reduced to nitrite (NO2-) at a pH 7.5 in a copper-cadmium reductor cell. The NO2- reduced from NO3- plus any free NO2- present reacts under acidic conditions with sulfanilamide to form a diazo compound that then couples with N-(1-naphthyl)-ethylenediamine dihydrochloride to form a reddish purple azo dye which is measured at 520 nm.
Nitrite and Nitrate as N (NOx)	EK059A	WATER	In house: referenced to APHA 4500 - NO3 I. This automated procedure for the determination of TON (NO2- + NO3-) utilises the procedure whereby (NO3-) is reduced to nitrite (NO2-) at a pH 7.5 in a copper-cadmium reductor cell. The NO2- reduced from NO3- plus any free NO2- present reacts under acidic conditions with sulfanilamide to form a diazo compound that then couples with N-(1-naphthyl)-ethylenediamine dihydrochloride to form a reddish purple azo dye which is measured at 520 nm.
Total Kjeldahl Nitrogen as N	EK061A	WATER	In house 6. TKN is calculated by difference from Total Nitrogen and NOx. Contributing method parameters are determined by FIA
Total Nitrogen as N	EK062A	WATER	In house 13. The persulfate method determines Total Nitrogen by oxidation of all nitrogenous compounds to nitrate. Alkaline oxidation at 100 to 1100C using an autoclave converts organic and inorganic nitrogen to nitrate. Total Nitrogen is determined by analysing the nitrate in the digestate using Automated Cadmium reduction method.

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Work Order : WN2111951

Client : ROBERT CARR & ASSOCIATES P/L



Analytical Methods	Method	Matrix	Method Descriptions
Total Phosphorus as P	EK067A	WATER	In house: referenced to APHA 4500 - P G. The Total Phosphorus content of a sample includes all the orthophosphates and condensed phosphates, both soluble insoluble and the organic and inorganic species of Phosphorus in the sample. The more complex forms of phosphorus must be converted to the simple orthophosphate species before analysis is possible and this is achieved by digesting the sample with ammonium persulphate and sulphuric acid.
Reactive Phosphorus as P	EK071A	WATER	In house: referenced to APHA 4500 - P G. This automated procedure for the determination of Ortho Phosphorus is based on the colorimetric method in which a blue colour is formed by the reaction of ortho phosphorus and molybdate ion followed by reduction with ascorbic acid at an acidic pH. The reduced blue phosphomolybdenum complex is read at 660 nm.
Preparation Methods	Method	Matrix	Method Descriptions
Total Oxidisable Sulfur as SO4 2- Prep	ED043-PR	WATER	In house
Basic Persulfate Digestion for TN with FIA finish.	EK062-PA	WATER	In house: Referenced to APHA 24500 P - J.
Acid Persulfate Digestion for TP with FIA finish.	EK067-PA	WATER	#
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)

CHAIN OF CUSTODY

ALS Laboratory: please tick ->

ALS Water

EJADELAIDE 21 Burma Road Pooraka SA 5096 Ph: 08 8359 0890 E: adelaide@alsolobsl.com

GBRISBANE 2 Byth Street Stefford Ot D 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com ©MACKAY 78 Harbour Road Mackey QLD 4740 Ph: 07 4944 0177 E. mackey@alsglobal.com

LIMELBOURNE 2-4 Wastall Road Springvale VIC 3171 Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com JEKRANECCZY PSESSOSIANIC BONIER MARINER WELLEN 2304 PIP (21) 0739 (4556) C. I Saundone wile will salve the transfer of the control of

Ph; 07 #7/80264928;206366v/leven/@macdal@shaicbal.com

LIMUDGEE 1/29 Sydney Road Mudgee IIISVO2IEERG50NO 1964A/anylikistagsVivilko8gs0g NSW 2500 Ph: 02 6372 6735 E: mudgee mail@alsglobalizatin26 3389 E59icEbssprongi@apsglobalizatin26 3389 E59icEbssprongi@apsglobalizatin26 □GLADSTONE 46 Callemonoah Brive Clinton OLD 4680 Ph: 07 7471 5600 E: gradstone@alsglooal.com

CLIENT: RCA (ROBCAR	₹)		.1	OUND REQUIREMENTS:	Standard TAT (List due date):					FOR LABORATORY USE ONLY (Circle)															
OFFICE: Carrington			(Standard TAT may be longer for some tests e.g., Ultra Trace Organics) Non Standard or urgent TAT (List due dat				e date):								Seal Inta				Yes	No	€,	(II)			
PROJECT: 6919 ISCOs			ALS QUOTE NO.: WN/087/16v2					COC SEQUENCE NUMBER (Circle)							perfice/l eceipt?	frozen id	ce bricks	79	No		N/A				
PURCHASE ORDER NO).:		COUNTRY OF ORIGIN:					coc: 1							Random Sample Temperature on Receipt: 'C										
PROJECT MANAGER: I	_aura Schofield	CONTACT P	PH:				OF:	1					c	Other con	nment:		-0.	1							
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COC Emailed to ALS? (NO)	EDD FORMA	AT (or defa	ult):	sĸ				6											,					
Email Reports to (will defau	It to PM If no other addresses are listed): lauras@	rca.com.au; enviro@rca.com	ı.au		DATE/TIM:				DATE/TIME: DATE/TIM					TIME:				D	DATE/TIME:						
Email Invoice to lauras(@rca.com.au; administrator@rca.co	m.au; enviro@rca.com.au			14/10/21	/6; 2	0		14.10.21 4:20																
COMMENTS/SPECIAL I	HANDLING/STORAGE OR DISPOS	AL:																							
ALS USE ONLY		LE DETAILS :: Solid(S) Water(W)	CONTAINER INFORMATION						REQUIRED including SUITES (NB. Suite Codes											Additional Information					
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE codes below)	(refer to	TOTAL BOTTLES	NT-08A.WN (TP, TON, TKN, Reactive Phos, NO2, NO3, NH3)	ED041A • Sulfate	ED043 - Suiphur - Total	otal Zinc	EK067A PO4 - Phosphate										its on likely co or samples r etc.				
•	10216919003	12/10/2021	w	1 x 500ml P, 1 x 125ml P, 1 x 125ml	SP. 1 x 60mi N	4	X Fr gd	<u>a</u>	ED0	x F	×				-					_		cos			
1	10210313003	12110/2021	- "	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		-		^			_	•	_			_			-	 					
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Water Container Codes: P-	= Unpreserved Plastic; N = Nitric Preserved Plastic; ORC	= Nitric Preserved ORC; SH ≈ Sodium Hydroxide/C	d Preserved; S =	Sodium Hydroxide Preserved Plastic; AG - Ami	ber Glass Unpreserve	od; AP - Airfreight Un	preserved Plastic																		

V = VOA Vial HCI Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Solfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Plastic; H = HCI preserved Plastic; H = HCI preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Giass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols lodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.



CARRINGTON NSW 2294

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : WN2111951

Client : ROBERT CARR & ASSOCIATES P/L Laboratory : ALS Water - Newcastle Contact : MS LAURA SCHOFIELD Contact : Hayley Worthington

Address : 92 HILL STREET Address : 5/585 Maitland Road Newcastle West

NSW Australia 2304

Telephone : +61 02 49029200 Telephone : +612 4014 2500 Facsimile : +61 02 4036 99112 Facsimile : +61 2 4967 7382

Project : 6919 ISCOs Page : 1 of 2

 Order number
 : --- Quote number
 : WN2016ROBCAR0005 (WN/087/16v2)

 C-O-C number
 : --- QC Level
 : NEPM 2013 B3 & ALS QC Standard

Site : ----Sampler : SK

Dates

Date

Delivery Details

Mode of Delivery : Undefined Security Seal : Not Available

No. of coolers/boxes : --- Temperature : ---
Receipt Detail No. of samples received / analysed : 1 / 1

General Comments

This report contains the following information:

- Sample Container(s)/Preservation Non-Compliances
- Summary of Sample(s) and Requested Analysis
- Proactive Holding Time Report
- Requested Deliverables
- EA043, and EG020T conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.
- Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The laboratory will process these samples unless instructions are received from you indicating you do not wish to proceed. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.

: 14-Oct-2021 Issue Date

Page

: 2 of 2 : WN2111951 Amendment 0 Work Order

Client : ROBERT CARR & ASSOCIATES P/L



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

• No sample container / preservation non-compliance exists.

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such otal Nitrogen + NO2 + NO3 +NH3 + Total P + as the determination of moisture content and preparation tasks, that are included in the package. If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date Oxidised Sulfur as SO4 2is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time VATER - EG020A-T otal Metals by ICPMS -/ATER - NT-08A.WN urbidimetric Sulfate component VATER - ED041A otal Phosphate Matrix: WATER Laboratory sample Sampling date / Sample ID otal (ID time 10216919003 WN2111951-001 12-Oct-2021 00:00

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ALL INVOICES

- A4 - AU Tax Invoice (INV)	Email	administrator@rca.com.au
ENVIRO		
 *AU Certificate of Analysis - NATA (COA) 	Email	enviro@rca.com.au
 *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) 	Email	enviro@rca.com.au
 *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) 	Email	enviro@rca.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	enviro@rca.com.au
- A4 - AU Tax Invoice (INV)	Email	enviro@rca.com.au
- Chain of Custody (CoC) (COC)	Email	enviro@rca.com.au
- EDI Format - ENMRG (ENMRG)	Email	enviro@rca.com.au
- EDI Format - ESDAT (ESDAT)	Email	enviro@rca.com.au
LAURA SCHOFIELD		
 *AU Certificate of Analysis - NATA (COA) 	Email	lauras@rca.com.au
 *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) 	Email	lauras@rca.com.au
 *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) 	Email	lauras@rca.com.au
 A4 - AU Sample Receipt Notification - Environmental HT (SRN) 	Email	lauras@rca.com.au
- A4 - AU Tax Invoice (INV)	Email	lauras@rca.com.au
- Chain of Custody (CoC) (COC)	Email	lauras@rca.com.au
- EDI Format - ENMRG (ENMRG)	Email	lauras@rca.com.au
- EDI Format - ESDAT (ESDAT)	Email	lauras@rca.com.au



CERTIFICATE OF ANALYSIS

Work Order : WN2112534

: ROBERT CARR & ASSOCIATES P/L

Contact : LAURA SCHOFIELD

Address : PO BOX 175

CARRINGTON NSW, AUSTRALIA 2294

Telephone : +61 2 4902 9200

Project : 6919 Wheel Wash

 Order number
 : ---

 C-O-C number
 : ---

 Sampler
 : S King

 Site
 : ---

Quote number : WN/088/16

No. of samples received : 1

No. of samples analysed : 1

Page : 1 of 3

Laboratory : ALS Water - Newcastle

Contact : Andrea Swan

Address : 5/585 Maitland Road Newcastle West NSW Australia 2304

Telephone : +61 2 4014 2500

Date Samples Received : 29-Oct-2021 14:28

Date Analysis Commenced : 01-Nov-2021

Issue Date : 05-Nov-2021 11:22



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

Client

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

Ivan TaylorAnalystSydney Inorganics, Smithfield, NSWNeil MartinTeam Leader - ChemistryChemistry, Newcastle West, NSW

Page : 2 of 3 Work Order : WN2112534

Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 Wheel Wash

ALS

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.

EG020A-F, EG020A-T & EG035F conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.

Page : 3 of 3 Work Order : WN2112534

Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 Wheel Wash

Analytical Results



Sub-Matrix: WATER (Matrix: WATER)			Sample ID	10216919004	 	
		Sampli	ng date / time	29-Oct-2021 00:00	 	
Compound	CAS Number	LOR	Unit	WN2112534-001	 	
				Result	 	
EG020F: Dissolved Metals by ICP-MS						
Arsenic	7440-38-2	0.001	mg/L	0.293	 	
Cadmium	7440-43-9	0.0001	mg/L	0.0012	 	
Copper	7440-50-8	0.001	mg/L	0.214	 	
Nickel	7440-02-0	0.001	mg/L	0.069	 	
Lead	7439-92-1	0.001	mg/L	<0.001	 	
Zinc	7440-66-6	0.005	mg/L	0.435	 	
Molybdenum	7439-98-7	0.001	mg/L	0.189	 	
EG020T: Total Metals by ICP-MS						
Chromium	7440-47-3	0.001	mg/L	0.010	 	
EG035F: Dissolved Mercury by FIMS						
Mercury	7439-97-6	0.0001	mg/L	<0.0001	 	
EK057A: Nitrite as N						
Nitrite as N	14797-65-0	0.05	mg/L	13.5	 	
EK058A: Nitrate as N						
Nitrate as N	14797-55-8	0.05	mg/L	132	 	
EK059A: Nitrite and Nitrate as N (NOx)						
Nitrite + Nitrate as N		0.05	mg/L	145	 	
EK061A: Total Kjeldahl Nitrogen as N						
Total Kjeldahl Nitrogen as N		0.2	mg/L	18400	 	
EK062A: Total Nitrogen as N						
Total Nitrogen as N		0.1	mg/L	18600	 	
EK067A: Total Phosphorus as P						
Total Phosphorus as P		0.05	mg/L	2000	 	

Inter-Laboratory Testing

Analysis conducted by ALS Sydney, NATA accreditation no. 825, site no. 10911 (Chemistry) 14913 (Biology).

(WATER) EG035F: Dissolved Mercury by FIMS (WATER) EG020F: Dissolved Metals by ICP-MS (WATER) EG020T: Total Metals by ICP-MS



QUALITY CONTROL REPORT

Work Order : WN2112534

: ROBERT CARR & ASSOCIATES P/L

Contact : LAURA SCHOFIELD

Address : PO BOX 175

CARRINGTON NSW, AUSTRALIA 2294

Telephone : +61 2 4902 9200
Project : 6919 Wheel Wash

Order number : ---C-O-C number : ----

Sampler : S King Site : ----

Quote number : WN/088/16

No. of samples received : 1
No. of samples analysed : 1

Page : 1 of 5

Laboratory : ALS Water - Newcastle

Contact : Andrea Swan

Address : 5/585 Maitland Road Newcastle West NSW Australia 2304

Telephone : +61 2 4014 2500

Date Samples Received : 29-Oct-2021

Date Analysis Commenced : 01-Nov-2021

Issue Date : 05-Nov-2021



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 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

Client

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

 Ivan Taylor
 Analyst
 Sydney Inorganics, Smithfield, NSW

 Neil Martin
 Team Leader - Chemistry
 Chemistry, Newcastle West, NSW

Page : 2 of 5 Work Order : WN2112534

Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 Wheel Wash



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.

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	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)	
EG020F: Dissolved	Metals by ICP-MS (QC	Lot: 3991143)								
ET2105146-004	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit	
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit	
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.004	0.004	0.0	No Limit	
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit	
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit	
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.001	0.001	0.0	No Limit	
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit	
EW2104541-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit	
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit	
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.003	0.003	0.0	No Limit	
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit	
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	<0.001	0.0	No Limit	
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit	
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.007	0.007	0.0	No Limit	
EG020T: Total Meta	Is by ICP-MS (QC Lot: 3	3991259)								
EW2104555-006	Anonymous	EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.0	No Limit	
EW2104555-016	Anonymous	EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit	
EG035F: Dissolved	Mercury by FIMS (QC L	ot: 3991141)								
ES2139413-002	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit	
EK057A: Nitrite as	N (QC Lot: 3987126)									
WN2112534-001	10216919004	EK057A: Nitrite as N	14797-65-0	0.03	mg/L	13.5	16.4	19.9	0% - 20%	
EK059A: Nitrite and	Nitrate as N (NOx) (QC	Lot: 3987125)								
WN2112534-001	10216919004	EK059A: Nitrite + Nitrate as N		0.05	mg/L	145	135	6.6	0% - 20%	

Page : 3 of 5
Work Order : WN2112534

Client : ROBERT CARR & ASSOCIATES P/L



Sub-Matrix: WATER		Laboratory Duplicate (DUP) Report								
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)	
EK062A: Total Nitrog	gen as N (QC Lot: 3987248)									
WN2112534-001	10216919004	EK062A: Total Nitrogen as N		0.1	mg/L	18600	15800	16.1	0% - 20%	
EK067A: Total Phosphorus as P (QC Lot: 3987250)										
WN2112534-001	10216919004	EK067A: Total Phosphorus as P		0.05	mg/L	2000	1940	3.1	0% - 20%	

Page : 4 of 5 Work Order : WN2112534

Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 Wheel Wash



Method Blank (MB) and Laboratory Control Sample (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 Sample (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)	Laboratory Control Spike (LCS) Report					
				Report	Spike	Spike Recovery (%)	Acceptable	Limits (%)		
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High		
EG020F: Dissolved Metals by ICP-MS (QCLot: 3991143)										
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	94.7	85.0	114		
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	94.6	84.0	110		
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	91.9	81.0	111		
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	93.5	83.0	111		
EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	0.1 mg/L	95.2	79.0	113		
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	92.3	82.0	112		
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	95.0	81.0	117		
EG020T: Total Metals by ICP-MS (QCLot: 3991259)										
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	96.0	86.0	116		
EG035F: Dissolved Mercury by FIMS (QCLot: 3991141)										
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	97.0	83.0	105		
EK057A: Nitrite as N (QCLot: 3987126)										
EK057A: Nitrite as N	14797-65-0	0.03	mg/L	<0.03	1 mg/L	103	90.0	110		
EK059A: Nitrite and Nitrate as N (NOx) (QCLot: 3987125)										
EK059A: Nitrite + Nitrate as N		0.05	mg/L	<0.05	2 mg/L	105	90.0	110		
EK062A: Total Nitrogen as N (QCLot: 3987248)										
EK062A: Total Nitrogen as N		0.1	mg/L	<0.1	5 mg/L	95.0	90.0	110		
EK067A: Total Phosphorus as P (QCLot: 3987250)										
EK067A: Total Phosphorus as P		0.05	mg/L	<0.05	5 mg/L	95.6	90.0	110		

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		Matrix Spike (MS) Report							
				Spike	SpikeRecovery(%)	Acceptable	Limits (%)		
aboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High		
EG020F: Dissolve	d Metals by ICP-MS (QCLot: 3991143)								
ET2105146-003	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	89.7	70.0	130		
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	91.0	70.0	130		
		EG020A-F: Copper	7440-50-8	1 mg/L	90.5	70.0	130		
		EG020A-F: Lead	7439-92-1	1 mg/L	96.1	70.0	130		
		EG020A-F: Nickel	7440-02-0	1 mg/L	89.9	70.0	130		

Page : 5 of 5 Work Order : WN2112534

Client : ROBERT CARR & ASSOCIATES P/L



Sub-Matrix: WATER					Matrix Spike (MS) Report						
				Spike	SpikeRecovery(%)	Acceptable L	imits (%)				
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High				
EG020F: Dissolved	Metals by ICP-MS (QCLot: 3991143) - continued										
ET2105146-003	Anonymous	EG020A-F: Zinc	7440-66-6	1 mg/L	91.3	70.0	130				
EG020T: Total Met	als by ICP-MS (QCLot: 3991259)										
EW2104555-007	Anonymous	EG020A-T: Chromium	7440-47-3	1 mg/L	102	70.0	130				
EG035F: Dissolved	Mercury by FIMS (QCLot: 3991141)										
ES2139413-001	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	106	70.0	130				
EK057A: Nitrite as	N (QCLot: 3987126)										
WN2112538-001	Anonymous	EK057A: Nitrite as N	14797-65-0	1 mg/L	107	80.0	120				
EK059A: Nitrite an	d Nitrate as N (NOx) (QCLot: 3987125)										
WN2112538-001	Anonymous	EK059A: Nitrite + Nitrate as N		2 mg/L	103	80.0	120				



QA/QC Compliance Assessment to assist with Quality Review

Issue Date

No. of samples analysed

: 05-Nov-2021

: 1

Work Order : WN2112534 Page : 1 of 6

Client : ROBERT CARR & ASSOCIATES P/L Laboratory : ALS Water - Newcastle

Contact: LAURA SCHOFIELDTelephone: +61 2 4014 2500Project: 6919 Wheel WashDate Samples Received: 29-Oct-2021

Sampler : S King No. of samples received : 1

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this

Brief method summaries and references are also provided to assist in traceability.

report contribute to the overall DQO assessment and reporting for guideline compliance.

Summary of Outliers

Site

Order number

Outliers: Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- NO Method Blank value outliers occur.
- NO Duplicate outliers occur.
- NO Laboratory Control outliers occur.
- NO Matrix Spike outliers occur.
- For all regular sample matrices, NO surrogate recovery outliers occur.

Outliers: Analysis Holding Time Compliance

• Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

Quality Control Sample Frequency Outliers exist - please see following pages for full details.

Page : 2 of 6
Work Order : WN2112534

Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 Wheel Wash

Outliers: Analysis Holding Time Compliance

Matrix: WATER

Method	Ex	Extraction / Preparation Analysis				
Container / Client Sample ID(s)	Date extracted	Due for extraction	Days	Date analysed	Due for analysis	Days
			overdue			overdue
EK057A: Nitrite as N						
Clear Plastic Bottle - Natural						
10216919004				01-Nov-2021	31-Oct-2021	1

Outliers: Frequency of Quality Control Samples

Matrix: WATER

Quality Control Sample Type	Co	Count Rate (%)		(%)	Quality Control Specification
Method	QC	Regular	Actual	Expected	
Matrix Spikes (MS)					
Total Nitrogen as N	0	1	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P	0	1	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for <u>VOC in soils</u> vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: WATER Evaluation: ▼ = Holding time breach; ✓ = Within holding time.

Mattix. Water				Evaluation	. A - Holding time	breach, • - with	in notaling time.
Method	Sample Date	Ex	traction / Preparation			Analysis	
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F) 10216919004	29-Oct-2021				03-Nov-2021	26-Apr-2022	√
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) 10216919004	29-Oct-2021	03-Nov-2021	26-Apr-2022	1	03-Nov-2021	26-Apr-2022	✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F) 10216919004	29-Oct-2021				04-Nov-2021	26-Nov-2021	√
EK057A: Nitrite as N							
Clear Plastic Bottle - Natural (EK057A) 10216919004	29-Oct-2021				01-Nov-2021	31-Oct-2021	sc .
EK059A: Nitrite and Nitrate as N (NOx)							
Clear Plastic Bottle - Sulfuric Acid (EK059A) 10216919004	29-Oct-2021				01-Nov-2021	26-Nov-2021	1

CHAIN OF CUSTODY

ALS Laboratory: please tick ->

CLIENT: RCA (ROBCAR	₹)		1	OUND REQUIREMENTS:								FC	OR LABORATORY	USE ONLY (Cir	cle)		
OFFICE: Carrington			(Standard T e.g., Ultra T	AT may be longer for some tests race Organics)	☐ Non St	andard or urg	gent TAT (Lis	st due dat	e):			Cu	ustody Seal Intact?		Yes	No N	盈
PROJECT: 6919 Wheel	Wash			UOTE NO.: WN/088/16					COC SEQUE	NCE NUME	BER (Circle		ee ice / frozen ice ofick ceipt?	s present upon	(es_	No N	N/A
PURCHASE ORDER NO).:		COUNTR	Y OF ORIGIN:				co	C: 1 2	3 4	5 6	7 R	andom Sample Temper	rature on Receipt:	10	ъ.	
PROJECT MANAGER: I	Laura S	CONTACT F	PH: 047854	8630				OF	1 2	3 4	5 6	7 Ot	her comment:		14.0	7	
SAMPLER: S King		SAMPLER N	MOBILE: 04	167053540	RELINQUE	SHED BY:		RE	CEIVED BY:			RELING	UISHED BY:	RE	CEIVED BY:		
COC Emailed to ALS? (YES / NO)	EDD FORM	AT (or defa	ult):	ls			1	ICS TE/TIME: 2	_ ,							
Email Reports to (will de	efault to PM if no other addresses are	e listed): lauras@rca.com.au;			DATE/TIME	:		DA'	TE/TIME: 4	حتر ، از	ک ^ہ کار	DATE/T	IME:	DA	TE/TIME:		
Email Invoice to : lauras	@rca.com.au; administrator@rca.co	om.au; lauras@rca.com.au			29/10/2021					<u>Z:2</u>	28/-						
COMMENTS/SPECIAL H	HANDLING/STORAGE OR DISPOSA	AL:															
ALCUIES ONLY	SAMPL	E DETAILS		CONTAINED IN	ODMATION		ANALYS	IS REQU	IRED including	g SUITES	(NB. Suite Co	odes must b	e listed to attract suite p		A . I		
ALS USE ONLY	MATRIX: So	olid(S) Water(W)		CONTAINER INF	ORMATION		Where M	Motals are re	equired, specify Total	al (unfiltered b	ottle required) o	or Dissolved (field filtered bottle required		Additional Info	rmation	
LAB ID	SAMPLE ID 10216919004	DATE / TIME 29/10/2021 0:00	W	TYPE & PRESERVAT (refer to codes below 1 x 500ml P, 1 x 125ml SP, 1 x 60ml N (field filter	w) x 60ml N, 1	TOTAL BOTTLES	x NT-11 (TP, TON, TKN, NOX)	X NT-4 (Ntrate + Nitrite)	8 Metals Dissolved (As, × Cd, Cu, Ni, Pb, Zn, Hg, Molybdenum)	x EG020T - Total Chromium	1				wheel W	ng/L.	
										. Er	vironm	iental i	Division				
									_	6.1		$\alpha = M/3$	iter				_
											Work O	10er ner 1 011	2534				
										-,	AAIA	211	200				
										_		+ #V.A	##/T_= ###				
			<u> </u>	·									887 =	_			
												MM	Heer MIIII				
										_							
										_	elephone :	_ 67 2 401	2.960				_
								·			elebitorie		-	_			
					TOTAL												
Water Container Codes: P	= Unpreserved Plastic; N = Nitric Preserv	red Plastic; ORC = Nitric Preserver	d ORC; SH =	Sodium Hydroxide/Cd Preserved,	S = Sodium Hy	droxide Prese	rved Plastic; A	G = Amber	r Glass Unpreser	ved; AP - Ai	rfreight Unpre	served Plas	tic ria Brassa and Blastic:	E = Formaldehyda l	Proconyad Glass:		

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; N = Nitric Preserved Plastic; AP - Airfreight Unpreserved Plastic; N = Nitric Preserved Plastic; N = HCI preserved Plastic; N = HCI preserved Speciation bottle; SP = Sulfuric Preserved Plastic; N = Formaldehyde Preserved Glass; N = Nitric Preserved Speciation bottle; N = Sulfuric Preserved Plastic; N = Unpreserved Plastic; N = Nitric Preserved Plastic; N = Nitric Plastic Plastic Plastic Plastic Plastic Plastic Plastic Plastic Plastic

Page : 3 of 6
Work Order : WN2112534

Client : ROBERT CARR & ASSOCIATES P/L



Matrix: WATER				Evaluation	: x = Holding time	breach ; ✓ = Withi	n holding time.
Method	Sample Date	Ex	traction / Preparation		Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK062A: Total Nitrogen as N							
Clear Plastic Bottle - Sulfuric Acid (EK062A) 10216919004	29-Oct-2021	02-Nov-2021	26-Nov-2021	✓	02-Nov-2021	26-Nov-2021	✓
EK067A: Total Phosphorus as P							
Clear Plastic Bottle - Sulfuric Acid (EK067A) 10216919004	29-Oct-2021	02-Nov-2021	26-Nov-2021	✓	02-Nov-2021	26-Nov-2021	✓

Page : 4 of 6 Work Order WN2112534

ROBERT CARR & ASSOCIATES P/L Client

6919 Wheel Wash Project



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to

the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: WATER				Evaluation	n: × = Quality Co	entrol frequency	not within specification; ✓ = Quality Control frequency within specification
Quality Control Sample Type		Co	ount		Rate (%)		Quality Control Specification
Analytical Methods	Method	OC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Dissolved Mercury by FIMS	EG035F	1	6	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	17	11.76	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)	EK059A	1	3	33.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N	EK057A	1	2	50.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	17	11.76	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen as N	EK062A	1	1	100.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P	EK067A	1	1	100.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Dissolved Mercury by FIMS	EG035F	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	17	5.88	5.00	√	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)	EK059A	1	3	33.33	5.00	√	NEPM 2013 B3 & ALS QC Standard
Nitrite as N	EK057A	1	2	50.00	5.00	√	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	17	5.88	5.00	√	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen as N	EK062A	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P	EK067A	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Dissolved Mercury by FIMS	EG035F	1	6	16.67	5.00	√	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	17	5.88	5.00	√	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)	EK059A	1	3	33.33	5.00	√	NEPM 2013 B3 & ALS QC Standard
Nitrite as N	EK057A	1	2	50.00	5.00	√	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	17	5.88	5.00	√	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen as N	EK062A	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P	EK067A	1	1	100.00	5.00	√	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Dissolved Mercury by FIMS	EG035F	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	17	5.88	5.00	√	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx)	EK059A	1	3	33.33	5.00	√	NEPM 2013 B3 & ALS QC Standard
Nitrite as N	EK057A	1	2	50.00	5.00	<u>√</u>	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	17	5.88	5.00	<u>√</u>	NEPM 2013 B3 & ALS QC Standard
Total Nitrogen as N	EK062A	0	1	0.00	5.00	<u> </u>	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P	EK067A	0	1	0.00	5.00	<u> </u>	NEPM 2013 B3 & ALS QC Standard

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Client : ROBERT CARR & ASSOCIATES P/L

Project : 6919 Wheel Wash



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Nitrite as N	EK057A	WATER	In house: referenced to APHA 4500 - NO3 I (no reduction). Nitrite (NO2-) is determined through the formation of a reddish purple azo dye produced at pH 2.0 to 2.5 by coupling diazotised acid with N-(1-naphthyl) -ethylenediamine dihydrochloride which is measured at 520 nm.
Nitrate as N	EK058A	WATER	In house: referenced to APHA 4500 - NO3 I. This automated procedure for the determination of TON (NO2- + NO3-) utilises the procedure whereby (NO3-) is reduced to nitrite (NO2-) at a pH 7.5 in a copper-cadmium reductor cell. The NO2- reduced from NO3- plus any free NO2- present reacts under acidic conditions with sulfanilamide to form a diazo compound that then couples with N-(1-naphthyl)-ethylenediamine dihydrochloride to form a reddish purple azo dye which is measured at 520 nm.
Nitrite and Nitrate as N (NOx)	EK059A	WATER	In house: referenced to APHA 4500 - NO3 I. This automated procedure for the determination of TON (NO2- + NO3-) utilises the procedure whereby (NO3-) is reduced to nitrite (NO2-) at a pH 7.5 in a copper-cadmium reductor cell. The NO2- reduced from NO3- plus any free NO2- present reacts under acidic conditions with sulfanilamide to form a diazo compound that then couples with N-(1-naphthyl)-ethylenediamine dihydrochloride to form a reddish purple azo dye which is measured at 520 nm.
Total Kjeldahl Nitrogen as N	EK061A	WATER	In house 6. TKN is calculated by difference from Total Nitrogen and NOx. Contributing method parameters are determined by FIA
Total Nitrogen as N	EK062A	WATER	In house 13. The persulfate method determines Total Nitrogen by oxidation of all nitrogenous compounds to nitrate. Alkaline oxidation at 100 to 1100C using an autoclave converts organic and inorganic nitrogen to nitrate. Total Nitrogen is determined by analysing the nitrate in the digestate using Automated Cadmium reduction method.

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Analytical Methods	Method	Matrix	Method Descriptions
Total Phosphorus as P	EK067A	WATER	In house: referenced to APHA 4500 - P G. The Total Phosphorus content of a sample includes all the orthophosphates and condensed phosphates, both soluble insoluble and the organic and inorganic species of Phosphorus in the sample. The more complex forms of phosphorus must be converted to the simple orthophosphate species before analysis is possible and this is achieved by digesting the sample with ammonium persulphate and sulphuric acid.
Preparation Methods	Method	Matrix	Method Descriptions
Basic Persulfate Digestion for TN with FIA finish.	EK062-PA	WATER	In house: Referenced to APHA 24500 P - J.
Acid Persulfate Digestion for TP with FIA finish.	EK067-PA	WATER	#
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)