
26 April 2023

680.30105.00100-L01-v1.0-20230426.docx

Attention: Litchfield Council - Paul Wilson

Dear Paul

In February 2023, in accordance with the site Environmental Management Plans (EMPs) relating to EPLs 278 and 279, SLR conducted surface water quality monitoring at Humpty Doo, Howard Springs and Berry Springs waste transfer stations (WTS) for the fourth round of the 2022/23 wet season.

This letter report details the surface water data results compared to the ANZG (2018) and Darwin Harbour Water Quality Objectives default assessment criteria with interpretation and recommendations.

Yours sincerely

MATHI SAKTHIVEL
Project Consultant

Checked/ Authorised by: EA

1 Introduction

The wet season monitoring programs outlined in the EMPs have been designed to monitor risks to the environment from factors identified in the Risk Assessment in the EMPs. The monitoring aims to prevent and minimise the Waste Transfer Stations (WTS) impact on the surrounding environment.

The surface water sampling locations have been positioned to monitor water quality at specific stages of passive release from rainfall run-off from the sites.

1.1 Sampling Locations

Sampling locations for the wet season 2022/23 surface water monitoring are:

- Howard Springs WTS
- Humpty Doo WTS
- Berry Springs WTS

1.2 Assessment Criteria

Surface water quality is assessed against the following criteria:

- ANZG (2018) freshwater default 95% species protection, and
- Darwin Harbour Water Quality Objectives (2010) (DHWQO):
 - Freshwater rivers and streams

The Water Quality Guidelines do not apply to total metals but only to dissolved metals (bioavailable content). However, the total metal concentrations do provide an indication of metals in the system that are not bioavailable and how the total organic carbon (TOC) complexes with the bioavailable fraction to reduce the toxicity.

There is no trigger value within the ANZG or DHWQO for unspecified chromium (Cr III + VI). Therefore, for conservative purposes, the trigger value for Cr VI 0.001 mg/L is used for the assessment.

1.3 Analytical Program

The analytical program outlined in the EMPs is summarised in Table 1.

Table 1 Analytical Program

Sample Location	In situ/lab physio-chemical parameters	Nutrients	Total and Dissolved Metals	Major Ions and Cations	Hydrocarbons
	pH, Temp, EC, Redox, DO, Turbidity, TDS*, BOD*	TN, TKN, Nitrate, Nitrite, TP, TOC	As, Cd, Cr, Cu, Hg, Pb, Ni and Zn Total Fe	Ca, Mg, Na, K, SO ₄ , Cl, CO ₃ & HCO ₃	TPH, TRH and BTEX
Berry Springs (BS)	✓	✓	✓	✓	✓
Humpty Doo (HD)	✓	✓	✓	✓	✓
Howard Springs (HS)	✓	✓	✓	✓	✓

* Laboratory analysis

1.4 Field and Laboratory Parameters

The field and laboratory parameters analysed for surface water monitoring conducted on 23 February 2023 is outlined below in Table 2:

Table 2 Field and Laboratory Parameters analysed 23 February 2023

	In situ/lab physico-chemical parameters	Nutrients	Total and Dissolved Metals	Major Ions and Cations	Hydrocarbons	PFAS	Microbiology
Sample Location	pH, Temp, EC, Redox, DO, Turbidity, TDS*, BOD*	TN, TKN, Nitrate, Nitrite, TP, TOC	As, Cd, Cr, Cu, Hg, Pb, Ni and Zn Total Fe	Ca, Mg, Na, K, SO ₄ , Cl, CO ₃ & HCO ₃	TPH, TRH and BTEX	Per and polyfluoroalkyl substances	<i>Escherichia coli</i>
Berry Springs (BS)	X	X	X	X	X	X	X
Humpty Doo (HD)	✓	✓	✓	✓	✓	✓	✓
Howard Springs (HS)	✓	✓	✓	✓	✓	✓	✓

* Laboratory analysis

2 In-situ Monitoring and Observations

Prior the sampling day in February 2023, rains were occurring at the three (3) Waste Transfer Stations (Humpty Doo, Howard Springs and Berry Springs). There was insufficient rain at Berry Springs for run-off to occur in February 2023, therefore no data are available for this site during this round of monitoring. Photos are presented in Figure 1.

Physico-chemical parameters were recorded at Humpty Doo and Howards Springs and are presented in Table 3.

The following in-situ physio-chemical parameters were recorded outside the DHWQO 2010:

- pH at Humpty Doo WTS sampling location with 9.19.
- Turbidity at Humpty Doo and Howard Spring WTS sampling locations with 136 NTU and 321 NTU respectively.
- Electrical conductivity at Howard Springs WTS with 214 $\mu\text{S}/\text{cm}$.

Table 3 Field Physico-Chemical Parameters (February 2023)

Analytes	pH	Temperature	Oxidation Reduction Potential	Electrical Conductivity	Dissolved Oxygen	Turbidity
Units	pH Unit	(°C)	(mV)	($\mu\text{S}/\text{cm}$)	(% saturation)	(NTU)
Water Quality Objectives 2010 - freshwater rivers and streams	6-7.5	-	-	200	50-100	20
ANZG 2018 freshwater - 95% species protection	-	-	-	-	-	-
Humpty Doo (HD)	9.2	27.2	21	114	97	136
Howard Springs (HS)	6.7	26.5	78	214	69	321
Berry Springs (BS)	N/A					

Note: Shaded cells denote where parameters were reported outside of water quality objectives

Figure 1 Monitoring on 24/01/2023 Humpty Doo and Howard Springs



3 Laboratory Results

A summary of the laboratory results with exceedances of the assessment criteria are presented in Table 4.

All parameters were within the two selected assessment criteria, excepting:

- Nutrients:
 - Levels of nitrite and nitrate (NO_x) were recorded above the DHWQO (2010) assessment criteria of 8 µg/L at Humpty Doo WTS and Howard Springs WTS sampling locations with a recording of 310 µg/L.
 - Total nitrogen concentrations exceeded the DHWQO (2010) assessment criteria of 230 µg/L at both sites with 700 µg/L at Humpty Doo WTS and 2,100 µg/L at Howard Springs WTS.
 - Total phosphorus levels exceeded the DHWQO (2010) assessment criteria of 10 µg/L at Humpty Doo and Howard Springs WTS sampling locations recording 60 µg/L, and 120 µg/L respectively.
- Heavy Metals:
 - No heavy metals exceeded the DHWQO and ANZG assessment criteria.
- Hydrocarbons:
 - All hydrocarbons were below laboratory detection limits.
- PFAS:
 - All PFAS were below the DHWQO and ANZG assessment criteria.
- Microbiology:
 - *Escherichia coli* exceeded the DHWQO criteria of 200 MPN/100 mL with ~35,000/100 mL at the Humpty Doo WTS sampling location and ~9,300/100 mL at the Howard Springs WTS sampling location.

Laboratory quality assurance and quality control reported no outliers for the two samples. A duplicate sample was collected at Humpty Doo and sent for testing. Comparison of RPDs between the original sample from Humpty Doo and the duplicate indicated that all values were within the accepted range. Refer to Laboratory Certificates in Attachment 1 for further information.

Table 4 Laboratory Results Summary (January 2023)

Analytes	Ammonia (as N)	Nitrite + Nitrate (as NOx)	Total Nitrogen (as N)	Total Phosphorus 9as P)	E. coli
Units	µg/L				MNP/100ml
Water Quality Objectives 2010 - freshwater rivers and streams					
	-	8	230	10	200
ANZG 2018 freshwater - 95% species protection					
	900	-		-	
Humpty Doo (HD)	70	310	700	60	35,000
Howard Springs (HS)	890	310	2,100	120	9,300
Berry Springs (BS)	N/A				

Notes:

- Shaded cells denote where parameters were reported outside of the guideline value or range.
- ANZG guideline applies to dissolved metals. However, total metal concentrations indicate the formation of bioavailable metal complex. Results of dissolved heavy metals display lower concentrations than total heavy metals.

4 Conclusion

The key findings of this surface water monitoring event are:

- Samples were collected at Humpty Doo and Howards Springs WTS on 23 February 2023 sampling locations following a rainfall event. Berry Springs WTS sampling location was dry during the sampling event and therefore, could not be sampled.
- pH was within the guideline value range at the Howard Springs WTS sampling location but exceeded the guideline value at the Humpty Doo WTS sampling location.
- Electrical conductivity exceeded the DHWQO (2010) guideline value of freshwater rivers and streams assessment criteria at the Howard Springs WTS.
- Turbidity exceeded the DHWQO (2010) guideline value of freshwater rivers and streams assessment criteria at the Humpty Doo and Howard Springs WTS. This is to be expected during a rain event and commonly occurs in the Top End.
- Dissolved metal concentrations detected did not exceed the ANZG (2018) ecosystem protection assessment criteria and the DHWQO (2010) guideline value of freshwater rivers and streams assessment criteria.
- All the PFAS substance concentrations were recorded below the ANZG (2018) ecosystem protection assessment criteria and the DHWQO (2010) guideline value of freshwater rivers and streams assessment criteria.
- Concentrations of nutrients were recorded above the assessment criteria at the two sites and were consistent with the historical data. Three (3) nutrients were recorded to be exceeding the relevant guideline values (Nitrite + Nitrate (as NO_x), Total Nitrogen and Total Phosphorus). It is important to note that the assessment criteria are applied to natural waterways and not to drainage channels for stormwater (as shown in Figure 1), therefore, elevated concentrations are expected to reduce upon mixing in a waterway.
- Levels of *Escherichia coli* exceeded the guideline value at the Humpty Doo and Howard Springs WTS sampling locations, which is consistent with the historical data.

Enclosures: Attachment 1: Laboratory Certificates

Attachment 1: Laboratory Certificate

SLR Consulting Australia Pty Ltd

ABN 29 001 584 612

PROJECT OFFICE (Tick one)	☐ BRISBANE: Level 2, 15 Astor Terrace, Spring Hill, Q4 4000	☐ GOLD COAST: 194 Varisty Parade, Varisty Lakes, QLD 4227	☐ NEWCASTLE: 10 Kings Road, New Lambton, NSW 2305	☐ SYDNEY: 2 Lincoln Street, Lane Cove, Sydney, NSW 2066	☐ NELSON: 6/A Cambridge Street, Richmond, Port Nelson, 7020 NZ
	☐ CANBERRA: GPO Box 410, Canberra, ACT 2600	☐ MACKAY: 21 River Street, Mackay, QLD 4740	☐ PERTH: 503 Murray Street, Perth, WA 6000	☐ TOWNSVILLE: 514 Sturt Street, Townsville, QLD 4810	☐ NEW PLYMOUTH: Level 2, 10 Devon Street East, New Plymouth, 4310 NZ
	☒ DARWIN: 21 Parap Rd, Darwin, NT 0820	☐ MELBOURNE: Lvl 11, 176 Wellington Street, East Melbourne, VIC 3002	☐ ROCKHAMPTON: rockhampton@sirconsulting.com	☐ AUCKLAND: 68 Beach Road, Auckland 1010 NZ	☐

CLIENT: Litchfield Council	LABORATORY: ALS Environmental	Turnaround Time (TAT) ☒ Standard TAT ☐ Non Standard or Urgent TAT Required TAT: Standard	COC Number 2 of 1
PROJECT: LSC waste transfer facilities SW monitoring	LABORATORY ADDRESS: Charlton Crt, Winnellie NT		
PROJECT NUMBER: 680.30105.00100 - LSC waste transfer facilities SW monitoring	SAMPLER: Flynn Mackley, Tom Flux		
PROJECT MANAGER: Emmanuelle Aliotti	SAMPLER CONTACT No: Flynn Mackley: 0428 012 854		
PM CONTACT No: 0455 656 856	Email Reports and Invoices to: ealiotti@slrconsulting.com; pturyn@slrconsulting.com		

COMMENTS OR ADDITIONAL DIRECTIONS						REQUESTED ANALYSIS												Additional Information (Comment on any gross contamination or specific requirements)	
No.	Sample ID	Date & Time	Matrix (Soil, water, ACM, etc)	Containers and Preservatives	EA005 - pH	IN-1 - EC, TDS	EP025 - DO	EA045 - Turbidity	NT-1&NT-2 - Major Ions ((Ca, Mg, Na, K, SO ₄ , Cl, CO ₃ & HCO ₃)	EP005 - TOC	EP030 - BOD	NT-8 Total Nitrogen (as N), Nitrate, Nitrite, TKN, Total Phosphorus	W-5 - TRH (C6-C40) / BTEXN / 8 Metals (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg)	W-2T - 8 Metals: As, Cd, Cr, Cu, Ni, Pb, Zn, Hg	EG020T - Iron (Fe)	EP231X - PFAS – Full Suite (28 analytes)	MW006 - E. Coli		
1	HS	23-2-23	Water		X	X	X	X	X	X	X	X	X	X	X	X	X		
2	HD	23-2-23	Water		X	X	X	X	X	X	X	X	X	X	X	X	X		
	~~BS~~	~~23-2-23~~	~~Water~~		~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~	~~X~~		
3	D1	23-2-23	Water		X	X	X	X	X	X	X	X	X	X	X	X	X		

Environmental Division
Sydney
Work Order Reference
ES2306051



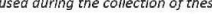
Telephone : + 61-2-8784 8555

Environmental Division
Sydney
Work Order Reference
ES2306051



Telephone : + 61-2-8784 8555

Sample Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AS = Preserved Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl Preserved Plastic; HS = HCl Preserved Sedation 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 = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles; G = unpreserved glass soil jar

I attest that the proper field sampling procedures were used during the collection of these samples.					Temperature Received:
Relinquished By Sampler	FM 	Date / Time 23/2/23	Received by	Sign  Date / Time 23/02/23 1330	
Relinquished By	Sign	Date / Time	Received by	Sign Date / Time	
Relinquished By	Sign	Date / Time	Received by	Sign Date / Time	

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : ES2306051

Client	: SLR CONSULTING AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: EMMANUELLE ALIOTTI	Contact	: Hannah White
Address	: UNIT 5/21 PARAP ROAD PARAP 0820	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ealiotti@slrconsulting.com	E-mail	: Hannah.White@alsglobal.com
Telephone	: ----	Telephone	: +61-2-8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: 680.30105.00100 - LSC waste transfer facilities SW monitoring	Page	: 1 of 3
Order number	: ----	Quote number	: ES2020HEGAUS0005 (SY/333/20 V2)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: Litchfield Council		
Sampler	:		

Dates

Date Samples Received	: 24-Feb-2023 08:30	Issue Date	: 24-Feb-2023
Client Requested Due Date	: 03-Mar-2023	Scheduled Reporting Date	: 03-Mar-2023

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: ----
Receipt Detail	:	No. of samples received / analysed	: 3 / 3

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
- **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.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- 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.



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.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EA005P pH (Auto Titrator)	WATER - EA045 Turbidity	WATER - EG020T Total Metals by ICPMS (including digestion)	WATER - EP005 Total Organic Carbon (TOC)	WATER - EP025 Dissolved Oxygen (DO)	WATER - EP030 BOD	WATER - MW006 (Ec) E.coli by Membrane Filtration
ES2306051-001	23-Feb-2023 00:00	HS	✓	✓	✓	✓	✓	✓	✓
ES2306051-002	23-Feb-2023 00:00	HD	✓	✓	✓	✓	✓	✓	✓
ES2306051-003	23-Feb-2023 00:00	D1	✓	✓	✓	✓	✓	✓	✓

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - EP231X PFAS - Full Suite (28 analytes)	WATER - IN-1 EC plus TDS Calculated	WATER - NT-01 & 02 Ca, Mg, Na, K, Cl, SO ₄ , Alkalinity	WATER - NT-08 Total Nitrogen + NO ₂ + NO ₃ + NH ₃ + Total P	WATER - W-02T 8 metals (Total)	WATER - W-05 TRH/BTEXN/8 Metals
ES2306051-001	23-Feb-2023 00:00	HS	✓	✓	✓	✓	✓	✓
ES2306051-002	23-Feb-2023 00:00	HD	✓	✓	✓	✓	✓	✓
ES2306051-003	23-Feb-2023 00:00	D1	✓	✓	✓	✓	✓	✓

Proactive Holding Time Report

The following table summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory.

Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Due for extraction	Due for analysis	Samples Received		Instructions Received	
Client Sample ID(s)	Container		Date	Evaluation	Date	Evaluation
EA005-P: pH by Auto Titrator						
D1	Clear Plastic Bottle - Natural	----	23-Feb-2023	24-Feb-2023	✖	----
HD	Clear Plastic Bottle - Natural	----	23-Feb-2023	24-Feb-2023	✖	----
HS	Clear Plastic Bottle - Natural	----	23-Feb-2023	24-Feb-2023	✖	----
EP025: Oxygen - Dissolved						
D1	Clear Plastic Bottle - Natural	----	23-Feb-2023	24-Feb-2023	✖	----
HD	Clear Plastic Bottle - Natural	----	23-Feb-2023	24-Feb-2023	✖	----
HS	Clear Plastic Bottle - Natural	----	23-Feb-2023	24-Feb-2023	✖	----

[illegible]

CERTIFICATE OF ANALYSIS

Work Order : **ES2306051**
Client : **SLR CONSULTING AUSTRALIA PTY LTD**
Contact : EMMANUELLE ALIOTTI
Address : UNIT 5/21 PARAP ROAD
 PARAP 0820
Telephone : ----
Project : 680.30105.00100 - LSC waste transfer facilities SW monitoring
Order number : ----
C-O-C number : ----
Sampler : ----
Site : Litchfield Council
Quote number : SY/333/20 V2
No. of samples received : 3
No. of samples analysed : 3

Page : 1 of 8
Laboratory : Environmental Division Sydney
Contact : Hannah White
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 24-Feb-2023 08:30
Date Analysis Commenced : 24-Feb-2023
Issue Date : 06-Mar-2023 10:00



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Somlok Chai	Microbiologist	Sydney Microbiology, Smithfield, NSW



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 Contract 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.

- MF = membrane filtration
- CFU = colony forming unit
- EP231X - Per- and Polyfluoroalkyl Substances (PFAS): Samples received in 20ml or 125ml bottles have been tested in accordance with the QSM5.3 compliant, NATA accredited method. 60mL or 250mL bottles have been tested to the legacy QSM 5.1 aligned, NATA accredited method.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- As per QWI – EN55-3 Data Interpreting Procedures, Ionic balances are typically calculated using Major Anions - Chloride, Alkalinity and Sulfate; and Major Cations - Calcium, Magnesium, Potassium and Sodium. Where applicable and dependent upon sample matrix, the Ionic Balance may also include the additional contribution of Ammonia, Dissolved Metals by ICPMS and H+ to the Cations and Nitrate, SiO2 and Fluoride to the Anions.
- MW006 is ALS's internal code and is equivalent to AS4276.5.
- Microbiological Comment: In accordance with ALS work instruction QWI-MIC/04, membrane filtration result is reported an approximate (~) when the count of colonies on the filtered membrane is outside the range of 10 - 100cfu.
- EA016: Calculated TDS is determined from Electrical conductivity using a conversion factor of 0.65.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.
- EP231: Stable isotope enriched internal standards are added to samples prior to extraction. Target compounds have a direct analogous internal standard with the exception of PFPeS, PFHpA, PFDS, PFTrDA and 10:2 FTS. These compounds use an internal standard that is chemically related and has a retention time close to that of the target compound. The DQO for internal standard response is 50-150% of that established at initial calibration. PFOS is quantified using a certified, traceable standard consisting of linear and branched PFOS isomers. These practices are in line with recommendations in the National Environmental Management Plan for PFAS (Australian HEPA) and also conform to QSM 5.3 (US DoD) requirements.



Analytical Results

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

Sample ID

				HS	HD	D1	----	----
Sampling date / time				23-Feb-2023 00:00	23-Feb-2023 00:00	23-Feb-2023 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2306051-001	ES2306051-002	ES2306051-003	-----	-----
				Result	Result	Result	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	6.94	6.97	6.93	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	139	112	112	----	----
EA016: Calculated TDS (from Electrical Conductivity)								
Total Dissolved Solids (Calc.)	----	1	mg/L	90	73	73	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	276	154	155	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	<1	----	----
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	<1	----	----
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	49	32	32	----	----
Total Alkalinity as CaCO ₃	----	1	mg/L	49	32	32	----	----
ED041G: Sulfate (Turbidimetric) as SO₄ 2- by DA								
Sulfate as SO ₄ - Turbidimetric	14808-79-8	1	mg/L	12	20	20	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	5	2	2	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	19	16	16	----	----
Magnesium	7439-95-4	1	mg/L	4	<1	<1	----	----
Sodium	7440-23-5	1	mg/L	3	4	3	----	----
Potassium	7440-09-7	1	mg/L	7	2	2	----	----
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	0.001	0.001	----	----
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	----	----
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	----	----
EG020T: Total Metals by ICP-MS								
Arsenic	7440-38-2	0.001	mg/L	0.002	0.001	0.001	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----
Chromium	7440-47-3	0.001	mg/L	0.003	0.006	0.007	----	----
Copper	7440-50-8	0.001	mg/L	0.004	0.003	0.003	----	----



Analytical Results

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

Sample ID

				HS	HD	D1	----	----
Sampling date / time				23-Feb-2023 00:00	23-Feb-2023 00:00	23-Feb-2023 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2306051-001	ES2306051-002	ES2306051-003	-----	-----
				Result	Result	Result	----	----
EG020T: Total Metals by ICP-MS - Continued								
Nickel	7440-02-0	0.001	mg/L	0.002	<0.001	<0.001	----	----
Lead	7439-92-1	0.001	mg/L	0.004	0.002	0.003	----	----
Zinc	7440-66-6	0.005	mg/L	0.030	0.013	0.013	----	----
Iron	7439-89-6	0.05	mg/L	3.01	1.39	1.60	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.89	0.07	0.12	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.06	0.06	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	0.31	0.25	0.25	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.31	0.31	0.31	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.8	0.4	0.6	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	2.1	0.7	0.9	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.12	0.06	0.08	----	----
EN055: Ionic Balance								
∅ Total Anions	----	0.01	meq/L	1.37	1.11	1.11	----	----
∅ Total Cations	----	0.01	meq/L	1.59	1.02	0.98	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	3	1	2	----	----
EP025: Oxygen - Dissolved (DO)								
Dissolved Oxygen	----	0.1	mg/L	9.8	9.1	9.3	----	----
EP030: Biochemical Oxygen Demand (BOD)								
Biochemical Oxygen Demand	----	2	mg/L	2	<2	2	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	----	----



Analytical Results

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

Sample ID

				HS	HD	D1	----	----
Sampling date / time				23-Feb-2023 00:00	23-Feb-2023 00:00	23-Feb-2023 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2306051-001	ES2306051-002	ES2306051-003	-----	-----
				Result	Result	Result	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued								
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	----	----
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	----	----
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	----	----
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	----	----
Toluene	108-88-3	2	µg/L	<2	<2	<2	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	----	----
^ Total Xylenes	----	2	µg/L	<2	<2	<2	----	----
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	----	----
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	----	----
EP231A: Perfluoroalkyl Sulfonic Acids								
Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	<0.01	<0.01	----	----
Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	<0.02	<0.02	----	----
Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	0.04	<0.01	<0.01	----	----

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

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Sample ID	HS	HD	D1	----	----
Sampling date / time				23-Feb-2023 00:00	23-Feb-2023 00:00	23-Feb-2023 00:00	----	----	
Compound	CAS Number	LOR	Unit	ES2306051-001	ES2306051-002	ES2306051-003	-----	-----	
				Result	Result	Result	----	----	
EP231A: Perfluoroalkyl Sulfonic Acids - Continued									
Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
EP231B: Perfluoroalkyl Carboxylic Acids									
Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	<0.1	<0.1	----	----	
Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	<0.01	<0.01	----	----	
Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluorotridecanoic acid (PFTrDA)	72629-94-8	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	<0.05	<0.05	----	----	
EP231C: Perfluoroalkyl Sulfonamides									
Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	<0.05	<0.05	----	----	
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	<0.05	<0.05	----	----	
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	<0.05	<0.05	----	----	
N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	<0.05	<0.05	----	----	
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	<0.02	<0.02	----	----	
EP231D: (n:2) Fluorotelomer Sulfonic Acids									



Analytical Results

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

Sample ID

				HS	HD	D1	----	----
Sampling date / time				23-Feb-2023 00:00	23-Feb-2023 00:00	23-Feb-2023 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2306051-001	ES2306051-002	ES2306051-003	-----	-----
				Result	Result	Result	----	----
EP231D: (n:2) Fluorotelomer Sulfonic Acids - Continued								
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	<0.05	<0.05	----	----
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	<0.05	<0.05	----	----
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	<0.05	<0.05	----	----
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	<0.05	<0.05	----	----
EP231P: PFAS Sums								
Sum of PFAS	----	0.01	µg/L	0.04	<0.01	<0.01	----	----
Sum of PFHxS and PFOS	355-46-4/1763-23-1	0.01	µg/L	0.04	<0.01	<0.01	----	----
Sum of PFAS (WA DER List)	----	0.01	µg/L	0.04	<0.01	<0.01	----	----
MW006: Faecal Coliforms & E.coli by MF								
<i>Escherichia coli</i>	----	1	CFU/100mL	9300	35000	28000	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	95.0	93.6	95.8	----	----
Toluene-D8	2037-26-5	2	%	107	107	108	----	----
4-Bromofluorobenzene	460-00-4	2	%	113	113	113	----	----
EP231S: PFAS Surrogate								
13C4-PFOS	----	0.02	%	89.5	96.7	98.0	----	----
13C8-PFOA	----	0.02	%	92.7	90.3	95.0	----	----



Surrogate Control Limits

Sub-Matrix: SURFACE WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128
EP231S: PFAS Surrogate			
13C4-PFOS	----	60	120
13C8-PFOA	----	60	120

QUALITY CONTROL REPORT

Work Order	: ES2306051	Page	: 1 of 10
Client	: SLR CONSULTING AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: EMMANUELLE ALIOTTI	Contact	: Hannah White
Address	: UNIT 5/21 PARAP ROAD PARAP 0820	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: ----	Telephone	: +61-2-8784 8555
Project	: 680.30105.00100 - LSC waste transfer facilities SW monitoring	Date Samples Received	: 24-Feb-2023
Order number	: ----	Date Analysis Commenced	: 24-Feb-2023
C-O-C number	: ----	Issue Date	: 06-Mar-2023
Sampler	: ----		
Site	: Litchfield Council		
Quote number	: SY/333/20 V2		
No. of samples received	: 3		
No. of samples analysed	: 3		



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

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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Somlok Chai	Microbiologist	Sydney Microbiology, Smithfield, NSW



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 (%)
EA005P: pH by PC Titrator (QC Lot: 4894175)									
ES2306101-004	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.55	7.70	2.0	0% - 20%
ES2306101-007	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	6.89	6.88	0.1	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 4894173)									
ES2305763-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	1250	1240	1.1	0% - 20%
ES2305997-002	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	7890	7750	1.8	0% - 20%
ES2306101-004	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	667	655	1.8	0% - 20%
ES2306230-002	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	225	224	0.5	0% - 20%
ES2305940-006	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	21900	22100	1.1	0% - 20%
ES2306117-004	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	3890	3960	1.7	0% - 20%
EA045: Turbidity (QC Lot: 4894233)									
ES2305185-001	Anonymous	EA045: Turbidity	----	0.1	NTU	1.7	1.8	0.0	0% - 50%
ES2305914-001	Anonymous	EA045: Turbidity	----	0.1	NTU	<0.1	<0.1	0.0	No Limit
EA045: Turbidity (QC Lot: 4894234)									
ES2306051-003	D1	EA045: Turbidity	----	0.1	NTU	155	153	1.3	0% - 20%
ES2306087-002	Anonymous	EA045: Turbidity	----	0.1	NTU	77.7	75.9	2.3	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 4894172)									
ES2305763-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	152	154	1.2	0% - 20%
		ED037-P: Total Alkalinity as CaCO ₃	----	1	mg/L	152	154	1.2	0% - 20%
ES2305997-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	0.0	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	511	511	0.0	0% - 20%

Page : 3 of 10
 Work Order : ES2306051
 Client : SLR CONSULTING AUSTRALIA PTY LTD
 Project : 680.30105.00100 - LSC waste transfer facilities SW monitoring



Sub-Matrix: **WATER**

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 (%)
ED037P: Alkalinity by PC Titrator (QC Lot: 4894172) - continued									
ES2305997-002	Anonymous	ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	511	511	0.0	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 4895468)									
ES2306141-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	20	20	0.0	0% - 20%
ES2306043-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	1	1	0.0	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 4895469)									
ES2306104-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	1	1	0.0	No Limit
ES2306043-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	2	2	0.0	No Limit
ED093F: Dissolved Major Cations (QC Lot: 4897411)									
ES2306126-005	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	76	77	0.0	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	27	28	0.0	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	66	68	1.9	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	2	2	0.0	No Limit
ES2306043-002	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	19	19	0.0	0% - 50%
		ED093F: Magnesium	7439-95-4	1	mg/L	11	12	0.0	0% - 50%
		ED093F: Sodium	7440-23-5	1	mg/L	3	3	0.0	No Limit
		ED093F: Potassium	7440-09-7	1	mg/L	<1	<1	0.0	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 4897408)									
ES2306126-005	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	0.002	0.002	0.0	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	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	0.021	0.021	0.0	No Limit
ES2306043-002	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: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-F: Lead	7439-92-1	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
EG020T: Total Metals by ICP-MS (QC Lot: 4893554)									
ES2305796-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.0	No Limit



Sub-Matrix: **WATER**

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 (%)
EG020T: Total Metals by ICP-MS (QC Lot: 4893554) - continued									
ES2305796-001	Anonymous	EG020A-T: Iron	7439-89-6	0.05	mg/L	0.90	0.93	2.9	0% - 50%
ES2306051-003	D1	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.001	0.001	0.0	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.007	0.007	0.0	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.003	0.003	0.0	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	0.003	0.003	0.0	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.0	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.013	0.015	16.9	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	1.60	1.74	8.5	0% - 20%
EG035F: Dissolved Mercury by FIMS (QC Lot: 4897409)									
ES2305985-002	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
ES2306099-003	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.0	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 4897426)									
ES2305796-001	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.1 µg/L	<0.0001	0.0	No Limit
ES2305993-002	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.1 µg/L	<0.0001	0.0	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 4898578)									
ES2305185-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.31	0.31	0.0	0% - 20%
ES2306051-003	D1	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.12	0.13	0.0	0% - 50%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 4895467)									
ES2306141-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
ES2306043-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.0	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 4898579)									
ES2305185-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.01	0.01	0.0	No Limit
ES2306051-003	D1	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.31	0.31	0.0	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 4898570)									
ES2305185-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.5	0.4	0.0	No Limit
ES2306068-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.8	0.6	35.3	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 4898569)									
ES2305185-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.03	0.02	42.8	No Limit
ES2306068-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.06	0.04	49.3	No Limit
EP005: Total Organic Carbon (TOC) (QC Lot: 4899301)									
ES2305895-001	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	2	<1	75.8	No Limit
ES2305895-011	Anonymous	EP005: Total Organic Carbon	----	1	mg/L	1	1	0.0	No Limit
EP030: Biochemical Oxygen Demand (BOD) (QC Lot: 4894338)									
ES2305965-001	Anonymous	EP030: Biochemical Oxygen Demand	----	2	mg/L	3	8	90.9	No Limit
ES2306037-001	Anonymous	EP030: Biochemical Oxygen Demand	----	2	mg/L	582	600	3.0	0% - 20%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4897584)									
EB2305073-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit

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 Work Order : ES2306051
 Client : SLR CONSULTING AUSTRALIA PTY LTD
 Project : 680.30105.00100 - LSC waste transfer facilities SW monitoring



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 (%)
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 4897584) - continued									
ES2305985-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.0	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 4897584)									
EB2305073-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
ES2305985-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.0	No Limit
EP080: BTEXN (QC Lot: 4897584)									
EB2305073-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.0	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
ES2305985-001	Anonymous	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.0	No Limit
		EP080: Toluene	108-88-3	2	µg/L	4	4	0.0	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.0	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.0	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.0	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.0	No Limit



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**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	Low	High
EA005P: pH by PC Titrator (QCLot: 4894175)								
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	99.8	98.8	101
				----	7 pH Unit	99.7	99.2	101
EA010P: Conductivity by PC Titrator (QCLot: 4894173)								
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	220 µS/cm	95.5	89.9	110
				<1	2100 µS/cm	98.5	90.2	111
EA045: Turbidity (QCLot: 4894233)								
EA045: Turbidity	----	0.1	NTU	<0.1	40 NTU	99.8	91.0	105
EA045: Turbidity (QCLot: 4894234)								
EA045: Turbidity	----	0.1	NTU	<0.1	40 NTU	99.5	91.0	105
ED037P: Alkalinity by PC Titrator (QCLot: 4894172)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	96.9	81.0	111
				----	50 mg/L	105	80.0	120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4895468)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	106	82.0	122
				<1	500 mg/L	108	82.0	122
ED045G: Chloride by Discrete Analyser (QCLot: 4895469)								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	92.3	80.9	127
				<1	1000 mg/L	97.7	80.9	127
ED093F: Dissolved Major Cations (QCLot: 4897411)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	99.4	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	97.4	90.0	116
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	100	82.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	99.5	85.0	113
EG020F: Dissolved Metals by ICP-MS (QCLot: 4897408)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	94.8	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	94.3	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	91.9	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	94.9	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	94.6	83.0	111
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	94.5	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	98.5	81.0	117
EG020T: Total Metals by ICP-MS (QCLot: 4893554)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	98.4	82.0	114



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
Method: Compound		CAS Number	LOR		Unit	Result	Spike Concentration	Spike Recovery (%) LCS
EG020T: Total Metals by ICP-MS (QCLot: 4893554) - continued								
EG020A-T: Cadmium		7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	97.6	84.0 112
EG020A-T: Chromium		7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	95.8	86.0 116
EG020A-T: Copper		7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	95.8	83.0 118
EG020A-T: Lead		7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	94.8	85.0 115
EG020A-T: Nickel		7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	99.4	84.0 116
EG020A-T: Zinc		7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	96.4	79.0 117
EG020A-T: Iron		7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	96.7	85.0 117
EG035F: Dissolved Mercury by FIMS (QCLot: 4897409)								
EG035F: Mercury		7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	97.1	83.0 105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4897426)								
EG035T: Mercury		7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	96.0	77.0 111
EK055G: Ammonia as N by Discrete Analyser (QCLot: 4898578)								
EK055G: Ammonia as N		7664-41-7	0.01	mg/L	<0.01	1 mg/L	105	90.0 114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4895467)								
EK057G: Nitrite as N		14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	105	82.0 114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4898579)								
EK059G: Nitrite + Nitrate as N		----	0.01	mg/L	<0.01	0.5 mg/L	100	91.0 113
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4898570)								
EK061G: Total Kjeldahl Nitrogen as N		----	0.1	mg/L	<0.1	10 mg/L	94.8	69.0 101
					<0.1	1 mg/L	102	70.0 118
					<0.1	5 mg/L	97.2	70.0 130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 4898569)								
EK067G: Total Phosphorus as P		----	0.01	mg/L	<0.01	4.42 mg/L	95.1	71.3 126
					<0.01	0.442 mg/L	99.3	71.3 126
					<0.01	1 mg/L	103	71.3 126
EP005: Total Organic Carbon (TOC) (QCLot: 4899301)								
EP005: Total Organic Carbon		----	1	mg/L	<1	10 mg/L	100	72.0 120
EP030: Biochemical Oxygen Demand (BOD) (QCLot: 4894338)								
EP030: Biochemical Oxygen Demand		----	2	mg/L	<2	200 mg/L	94.5	74.0 112
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4892933)								
EP071: C10 - C14 Fraction		----	50	µg/L	<50	400 µg/L	78.3	53.7 97.0
EP071: C15 - C28 Fraction		----	100	µg/L	<100	600 µg/L	75.3	63.3 107
EP071: C29 - C36 Fraction		----	50	µg/L	<50	400 µg/L	80.4	58.3 120
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4897584)								
EP080: C6 - C9 Fraction		----	20	µg/L	<20	260 µg/L	99.6	75.0 127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4892933)								
EP071: >C10 - C16 Fraction		----	100	µg/L	<100	500 µg/L	78.7	53.9 95.5



Sub-Matrix: **WATER**

Method: Compound				Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Acceptable Limits (%)	
						LCS	Low	High
CAS Number	LOR	Unit						
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4892933) - continued								
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	93.6	57.8	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	102	50.5	115
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4897584)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	105	75.0	127
EP080: BTEXN (QCLot: 4897584)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	85.8	70.0	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	102	69.0	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	103	70.0	120
EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	10 µg/L	104	69.0	121
	106-42-3							
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	106	72.0	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	107	70.0	120
EP231A: Perfluoroalkyl Sulfonic Acids (QCLot: 4899191)								
EP231X: Perfluorobutane sulfonic acid (PFBS)	375-73-5	0.02	µg/L	<0.02	0.25 µg/L	118	72.0	130
EP231X: Perfluoropentane sulfonic acid (PFPeS)	2706-91-4	0.02	µg/L	<0.02	0.25 µg/L	114	71.0	127
EP231X: Perfluorohexane sulfonic acid (PFHxS)	355-46-4	0.01	µg/L	<0.01	0.25 µg/L	102	68.0	131
EP231X: Perfluoroheptane sulfonic acid (PFHpS)	375-92-8	0.02	µg/L	<0.02	0.25 µg/L	118	69.0	134
EP231X: Perfluorooctane sulfonic acid (PFOS)	1763-23-1	0.01	µg/L	<0.01	0.25 µg/L	114	65.0	140
EP231X: Perfluorodecane sulfonic acid (PFDS)	335-77-3	0.02	µg/L	<0.02	0.25 µg/L	111	53.0	142
EP231B: Perfluoroalkyl Carboxylic Acids (QCLot: 4899191)								
EP231X: Perfluorobutanoic acid (PFBA)	375-22-4	0.1	µg/L	<0.1	1.25 µg/L	109	73.0	129
EP231X: Perfluoropentanoic acid (PFPeA)	2706-90-3	0.02	µg/L	<0.02	0.25 µg/L	117	72.0	129
EP231X: Perfluorohexanoic acid (PFHxA)	307-24-4	0.02	µg/L	<0.02	0.25 µg/L	120	72.0	129
EP231X: Perfluoroheptanoic acid (PFHpA)	375-85-9	0.02	µg/L	<0.02	0.25 µg/L	116	72.0	130
EP231X: Perfluorooctanoic acid (PFOA)	335-67-1	0.01	µg/L	<0.01	0.25 µg/L	119	71.0	133
EP231X: Perfluorononanoic acid (PFNA)	375-95-1	0.02	µg/L	<0.02	0.25 µg/L	125	69.0	130
EP231X: Perfluorodecanoic acid (PFDA)	335-76-2	0.02	µg/L	<0.02	0.25 µg/L	114	71.0	129
EP231X: Perfluoroundecanoic acid (PFUnDA)	2058-94-8	0.02	µg/L	<0.02	0.25 µg/L	128	69.0	133
EP231X: Perfluorododecanoic acid (PFDoDA)	307-55-1	0.02	µg/L	<0.02	0.25 µg/L	120	72.0	134
EP231X: Perfluorotridecanoic acid (PFTriDA)	72629-94-8	0.02	µg/L	<0.02	0.25 µg/L	116	65.0	144
EP231X: Perfluorotetradecanoic acid (PFTeDA)	376-06-7	0.05	µg/L	<0.05	0.625 µg/L	104	71.0	132
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4899191)								
EP231X: Perfluorooctane sulfonamide (FOSA)	754-91-6	0.02	µg/L	<0.02	0.25 µg/L	119	67.0	137
EP231X: N-Methyl perfluorooctane sulfonamide (MeFOSA)	31506-32-8	0.05	µg/L	<0.05	0.625 µg/L	119	68.0	141
EP231X: N-Ethyl perfluorooctane sulfonamide (EtFOSA)	4151-50-2	0.05	µg/L	<0.05	0.625 µg/L	83.6	62.6	147
EP231X: N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)	24448-09-7	0.05	µg/L	<0.05	0.625 µg/L	125	66.0	145



Sub-Matrix: **WATER**

Sub-Matrix: WATER				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%) LCS	Acceptable Limits (%) LowHigh	
Method: Compound	CAS Number	LOR	Unit	Result				
EP231C: Perfluoroalkyl Sulfonamides (QCLot: 4899191) - continued								
EP231X: N-Ethyl perfluorooctane sulfonamidoethanol (EtFOSE)	1691-99-2	0.05	µg/L	<0.05	0.625 µg/L	120	57.6	145
EP231X: N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)	2355-31-9	0.02	µg/L	<0.02	0.25 µg/L	125	65.0	136
EP231X: N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)	2991-50-6	0.02	µg/L	<0.02	0.25 µg/L	105	61.0	135
EP231D: (n:2) Fluorotelomer Sulfonic Acids (QCLot: 4899191)								
EP231X: 4:2 Fluorotelomer sulfonic acid (4:2 FTS)	757124-72-4	0.05	µg/L	<0.05	0.25 µg/L	120	63.0	143
EP231X: 6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	0.05	µg/L	<0.05	0.25 µg/L	128	64.0	140
EP231X: 8:2 Fluorotelomer sulfonic acid (8:2 FTS)	39108-34-4	0.05	µg/L	<0.05	0.25 µg/L	112	67.0	138
EP231X: 10:2 Fluorotelomer sulfonic acid (10:2 FTS)	120226-60-0	0.05	µg/L	<0.05	0.25 µg/L	121	71.4	144

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**

Sub-Matrix: WATER				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 4895468)							
ES2306043-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	103	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 4895469)							
ES2306043-001	Anonymous	ED045G: Chloride	16887-00-6	50 mg/L	86.0	70.0	130
EG020T: Total Metals by ICP-MS (QCLot: 4893554)							
ES2305796-002	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	90.1	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	90.8	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	90.6	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	89.3	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	99.2	70.0	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	88.6	70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	87.3	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 4897409)							
ES2305985-001	Anonymous	EG035F: Mercury	7439-97-6	0.01 mg/L	94.1	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 4897426)							
ES2305796-002	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	99.0	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 4898578)							
ES2305185-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	110	70.0	130

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 Work Order : ES2306051
 Client : SLR CONSULTING AUSTRALIA PTY LTD
 Project : 680.30105.00100 - LSC waste transfer facilities SW monitoring



Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK057G: Nitrite as N by Discrete Analyser (QCLot: 4895467)							
ES2306043-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	103	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 4898579)							
ES2305185-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	97.7	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 4898570)							
ES2305185-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	89.7	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 4898569)							
ES2305185-002	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	101	70.0	130
EP005: Total Organic Carbon (TOC) (QCLot: 4899301)							
ES2305895-002	Anonymous	EP005: Total Organic Carbon	----	100 mg/L	98.8	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 4897584)							
EB2305073-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	118	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 4897584)							
EB2305073-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	115	70.0	130
EP080: BTEXN (QCLot: 4897584)							
EB2305073-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	98.5	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	109	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	108	70.0	130
		EP080: meta- & para-Xylene	108-38-3	25 µg/L	106	70.0	130
			106-42-3				
		EP080: ortho-Xylene	95-47-6	25 µg/L	108	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	97.0	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: ES2306051	Page	: 1 of 11
Client	: SLR CONSULTING AUSTRALIA PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: EMMANUELLE ALIOTTI	Telephone	: +61-2-8784 8555
Project	: 680.30105.00100 - LSC waste transfer facilities SW monitoring	Date Samples Received	: 24-Feb-2023
Site	: Litchfield Council	Issue Date	: 06-Mar-2023
Sampler	: ----	No. of samples received	: 3
Order number	: ----	No. of samples analysed	: 3

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.
- **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.



Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method		Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural							
HS, HD,		----	----	----	24-Feb-2023	23-Feb-2023	1
D1							
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural							
HS, HD,		----	----	----	27-Feb-2023	25-Feb-2023	2
D1							
EP025: Oxygen - Dissolved (DO)							
Clear Plastic Bottle - Natural							
HS, HD,		----	----	----	24-Feb-2023	23-Feb-2023	1
D1							

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	18	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	9	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)					
Conductivity by Auto Titrator	4	51	7.84	8.33	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
Dissolved Metals by ICP-MS - Suite A	0	16	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	0	18	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	9	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 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**

Evaluation: ✖ = Holding time breach ; ✔ = Within 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



Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within 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
EA005P: pH by PC Titrator								
Clear Plastic Bottle - Natural (EA005-P) HS, D1	HD,	23-Feb-2023	----	----	----	24-Feb-2023	23-Feb-2023	✖
EA010P: Conductivity by PC Titrator								
Clear Plastic Bottle - Natural (EA010-P) HS, D1	HD,	23-Feb-2023	----	----	----	24-Feb-2023	23-Mar-2023	✔
EA045: Turbidity								
Clear Plastic Bottle - Natural (EA045) HS, D1	HD,	23-Feb-2023	----	----	----	24-Feb-2023	25-Feb-2023	✔
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P) HS, D1	HD,	23-Feb-2023	----	----	----	24-Feb-2023	09-Mar-2023	✔
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G) HS, D1	HD,	23-Feb-2023	----	----	----	27-Feb-2023	23-Mar-2023	✔
ED045G: Chloride by Discrete Analyser								
Clear Plastic Bottle - Natural (ED045G) HS, D1	HD,	23-Feb-2023	----	----	----	27-Feb-2023	23-Mar-2023	✔
ED093F: Dissolved Major Cations								
Clear Plastic Bottle - Filtered; Lab-acidified (ED093F) HS, D1	HD,	23-Feb-2023	----	----	----	28-Feb-2023	23-Mar-2023	✔
EG020F: Dissolved Metals by ICP-MS								
Clear Plastic Bottle - Filtered; Lab-acidified (EG020A-F) HS, D1	HD,	23-Feb-2023	----	----	----	28-Feb-2023	22-Aug-2023	✔
EG020T: Total Metals by ICP-MS								
Clear Plastic Bottle - Unspecified; Lab-acidified (EG020A-T) HS, D1	HD,	23-Feb-2023	24-Feb-2023	22-Aug-2023	✔	24-Feb-2023	22-Aug-2023	✔
EG035F: Dissolved Mercury by FIMS								
Clear Plastic Bottle - Filtered; Lab-acidified (EG035F) HS, D1	HD,	23-Feb-2023	----	----	----	01-Mar-2023	23-Mar-2023	✔



Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within 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	
EG035T: Total Recoverable Mercury by FIMS								
Clear Plastic Bottle - Unspecified; Lab-acidified (EG035T) HS, D1	HD,	23-Feb-2023	----	----	----	01-Mar-2023	23-Mar-2023	✓
EK055G: Ammonia as N by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK055G) HS, D1	HD,	23-Feb-2023	----	----	----	01-Mar-2023	23-Mar-2023	✓
EK057G: Nitrite as N by Discrete Analyser								
Clear Plastic Bottle - Natural (EK057G) HS, D1	HD,	23-Feb-2023	----	----	----	27-Feb-2023	25-Feb-2023	✗
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G) HS, D1	HD,	23-Feb-2023	----	----	----	01-Mar-2023	23-Mar-2023	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK061G) HS, D1	HD,	23-Feb-2023	28-Feb-2023	23-Mar-2023	✓	01-Mar-2023	23-Mar-2023	✓
EK067G: Total Phosphorus as P by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK067G) HS, D1	HD,	23-Feb-2023	28-Feb-2023	23-Mar-2023	✓	01-Mar-2023	23-Mar-2023	✓
EP005: Total Organic Carbon (TOC)								
Amber TOC Vial - Sulfuric Acid (EP005) HS, D1	HD,	23-Feb-2023	----	----	----	01-Mar-2023	23-Mar-2023	✓
EP025: Oxygen - Dissolved (DO)								
Clear Plastic Bottle - Natural (EP025) HS, D1	HD,	23-Feb-2023	----	----	----	24-Feb-2023	23-Feb-2023	✗
EP030: Biochemical Oxygen Demand (BOD)								
Clear Plastic Bottle - Natural (EP030) HS, D1	HD,	23-Feb-2023	----	----	----	24-Feb-2023	25-Feb-2023	✓



Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within 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
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071) HS, D1	HD,	23-Feb-2023	28-Feb-2023	02-Mar-2023	✓	01-Mar-2023	09-Apr-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) HS, D1	HD,	23-Feb-2023	28-Feb-2023	09-Mar-2023	✓	28-Feb-2023	09-Mar-2023	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071) HS, D1	HD,	23-Feb-2023	28-Feb-2023	02-Mar-2023	✓	01-Mar-2023	09-Apr-2023	✓
Amber VOC Vial - Sulfuric Acid (EP080) HS, D1	HD,	23-Feb-2023	28-Feb-2023	09-Mar-2023	✓	28-Feb-2023	09-Mar-2023	✓
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080) HS, D1	HD,	23-Feb-2023	28-Feb-2023	09-Mar-2023	✓	28-Feb-2023	09-Mar-2023	✓
EP231A: Perfluoroalkyl Sulfonic Acids								
HDPE (no PTFE) (EP231X) HS, D1	HD,	23-Feb-2023	28-Feb-2023	22-Aug-2023	✓	01-Mar-2023	22-Aug-2023	✓
EP231B: Perfluoroalkyl Carboxylic Acids								
HDPE (no PTFE) (EP231X) HS, D1	HD,	23-Feb-2023	28-Feb-2023	22-Aug-2023	✓	01-Mar-2023	22-Aug-2023	✓
EP231C: Perfluoroalkyl Sulfonamides								
HDPE (no PTFE) (EP231X) HS, D1	HD,	23-Feb-2023	28-Feb-2023	22-Aug-2023	✓	01-Mar-2023	22-Aug-2023	✓
EP231D: (n:2) Fluorotelomer Sulfonic Acids								
HDPE (no PTFE) (EP231X) HS, D1	HD,	23-Feb-2023	28-Feb-2023	22-Aug-2023	✓	01-Mar-2023	22-Aug-2023	✓
EP231P: PFAS Sums								
HDPE (no PTFE) (EP231X) HS, D1	HD,	23-Feb-2023	28-Feb-2023	22-Aug-2023	✓	01-Mar-2023	22-Aug-2023	✓
MW006: Faecal Coliforms & E.coli by MF								
Sterile Plastic Bottle - Sodium Thiosulfate (MW006) HS, D1	HD,	23-Feb-2023	----	----	----	24-Feb-2023	24-Feb-2023	✓



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: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by Auto Titrator	ED037-P	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Biochemical Oxygen Demand (BOD)	EP030	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	6	51	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	17	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	16	12.50	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	16	12.50	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	18	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	12	16.67	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	9	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	18	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	4	40	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by Auto Titrator	ED037-P	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Biochemical Oxygen Demand (BOD)	EP030	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	4	51	7.84	8.33	✖	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
pH by Auto Titrator	EA005-P	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	20	15.00	15.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)		Quality Control Specification	
Analytical Methods	Method	QC	Regular	Actual	Expected		Evaluation
Laboratory Control Samples (LCS) - Continued							
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	3	19	15.79	15.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	9	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Biochemical Oxygen Demand (BOD)	EP030	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by Auto Titrator	EA010-P	1	51	1.96	1.67	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	9	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Turbidity	EA045	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	0	16	0.00	5.00	✗	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	0	18	0.00	5.00	✗	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Organic Carbon	EP005	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard

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 Work Order : ES2306051
 Client : SLR CONSULTING AUSTRALIA PTY LTD
 Project : 680.30105.00100 - LSC waste transfer facilities SW monitoring



Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Matrix Spikes (MS) - Continued							
Total Phosphorus as P By Discrete Analyser	EK067G	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	9	0.00	5.00	✗	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard



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
pH by Auto Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM Schedule B(3)
Conductivity by Auto Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM Schedule B(3)
Calculated TDS (from Electrical Conductivity)	EA016	WATER	In house: Calculation from Electrical Conductivity (APHA 2510 B) using a conversion factor specified in the analytical report. This method is compliant with NEPM Schedule B(3)
Turbidity	EA045	WATER	In house: Referenced to APHA 2130 B. This method is compliant with NEPM Schedule B(3)
Alkalinity by Auto Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO ₄ 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO ₄ . Dissolved sulfate is determined in a 0.45µm filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO ₄ suspension is measured by a photometer and the SO ₄ -2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm.
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
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 APHA 3112 Hg - B (Flow-injection (SnCl ₂)(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 SnCl ₂ 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).



Analytical Methods	Method	Matrix	Method Descriptions
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to APHA 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ 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).
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH ₃ G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO ₂ - B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO ₃ - F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NO _x) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO ₃ - F. Combined oxidised Nitrogen (NO ₂ +NO ₃) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO ₃ -. This method is compliant with NEPM Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al, Zhang et al. This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO ₄ DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
Total Organic Carbon	EP005	WATER	In house: Referenced to APHA 5310 B, The automated TOC analyzer determines Total and Inorganic Carbon by IR cell. TOC is calculated as the difference. This method is compliant with NEPM Schedule B(3)
Oxygen - Dissolved	EP025	WATER	In house: Referenced to APHA 4500-O G. Dissolved Oxygen Probe. This method is compliant with NEPM Schedule B(3)
Biochemical Oxygen Demand (BOD)	EP030	WATER	In house: Referenced to APHA 5210 B. The 5-Day BOD test provides an empirical measure of the oxygen consumption capacity of a given water. A portion of the sample is diluted into oxygenated, nutrient rich water, and a seed added to begin biological decay. The initial dissolved oxygen content is measured, then the bottle is sealed and incubated for five days. The remaining dissolved oxygen is measured, and from the difference, the demand for oxygen, by biological decay, is determined. This method is compliant with NEPM Schedule B(3).
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM Schedule B(3)



Analytical Methods	Method	Matrix	Method Descriptions
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM Schedule B(3)
Per- and Polyfluoroalkyl Substances (PFAS) by LCMSMS	EP231X	WATER	In-house: Analysis of fresh and saline waters by Solid Phase Extraction (SPE) followed by LC-Electrospray-MS-MS, Negative Mode using MRM and internal standard quantitation. Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures and data quality objectives conform to US DoD QSM 5.3, table B-15 requirements.
Thermotolerant Coliforms & E.coli by Membrane Filtration	MW006	WATER	AS 4276.7
Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)
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)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.
Solid Phase Extraction (SPE) for PFAS in water	ORG72	WATER	In-house: Isotopically labelled analogues of target analytes used as internal standards and surrogates are added to the sample container. The entire contents are transferred to a solid phase extraction (SPE) cartridge. The sample container is successively rinsed with aliquots of the elution solvent. The eluted extract is combined with an equal volume of reagent water and a portion is filtered for analysis. Method procedures conform to US DoD QSM 5.3, table B-15 requirements.