



CERTIFICATE OF ANALYSIS

Work Order	: ES2421744	Page	: 1 of 9
Client	: Department of Climate Change, Energy, the Environment and Water	Laboratory	: Environmental Division Sydney
Contact	: [REDACTED]	Contact	: Customer Services ES
Address	: [REDACTED]	Address	: [REDACTED]
Telephone	: [REDACTED]	Telephone	: [REDACTED]
Project	: Darling Baaka River Health Program	Date Samples Received	: 02-Jul-2024 15:30
Order number	: [REDACTED]	Date Analysis Commenced	: 02-Jul-2024
C-O-C number	: [REDACTED]	Issue Date	: 09-Jul-2024 20:32
Sampler	: [REDACTED]		
Site	: [REDACTED]		
Quote number	: ES24DEPENWAT0001		
No. of samples received	: 32		
No. of samples analysed	: 32		



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

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, 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
[REDACTED]	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW

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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

∅ = ALS is not NATA accredited for these tests.

~ = Indicates an estimated value.

- EK271A-CM: Samples for Ultra-Trace Reactive Phosphorus by FIA should be frozen upon sampling. If not, low-level results (below 0.01 mg/L) may bias low.
- EK262PA-CM/EK262PA-F-CM: It is recognised that Total Nitrogen is less than Dissolved Total Nitrogen for various samples. However, the difference is confirmed from their respective bottles.
- EK267PA-F-CM/EK271A-CM: It has been noted that Reactive Phosphorus is greater than Dissolved Total Phosphorus on samples 3 & 22, however this difference is within the limits of experimental variation.

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Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DBRH-Z-01	DBRH-Z-02	DBRH-Z-03	DBRH-Z-04	DBRH-Z-05
Sampling date / time				24-Jun-2024 00:00	24-Jun-2024 00:00	24-Jun-2024 00:00	27-Jun-2024 00:00	27-Jun-2024 00:00	
Compound	CAS Number	LOR	Unit	ES2421744-001	ES2421744-002	ES2421744-003	ES2421744-004	ES2421744-005	
				Result	Result	Result	Result	Result	
ED040F: Dissolved Major Anions									
Sulfate as SO4 2-	14808-79-8	1	mg/L	11	11	10	12	10	
Sulfur as S	63705-05-5	1	mg/L	4	4	3	4	3	
Silicon as SiO2	14464-46-1	0.1	mg/L	17.2	17.0	17.5	18.2	17.0	
Silicon	7440-21-3	0.05	mg/L	8.04	7.92	8.15	8.50	7.96	
EK255A: Ammonia									
Ammonia as N	7664-41-7	0.005	mg/L	0.012	0.019	0.007	0.028	0.010	
EK257A: Nitrite									
Nitrite as N	14797-65-0	0.002	mg/L	0.002	0.002	0.004	0.004	<0.002	
EK258A: Nitrate									
Nitrate as N	14797-55-8	0.002	mg/L	0.659	0.613	0.613	0.640	0.572	
EK259A: Nitrite and Nitrate (NOx)									
Nitrite + Nitrate as N	----	0.002	mg/L	0.661	0.615	0.617	0.644	0.572	
EK261A: Total Kjeldahl Nitrogen									
Total Kjeldahl Nitrogen as N	----	0.01	mg/L	0.84	0.88	0.89	0.86	0.88	
EK262A: Total Nitrogen									
Dissolved Total Nitrogen as N	----	0.01	mg/L	3.26	1.44	1.33	1.25	1.29	
Total Nitrogen as N	----	0.01	mg/L	1.50	1.49	1.51	1.50	1.45	
EK267A: Total Phosphorus (Persulfate Digestion)									
Dissolved Total Phosphorus as P	----	0.005	mg/L	0.206	0.207	0.202	0.214	0.206	
Total Phosphorus as P	----	0.005	mg/L	0.454	0.452	0.466	0.479	0.467	
EK271A: Reactive Phosphorus									
Reactive Phosphorus as P	14265-44-2	0.001	mg/L	0.200	0.204	0.203	0.212	0.206	

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Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DBRH-Z-06	DBRH-Z-07	DBRH-Z-08	DBRH-Z-09	DBRH-Z-10
Sampling date / time				27-Jun-2024 00:00	26-Jun-2024 00:00	26-Jun-2024 00:00	25-Jun-2024 00:00	21-Jun-2024 00:00	
Compound	CAS Number	LOR	Unit	ES2421744-006	ES2421744-007	ES2421744-008	ES2421744-009	ES2421744-010	
				Result	Result	Result	Result	Result	
ED040F: Dissolved Major Anions									
Sulfate as SO4 2-	14808-79-8	1	mg/L	8	8	7	11	13	
Sulfur as S	63705-05-5	1	mg/L	3	2	2	4	4	
Silicon as SiO2	14464-46-1	0.1	mg/L	17.8	13.3	18.3	18.2	15.5	
Silicon	7440-21-3	0.05	mg/L	8.33	6.20	8.55	8.48	7.22	
EK255A: Ammonia									
Ammonia as N	7664-41-7	0.005	mg/L	0.013	0.008	0.012	0.026	0.032	
EK257A: Nitrite									
Nitrite as N	14797-65-0	0.002	mg/L	0.003	0.003	0.003	0.069	0.005	
EK258A: Nitrate									
Nitrate as N	14797-55-8	0.002	mg/L	0.555	0.619	0.584	0.908	0.644	
EK259A: Nitrite and Nitrate (NOx)									
Nitrite + Nitrate as N	----	0.002	mg/L	0.558	0.622	0.587	0.977	0.649	
EK261A: Total Kjeldahl Nitrogen									
Total Kjeldahl Nitrogen as N	----	0.01	mg/L	0.86	0.85	0.98	0.58	1.04	
EK262A: Total Nitrogen									
Dissolved Total Nitrogen as N	----	0.01	mg/L	1.32	1.37	1.38	2.51	1.59	
Total Nitrogen as N	----	0.01	mg/L	1.42	1.47	1.57	1.56	1.69	
EK267A: Total Phosphorus (Persulfate Digestion)									
Dissolved Total Phosphorus as P	----	0.005	mg/L	0.203	0.205	0.204	0.218	0.171	
Total Phosphorus as P	----	0.005	mg/L	0.411	0.424	0.434	0.460	0.426	
EK271A: Reactive Phosphorus									
Reactive Phosphorus as P	14265-44-2	0.001	mg/L	0.202	0.201	0.194	0.217	0.168	

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Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DBRH-Z-11	DBRH-Z-12	DBRH-Z-13	DBRH-Z-14	DBRH-Z-15
Sampling date / time				21-Jun-2024 00:00					
Compound	CAS Number	LOR	Unit	ES2421744-011	ES2421744-012	ES2421744-013	ES2421744-014	ES2421744-015	
				Result	Result	Result	Result	Result	
ED040F: Dissolved Major Anions									
Sulfate as SO4 2-	14808-79-8	1	mg/L	14	15	12	14	13	
Sulfur as S	63705-05-5	1	mg/L	5	5	4	5	4	
Silicon as SiO2	14464-46-1	0.1	mg/L	16.0	15.7	16.4	15.6	14.9	
Silicon	7440-21-3	0.05	mg/L	7.46	7.34	7.66	7.30	6.96	
EK255A: Ammonia									
Ammonia as N	7664-41-7	0.005	mg/L	0.038	0.012	0.016	0.079	0.020	
EK257A: Nitrite									
Nitrite as N	14797-65-0	0.002	mg/L	<0.002	0.003	<0.002	0.003	<0.002	
EK258A: Nitrate									
Nitrate as N	14797-55-8	0.002	mg/L	0.306	0.692	0.739	0.729	0.734	
EK259A: Nitrite and Nitrate (NOx)									
Nitrite + Nitrate as N	----	0.002	mg/L	0.306	0.695	0.739	0.732	0.734	
EK261A: Total Kjeldahl Nitrogen									
Total Kjeldahl Nitrogen as N	----	0.01	mg/L	1.09	0.94	0.88	0.90	0.93	
EK262A: Total Nitrogen									
Dissolved Total Nitrogen as N	----	0.01	mg/L	0.78	1.33	1.46	1.54	1.44	
Total Nitrogen as N	----	0.01	mg/L	1.40	1.63	1.62	1.63	1.66	
EK267A: Total Phosphorus (Persulfate Digestion)									
Dissolved Total Phosphorus as P	----	0.005	mg/L	0.149	0.152	0.167	0.156	0.151	
Total Phosphorus as P	----	0.005	mg/L	0.421	0.402	0.428	0.322	0.355	
EK271A: Reactive Phosphorus									
Reactive Phosphorus as P	14265-44-2	0.001	mg/L	0.126	0.134	0.146	0.147	0.143	

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Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DBRH-Z-16	DBRH-Z-17	DBRH-Z-18	DBRH-Z-19	DBRH-Z-20
Sampling date / time				21-Jun-2024 00:00	20-Jun-2024 00:00	20-Jun-2024 00:00	20-Jun-2024 00:00	20-Jun-2024 00:00	
Compound	CAS Number	LOR	Unit	ES2421744-016	ES2421744-017	ES2421744-018	ES2421744-019	ES2421744-020	
				Result	Result	Result	Result	Result	
ED040F: Dissolved Major Anions									
Sulfate as SO4 2-	14808-79-8	1	mg/L	14	14	15	14	12	
Sulfur as S	63705-05-5	1	mg/L	5	5	5	4	4	
Silicon as SiO2	14464-46-1	0.1	mg/L	16.5	15.4	15.3	16.3	15.4	
Silicon	7440-21-3	0.05	mg/L	7.69	7.17	7.14	7.60	7.19	
EK255A: Ammonia									
Ammonia as N	7664-41-7	0.005	mg/L	0.028	0.017	0.014	0.020	0.021	
EK257A: Nitrite									
Nitrite as N	14797-65-0	0.002	mg/L	0.004	<0.002	<0.002	<0.002	<0.002	
EK258A: Nitrate									
Nitrate as N	14797-55-8	0.002	mg/L	0.740	0.772	0.792	0.828	0.815	
EK259A: Nitrite and Nitrate (NOx)									
Nitrite + Nitrate as N	----	0.002	mg/L	0.744	0.772	0.792	0.828	0.815	
EK261A: Total Kjeldahl Nitrogen									
Total Kjeldahl Nitrogen as N	----	0.01	mg/L	1.06	0.99	0.89	0.94	0.94	
EK262A: Total Nitrogen									
Dissolved Total Nitrogen as N	----	0.01	mg/L	1.07	1.52	1.50	1.61	1.55	
Total Nitrogen as N	----	0.01	mg/L	1.80	1.76	1.68	1.77	1.75	
EK267A: Total Phosphorus (Persulfate Digestion)									
Dissolved Total Phosphorus as P	----	0.005	mg/L	0.147	0.156	0.153	0.154	0.160	
Total Phosphorus as P	----	0.005	mg/L	0.409	0.292	0.413	0.469	0.492	
EK271A: Reactive Phosphorus									
Reactive Phosphorus as P	14265-44-2	0.001	mg/L	0.145	0.151	0.146	0.154	0.154	

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Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DBRH-Z-21	DBRH-Z-22	DBRH-Z-23	DBRH-Z-24	DBRH-Z-25
Sampling date / time				19-Jun-2024 00:00	19-Jun-2024 00:00	19-Jun-2024 00:00	19-Jun-2024 00:00	24-Jun-2024 00:00	
Compound	CAS Number	LOR	Unit	ES2421744-021	ES2421744-022	ES2421744-023	ES2421744-024	ES2421744-025	
				Result	Result	Result	Result	Result	
ED040F: Dissolved Major Anions									
Sulfate as SO4 2-	14808-79-8	1	mg/L	14	14	12	14	16	
Sulfur as S	63705-05-5	1	mg/L	5	5	4	5	6	
Silicon as SiO2	14464-46-1	0.1	mg/L	14.6	15.8	15.9	1.1	1.2	
Silicon	7440-21-3	0.05	mg/L	6.83	7.36	7.40	0.52	0.55	
EK255A: Ammonia									
Ammonia as N	7664-41-7	0.005	mg/L	0.018	0.019	0.033	0.017	0.017	
EK257A: Nitrite									
Nitrite as N	14797-65-0	0.002	mg/L	0.002	<0.002	<0.002	<0.002	<0.002	
EK258A: Nitrate									
Nitrate as N	14797-55-8	0.002	mg/L	0.884	0.923	1.14	0.008	0.010	
EK259A: Nitrite and Nitrate (NOx)									
Nitrite + Nitrate as N	----	0.002	mg/L	0.886	0.923	1.14	0.008	0.010	
EK261A: Total Kjeldahl Nitrogen									
Total Kjeldahl Nitrogen as N	----	0.01	mg/L	0.95	1.04	0.69	1.88	1.46	
EK262A: Total Nitrogen									
Dissolved Total Nitrogen as N	----	0.01	mg/L	1.60	1.71	1.87	1.06	1.03	
Total Nitrogen as N	----	0.01	mg/L	1.84	1.96	1.83	1.89	1.47	
EK267A: Total Phosphorus (Persulfate Digestion)									
Dissolved Total Phosphorus as P	----	0.005	mg/L	0.162	0.150	0.160	0.023	0.021	
Total Phosphorus as P	----	0.005	mg/L	0.537	0.556	0.524	0.154	0.112	
EK271A: Reactive Phosphorus									
Reactive Phosphorus as P	14265-44-2	0.001	mg/L	0.154	0.154	0.155	0.006	0.002	

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Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DBRH-Z-26	DBRH-Z-29	DBRH-Z-30	DBRH-Z-31	DBRH-Z-B1
Sampling date / time				19-Jun-2024 00:00	19-Jun-2024 00:00	19-Jun-2024 00:00	19-Jun-2024 00:00	21-Jun-2024 00:00	
Compound	CAS Number	LOR	Unit	ES2421744-026	ES2421744-027	ES2421744-028	ES2421744-029	ES2421744-030	
				Result	Result	Result	Result	Result	
ED040F: Dissolved Major Anions									
Sulfate as SO4 2-	14808-79-8	1	mg/L	17	17	16	17	12	
Sulfur as S	63705-05-5	1	mg/L	6	6	5	6	4	
Silicon as SiO2	14464-46-1	0.1	mg/L	1.0	8.6	8.9	2.3	15.7	
Silicon	7440-21-3	0.05	mg/L	0.45	4.02	4.16	1.06	7.35	
EK255A: Ammonia									
Ammonia as N	7664-41-7	0.005	mg/L	0.041	0.156	0.249	0.024	0.030	
EK257A: Nitrite									
Nitrite as N	14797-65-0	0.002	mg/L	<0.002	0.008	0.016	<0.002	0.003	
EK258A: Nitrate									
Nitrate as N	14797-55-8	0.002	mg/L	0.008	0.034	0.032	0.020	0.594	
EK259A: Nitrite and Nitrate (NOx)									
Nitrite + Nitrate as N	----	0.002	mg/L	0.008	0.042	0.048	0.020	0.597	
EK261A: Total Kjeldahl Nitrogen									
Total Kjeldahl Nitrogen as N	----	0.01	mg/L	1.43	1.59	1.34	1.12	0.98	
EK262A: Total Nitrogen									
Dissolved Total Nitrogen as N	----	0.01	mg/L	1.34	1.46	1.28	1.04	1.29	
Total Nitrogen as N	----	0.01	mg/L	1.44	1.63	1.39	1.14	1.58	
EK267A: Total Phosphorus (Persulfate Digestion)									
Dissolved Total Phosphorus as P	----	0.005	mg/L	0.033	0.067	0.091	0.012	0.160	
Total Phosphorus as P	----	0.005	mg/L	0.146	0.205	0.222	0.129	0.435	
EK271A: Reactive Phosphorus									
Reactive Phosphorus as P	14265-44-2	0.001	mg/L	0.004	0.044	0.055	0.006	0.139	

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Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	DBRH-Z-B2	DBRH-Z-B3	----	----	----
Sampling date / time				21-Jun-2024 00:00	20-Jun-2024 00:00	----	----	----	
Compound	CAS Number	LOR	Unit	ES2421744-031	ES2421744-032	-----	-----	-----	
				Result	Result	----	----	----	
ED040F: Dissolved Major Anions									
Sulfate as SO4 2-	14808-79-8	1	mg/L	13	18	----	----	----	
Sulfur as S	63705-05-5	1	mg/L	4	6	----	----	----	
Silicon as SiO2	14464-46-1	0.1	mg/L	17.2	9.2	----	----	----	
Silicon	7440-21-3	0.05	mg/L	8.01	4.31	----	----	----	
EK255A: Ammonia									
Ammonia as N	7664-41-7	0.005	mg/L	0.033	1.49	----	----	----	
EK257A: Nitrite									
Nitrite as N	14797-65-0	0.002	mg/L	0.004	0.014	----	----	----	
EK258A: Nitrate									
Nitrate as N	14797-55-8	0.002	mg/L	0.650	0.050	----	----	----	
EK259A: Nitrite and Nitrate (NOx)									
Nitrite + Nitrate as N	----	0.002	mg/L	0.654	0.064	----	----	----	
EK261A: Total Kjeldahl Nitrogen									
Total Kjeldahl Nitrogen as N	----	0.01	mg/L	0.95	4.55	----	----	----	
EK262A: Total Nitrogen									
Dissolved Total Nitrogen as N	----	0.01	mg/L	1.42	3.05	----	----	----	
Total Nitrogen as N	----	0.01	mg/L	1.60	4.61	----	----	----	
EK267A: Total Phosphorus (Persulfate Digestion)									
Dissolved Total Phosphorus as P	----	0.005	mg/L	0.162	0.221	----	----	----	
Total Phosphorus as P	----	0.005	mg/L	0.456	0.473	----	----	----	
EK271A: Reactive Phosphorus									
Reactive Phosphorus as P	14265-44-2	0.001	mg/L	0.140	0.189	----	----	----	