

CERTIFICATE OF ANALYSIS

Work Order : **EW2202426**
Client : **KIAMA COUNCIL**
Contact : MR PAUL CZULOWSKI
Address : 11 MANNING STREET
 KIAMA NSW, AUSTRALIA 2533
Telephone : +61 02 4232 0444
Project : Gerroa Landfill
Order number : PO00011917
C-O-C number : ----
Sampler : Robert DaLio
Site : Gerroa Landfill
Quote number : WO/010/2021
No. of samples received : 17
No. of samples analysed : 17

Page : 1 of 7
Laboratory : Environmental Division NSW South Coast
Contact : Aneta Prosaroski
Address : 1/19 Ralph Black Dr, North Wollongong 2500 NSW Australia
Telephone : +61 2 4225 3125
Date Samples Received : 26-May-2022 15:35
Date Analysis Commenced : 26-May-2022
Issue Date : 02-Jun-2022 17:48



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.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Aneta Prosaroski	Client Liaison Officer	Laboratory - Wollongong, NSW
Ankit Joshi	Senior Chemist - Inorganics	Sydney Inorganics, Smithfield, NSW
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, 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.

- **Analytical work for this work order will be conducted at ALS Sydney.**
- EK059G: LOR raised for NOx due to sample matrix.
- EK057G: LOR raised for Nitrite due to sample matrix.
- TDS by method EA-015 may bias high for various samples due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- pH performed by ALS Wollongong via in-house method EA005FD and EN67 PK.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Sampling and groundwater depth measurements completed by ALS Wollongong via inhouse sampling method EN/67.11 Groundwater Sampling Via High Flow Method.
- Sampling completed by ALS Wollongong in accordance with in-house sampling method EN/67.6 Rivers and Streams.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EA025FD and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW1D	MW1S	MW3	MW4	MW5
Sampling date / time				26-May-2022 11:05	26-May-2022 10:55	26-May-2022 10:40	26-May-2022 11:15	26-May-2022 10:25	
Compound	CAS Number	LOR	Unit	EW2202426-001	EW2202426-002	EW2202426-003	EW2202426-004	EW2202426-005	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	7.5	6.1	7.5	7.0	7.8	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	458	104	629	390	363	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	233	82	314	217	194	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	200	35	133	172	156	
Total Alkalinity as CaCO3	----	1	mg/L	200	35	133	172	156	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.89	0.09	1.32	0.04	0.05	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.3	0.6	2.4	0.6	0.4	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	1.3	0.6	2.4	0.6	0.4	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.17	0.22	0.55	0.80	0.05	
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L	0.72	0.55	0.79	0.59	0.54	
FWI-EN/001: Groundwater Sampling - Depth									
Depth	----	0.01	m	1.89	1.94	2.16	2.60	2.84	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW6D	MW6S	MW7D	MW7S	MW9
Sampling date / time				26-May-2022 09:45	26-May-2022 09:35	26-May-2022 10:10	26-May-2022 09:55	26-May-2022 12:50	
Compound	CAS Number	LOR	Unit	EW2202426-006	EW2202426-007	EW2202426-008	EW2202426-009	EW2202426-010	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	7.0	6.0	7.0	6.6	7.1	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	1570	224	1050	261	626	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	994	108	515	133	384	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	536	81	337	89	150	
Total Alkalinity as CaCO3	----	1	mg/L	536	81	337	89	150	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	30.0	<0.01	4.66	0.02	0.07	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	0.07	<0.01	<0.01	0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.08	<0.01	<0.01	0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	33.6	0.4	5.5	0.4	1.7	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	33.6	0.5	5.5	0.4	1.7	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	2.80	0.04	0.79	0.14	0.23	
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L	0.48	1.29	0.51	3.10	5.58	
FWI-EN/001: Groundwater Sampling - Depth									
Depth	----	0.01	m	3.68	3.42	3.46	3.27	1.37	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW10	MW11	ML-1	ML-2	ML-3
Sampling date / time				26-May-2022 13:00	26-May-2022 12:45	26-May-2022 12:10	26-May-2022 13:25	26-May-2022 12:15	
Compound	CAS Number	LOR	Unit	EW2202426-011	EW2202426-012	EW2202426-013	EW2202426-014	EW2202426-015	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	5.8	6.4	6.6	6.7	6.6	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	133	271	334	564	328	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	267	204	210	311	207	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	27	84	34	46	33	
Total Alkalinity as CaCO3	----	1	mg/L	27	84	34	46	33	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.13	0.07	0.33	0.07	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.10	<0.01	<0.01	0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.10	<0.01	0.02	0.01	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.10	<0.01	0.02	0.02	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	8.0	2.6	1.3	1.6	1.3	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	8.0	2.6	1.3	1.6	1.3	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.73	0.15	0.11	0.15	0.12	
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L	6.54	5.20	5.50	5.77	5.76	
FWI-EN/001: Groundwater Sampling - Depth									
Depth	----	0.01	m	1.76	1.78	----	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Sample ID		ML-4	ML-5	----	----	----
		Sampling date / time		26-May-2022 12:20	26-May-2022 12:45	----	----	----
Compound	CAS Number	LOR	Unit	EW2202426-016	EW2202426-017	-----	-----	-----
				Result	Result	----	----	----
EA005FD: Field pH								
pH	----	0.1	pH Unit	6.6	6.6	----	----	----
EA010FD: Field Conductivity								
Electrical Conductivity (Non Compensated)	----	1	µS/cm	331	381	----	----	----
EA015: Total Dissolved Solids dried at 180 ± 5 °C								
Total Dissolved Solids @180°C	----	10	mg/L	214	232	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	34	37	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	34	37	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.07	0.28	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	0.01	0.03	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.01	0.03	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.4	1.6	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	1.4	1.6	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.14	0.21	----	----	----
EP025FD: Field Dissolved Oxygen								
Dissolved Oxygen	----	0.01	mg/L	5.29	5.52	----	----	----



Inter-Laboratory Testing

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

(WATER) ED037P: Alkalinity by PC Titrator

(WATER) EK062G: Total Nitrogen as N (TKN + NO_x) by Discrete Analyser

(WATER) EK061G: Total Kjeldahl Nitrogen By Discrete Analyser

(WATER) EK059G: Nitrite plus Nitrate as N (NO_x) by Discrete Analyser

(WATER) EK058G: Nitrate as N by Discrete Analyser

(WATER) EK057G: Nitrite as N by Discrete Analyser

(WATER) EK055G: Ammonia as N by Discrete Analyser

(WATER) EK067G: Total Phosphorus as P by Discrete Analyser

(WATER) EA015: Total Dissolved Solids dried at 180 ± 5 °C