



CERTIFICATE OF ANALYSIS

Work Order : **EW2302166**
Client : **KIAMA COUNCIL**
Contact : **MS JULIE MILEVSKI**
Address : **11 MANNING STREET**
KIAMA NSW, AUSTRALIA 2533
Telephone : **+61 02 4232 0557**
Project : **Gerroa Landfill**
Order number :
C-O-C number : **----**
Sampler : **Michael Santos, Tom Roose**
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 : 12-May-2023 14:53
Date Analysis Commenced : 12-May-2023
Issue Date : 18-May-2023 15:58



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	Environmental Services Representative	Laboratory - Wollongong, NSW
Ankit Joshi	Senior Chemist - Inorganics	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.**
- TDS by method EA-015 may bias high for sample 2 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.
- Sampling and sample data supplied by ALS Wollongong.
- Electrical conductivity performed by ALS Wollongong via in-house method EA010FD and EN67 PK.
- Sampling completed as per FWI-EN001 Groundwater Sampling.
- Sampling and groundwater depth measurements completed by ALS Wollongong via inhouse sampling method EN/67.11 Groundwater Sampling Via High Flow and Bailer Method.
- Temperature performed by ALS Wollongong via in-house method EA116 and EN67 PK.
- Field tests completed on day of sampling/receipt.
- Dissolved oxygen (DO) performed by ALS Wollongong via in-house method EP025FD and EN67 PK.
- All field analysis performed by ALS Wollongong were completed at the time of sampling.
- Sample collection of Ground Waters by in-house EN67 where the "surface layer of the aquifer was sampled".



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW1D	MW1S	MW3	MW4	MW5
Sampling date / time				12-May-2023 11:37	12-May-2023 11:21	12-May-2023 11:12	12-May-2023 11:35	12-May-2023 11:00	
Compound	CAS Number	LOR	Unit	EW2302166-001	EW2302166-002	EW2302166-003	EW2302166-004	EW2302166-005	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	7.6	6.6	7.5	6.8	8.0	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	397	231	188	308	304	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	224	166	345	208	177	
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	189	50	261	136	116	
Total Alkalinity as CaCO3	----	1	mg/L	189	50	261	136	116	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.44	0.28	1.62	0.09	0.22	
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	0.20	<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	0.20	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.8	2.0	8.3	0.8	2.9	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.8	2.0	8.3	1.0	2.9	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.16	0.28	0.86	0.40	0.27	
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L	1.08	1.52	0.18	3.85	0.31	
FWI-EN/001: Groundwater Sampling - Depth									
Depth	----	0.01	m	3.14	3.80	3.52	5.50	4.02	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW6D	MW6S	MW7D	MW7S	MW9
Sampling date / time				12-May-2023 11:00	12-May-2023 00:00	12-May-2023 10:20	12-May-2023 10:00	12-May-2023 12:50	
Compound	CAS Number	LOR	Unit	EW2302166-006	EW2302166-007	EW2302166-008	EW2302166-009	EW2302166-010	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	7.6	----	7.3	6.7	6.8	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	1120	----	697	352	9100	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	536	----	320	232	5340	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	<1	<1	<1	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	<1	<1	<1	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	498	----	262	124	67	
Total Alkalinity as CaCO3	----	1	mg/L	498	----	262	124	67	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	25.3	----	4.59	<0.01	<0.01	
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	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	----	<0.01	<0.01	0.10	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	----	<0.01	<0.01	0.10	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	28.3	----	5.8	0.8	2.1	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	28.3	----	5.8	0.8	2.2	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	3.02	----	0.81	0.25	0.24	
EN67 PK: Field Tests									
Field Observations	----	0.01	--	----	DRY	----	----	----	
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L	0.02	----	0.20	2.08	4.65	
FWI-EN/001: Groundwater Sampling - Depth									
Depth	----	0.01	m	4.50	----	4.29	4.18	2.20	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW10	MW11	ML-1	ML-2	ML-3
Sampling date / time				12-May-2023 12:55	12-May-2023 12:35	12-May-2023 12:15	12-May-2023 12:06	12-May-2023 00:00	
Compound	CAS Number	LOR	Unit	EW2302166-011	EW2302166-012	EW2302166-013	EW2302166-014	EW2302166-015	
				Result	Result	Result	Result	Result	
EA005FD: Field pH									
pH	----	0.1	pH Unit	5.4	5.8	7.3	7.4	----	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	7510	10500	602	6640	----	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	4490	6710	300	3820	----	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	----	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	----	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	6	9	43	60	----	
Total Alkalinity as CaCO3	----	1	mg/L	6	9	43	60	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.08	0.11	0.09	0.51	----	
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	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	0.08	0.02	0.03	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.08	0.02	0.03	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	4.3	3.9	0.5	1.1	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	4.3	4.0	0.5	1.1	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.47	0.23	0.05	0.05	----	
EN67 PK: Field Tests									
Field Observations	----	0.01	--	----	----	----	----	NO SAFE ACCESS	
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L	4.81	4.50	4.57	6.12	----	
FWI-EN/001: Groundwater Sampling - Depth									
Depth	----	0.01	m	1.95	1.95	----	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	ML-4	ML-5	----	----	----
Sampling date / time				12-May-2023 12:20	12-May-2023 12:45	----	----	----	
Compound	CAS Number	LOR	Unit	EW2302166-016	EW2302166-017	-----	-----	-----	
				Result	Result	----	----	----	
EA005FD: Field pH									
pH	----	0.1	pH Unit	7.1	7.0	----	----	----	
EA010FD: Field Conductivity									
Electrical Conductivity (Non Compensated)	----	1	µS/cm	571	1910	----	----	----	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	335	963	----	----	----	
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	44	54	----	----	----	
Total Alkalinity as CaCO3	----	1	mg/L	44	54	----	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.08	0.38	----	----	----	
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	0.02	0.02	----	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.02	0.02	----	----	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.6	0.9	----	----	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.6	0.9	----	----	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.06	0.04	----	----	----	
EP025FD: Field Dissolved Oxygen									
Dissolved Oxygen	----	0.01	mg/L	3.83	4.16	----	----	----	



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 + NOx) by Discrete Analyser

(WATER) EK061G: Total Kjeldahl Nitrogen By Discrete Analyser

(WATER) EK059G: Nitrite plus Nitrate as N (NOx) 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