



CERTIFICATE OF ANALYSIS

Work Order : **ES2409457**
Client : **GOLDER ASSOCIATES**
Contact : **IVAN WARD**
Address : **LEVEL 8 40 MOUNT STREET**
NORTH SYDNEY NSW, AUSTRALIA 2065
Telephone : **----**
Project : **117623088**
Order number : **117623088**
C-O-C number : **----**
Sampler : **Grace Bendall-Pease**
Site : **Wetherill Park**
Quote number : **EN/000**
No. of samples received : **7**
No. of samples analysed : **7**

Page : 1 of 11
Laboratory : Environmental Division Sydney
Contact : Josh Alexander
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 22-Mar-2024 18:00
Date Analysis Commenced : 22-Mar-2024
Issue Date : 28-Mar-2024 21:19



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
Ivan Taylor	Analyst	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.

- EP074: Where reported, Total Trihalomethanes is the sum of the reported concentrations of all Trihalomethanes at or above the LOR.
- EP074: Where reported, Total Trimethylbenzenes is the sum of the reported concentrations of 1.2.3-Trimethylbenzene, 1.2.4-Trimethylbenzene and 1.3.5-Trimethylbenzene 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.
- EK040: Poor spike recovery for Fluoride due to matrix interferences
- EG020/ED093: Filtered results for samples ES2409457-#002, #006 and #007 have been confirmed by reanalysis.
- 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.
- ED045G: The presence of Thiocyanate, Thiosulfate and Sulfite can positively contribute to the chloride result, thereby may bias results higher than expected. Results should be scrutinised accordingly.



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	GW1	GW3	GW4	QC100	QC100A
Sampling date / time				21-Mar-2024 00:00	21-Mar-2024 00:00	21-Mar-2024 00:00	21-Mar-2024 00:00	21-Mar-2024 00:00	
Compound	CAS Number	LOR	Unit	ES2409457-001	ES2409457-002	ES2409457-003	ES2409457-006	ES2409457-007	
				Result	Result	Result	Result	Result	
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	355	698	954	569	714	
Total Alkalinity as CaCO3	----	1	mg/L	355	698	954	569	714	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	50	157	306	144	165	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	189	812	1560	827	870	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	105	21	10	22	20	
Magnesium	7439-95-4	1	mg/L	28	43	118	47	48	
Sodium	7440-23-5	1	mg/L	116	689	1380	716	790	
Potassium	7440-09-7	1	mg/L	12	3	13	3	3	
EG020F: Dissolved Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	0.344	0.171	0.933	0.194	0.084	
Iron	7439-89-6	0.05	mg/L	0.06	2.75	<0.05	2.73	0.91	
EG020T: Total Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	1.03	0.320	0.986	0.323	0.318	
Iron	7439-89-6	0.05	mg/L	1.41	9.01	0.69	10.3	8.54	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.4	0.8	0.6	0.8	0.8	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.30	1.04	0.37	1.05	1.05	
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	0.04	0.04	0.06	0.06	0.06	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Sample ID	GW1	GW3	GW4	QC100	QC100A
Sampling date / time					21-Mar-2024 00:00	21-Mar-2024 00:00	21-Mar-2024 00:00	21-Mar-2024 00:00	21-Mar-2024 00:00
Compound	CAS Number	LOR	Unit		ES2409457-001	ES2409457-002	ES2409457-003	ES2409457-006	ES2409457-007
					Result	Result	Result	Result	Result
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser - Continued									
Nitrite + Nitrate as N	----	0.01	mg/L		0.04	0.04	0.06	0.06	0.06
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L		13.5	40.1	69.4	37.7	42.2
∅ Total Cations	----	0.01	meq/L		12.9	34.6	70.6	36.2	39.4
∅ Ionic Balance	----	0.01	%		2.16	7.34	0.81	2.04	3.50
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		17	31	24	32	31
EP074D: Fumigants									
2,2-Dichloropropane	594-20-7	5	µg/L		<5	<5	<5	<5	<5
1,2-Dichloropropane	78-87-5	5	µg/L		<5	<5	<5	<5	<5
cis-1,3-Dichloropropylene	10061-01-5	5	µg/L		<5	<5	<5	<5	<5
trans-1,3-Dichloropropylene	10061-02-6	5	µg/L		<5	<5	<5	<5	<5
1,2-Dibromoethane (EDB)	106-93-4	5	µg/L		<5	<5	<5	<5	<5
EP074E: Halogenated Aliphatic Compounds									
Dichlorodifluoromethane	75-71-8	50	µg/L		<50	<50	<50	<50	<50
Chloromethane	74-87-3	50	µg/L		<50	<50	<50	<50	<50
Vinyl chloride	75-01-4	50	µg/L		<50	<50	<50	<50	<50
Bromomethane	74-83-9	50	µg/L		<50	<50	<50	<50	<50
Chloroethane	75-00-3	50	µg/L		<50	<50	<50	<50	<50
Trichlorofluoromethane	75-69-4	50	µg/L		<50	<50	<50	<50	<50
1,1-Dichloroethene	75-35-4	5	µg/L		<5	<5	<5	<5	<5
Iodomethane	74-88-4	5	µg/L		<5	<5	<5	<5	<5
trans-1,2-Dichloroethene	156-60-5	5	µg/L		<5	<5	<5	<5	<5
1,1-Dichloroethane	75-34-3	5	µg/L		<5	<5	<5	<5	<5
cis-1,2-Dichloroethene	156-59-2	5	µg/L		<5	<5	<5	<5	<5
1,1,1-Trichloroethane	71-55-6	5	µg/L		<5	<5	<5	<5	<5
1,1-Dichloropropylene	563-58-6	5	µg/L		<5	<5	<5	<5	<5



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

				Sample ID	GW1	GW3	GW4	QC100	QC100A
				Sampling date / time	21-Mar-2024 00:00	21-Mar-2024 00:00	21-Mar-2024 00:00	21-Mar-2024 00:00	21-Mar-2024 00:00
Compound	CAS Number	LOR	Unit		ES2409457-001	ES2409457-002	ES2409457-003	ES2409457-006	ES2409457-007
					Result	Result	Result	Result	Result
EP074E: Halogenated Aliphatic Compounds - Continued									
Carbon Tetrachloride	56-23-5	5	µg/L		<5	<5	<5	<5	<5
1,2-Dichloroethane	107-06-2	5	µg/L		<5	<5	<5	<5	<5
Trichloroethene	79-01-6	5	µg/L		<5	<5	<5	<5	<5
Dibromomethane	74-95-3	5	µg/L		<5	<5	<5	<5	<5
1,1,2-Trichloroethane	79-00-5	5	µg/L		<5	<5	<5	<5	<5
1,3-Dichloropropane	142-28-9	5	µg/L		<5	<5	<5	<5	<5
Tetrachloroethene	127-18-4	5	µg/L		<5	<5	<5	<5	<5
1,1,1,2-Tetrachloroethane	630-20-6	5	µg/L		<5	<5	<5	<5	<5
trans-1,4-Dichloro-2-butene	110-57-6	5	µg/L		<5	<5	<5	<5	<5
cis-1,4-Dichloro-2-butene	1476-11-5	5	µg/L		<5	<5	<5	<5	<5
1,1,2,2-Tetrachloroethane	79-34-5	5	µg/L		<5	<5	<5	<5	<5
1,2,3-Trichloropropane	96-18-4	5	µg/L		<5	<5	<5	<5	<5
Pentachloroethane	76-01-7	5	µg/L		<5	<5	<5	<5	<5
1,2-Dibromo-3-chloropropane	96-12-8	5	µg/L		<5	<5	<5	<5	<5
Hexachlorobutadiene	87-68-3	5	µg/L		<5	<5	<5	<5	<5
EP074F: Halogenated Aromatic Compounds									
Chlorobenzene	108-90-7	5	µg/L		<5	<5	<5	<5	<5
Bromobenzene	108-86-1	5	µg/L		<5	<5	<5	<5	<5
2-Chlorotoluene	95-49-8	5	µg/L		<5	<5	<5	<5	<5
4-Chlorotoluene	106-43-4	5	µg/L		<5	<5	<5	<5	<5
1,3-Dichlorobenzene	541-73-1	5	µg/L		<5	<5	<5	<5	<5
1,4-Dichlorobenzene	106-46-7	5	µg/L		<5	<5	<5	<5	<5
1,2-Dichlorobenzene	95-50-1	5	µg/L		<5	<5	<5	<5	<5
1,2,4-Trichlorobenzene	120-82-1	5	µg/L		<5	<5	<5	<5	<5
1,2,3-Trichlorobenzene	87-61-6	5	µg/L		<5	<5	<5	<5	<5
EP074G: Trihalomethanes									
Chloroform	67-66-3	5	µg/L		<5	<5	<5	<5	<5



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

				Sample ID	GW1	GW3	GW4	QC100	QC100A
				Sampling date / time	21-Mar-2024 00:00	21-Mar-2024 00:00	21-Mar-2024 00:00	21-Mar-2024 00:00	21-Mar-2024 00:00
Compound	CAS Number	LOR	Unit		ES2409457-001	ES2409457-002	ES2409457-003	ES2409457-006	ES2409457-007
					Result	Result	Result	Result	Result
EP074G: Trihalomethanes - Continued									
Bromodichloromethane	75-27-4	5	µg/L		<5	<5	<5	<5	<5
Dibromochloromethane	124-48-1	5	µg/L		<5	<5	<5	<5	<5
Bromoform	75-25-2	5	µg/L		<5	<5	<5	<5	<5
EP074S: VOC Surrogates									
1,2-Dichloroethane-D4	17060-07-0	5	%		96.8	99.7	109	107	105
Toluene-D8	2037-26-5	5	%		101	106	114	112	110
4-Bromofluorobenzene	460-00-4	5	%		94.1	101	105	106	102



Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Sample ID	SW1	SW2	----	----	----
Sampling date / time				21-Mar-2024 00:00	21-Mar-2024 00:00	----	----	----	
Compound	CAS Number	LOR	Unit	ES2409457-004	ES2409457-005	-----	-----	-----	
				Result	Result	----	----	----	
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L	<5	118	----	----	----	
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	118	75	----	----	----	
Total Alkalinity as CaCO3	----	1	mg/L	118	75	----	----	----	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	29	17	----	----	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	102	48	----	----	----	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	26	15	----	----	----	
Magnesium	7439-95-4	1	mg/L	12	5	----	----	----	
Sodium	7440-23-5	1	mg/L	66	39	----	----	----	
Potassium	7440-09-7	1	mg/L	5	6	----	----	----	
EG020F: Dissolved Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	0.009	0.113	----	----	----	
Iron	7439-89-6	0.05	mg/L	0.10	1.88	----	----	----	
EG020T: Total Metals by ICP-MS									
Manganese	7439-96-5	0.001	mg/L	0.133	0.170	----	----	----	
Iron	7439-89-6	0.05	mg/L	0.48	2.56	----	----	----	
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L	0.5	0.2	----	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.48	1.60	----	----	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	0.07	<0.01	----	----	----	
EK058G: Nitrate as N by Discrete Analyser									



Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Sample ID	SW1	SW2	----	----	----
Sampling date / time				21-Mar-2024 00:00	21-Mar-2024 00:00	----	----	----	
Compound	CAS Number	LOR	Unit	ES2409457-004	ES2409457-005	-----	-----	-----	
				Result	Result	----	----	----	
EK058G: Nitrate as N by Discrete Analyser - Continued									
Nitrate as N	14797-55-8	0.01	mg/L	0.05	<0.01	----	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.12	<0.01	----	----	----	
EN055: Ionic Balance									
∅ Total Anions	----	0.01	meq/L	5.84	3.21	----	----	----	
∅ Total Cations	----	0.01	meq/L	5.28	3.01	----	----	----	
∅ Ionic Balance	----	0.01	%	4.99	3.16	----	----	----	
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L	10	117	----	----	----	
EP020: Oil and Grease (O&G)									
Oil & Grease	----	5	mg/L	<5	48	----	----	----	
EP074D: Fumigants									
2,2-Dichloropropane	594-20-7	5	µg/L	<5	<5	----	----	----	
1,2-Dichloropropane	78-87-5	5	µg/L	<5	<5	----	----	----	
cis-1,3-Dichloropropylene	10061-01-5	5	µg/L	<5	<5	----	----	----	
trans-1,3-Dichloropropylene	10061-02-6	5	µg/L	<5	<5	----	----	----	
1,2-Dibromoethane (EDB)	106-93-4	5	µg/L	<5	<5	----	----	----	
EP074E: Halogenated Aliphatic Compounds									
Dichlorodifluoromethane	75-71-8	50	µg/L	<50	<50	----	----	----	
Chloromethane	74-87-3	50	µg/L	<50	<50	----	----	----	
Vinyl chloride	75-01-4	50	µg/L	<50	<50	----	----	----	
Bromomethane	74-83-9	50	µg/L	<50	<50	----	----	----	
Chloroethane	75-00-3	50	µg/L	<50	<50	----	----	----	
Trichlorofluoromethane	75-69-4	50	µg/L	<50	<50	----	----	----	
1,1-Dichloroethene	75-35-4	5	µg/L	<5	<5	----	----	----	
Iodomethane	74-88-4	5	µg/L	<5	<5	----	----	----	
trans-1,2-Dichloroethene	156-60-5	5	µg/L	<5	<5	----	----	----	



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Sample ID

				SW1	SW2	----	----	----
Sampling date / time				21-Mar-2024 00:00	21-Mar-2024 00:00	----	----	----
Compound	CAS Number	LOR	Unit	ES2409457-004	ES2409457-005	-----	-----	-----
				Result	Result	----	----	----
EP074E: Halogenated Aliphatic Compounds - Continued								
1.1-Dichloroethane	75-34-3	5	µg/L	<5	<5	----	----	----
cis-1.2-Dichloroethene	156-59-2	5	µg/L	<5	<5	----	----	----
1.1.1-Trichloroethane	71-55-6	5	µg/L	<5	<5	----	----	----
1.1-Dichloropropylene	563-58-6	5	µg/L	<5	<5	----	----	----
Carbon Tetrachloride	56-23-5	5	µg/L	<5	<5	----	----	----
1.2-Dichloroethane	107-06-2	5	µg/L	<5	<5	----	----	----
Trichloroethene	79-01-6	5	µg/L	<5	<5	----	----	----
Dibromomethane	74-95-3	5	µg/L	<5	<5	----	----	----
1.1.2-Trichloroethane	79-00-5	5	µg/L	<5	<5	----	----	----
1.3-Dichloropropane	142-28-9	5	µg/L	<5	<5	----	----	----
Tetrachloroethene	127-18-4	5	µg/L	<5	<5	----	----	----
1.1.1.2-Tetrachloroethane	630-20-6	5	µg/L	<5	<5	----	----	----
trans-1.4-Dichloro-2-butene	110-57-6	5	µg/L	<5	<5	----	----	----
cis-1.4-Dichloro-2-butene	1476-11-5	5	µg/L	<5	<5	----	----	----
1.1.2.2-Tetrachloroethane	79-34-5	5	µg/L	<5	<5	----	----	----
1.2.3-Trichloropropane	96-18-4	5	µg/L	<5	<5	----	----	----
Pentachloroethane	76-01-7	5	µg/L	<5	<5	----	----	----
1.2-Dibromo-3-chloropropane	96-12-8	5	µg/L	<5	<5	----	----	----
Hexachlorobutadiene	87-68-3	5	µg/L	<5	<5	----	----	----
EP074F: Halogenated Aromatic Compounds								
Chlorobenzene	108-90-7	5	µg/L	<5	<5	----	----	----
Bromobenzene	108-86-1	5	µg/L	<5	<5	----	----	----
2-Chlorotoluene	95-49-8	5	µg/L	<5	<5	----	----	----
4-Chlorotoluene	106-43-4	5	µg/L	<5	<5	----	----	----
1.3-Dichlorobenzene	541-73-1	5	µg/L	<5	<5	----	----	----
1.4-Dichlorobenzene	106-46-7	5	µg/L	<5	<5	----	----	----
1.2-Dichlorobenzene	95-50-1	5	µg/L	<5	<5	----	----	----



Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Sample ID	SW1	SW2	----	----	----
Sampling date / time				21-Mar-2024 00:00	21-Mar-2024 00:00	----	----	----	
Compound	CAS Number	LOR	Unit	ES2409457-004	ES2409457-005	-----	-----	-----	
				Result	Result	----	----	----	
EP074F: Halogenated Aromatic Compounds - Continued									
1.2.4-Trichlorobenzene	120-82-1	5	µg/L	<5	<5	----	----	----	
1.2.3-Trichlorobenzene	87-61-6	5	µg/L	<5	<5	----	----	----	
EP074G: Trihalomethanes									
Chloroform	67-66-3	5	µg/L	<5	<5	----	----	----	
Bromodichloromethane	75-27-4	5	µg/L	<5	<5	----	----	----	
Dibromochloromethane	124-48-1	5	µg/L	<5	<5	----	----	----	
Bromoform	75-25-2	5	µg/L	<5	<5	----	----	----	
EP074S: VOC Surrogates									
1.2-Dichloroethane-D4	17060-07-0	5	%	101	118	----	----	----	
Toluene-D8	2037-26-5	5	%	107	126	----	----	----	
4-Bromofluorobenzene	460-00-4	5	%	101	114	----	----	----	



Surrogate Control Limits

Sub-Matrix: GROUNDWATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP074S: VOC Surrogates			
1,2-Dichloroethane-D4	17060-07-0	78	133
Toluene-D8	2037-26-5	79	129
4-Bromofluorobenzene	460-00-4	81	124

Sub-Matrix: SURFACE WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP074S: VOC Surrogates			
1,2-Dichloroethane-D4	17060-07-0	78	133
Toluene-D8	2037-26-5	79	129
4-Bromofluorobenzene	460-00-4	81	124