

## CERTIFICATE OF ANALYSIS

**Work Order** : **ES2025861**  
**Client** : **BENBOW ENVIRONMENTAL**  
**Contact** : Matthew Taylor  
**Address** : 25-27 SHERWOOD STREET  
 NORTHMEAD NSW, AUSTRALIA 2152  
  
**Telephone** : ----  
**Project** : 191251\_Stormwater  
**Order number** : 191251  
**C-O-C number** : ----  
**Sampler** : Matthew Taylor  
**Site** : ----  
**Quote number** : EN/222  
**No. of samples received** : 6  
**No. of samples analysed** : 6

**Page** : 1 of 9  
**Laboratory** : Environmental Division Sydney  
**Contact** : Customer Services ES  
**Address** : 277-289 Woodpark Road Smithfield NSW Australia 2164  
  
**Telephone** : +61-2-8784 8555  
**Date Samples Received** : 28-Jul-2020 10:20  
**Date Analysis Commenced** : 28-Jul-2020  
**Issue Date** : 04-Aug-2020 13:55



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. 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	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjjar	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 Contact 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.

- EP075 (SIM): Where reported, Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a,h)anthracene (1.0), Benzo(g,h,i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- Samples containing fine particulate matter less than 1.2 µm may bias low for TSS via EA025H.
- 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.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID				
Client sampling date / time				S-1	S-1	S-2	S-2	S-1
Client sampling date / time				28-Jul-2020 09:45	28-Jul-2020 09:45	28-Jul-2020 09:25	28-Jul-2020 09:25	28-Jul-2020 09:45
Compound	CAS Number	LOR	Unit	ES2025861-001	ES2025861-002	ES2025861-003	ES2025861-004	ES2025861-005
				Result	Result	Result	Result	Result
<b>EA005P: pH by PC Titrator</b>								
pH Value	----	0.01	pH Unit	----	----	----	----	8.41
<b>EA010P: Conductivity by PC Titrator</b>								
Electrical Conductivity @ 25°C	----	1	µS/cm	----	----	----	----	223
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>								
Suspended Solids (SS)	----	5	mg/L	----	----	----	----	29
<b>EG020F: Dissolved Metals by ICP-MS</b>								
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	<0.001	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	<0.0001	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	----	<0.001	----	----
Copper	7440-50-8	0.001	mg/L	0.006	----	0.001	----	----
Nickel	7440-02-0	0.001	mg/L	0.001	----	<0.001	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	----	<0.001	----	----
Zinc	7440-66-6	0.005	mg/L	0.092	----	0.034	----	----
<b>EG035F: Dissolved Mercury by FIMS</b>								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	<0.0001	----	----
<b>EP074A: Monocyclic Aromatic Hydrocarbons</b>								
Styrene	100-42-5	5	µg/L	----	<5	----	<5	----
Isopropylbenzene	98-82-8	5	µg/L	----	<5	----	<5	----
n-Propylbenzene	103-65-1	5	µg/L	----	<5	----	<5	----
1,3,5-Trimethylbenzene	108-67-8	5	µg/L	----	<5	----	<5	----
sec-Butylbenzene	135-98-8	5	µg/L	----	<5	----	<5	----
1,2,4-Trimethylbenzene	95-63-6	5	µg/L	----	<5	----	<5	----
tert-Butylbenzene	98-06-6	5	µg/L	----	<5	----	<5	----
p-Isopropyltoluene	99-87-6	5	µg/L	----	<5	----	<5	----
n-Butylbenzene	104-51-8	5	µg/L	----	<5	----	<5	----
<b>EP074B: Oxygenated Compounds</b>								
Vinyl Acetate	108-05-4	50	µg/L	----	<50	----	<50	----
2-Butanone (MEK)	78-93-3	50	µg/L	----	<50	----	<50	----
4-Methyl-2-pentanone (MIBK)	108-10-1	50	µg/L	----	<50	----	<50	----
2-Hexanone (MBK)	591-78-6	50	µg/L	----	<50	----	<50	----
<b>EP074C: Sulfonated Compounds</b>								
Carbon disulfide	75-15-0	5	µg/L	----	<5	----	18	----
<b>EP074D: Fumigants</b>								
2,2-Dichloropropane	594-20-7	5	µg/L	----	<5	----	<5	----



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	S-1	S-1	S-2	S-2	S-1
Client sampling date / time					28-Jul-2020 09:45	28-Jul-2020 09:45	28-Jul-2020 09:25	28-Jul-2020 09:25	28-Jul-2020 09:45
Compound	CAS Number	LOR	Unit		ES2025861-001	ES2025861-002	ES2025861-003	ES2025861-004	ES2025861-005
					Result	Result	Result	Result	Result
<b>EP074D: Fumigants - Continued</b>									
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	----
<b>EP074E: Halogenated Aliphatic Compounds</b>									
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	----
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	----
<b>EP074F: Halogenated Aromatic Compounds</b>									



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	S-1	S-1	S-2	S-2	S-1
Client sampling date / time					28-Jul-2020 09:45	28-Jul-2020 09:45	28-Jul-2020 09:25	28-Jul-2020 09:25	28-Jul-2020 09:45
Compound	CAS Number	LOR	Unit		ES2025861-001	ES2025861-002	ES2025861-003	ES2025861-004	ES2025861-005
					Result	Result	Result	Result	Result
<b>EP074F: Halogenated Aromatic Compounds - Continued</b>									
Chlorobenzene	108-90-7	5	µg/L	----	<5	----	<5	----	<5
Bromobenzene	108-86-1	5	µg/L	----	<5	----	<5	----	<5
2-Chlorotoluene	95-49-8	5	µg/L	----	<5	----	<5	----	<5
4-Chlorotoluene	106-43-4	5	µg/L	----	<5	----	<5	----	<5
1,3-Dichlorobenzene	541-73-1	5	µg/L	----	<5	----	<5	----	<5
1,4-Dichlorobenzene	106-46-7	5	µg/L	----	<5	----	<5	----	<5
1,2-Dichlorobenzene	95-50-1	5	µg/L	----	<5	----	<5	----	<5
1,2,4-Trichlorobenzene	120-82-1	5	µg/L	----	<5	----	<5	----	<5
1,2,3-Trichlorobenzene	87-61-6	5	µg/L	----	<5	----	<5	----	<5
<b>EP074G: Trihalomethanes</b>									
Chloroform	67-66-3	5	µg/L	----	21	----	<5	----	<5
Bromodichloromethane	75-27-4	5	µg/L	----	10	----	<5	----	<5
Dibromochloromethane	124-48-1	5	µg/L	----	<5	----	<5	----	<5
Bromoform	75-25-2	5	µg/L	----	<5	----	<5	----	<5
<b>EP075(SIM)B: Polynuclear Aromatic Hydrocarbons</b>									
Naphthalene	91-20-3	1.0	µg/L	----	<1.0	----	<1.0	----	<1.0
Acenaphthylene	208-96-8	1.0	µg/L	----	<1.0	----	<1.0	----	<1.0
Acenaphthene	83-32-9	1.0	µg/L	----	<1.0	----	<1.0	----	<1.0
Fluorene	86-73-7	1.0	µg/L	----	<1.0	----	<1.0	----	<1.0
Phenanthrene	85-01-8	1.0	µg/L	----	<1.0	----	<1.0	----	<1.0
Anthracene	120-12-7	1.0	µg/L	----	<1.0	----	<1.0	----	<1.0
Fluoranthene	206-44-0	1.0	µg/L	----	<1.0	----	<1.0	----	<1.0
Pyrene	129-00-0	1.0	µg/L	----	<1.0	----	<1.0	----	<1.0
Benz(a)anthracene	56-55-3	1.0	µg/L	----	<1.0	----	<1.0	----	<1.0
Chrysene	218-01-9	1.0	µg/L	----	<1.0	----	<1.0	----	<1.0
Benzo(b+j)fluoranthene	205-99-2	205-82-3	1.0	µg/L	<1.0	----	<1.0	----	<1.0
Benzo(k)fluoranthene	207-08-9	1.0	µg/L	----	<1.0	----	<1.0	----	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L	----	<0.5	----	<0.5	----	<0.5
Indeno(1,2,3.cd)pyrene	193-39-5	1.0	µg/L	----	<1.0	----	<1.0	----	<1.0
Dibenz(a,h)anthracene	53-70-3	1.0	µg/L	----	<1.0	----	<1.0	----	<1.0
Benzo(g,h,i)perylene	191-24-2	1.0	µg/L	----	<1.0	----	<1.0	----	<1.0
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L	----	<0.5	----	<0.5	----	<0.5
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L	----	<0.5	----	<0.5	----	<0.5
<b>EP080/071: Total Petroleum Hydrocarbons</b>									



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	S-1	S-1	S-2	S-2	S-1
Client sampling date / time					28-Jul-2020 09:45	28-Jul-2020 09:45	28-Jul-2020 09:25	28-Jul-2020 09:25	28-Jul-2020 09:45
Compound	CAS Number	LOR	Unit		ES2025861-001	ES2025861-002	ES2025861-003	ES2025861-004	ES2025861-005
					Result	Result	Result	Result	Result
<b>EP080/071: Total Petroleum Hydrocarbons - Continued</b>									
C6 - C9 Fraction	----	20	µg/L	----	<20	----	<20	----	----
C10 - C14 Fraction	----	50	µg/L	----	140	----	100	----	----
C15 - C28 Fraction	----	100	µg/L	----	960	----	610	----	----
C29 - C36 Fraction	----	50	µg/L	----	700	----	80	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	----	1800	----	790	----	----
<b>EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions</b>									
C6 - C10 Fraction	C6_C10	20	µg/L	----	<20	----	<20	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	----	<20	----	<20	----	----
>C10 - C16 Fraction	----	100	µg/L	----	210	----	180	----	----
>C16 - C34 Fraction	----	100	µg/L	----	1360	----	570	----	----
>C34 - C40 Fraction	----	100	µg/L	----	450	----	<100	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	----	2020	----	750	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	----	210	----	180	----	----
<b>EP080: BTEXN</b>									
Benzene	71-43-2	1	µg/L	----	<1	----	<1	----	----
Toluene	108-88-3	2	µg/L	----	<2	----	<2	----	----
Ethylbenzene	100-41-4	2	µg/L	----	<2	----	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	----	<2	----	<2	----	----
ortho-Xylene	95-47-6	2	µg/L	----	<2	----	<2	----	----
^ Total Xylenes	----	2	µg/L	----	<2	----	<2	----	----
^ Sum of BTEX	----	1	µg/L	----	<1	----	<1	----	----
Naphthalene	91-20-3	5	µg/L	----	<5	----	<5	----	----
<b>EP074S: VOC Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	5	%	----	104	----	99.5	----	----
Toluene-D8	2037-26-5	5	%	----	121	----	124	----	----
4-Bromofluorobenzene	460-00-4	5	%	----	109	----	111	----	----
<b>EP075(SIM)S: Phenolic Compound Surrogates</b>									
Phenol-d6	13127-88-3	1.0	%	----	22.2	----	23.9	----	----
2-Chlorophenol-D4	93951-73-6	1.0	%	----	40.6	----	52.2	----	----
2,4,6-Tribromophenol	118-79-6	1.0	%	----	36.8	----	50.6	----	----
<b>EP075(SIM)T: PAH Surrogates</b>									
2-Fluorobiphenyl	321-60-8	1.0	%	----	74.5	----	65.9	----	----



## Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	S-1	S-1	S-2	S-2	S-1
Client sampling date / time				28-Jul-2020 09:45	28-Jul-2020 09:45	28-Jul-2020 09:25	28-Jul-2020 09:25	28-Jul-2020 09:45	
Compound	CAS Number	LOR	Unit	ES2025861-001	ES2025861-002	ES2025861-003	ES2025861-004	ES2025861-005	
				Result	Result	Result	Result	Result	
<b>EP075(SIM)T: PAH Surrogates - Continued</b>									
Anthracene-d10	1719-06-8	1.0	%	----	69.9	----	67.2	----	
4-Terphenyl-d14	1718-51-0	1.0	%	----	70.7	----	66.0	----	
<b>EP080S: TPH(V)/BTEX Surrogates</b>									
1,2-Dichloroethane-D4	17060-07-0	2	%	----	110	----	105	----	
Toluene-D8	2037-26-5	2	%	----	114	----	117	----	
4-Bromofluorobenzene	460-00-4	2	%	----	104	----	109	----	



**Analytical Results**

Sub-Matrix: <b>WATER</b> (Matrix: <b>WATER</b> )			Client sample ID	S-2	----	----	----	----
Client sampling date / time			28-Jul-2020 09:25	----	----	----	----	
Compound	CAS Number	LOR	Unit	ES2025861-006	-----	-----	-----	-----
				Result	----	----	----	----
<b>EA005P: pH by PC Titrator</b>								
pH Value	----	0.01	pH Unit	7.35	----	----	----	----
<b>EA010P: Conductivity by PC Titrator</b>								
Electrical Conductivity @ 25°C	----	1	µS/cm	135	----	----	----	----
<b>EA025: Total Suspended Solids dried at 104 ± 2°C</b>								
Suspended Solids (SS)	----	5	mg/L	5	----	----	----	----





## Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
<b>EP074S: VOC Surrogates</b>			
1,2-Dichloroethane-D4	17060-07-0	78	133
Toluene-D8	2037-26-5	79	129
4-Bromofluorobenzene	460-00-4	81	124
<b>EP075(SIM)S: Phenolic Compound Surrogates</b>			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2,4,6-Tribromophenol	118-79-6	17	125
<b>EP075(SIM)T: PAH Surrogates</b>			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112
<b>EP080S: TPH(V)/BTEX Surrogates</b>			
1,2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128