Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: **EW1202322**	Page	: 1 of 8
Client	: **SHOALHAVEN CITY COUNCIL**	Laboratory	: Environmental Division NSW South Coast
Contact	: Mr David Hojem	Contact	: Brianne Martin
Address	: PO Box 42 Nowra NSW 2541	Address	: 99 Kenny Street, Wollongong 2500 Unit 4 / 13 Geary Place, PO Box 3105, North Nowra 2541 AUSTRALIA
E-mail	: nowra.lab@alsglobal.com	E-mail	: Nowra.Lab@alsglobal.com
Telephone	: 02 4429 3406	Telephone	: 02 44232063
Facsimile	: 02 4429 5929	Facsimile	: 02 44232083
Project	: West Nowra Landfill	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: 15425 16780		
C-O-C number	: ----	Date Samples Received	: 22-AUG-2012
Sampler	: Craig Wilson	Issue Date	: 29-AUG-2012
Site	: ----		
		No. of samples received	: 22
Quote number	: ----	No. of samples analysed	: 22

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

NATA Accredited Laboratory 825

Accredited for compliance with ISO/IEC 17025.

Signatories

This document has been electronically signed by the authorized signatories indicated below. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics
Glenn Davies	Environmental Services Representative	Laboratory - Wollongong
Sarah Millington	Senior Inorganic Chemist	Sydney Inorganics

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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.

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

- **TDS by method EA-015 may bias high due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.**

Analytical Results

Sub-Matrix: **WATER**

Compound	CAS Number	LOR	Unit	Client sample ID: SW 1 Client sampling date / time: 22-AUG-2012 09:30 EW1202322-001	SW2 22-AUG-2012 07:50 EW1202322-002	SW3 22-AUG-2012 10:00 EW1202322-003	BH2 22-AUG-2012 09:50 EW1202322-004	BH 3 22-AUG-2012 09:40 EW1202322-005
EA015: Total Dissolved Solids								
Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	**860**	----	**478**	**680**	**208**
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	**67**	----	**2**	<1	<1
Total Alkalinity as CaCO3	----	1	mg/L	**67**	----	**2**	<1	<1
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**48**	----	**4**	<1	**49**
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	**438**	----	**280**	**359**	**38**
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**36**	----	**10**	**10**	<1
Magnesium	7439-95-4	1	mg/L	**31**	----	**14**	**12**	**3**
Sodium	7440-23-5	1	mg/L	**227**	----	**130**	**168**	**43**
Potassium	7440-09-7	1	mg/L	**16**	----	**3**	**2**	<1
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	----	**0.12**	<0.01	**0.01**
EN055: Ionic Balance								
Total Anions	----	0.01	meq/L	**14.7**	----	**8.02**	**10.1**	**2.09**
Total Cations	----	0.01	meq/L	**14.6**	----	----	----	**2.12**
Total Cations	----	0.01	meq/L	----	----	**7.92**	**10.2**	----
Ionic Balance	----	0.01	%	**0.22**	----	----	----	----
Ionic Balance	----	0.01	%	----	----	**0.63**	**0.49**	----
EN67 PK: Field Tests								
pH	----	0.1	pH Unit	**7.0**	----	**4.7**	**4.2**	**4.1**
Electrical Conductivity (Non Compensated)	----	1	µS/cm	**1570**	----	**1560**	----	----
Dissolved Oxygen	----	0.01	mg/L	**10.2**	----	**5.07**	----	----
Field Observations	----	0.01	--	----	**Dry**	----	----	----
Standing Water Level	----	0.01	m AHD	----	----	----	**31.3**	**30.8**
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	**11**	----	**3**	**22**	<1
EP030: Biochemical Oxygen Demand (BOD)								
Biochemical Oxygen Demand	----	2	mg/L	**3**	----	<2	----	----

Analytical Results

Sub-Matrix: **WATER**

Compound	CAS Number	LOR	Unit	Client sample ID: BH 4	BH 5	BH 6	BH 7	BH 10
				Client sampling date / time: 22-AUG-2012 09:35	22-AUG-2012 09:25	22-AUG-2012 09:00	22-AUG-2012 09:05	22-AUG-2012 08:40
				EW1202322-006	EW1202322-007	EW1202322-008	EW1202322-009	EW1202322-010
EA015: Total Dissolved Solids								
Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	----	----	**942**	**306**	**270**
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	----	----	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	----	----	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	----	----	<1	**6**	**49**
Total Alkalinity as CaCO3	----	1	mg/L	----	----	<1	**6**	**49**
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	----	----	**46**	**32**	**1**
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	----	----	**542**	**153**	**140**
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	----	----	**6**	**15**	**8**
Magnesium	7439-95-4	1	mg/L	----	----	**17**	**12**	**9**
Sodium	7440-23-5	1	mg/L	----	----	**364**	**74**	**66**
Potassium	7440-09-7	1	mg/L	----	----	**2**	**3**	<1
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	----	----	**0.04**	**0.03**	**1.28**
EN055: Ionic Balance								
Total Anions	----	0.01	meq/L	----	----	**16.2**	**5.10**	**4.95**
Total Cations	----	0.01	meq/L	----	----	**17.6**	**5.03**	----
Total Cations	----	0.01	meq/L	----	----	----	----	**4.87**
Ionic Balance	----	0.01	%	----	----	**3.93**	**0.70**	----
Ionic Balance	----	0.01	%	----	----	----	----	**0.81**
EN67 PK: Field Tests								
pH	----	0.1	pH Unit	----	**3.0**	**4.3**	**5.4**	**5.7**
Field Observations	----	0.01	--	**Destroyed**	----	----	----	----
Standing Water Level	----	0.01	m AHD	----	**28.7**	**30.4**	**29.9**	**34.2**
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	----	----	**2**	**7**	**5**

Analytical Results

Sub-Matrix: **WATER**

Compound	CAS Number	LOR	Unit	Client sample ID: BH 11 Client sampling date / time: 22-AUG-2012 08:50 EW1202322-011	BH 12a 22-AUG-2012 09:15 EW1202322-012	BH 13 22-AUG-2012 10:10 EW1202322-013	BH 14 22-AUG-2012 10:40 EW1202322-014	BH 15 22-AUG-2012 10:30 EW1202322-015
EA015: Total Dissolved Solids								
Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	----	**1570**	**1870**	**298**	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	----	<1	<1	<1	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	----	<1	<1	<1	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	----	<1	<1	**12**	----
Total Alkalinity as CaCO3	----	1	mg/L	----	<1	<1	**12**	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	----	**35**	**4**	**131**	----
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	----	**970**	**1020**	**56**	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	----	**44**	**4**	<1	----
Magnesium	7439-95-4	1	mg/L	----	**53**	**14**	**3**	----
Sodium	7440-23-5	1	mg/L	----	**502**	**474**	**70**	----
Potassium	7440-09-7	1	mg/L	----	<1	<1	<1	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	----	<0.01	**0.03**	**0.01**	----
EN055: Ionic Balance								
Total Anions	----	0.01	meq/L	----	**28.1**	**28.9**	**4.55**	----
Total Cations	----	0.01	meq/L	----	**28.4**	----	----	----
Total Cations	----	0.01	meq/L	----	----	**31.9**	**4.66**	----
Ionic Balance	----	0.01	%	----	**0.52**	----	----	----
Ionic Balance	----	0.01	%	----	----	**4.93**	**1.53**	----
EN67 PK: Field Tests								
pH	----	0.1	pH Unit	----	**4.6**	**4.3**	**5.1**	----
Field Observations	----	0.01	--	**Dry**	----	----	----	**Dry**
Standing Water Level	----	0.01	m AHD	----	**30.0**	**33.4**	**37.3**	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	----	**1**	**2**	<1	----

Analytical Results

Sub-Matrix: **WATER**

Compound	CAS Number	LOR	Unit	Client sample ID	MW 1D	MW 1S	MW 2	MW 3a	MW 4
				Client sampling date / time	22-AUG-2012 08:20	22-AUG-2012 08:15	22-AUG-2012 08:30	22-AUG-2012 08:00	22-AUG-2012 10:20
					EW1202322-016	EW1202322-017	EW1202322-018	EW1202322-019	EW1202322-020
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		<1	<1	43	----	43
Total Alkalinity as CaCO3	----	1	mg/L		<1	<1	43	----	43
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		7	15	11	----	31
ED045G: Chloride Discrete analyser									
Chloride	16887-00-6	1	mg/L		158	161	610	----	714
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		9	4	32	----	<1
Magnesium	7439-95-4	1	mg/L		10	8	28	----	15
Sodium	7440-23-5	1	mg/L		78	92	311	----	420
Potassium	7440-09-7	1	mg/L		<1	<1	<1	----	<1
EG020F: Dissolved Metals by ICP-MS									
Iron	7439-89-6	0.05	mg/L		0.05	0.49	11.6	----	74.1
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		<0.01	0.02	0.02	----	<0.01
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		0.08	0.13	0.10	----	0.47
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L		4.60	4.85	18.3	----	21.6
Total Cations	----	0.01	meq/L		4.66	4.86	17.4	----	----
Total Cations	----	0.01	meq/L		----	----	----	----	23.4
Ionic Balance	----	0.01	%		0.66	0.04	2.44	----	----
Ionic Balance	----	0.01	%		----	----	----	----	4.00
EN67 PK: Field Tests									
pH	----	0.1	pH Unit		4.1	3.9	5.0	----	5.0
Electrical Conductivity (Non Compensated)	----	1	µS/cm		600	646	1810	----	2210
Field Observations	----	0.01	--		----	----	----	Dry	----
Standing Water Level	----	0.01	m AHD		38.0	39.1	36.1	----	35.4
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		<1	<1	<1	----	10
EP030: Biochemical Oxygen Demand (BOD)									
Biochemical Oxygen Demand	----	2	mg/L		<2	<2	<2	----	4

Analytical Results

Sub-Matrix: WATER				Client sample ID	MW 1D	MW 1S	MW 2	MW 3a	MW 4
				Client sampling date / time	22-AUG-2012 08:20	22-AUG-2012 08:15	22-AUG-2012 08:30	22-AUG-2012 08:00	22-AUG-2012 10:20
Compound	CAS Number	LOR	Unit		EW1202322-016	EW1202322-017	EW1202322-018	EW1202322-019	EW1202322-020
EP035G: Total Phenol by Discrete Analyser									
Phenols (Total)	----	0.05	mg/L		<0.05	<0.05	<0.05	----	<0.05

Analytical Results

Sub-Matrix: **WATER**

Compound	CAS Number	LOR	Unit	Client sample ID: Duplicate Client sampling date / time: 22-AUG-2012 09:15 EW1202322-021	Blank 22-AUG-2012 08:35 EW1202322-022	---- ---- ----	---- ---- ----	---- ---- ----
EA015: Total Dissolved Solids								
Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	**1620**	----	----	----	----
Total Dissolved Solids @180°C	GIS-210-010	1	mg/L	----	<1	----	----	----
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	<1	<1	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	<1	<1	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	**35**	<1	----	----	----
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	**899**	<1	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	**43**	<1	----	----	----
Magnesium	7439-95-4	1	mg/L	**53**	<1	----	----	----
Sodium	7440-23-5	1	mg/L	**504**	<1	----	----	----
Potassium	7440-09-7	1	mg/L	<1	<1	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	**0.05**	<0.01	----	----	----
EN055: Ionic Balance								
Total Anions	----	0.01	meq/L	**26.1**	<0.01	----	----	----
Total Cations	----	0.01	meq/L	**28.4**	<0.01	----	----	----
Ionic Balance	----	0.01	%	**4.28**	----	----	----	----
EN67 PK: Field Tests								
pH	----	0.1	pH Unit	**4.6**	**6.6**	----	----	----
Standing Water Level	----	0.01	m AHD	**30.0**	<0.01	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	<1	<1	----	----	----