



Analytical Results

Sub-Matrix: TCLP LEACHATE

Client sample ID

Client sampling date / time

				BH034_0.0-0.1	BH014_0.0-0.1	BH071_0.5-0.7	BH091_0.0-0.1	BH053_0.3-0.5
				28-AUG-2012 12:00	28-AUG-2012 12:00	28-AUG-2012 12:00	28-AUG-2012 12:00	28-AUG-2012 12:00
Compound	CAS Number	LOR	Unit	ES1220305-010	ES1220305-011	ES1220305-012	ES1220305-013	ES1220305-079
EG005C: Leachable Metals by ICPAES								
Aluminium	7429-90-5	0.1	mg/L	0.3	1.2	3.0	5.6	3.5
Antimony	7440-36-0	0.1	mg/L	10.5	<0.1	<0.1	<0.1	6.5
Arsenic	7440-38-2	0.1	mg/L	6.4	<0.1	<0.1	<0.1	16.2
Cadmium	7440-43-9	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium	7440-47-3	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Lead	7439-92-1	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	0.3
Nickel	7440-02-0	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/L	0.1	0.4	0.7	5.6	0.3
EG035C: Leachable Mercury by FIMS								
Mercury	7439-97-6	0.0010	mg/L	0.0026	<0.0010	<0.0010	<0.0010	0.0056



Analytical Results

Sub-Matrix: TCLP LEACHATE

Client sample ID

Client sampling date / time

				BH053_1.5-1.7	BH053_3.2-3.5	BH024_0.3-0.5	BH024_1.0-1.2	BH024_2.0-2.2
				28-AUG-2012 12:00	28-AUG-2012 12:00	28-AUG-2012 12:00	28-AUG-2012 12:00	28-AUG-2012 12:00
Compound	CAS Number	LOR	Unit	ES1220305-080	ES1220305-081	ES1220305-083	ES1220305-084	ES1220305-085
EG005C: Leachable Metals by ICPAES								
Aluminium	7429-90-5	0.1	mg/L	1.0	2.8	0.6	1.8	3.1
Antimony	7440-36-0	0.1	mg/L	4.7	0.5	0.8	2.2	0.4
Arsenic	7440-38-2	0.1	mg/L	0.4	0.9	1.4	1.3	<0.1
Cadmium	7440-43-9	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium	7440-47-3	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/L	<0.1	<0.1	0.2	<0.1	<0.1
Lead	7439-92-1	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	7440-02-0	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/L	0.8	0.1	0.2	5.2	5.7
EG035C: Leachable Mercury by FIMS								
Mercury	7439-97-6	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010



Analytical Results

Sub-Matrix: TCLP LEACHATE

Client sample ID

Client sampling date / time

				BH077_0.3-0.5	BH077_1.0-1.2	BH077_1.5-1.7	BH084_1.0-1.2	BH084_1.5-1.7
				28-AUG-2012 12:00	28-AUG-2012 12:00	28-AUG-2012 12:00	28-AUG-2012 12:00	28-AUG-2012 12:00
Compound	CAS Number	LOR	Unit	ES1220305-087	ES1220305-089	ES1220305-090	ES1220305-091	ES1220305-092
EG005C: Leachable Metals by ICPAES								
Aluminium	7429-90-5	0.1	mg/L	2.4	0.9	1.0	2.3	1.9
Antimony	7440-36-0	0.1	mg/L	0.1	0.1	1.2	10.1	10.6
Arsenic	7440-38-2	0.1	mg/L	<0.1	0.4	0.2	1.1	0.3
Cadmium	7440-43-9	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium	7440-47-3	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Lead	7439-92-1	0.1	mg/L	<0.1	<0.1	<0.1	0.1	<0.1
Nickel	7440-02-0	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/L	1.0	0.2	1.0	5.1	3.9
EG035C: Leachable Mercury by FIMS								
Mercury	7439-97-6	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010



Analytical Results

Sub-Matrix: WATER

				Client sample ID	RB01	RB02	RB03	RB04	RB05
				Client sampling date / time	15-AUG-2012 15:00	15-AUG-2012 15:00	16-AUG-2012 15:00	15-AUG-2012 15:00	16-AUG-2012 15:00
Compound	CAS Number	LOR	Unit		ES1220305-098	ES1220305-099	ES1220305-100	ES1220305-101	ES1220305-102
EG020T: Total Metals by ICP-MS									
Antimony	7440-36-0	0.001	mg/L		1.64	1.24	0.028	0.013	0.010
Arsenic	7440-38-2	0.001	mg/L		2.35	3.59	0.009	0.005	0.004

Certificate of Analysis

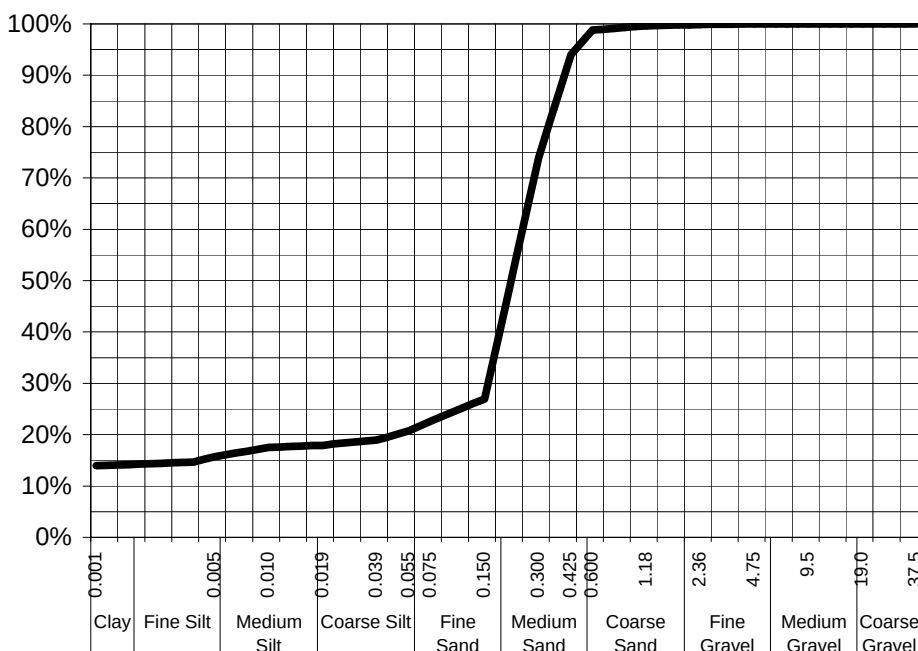
ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental Newcastle, NSW



CLIENT: Ben Luffman
DATE REPORTED: 31-Aug-2012
COMPANY: GHD Pty Ltd
DATE RECEIVED: 22-Aug-2012
ADDRESS: 230 Harbour Drive
PO Box 1340, Coffs Harbour
NSW 2450
REPORT NO: ES1220305-010 / PSD
PROJECT: 2216251
SAMPLE ID: BH034_0.1

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	100%
1.18	100%
0.600	99%
0.425	94%
0.300	74%
0.150	27%
0.075	23%
Particle Size (microns)	
55	21%
39	19%
19	18%
10	18%
5	16%
4	15%
1	14%

Samples analysed as received.

Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Sample Comments:

Loss on Pretreatment NA

Sample Description: Medium fine sand and silty clay

Test Method: AS1289.3.6.1/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65 g/cm³

NATA Accreditation: 825 Site: Newcastle

This document is issued in accordance with NATA's accreditation requirements. Accredited for compliance with ISO/IEC 17025. This document shall not be reproduced, except in full.



Median Particle Size (mm)	0.150
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Analysed: 28-Aug-12

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Hamish Murray
Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

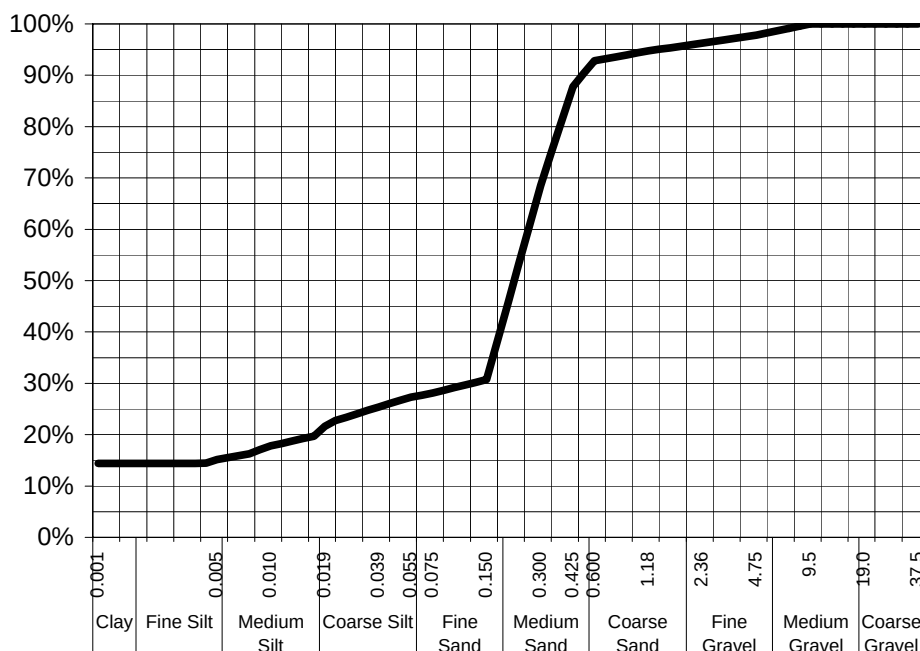
ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental Newcastle, NSW



CLIENT: Ben Luffman
DATE REPORTED: 31-Aug-2012
COMPANY: GHD Pty Ltd
DATE RECEIVED: 22-Aug-2012
ADDRESS: 230 Harbour Drive
PO Box 1340, Coffs Harbour
NSW 2450
REPORT NO: ES1220305-011 / PSD
PROJECT: 2216251
SAMPLE ID: BH014_0.1

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	98%
2.36	96%
1.18	95%
0.600	93%
0.425	88%
0.300	68%
0.150	31%
0.075	28%
Particle Size (microns)	
55	27%
39	25%
19	22%
10	18%
5	15%
4	14%
1	14%

Samples analysed as received.

Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Sample Comments:

Loss on Pretreatment NA

Sample Description: Medium fine sand and silty clay

Test Method: AS1289.3.6.1/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65 g/cm³

NATA Accreditation: 825 Site: Newcastle

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Median Particle Size (mm)	0.150
---------------------------	-------

Analysed: 28-Aug-12

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Hamish Murray
Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

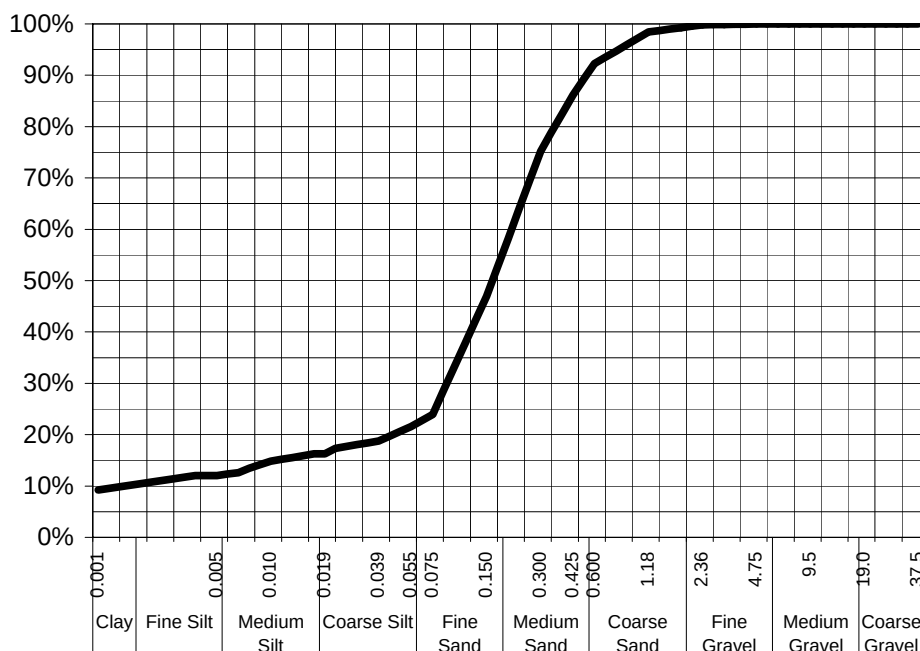
ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental Newcastle, NSW



CLIENT: Ben Luffman
DATE REPORTED: 31-Aug-2012
COMPANY: GHD Pty Ltd
DATE RECEIVED: 22-Aug-2012
ADDRESS: 230 Harbour Drive
PO Box 1340, Coffs Harbour
NSW 2450
REPORT NO: ES1220305-067 / PSD
PROJECT: 2216251
SAMPLE ID: BH031_0.0-0.2

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	100%
1.18	98%
0.600	92%
0.425	86%
0.300	75%
0.150	47%
0.075	24%
Particle Size (microns)	
55	22%
39	19%
19	16%
10	15%
5	12%
4	12%
1	9%

Samples analysed as received.

Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Sample Comments:

Loss on Pretreatment NA

Sample Description: Medium fine sand and silty clay

Test Method: AS1289.3.6.1/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65 g/cm³

NATA Accreditation: 825 Site: Newcastle

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Median Particle Size (mm)	0.150
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Analysed: 28-Aug-12

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Hamish Murray
Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

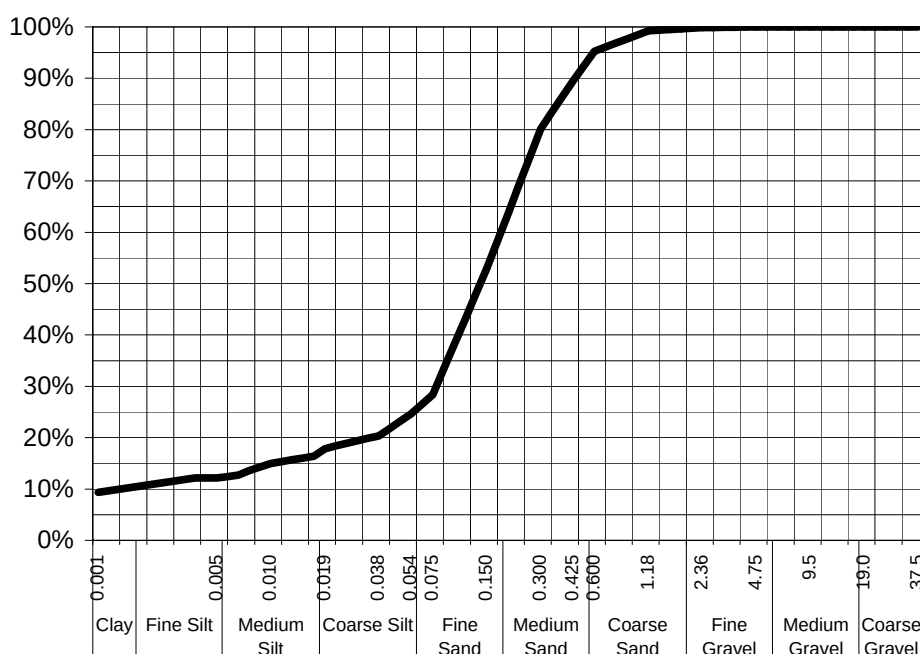
ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental Newcastle, NSW



CLIENT: Ben Luffman
DATE REPORTED: 31-Aug-2012
COMPANY: GHD Pty Ltd
DATE RECEIVED: 22-Aug-2012
ADDRESS: 230 Harbour Drive
PO Box 1340, Coffs Harbour
NSW 2450
REPORT NO: ES1220305-068 / PSD
PROJECT: 2216251
SAMPLE ID: BH031_0.5-0.7

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	100%
1.18	99%
0.600	95%
0.425	89%
0.300	80%
0.150	53%
0.075	28%
Particle Size (microns)	
54	25%
38	20%
19	18%
10	15%
5	12%
4	12%
1	9%

Samples analysed as received.

Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Sample Comments:

Loss on Pretreatment NA

Sample Description: Medium fine sand and silty clay

Test Method: AS1289.3.6.1/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65 g/cm³

NATA Accreditation: 825 Site: Newcastle

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Median Particle Size (mm)	0.113
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Analysed: 28-Aug-12

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Hamish Murray
Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

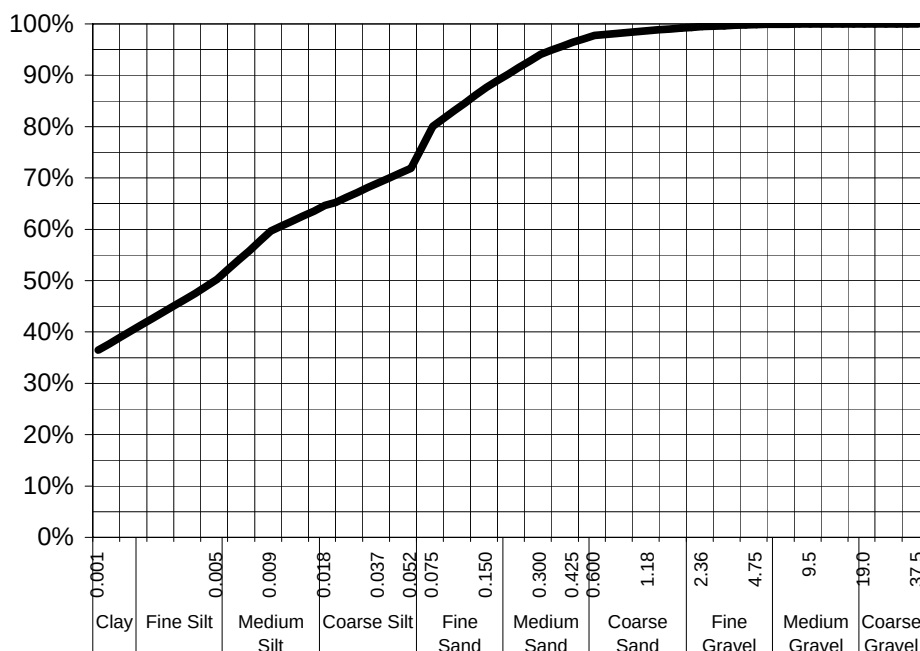
ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental Newcastle, NSW



CLIENT: Ben Luffman
DATE REPORTED: 31-Aug-2012
COMPANY: GHD Pty Ltd
DATE RECEIVED: 22-Aug-2012
ADDRESS: 230 Harbour Drive
PO Box 1340, Coffs Harbour
NSW 2450
REPORT NO: ES1220305-069 / PSD
PROJECT: 2216251
SAMPLE ID: BH031_1.8-2.0

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	99%
1.18	99%
0.600	98%
0.425	96%
0.300	94%
0.150	88%
0.075	80%
Particle Size (microns)	
52	72%
37	69%
18	65%
9	60%
5	50%
3	48%
1	36%

Samples analysed as received.

Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Sample Comments:

Loss on Pretreatment NA

Sample Description: Silty clay and medium fine sand

Test Method: AS1289.3.6.1/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65 g/cm³

NATA Accreditation: 825 Site: Newcastle

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Median Particle Size (mm)	0.005
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Analysed: 28-Aug-12

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Hamish Murray
Laboratory Supervisor, Newcastle
Authorised Signatory

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES1220402	Page	: 1 of 6
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR BEN LUFFMAN	Contact	: Angelene Kumar
Address	: 230 HARBOUR DRIVE PO Box 1340 COFFS HARBOUR NSW, AUSTRALIA 2450	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ben_luffman@ghd.com	E-mail	: angelene.kumar@alsglobal.com
Telephone	: +61 02 6650 5600	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 6652 6021	Facsimile	: +61 2 8784 8555
Project	: 2216251	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 22-AUG-2012
C-O-C number	: ----	Issue Date	: 28-AUG-2012
Sampler	: JS	No. of samples received	: 19
Site	: HILLSIDE DR, URUNGA	No. of samples analysed	: 19
Quote number	: SY/270/12		

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
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils



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

- **ASS: EA037 (Rapid Field and F(ox) screening): pH F(ox) Reaction Rate: 1 - Slight; 2 - Moderate; 3 - Strong; 4 - Extreme**
- **EA037 ASS Field Screening: NATA accreditation does not cover performance of this service.**



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				SE001-0.1	SE003-0.3	SE011-0.4	SE013-0.4	SE031-0.5
				16-AUG-2012 15:00	16-AUG-2012 15:00	16-AUG-2012 15:00	16-AUG-2012 15:00	16-AUG-2012 15:00
Compound	CAS Number	LOR	Unit	ES1220402-001	ES1220402-002	ES1220402-003	ES1220402-004	ES1220402-005
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	6.7	5.9	5.7	6.6	6.6
pH (Fox)	----	0.1	pH Unit	1.9	1.8	1.8	1.6	1.5
Reaction Rate	----	1	-	3	3	3	3	3



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				SE054-03	SEDUP04	SE050-0.1	SE050-0.3	SE004-0.1
				16-AUG-2012 15:00	16-AUG-2012 15:00	16-AUG-2012 15:00	16-AUG-2012 15:00	16-AUG-2012 15:00
Compound	CAS Number	LOR	Unit	ES1220402-006	ES1220402-007	ES1220402-008	ES1220402-009	ES1220402-010
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	6.5	6.5	5.4	5.4	5.9
pH (Fox)	----	0.1	pH Unit	1.6	1.6	2.2	2.2	1.8
Reaction Rate	----	1	-	3	3	2	2	3



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				BH031_0.0-0.2	BH031_0.5-0.7	BH031_1.8-2.0	BH054_0.0-0.2	BH054_0.7-0.9
				15-AUG-2012 15:00	15-AUG-2012 15:00	15-AUG-2012 15:00	14-AUG-2012 15:00	14-AUG-2012 15:00
Compound	CAS Number	LOR	Unit	ES1220402-011	ES1220402-012	ES1220402-013	ES1220402-014	ES1220402-015
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	3.4	3.8	6.9	6.5	6.9
pH (Fox)	----	0.1	pH Unit	2.5	0.9	1.4	2.9	1.7
Reaction Rate	----	1	-	3	3	4	3	2



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				BH054_1.0-1.2	BH032_0.0-0.2	BH032_0.3-0.5	BH32_1.0-1.2	----
				14-AUG-2012 15:00	14-AUG-2012 15:00	14-AUG-2012 15:00	14-AUG-2012 15:00	----
Compound	CAS Number	LOR	Unit	ES1220402-016	ES1220402-017	ES1220402-018	ES1220402-019	----
EA037: Ass Field Screening Analysis								
pH (F)	----	0.1	pH Unit	6.7	5.9	6.3	7.1	----
pH (Fox)	----	0.1	pH Unit	1.2	2.3	1.4	1.5	----
Reaction Rate	----	1	-	3	2	2	2	----

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: EB1225565	Page	: 1 of 6
Client	: GHD PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: MR BEN LUFFMAN	Contact	: Angelene Kumar
Address	: 230 HARBOUR DRIVE PO Box 1340 COFFS HARBOUR NSW, AUSTRALIA 2450	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: ben_luffman@ghd.com	E-mail	: angelene.kumar@alsglobal.com
Telephone	: +61 02 6650 5600	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 6652 6021	Facsimile	: +61 2 8784 8555
Project	: 2216251	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 26-SEP-2012
C-O-C number	: ----	Issue Date	: 05-OCT-2012
Sampler	: J. Simkus	No. of samples received	: 9
Site	: Hillside Dr, Urunga	No. of samples analysed	: 9
Quote number	: SY/270/12		

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
Kim McCabe	Senior Inorganic Chemist	Brisbane Acid Sulphate Soils



General Comments

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Where moisture determination has been performed, results are reported on a dry weight basis.

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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

- **ASS: EA029 (SPOCAS): Excess ANC not required because pH OX less than 6.5.**
- **ASS: EA029 (SPOCAS): Liming rate is calculated and reported on a dry weight basis assuming use of fine agricultural lime (CaCO₃) and using a safety factor of 1.5 to allow for non-homogeneous mixing and poor reactivity of lime. For conversion of Liming Rate from kg/t dry weight to kg/m³ in-situ soil, multiply reported results x wet bulk density of soil in t/m³.**



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)

Client sample ID

Client sampling date / time

				BH031_0.0-0.2	BH031_0.5-0.7	BH031_1.8-2.0	BH032_0.0-0.2	BH032_0.3-0.5
				15-AUG-2012 15:00	15-AUG-2012 15:00	15-AUG-2012 15:00	14-AUG-2012 15:00	14-AUG-2012 15:00
Compound	CAS Number	LOR	Unit	EB1225565-001	EB1225565-002	EB1225565-003	EB1225565-004	EB1225565-005
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	4.0	4.8	4.5	4.6	4.4
pH OX (23B)	----	0.1	pH Unit	2.1	1.9	2.1	3.2	2.6
EA029-B: Acidity Trail								
Titrateable Actual Acidity (23F)	----	2	mole H+ / t	32	12	85	19	38
Titrateable Peroxide Acidity (23G)	----	2	mole H+ / t	64	547	702	153	151
Titrateable Sulfidic Acidity (23H)	----	2	mole H+ / t	31	536	617	<2	<2
sulfidic - Titrateable Actual Acidity (s-23F)	----	0.02	% pyrite S	0.05	<0.02	0.14	0.03	0.06
sulfidic - Titrateable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	0.10	0.88	1.12	0.24	0.24
sulfidic - Titrateable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	0.05	0.86	0.99	<0.02	<0.02
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.02	% S	<0.02	<0.02	0.04	<0.02	<0.02
Peroxide Sulfur (23De)	----	0.02	% S	0.05	0.84	0.85	0.06	0.19
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	0.05	0.84	0.81	0.06	0.19
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	29	522	504	39	118
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	<0.02	<0.02	0.14	<0.02	<0.02
Peroxide Calcium (23Wh)	----	0.02	% Ca	<0.02	<0.02	0.17	<0.02	<0.02
Acid Reacted Calcium (23X)	----	0.02	% Ca	<0.02	<0.02	0.02	<0.02	<0.02
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	<10	<10	12	<10	<10
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	<0.02
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	<0.02	<0.02	0.03	<0.02	<0.02
Peroxide Magnesium (23Tm)	----	0.02	% Mg	<0.02	<0.02	0.04	<0.02	<0.02
Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	<0.02	<0.02	<0.02	<0.02
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	<10	<10	13	<10	<10
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	<0.02	0.02	<0.02	<0.02
EA029-G: Retained Acidity								
HCl Extractable Sulfur (20Be)	----	0.02	% S	0.02	----	----	----	0.09
Net Acid Soluble Sulfur (20Je)	----	0.02	% S	0.02	----	----	----	0.09
acidity - Net Acid Soluble Sulfur (a-20J)	----	10	mole H+ / t	11	----	----	----	43
sulfidic - Net Acid Soluble Sulfur (s-20J)	----	0.02	% pyrite S	<0.02	----	----	----	0.07



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)

Client sample ID

Client sampling date / time

				BH031_0.0-0.2	BH031_0.5-0.7	BH031_1.8-2.0	BH032_0.0-0.2	BH032_0.3-0.5
				15-AUG-2012 15:00	15-AUG-2012 15:00	15-AUG-2012 15:00	14-AUG-2012 15:00	14-AUG-2012 15:00
Compound	CAS Number	LOR	Unit	EB1225565-001	EB1225565-002	EB1225565-003	EB1225565-004	EB1225565-005
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	1.5
Net Acidity (sulfur units)	----	0.02	% S	0.12	0.86	0.94	0.09	0.32
Net Acidity (acidity units)	----	10	mole H+ / t	73	534	589	58	199
Liming Rate	----	1	kg CaCO3/t	5	40	44	4	15



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)

Client sample ID

Client sampling date / time

				BH032_1.0-1.2	SE013_0.3-0.5	SE003_0.2-0.4	SE031_0.5-0.7	----
				14-AUG-2012 15:00	16-AUG-2012 15:00	16-AUG-2012 15:00	16-AUG-2012 15:00	----
Compound	CAS Number	LOR	Unit	EB1225565-006	EB1225565-007	EB1225565-008	EB1225565-009	----
EA029-A: pH Measurements								
pH KCl (23A)	----	0.1	pH Unit	5.5	4.4	4.5	4.5	----
pH OX (23B)	----	0.1	pH Unit	2.7	3.2	2.4	2.3	----
EA029-B: Acidity Trail								
Titrateable Actual Acidity (23F)	----	2	mole H+ / t	18	260	56	87	----
Titrateable Peroxide Acidity (23G)	----	2	mole H+ / t	352	1010	356	712	----
Titrateable Sulfidic Acidity (23H)	----	2	mole H+ / t	334	746	300	625	----
sulfidic - Titrateable Actual Acidity (s-23F)	----	0.02	% pyrite S	0.03	0.42	0.09	0.14	----
sulfidic - Titrateable Peroxide Acidity (s-23G)	----	0.02	% pyrite S	0.56	1.61	0.57	1.14	----
sulfidic - Titrateable Sulfidic Acidity (s-23H)	----	0.02	% pyrite S	0.54	1.20	0.48	1.00	----
EA029-C: Sulfur Trail								
KCl Extractable Sulfur (23Ce)	----	0.02	% S	0.03	0.03	<0.02	<0.02	----
Peroxide Sulfur (23De)	----	0.02	% S	0.50	0.54	0.22	0.43	----
Peroxide Oxidisable Sulfur (23E)	----	0.02	% S	0.48	0.50	0.22	0.43	----
acidity - Peroxide Oxidisable Sulfur (a-23E)	----	10	mole H+ / t	297	313	141	268	----
EA029-D: Calcium Values								
KCl Extractable Calcium (23Vh)	----	0.02	% Ca	0.14	0.10	0.05	0.13	----
Peroxide Calcium (23Wh)	----	0.02	% Ca	0.18	0.12	0.06	0.15	----
Acid Reacted Calcium (23X)	----	0.02	% Ca	0.03	<0.02	<0.02	0.02	----
acidity - Acid Reacted Calcium (a-23X)	----	10	mole H+ / t	16	<10	<10	12	----
sulfidic - Acid Reacted Calcium (s-23X)	----	0.02	% S	0.02	<0.02	<0.02	<0.02	----
EA029-E: Magnesium Values								
KCl Extractable Magnesium (23Sm)	----	0.02	% Mg	0.08	0.04	0.04	0.09	----
Peroxide Magnesium (23Tm)	----	0.02	% Mg	0.09	0.05	0.05	0.10	----
Acid Reacted Magnesium (23U)	----	0.02	% Mg	<0.02	<0.02	<0.02	<0.02	----
Acidity - Acid Reacted Magnesium (a-23U)	----	10	mole H+ / t	11	<10	<10	<10	----
sulfidic - Acid Reacted Magnesium (s-23U)	----	0.02	% S	<0.02	<0.02	<0.02	<0.02	----
EA029-G: Retained Acidity								
HCl Extractable Sulfur (20Be)	----	0.02	% S	----	0.08	----	----	----
Net Acid Soluble Sulfur (20Je)	----	0.02	% S	----	0.04	----	----	----
acidity - Net Acid Soluble Sulfur (a-20J)	----	10	mole H+ / t	----	20	----	----	----
sulfidic - Net Acid Soluble Sulfur (s-20J)	----	0.02	% pyrite S	----	0.03	----	----	----



Analytical Results

Sub-Matrix: SOIL (Matrix: SOIL)

Client sample ID

Client sampling date / time

				BH032_1.0-1.2	SE013_0.3-0.5	SE003_0.2-0.4	SE031_0.5-0.7	----
				14-AUG-2012 15:00	16-AUG-2012 15:00	16-AUG-2012 15:00	16-AUG-2012 15:00	----
Compound	CAS Number	LOR	Unit	EB1225565-006	EB1225565-007	EB1225565-008	EB1225565-009	----
EA029-H: Acid Base Accounting								
ANC Fineness Factor	----	0.5	-	1.5	1.5	1.5	1.5	----
Net Acidity (sulfur units)	----	0.02	% S	0.50	0.95	0.32	0.57	----
Net Acidity (acidity units)	----	10	mole H+ / t	315	594	197	355	----
Liming Rate	----	1	kg CaCO3/t	24	44	15	27	----

Certificate of Analysis

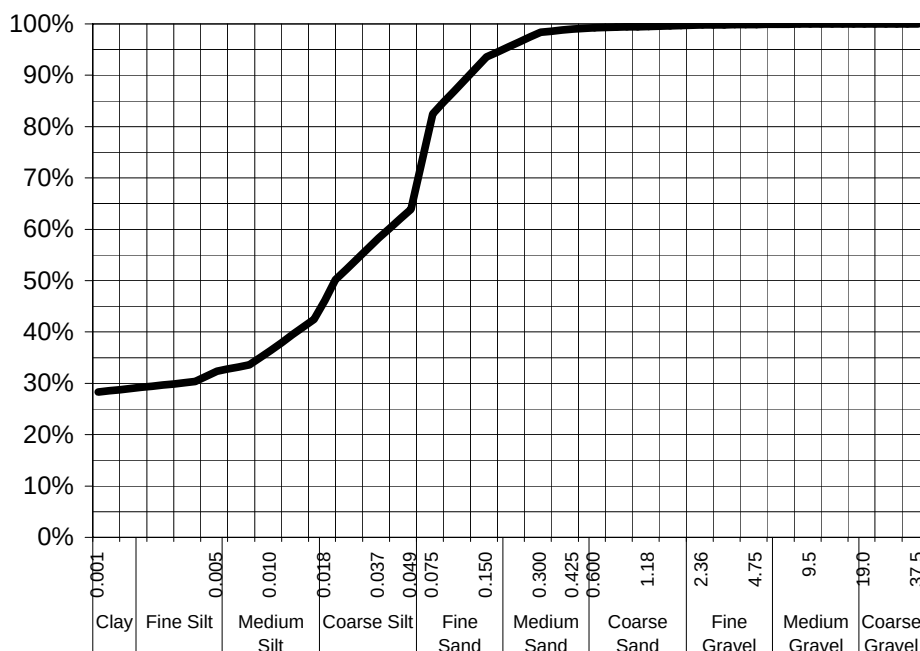
ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental Newcastle, NSW



CLIENT: Ben Luffman
DATE REPORTED: 4-Oct-2012
COMPANY: GHD Pty Ltd
DATE RECEIVED: 26-Sep-2012
ADDRESS: 230 Harbour Drive
PO Box 1340
Coffs Harbour, NSW 2450
REPORT NO: ES1223062-025 / PSD
PROJECT: 2216251
SAMPLE ID: SE003_0.2-0.4

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	100%
1.18	100%
0.600	99%
0.425	99%
0.300	98%
0.150	94%
0.075	82%
Particle Size (microns)	
49	64%
37	58%
18	46%
10	36%
5	32%
3	30%
1	28%

Samples analysed as received.

Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Sample Comments:

Loss on Pretreatment NA

Sample Description: Silty clay and fine sand

Test Method: AS1289.3.6.1/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65 g/cm³

NATA Accreditation: 825 Site: Newcastle

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Median Particle Size (mm)	0.020
---------------------------	-------

Analysed: 2-Oct-12

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Hamish Murray
Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

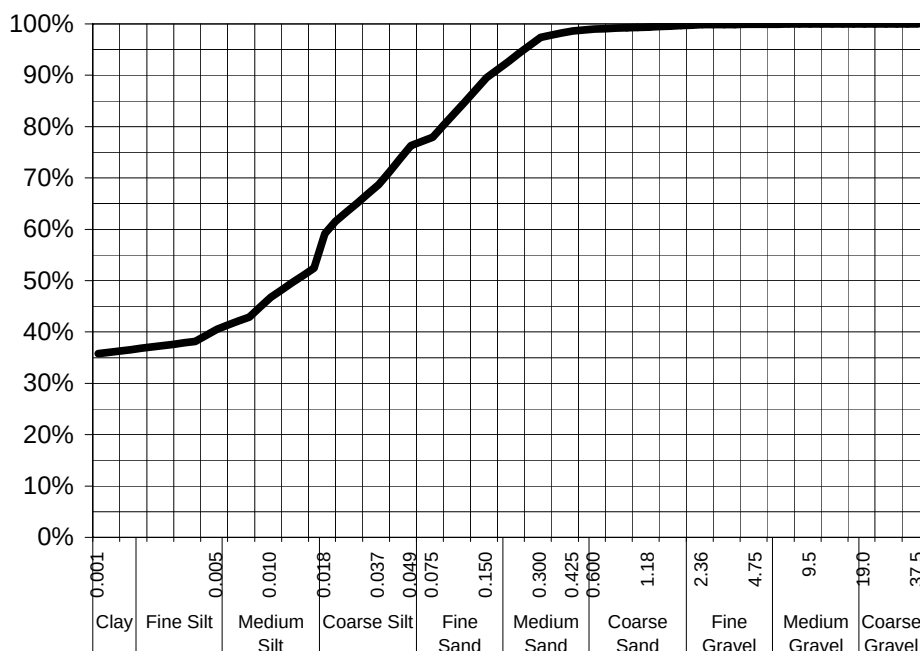
ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental Newcastle, NSW



CLIENT: Ben Luffman
DATE REPORTED: 4-Oct-2012
COMPANY: GHD Pty Ltd
DATE RECEIVED: 26-Sep-2012
ADDRESS: 230 Harbour Drive
PO Box 1340
Coffs Harbour, NSW 2450
REPORT NO: ES1223062-026 / PSD
PROJECT: 2216251
SAMPLE ID: SE002_0.5-0.7

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	100%
1.18	99%
0.600	99%
0.425	99%
0.300	97%
0.150	89%
0.075	78%
Particle Size (microns)	
49	76%
37	69%
18	59%
10	47%
5	41%
3	38%
1	36%

Samples analysed as received.

Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Sample Comments:

Loss on Pretreatment NA

Sample Description: Silty clay and medium fine sand

Test Method: AS1289.3.6.1/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65 g/cm³

NATA Accreditation: 825 Site: Newcastle

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Median Particle Size (mm)	0.014
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Analysed: 2-Oct-12

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Hamish Murray
Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

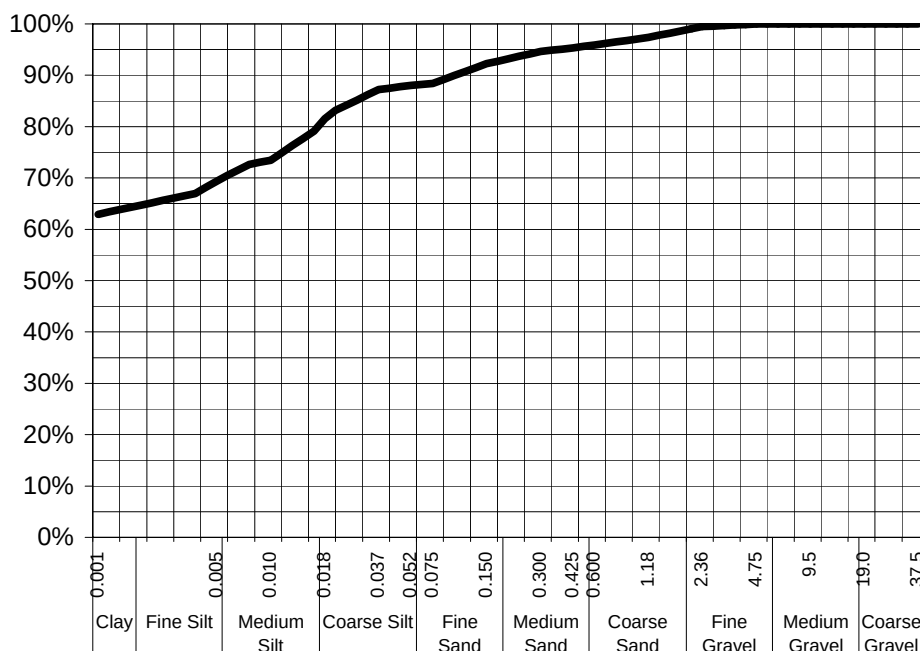
ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental Newcastle, NSW



CLIENT: Ben Luffman
DATE REPORTED: 4-Oct-2012
COMPANY: GHD Pty Ltd
DATE RECEIVED: 26-Sep-2012
ADDRESS: 230 Harbour Drive
PO Box 1340
Coffs Harbour, NSW 2450
REPORT NO: ES1223062-027 / PSD
PROJECT: 2216251
SAMPLE ID: SE011_0.7-0.9

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	99%
1.18	97%
0.600	96%
0.425	95%
0.300	95%
0.150	92%
0.075	88%
Particle Size (microns)	
52	88%
37	87%
18	82%
10	73%
5	69%
4	67%
1	63%

Samples analysed as received.

Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Sample Comments:

Loss on Pretreatment NA

Sample Description: Silty clay and fine sand

Test Method: AS1289.3.6.1/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65 g/cm³

NATA Accreditation: 825 Site: Newcastle

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Median Particle Size (mm) <0.001

Analysed: 2-Oct-12

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Hamish Murray
Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

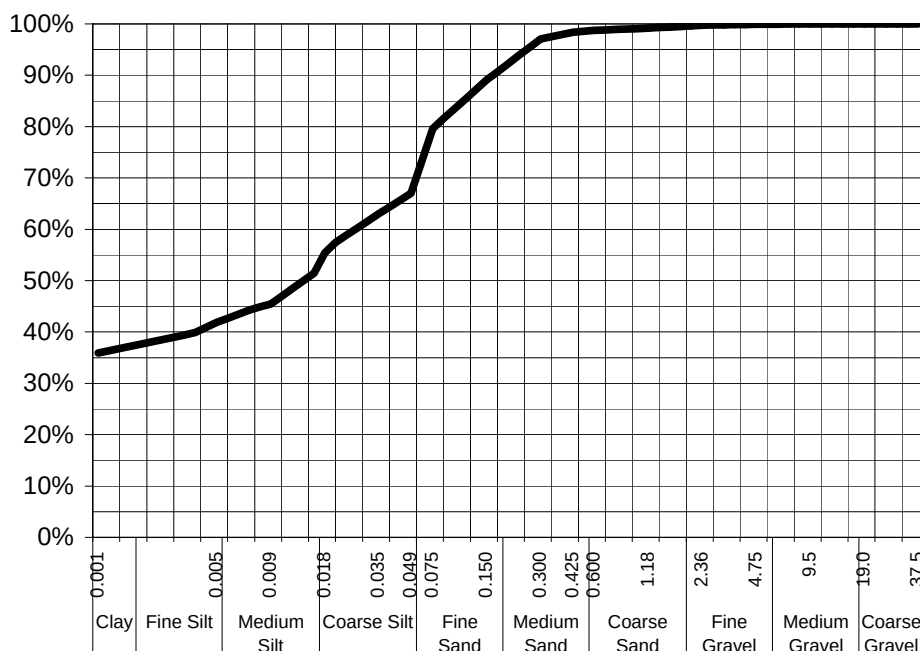
ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental Newcastle, NSW



CLIENT: Ben Luffman
DATE REPORTED: 4-Oct-2012
COMPANY: GHD Pty Ltd
DATE RECEIVED: 26-Sep-2012
ADDRESS: 230 Harbour Drive
PO Box 1340
Coffs Harbour, NSW 2450
REPORT NO: ES1223062-028 / PSD
PROJECT: 2216251
SAMPLE ID: SE004_0.2-0.3

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	100%
1.18	99%
0.600	99%
0.425	98%
0.300	97%
0.150	89%
0.075	80%
Particle Size (microns)	
49	67%
35	63%
18	55%
9	45%
5	42%
3	40%
1	36%

Samples analysed as received.

Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Sample Comments:

Loss on Pretreatment NA

Sample Description: Silty clay and medium fine sand

Test Method: AS1289.3.6.1/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65 g/cm³

NATA Accreditation: 825 Site: Newcastle

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Median Particle Size (mm)	0.016
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Analysed: 2-Oct-12

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Hamish Murray
Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

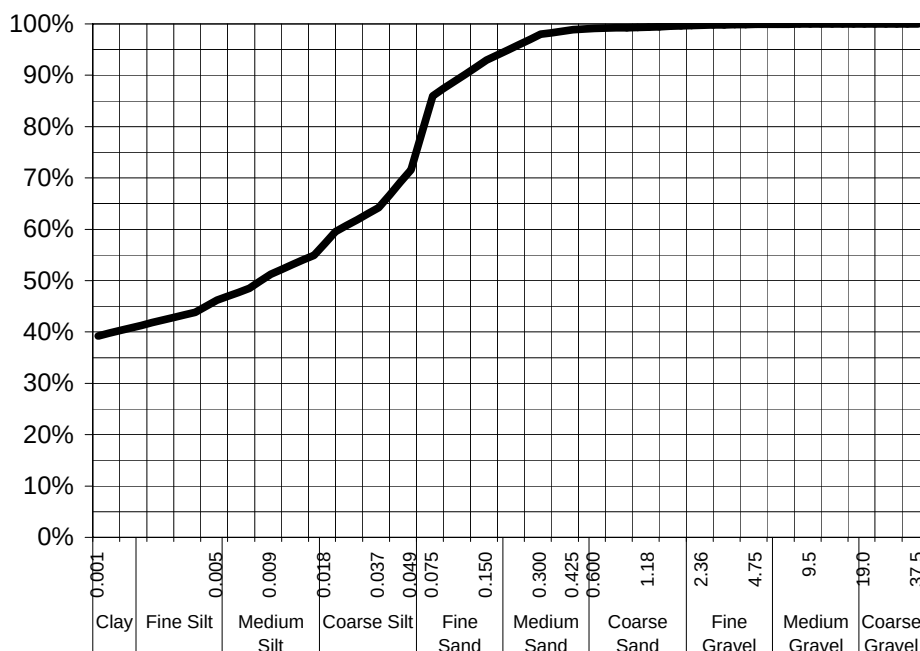
ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental Newcastle, NSW



CLIENT: Ben Luffman
DATE REPORTED: 4-Oct-2012
COMPANY: GHD Pty Ltd
DATE RECEIVED: 26-Sep-2012
ADDRESS: 230 Harbour Drive
PO Box 1340
Coffs Harbour, NSW 2450
REPORT NO: ES1223062-029 / PSD
PROJECT: 2216251
SAMPLE ID: SE004_0.4-0.6

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	100%
1.18	99%
0.600	99%
0.425	99%
0.300	98%
0.150	93%
0.075	86%
Particle Size (microns)	
49	72%
37	64%
18	57%
9	51%
5	46%
3	44%
1	39%

Samples analysed as received.

Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Sample Comments:

Loss on Pretreatment NA

Sample Description: Silty clay and fine sand

Test Method: AS1289.3.6.1/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65 g/cm³

NATA Accreditation: 825 Site: Newcastle

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Median Particle Size (mm)	0.009
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Analysed: 2-Oct-12

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Hamish Murray
Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

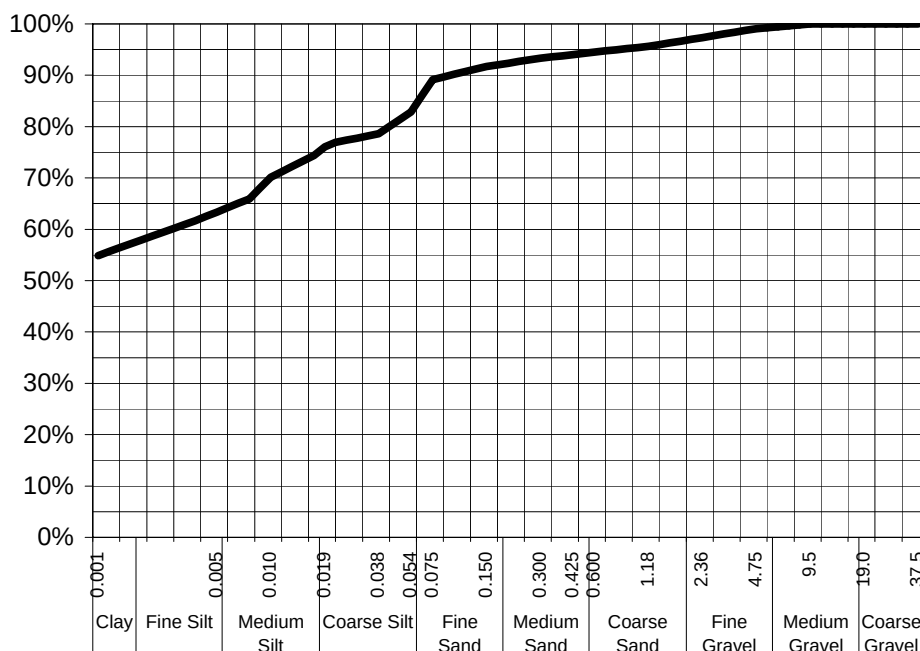
ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental Newcastle, NSW



CLIENT: Ben Luffman
DATE REPORTED: 4-Oct-2012
COMPANY: GHD Pty Ltd
DATE RECEIVED: 26-Sep-2012
ADDRESS: 230 Harbour Drive
PO Box 1340
Coffs Harbour, NSW 2450
REPORT NO: ES1223062-030 / PSD
PROJECT: 2216251
SAMPLE ID: SE033_0.0-0.05

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	99%
2.36	97%
1.18	96%
0.600	95%
0.425	94%
0.300	93%
0.150	92%
0.075	89%
Particle Size (microns)	
54	83%
38	79%
19	76%
10	70%
5	63%
4	62%
1	55%

Samples analysed as received.

Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Sample Comments:

Loss on Pretreatment NA

Sample Description: Silty clay and fine sand

Test Method: AS1289.3.6.1/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65 g/cm³

NATA Accreditation: 825 Site: Newcastle

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Median Particle Size (mm) <0.001

Analysed: 2-Oct-12

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Hamish Murray
Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

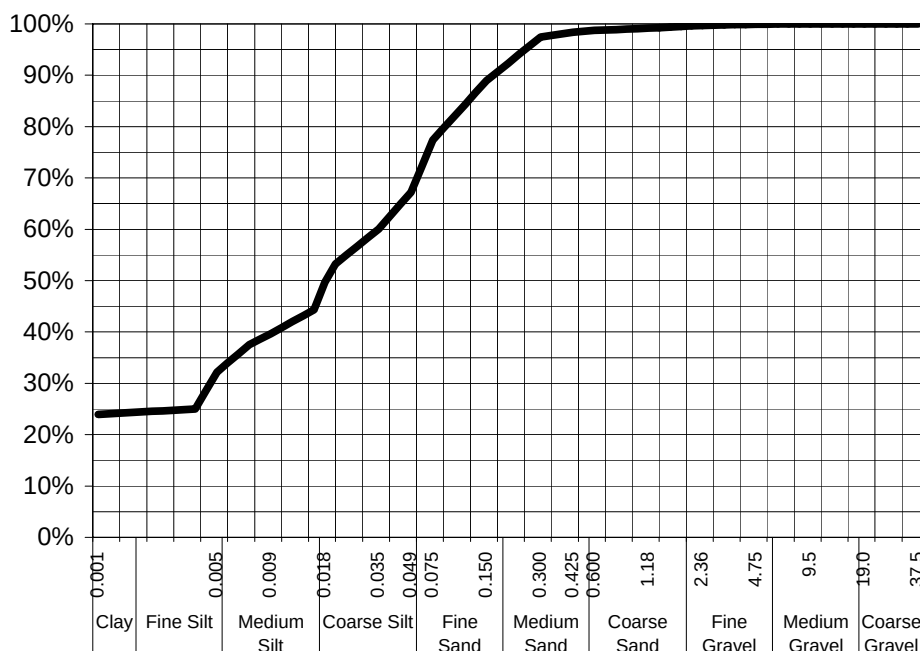
ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental Newcastle, NSW



CLIENT: Ben Luffman
DATE REPORTED: 4-Oct-2012
COMPANY: GHD Pty Ltd
DATE RECEIVED: 26-Sep-2012
ADDRESS: 230 Harbour Drive
PO Box 1340
Coffs Harbour, NSW 2450
REPORT NO: ES1223062-031 / PSD
PROJECT: 2216251
SAMPLE ID: SE033_0.2-0.4

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	100%
1.18	99%
0.600	99%
0.425	98%
0.300	97%
0.150	89%
0.075	77%
Particle Size (microns)	
49	67%
35	60%
18	50%
9	40%
5	32%
3	25%
1	24%

Samples analysed as received.

Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Sample Comments:

Loss on Pretreatment NA

Sample Description: Silty clay and medium fine sand

Test Method: AS1289.3.6.1/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65 g/cm³

NATA Accreditation: 825 Site: Newcastle

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Median Particle Size (mm)	0.020
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Analysed: 2-Oct-12

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Hamish Murray
Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

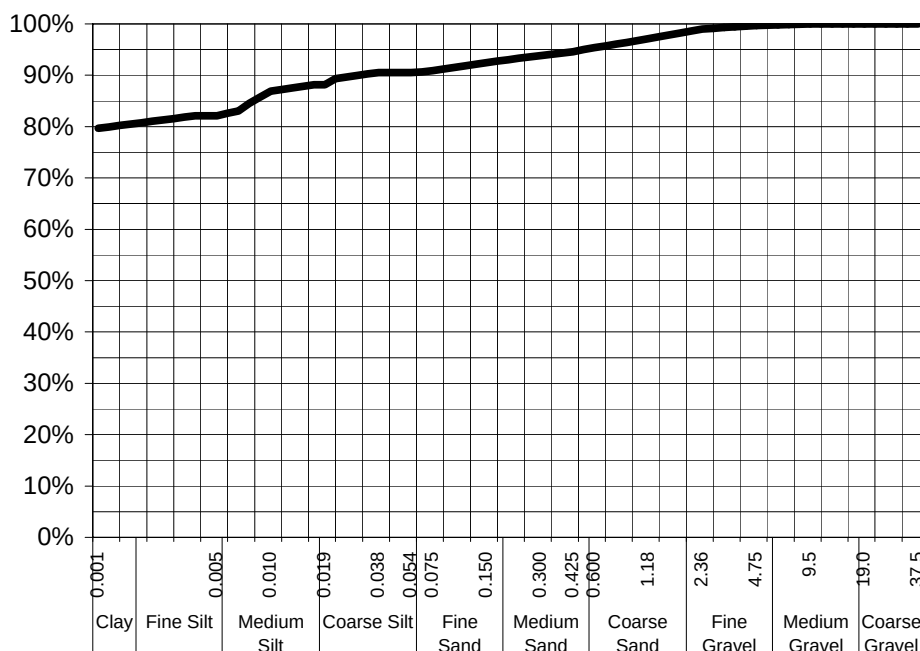
ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental Newcastle, NSW



CLIENT: Ben Luffman
DATE REPORTED: 4-Oct-2012
COMPANY: GHD Pty Ltd
DATE RECEIVED: 26-Sep-2012
ADDRESS: 230 Harbour Drive
PO Box 1340
Coffs Harbour, NSW 2450
REPORT NO: ES1223062-032 / PSD
PROJECT: 2216251
SAMPLE ID: SE033_0.4-0.6

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	99%
1.18	97%
0.600	95%
0.425	95%
0.300	94%
0.150	92%
0.075	91%
Particle Size (microns)	
54	91%
38	91%
19	88%
10	87%
5	82%
3	82%
1	80%

Samples analysed as received.

Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Sample Comments:

Loss on Pretreatment NA

Sample Description: Silty clay

Test Method: AS1289.3.6.1/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65 g/cm³

NATA Accreditation: 825 Site: Newcastle

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Median Particle Size (mm) <0.001

Analysed: 2-Oct-12

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Hamish Murray
Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

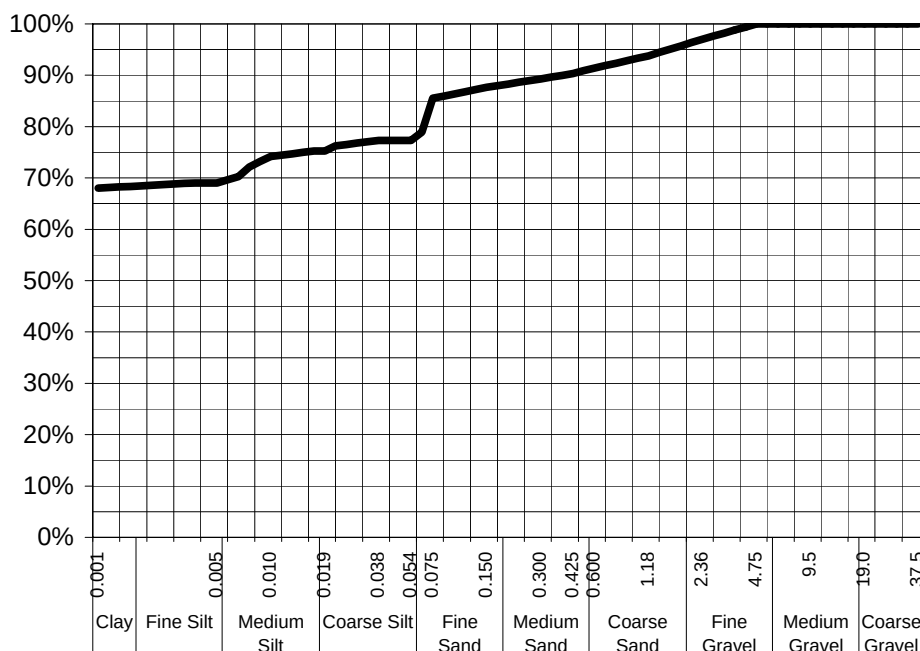
ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental
Newcastle, NSW



CLIENT: Ben Luffman
DATE REPORTED: 4-Oct-2012
COMPANY: GHD Pty Ltd
DATE RECEIVED: 26-Sep-2012
ADDRESS: 230 Harbour Drive
PO Box 1340
Coffs Harbour, NSW 2450
REPORT NO: ES1223062-033 / PSD
PROJECT: 2216251
SAMPLE ID: SE063_0.0-0.1

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	97%
1.18	94%
0.600	91%
0.425	90%
0.300	89%
0.150	88%
0.075	86%
Particle Size (microns)	
54	77%
38	77%
19	75%
10	74%
5	69%
3	69%
1	68%

Samples analysed as received.

Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Sample Comments:

Loss on Pretreatment NA

Sample Description: Silty clay and sand

Test Method: AS1289.3.6.1/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65 g/cm³

NATA Accreditation: 825 Site: Newcastle

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Median Particle Size (mm) <0.001

Analysed: 2-Oct-12

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Hamish Murray
Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

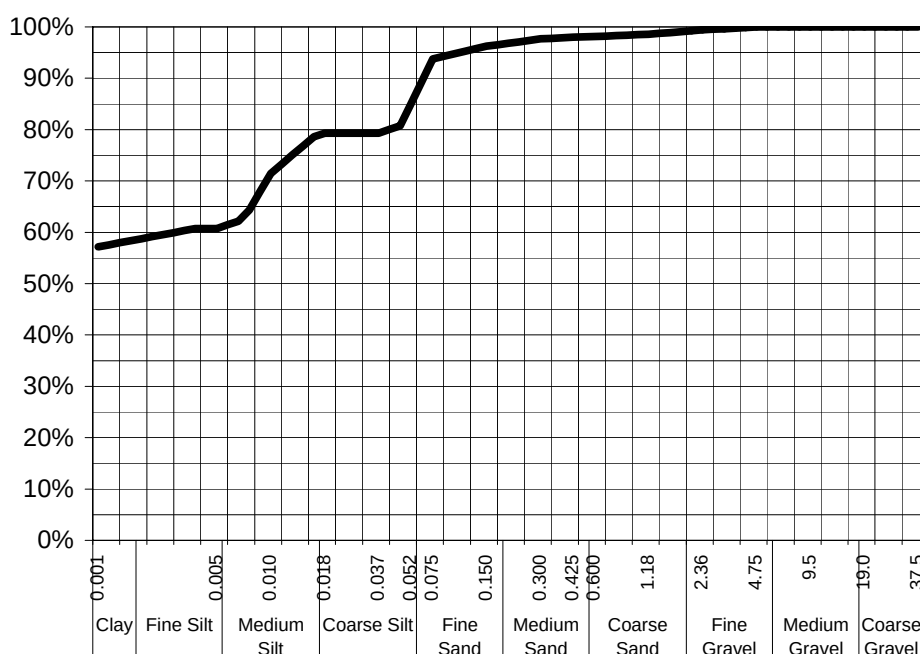
ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental Newcastle, NSW



CLIENT: Ben Luffman
DATE REPORTED: 4-Oct-2012
COMPANY: GHD Pty Ltd
DATE RECEIVED: 26-Sep-2012
ADDRESS: 230 Harbour Drive
PO Box 1340
Coffs Harbour, NSW 2450
REPORT NO: ES1223062-034 / PSD
PROJECT: 2216251
SAMPLE ID: SE063_0.2-0.3

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	99%
1.18	99%
0.600	98%
0.425	98%
0.300	98%
0.150	96%
0.075	94%
Particle Size (microns)	
52	85%
37	79%
18	79%
10	71%
5	61%
3	61%
1	57%

Samples analysed as received.

Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Sample Comments:

Loss on Pretreatment NA

Sample Description: Silty clay

Test Method: AS1289.3.6.1/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65 g/cm³

NATA Accreditation: 825 Site: Newcastle

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Median Particle Size (mm) <0.001

Analysed: 2-Oct-12

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Hamish Murray
Laboratory Supervisor, Newcastle
Authorised Signatory

Certificate of Analysis

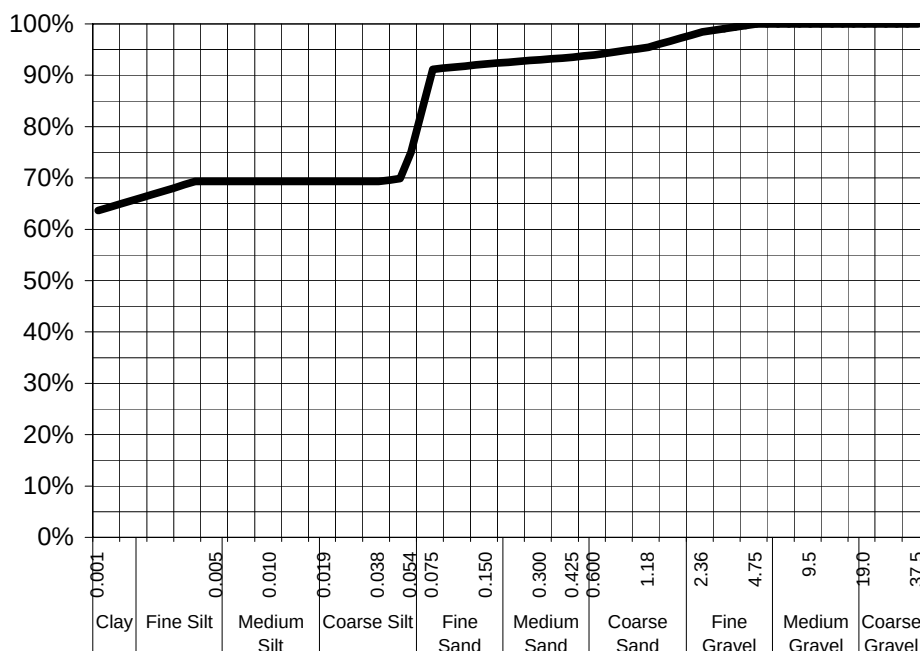
ALS Laboratory Group Pty Ltd
5 Rosegum Road
Warabrook, NSW 2304
pH 02 4968 9433
fax 02 4968 0349
samples.newcastle@alsenviro.com

ALS Environmental
Newcastle, NSW



CLIENT: Ben Luffman
DATE REPORTED: 4-Oct-2012
COMPANY: GHD Pty Ltd
DATE RECEIVED: 26-Sep-2012
ADDRESS: 230 Harbour Drive
PO Box 1340
Coffs Harbour, NSW 2450
REPORT NO: ES1223062-035 / PSD
PROJECT: 2216251
SAMPLE ID: SE063_0.4-0.6

Particle Size Distribution



Particle Size (mm)	Percent Passing
19.0	100%
9.5	100%
4.75	100%
2.36	98%
1.18	95%
0.600	94%
0.425	94%
0.300	93%
0.150	92%
0.075	91%
Particle Size (microns)	
54	75%
38	69%
19	69%
10	69%
5	69%
4	69%
1	64%

Samples analysed as received.

Soil Particle Density required for Hydrometer analysis according to AS 1289.3.5.1—2006 was not requested by the client. Typical sediment SPD values used for calculations and consequently, NATA endorsement does not apply to hydrometer results

Sample Comments:

Loss on Pretreatment NA

Sample Description: Silty clay

Test Method: AS1289.3.6.1/AS1289.3.6.3

Soil Particle Density (<2.36mm) 2.65 g/cm³

NATA Accreditation: 825 Site: Newcastle

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Median Particle Size (mm) <0.001

Analysed: 2-Oct-12

Limit of Reporting: 1%

Dispersion Method Shaker

Hydrometer Type ASTM E100

Hamish Murray
Laboratory Supervisor, Newcastle
Authorised Signatory

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES1223062	Page	: 1 of 14
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR BEN LUFFMAN	Contact	: Angelene Kumar
Address	: 230 HARBOUR DRIVE PO Box 1340 COFFS HARBOUR NSW, AUSTRALIA 2450	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ben_luffman@ghd.com	E-mail	: angelene.kumar@alsglobal.com
Telephone	: +61 02 6650 5600	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 6652 6021	Facsimile	: +61 2 8784 8555
Project	: 2216251	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----		
C-O-C number	: ----	Date Samples Received	: 26-SEP-2012
Sampler	: JS	Issue Date	: 04-OCT-2012
Site	: HILLSIDE DR, URUNGA		
Quote number	: SY/270/12	No. of samples received	: 35
		No. of samples analysed	: 35

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	Newcastle
Evie Sidarta	Inorganic Chemist	Sydney Inorganics
Wisam Marassa	Inorganics Coordinator	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

- **EG035: Positive mercury results have been confirmed by re-analysis.**



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				BH032_0.3-0.5	BHDUP01	BH012_0.0-0.1	BHDUP08	BH073_1.0-1.2
				14-AUG-2012 15:00	14-AUG-2012 15:00	16-AUG-2012 15:00	16-AUG-2012 15:00	15-AUG-2012 15:00
Compound	CAS Number	LOR	Unit	ES1223062-001	ES1223062-002	ES1223062-003	ES1223062-004	ES1223062-005
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	35.9	33.6	41.2	44.1	17.0
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	78.8	82.0	0.1	<0.1	0.8
EN33: TCLP Leach								
Initial pH	----	0.1	pH Unit	6.9	6.6	5.8	5.7	4.8
After HCl pH	----	0.1	pH Unit	1.9	1.8	1.9	1.9	----
Extraction Fluid Number	----	1	-	1	1	1	1	1
Final pH	----	0.1	pH Unit	5.0	5.0	4.9	4.9	4.9



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				BH077_0.0-0.2	BH077_2.0-2.2	BH101_0.0-0.2	BH022_0.5-0.7	BH028_0.0-0.2
				14-AUG-2012 15:00	14-AUG-2012 15:00	16-AUG-2012 15:00	16-AUG-2012 15:00	16-AUG-2012 15:00
Compound	CAS Number	LOR	Unit	ES1223062-006	ES1223062-007	ES1223062-008	ES1223062-009	ES1223062-010
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	17.1	72.5	27.2	18.4	5.2
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	2.0	0.8	343	0.3	47.3
EN33: TCLP Leach								
Initial pH	----	0.1	pH Unit	4.8	5.6	3.6	5.4	3.6
After HCl pH	----	0.1	pH Unit	----	2.0	----	1.9	----
Extraction Fluid Number	----	1	-	1	1	1	1	1
Final pH	----	0.1	pH Unit	4.9	5.0	4.9	5.0	4.9



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				BH028_0.3-0.5	BH020_0.0-0.2	SE014_0.2-0.4	SE067_0.0-0.1	SE068_0.0-0.1
				16-AUG-2012 15:00	16-AUG-2012 15:00	15-AUG-2012 15:00	15-AUG-2012 15:00	15-AUG-2012 15:00
Compound	CAS Number	LOR	Unit	ES1223062-011	ES1223062-012	ES1223062-013	ES1223062-014	ES1223062-015
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	10.4	13.6	37.1	84.2	73.4
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	30.6	0.6	0.2	0.9	0.2
EN33: TCLP Leach								
Initial pH	----	0.1	pH Unit	4.0	5.0	5.8	5.5	6.9
After HCl pH	----	0.1	pH Unit	----	1.8	1.9	1.9	1.7
Extraction Fluid Number	----	1	-	1	1	1	1	1
Final pH	----	0.1	pH Unit	5.0	5.0	4.9	4.9	4.9



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				SE064_0.2-0.3	SE001_0.4-0.6	SE042_0.2-0.4	SE041_0.0-0.05	SE041_0.1-0.3
				15-AUG-2012 15:00	14-AUG-2012 15:00	14-AUG-2012 15:00	14-AUG-2012 15:00	14-AUG-2012 15:00
Compound	CAS Number	LOR	Unit	ES1223062-016	ES1223062-017	ES1223062-018	ES1223062-019	ES1223062-020
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	41.6	65.9	35.4	69.5	50.1
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	0.1	26.0	0.2	62.6	0.3
EN33: TCLP Leach								
Initial pH	----	0.1	pH Unit	6.5	4.5	5.8	4.7	5.4
After HCl pH	----	0.1	pH Unit	1.7	----	1.7	1.7	1.7
Extraction Fluid Number	----	1	-	1	1	1	1	1
Final pH	----	0.1	pH Unit	4.9	4.9	4.9	4.9	4.9



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				SE050_0.4-0.6	SE032_0.0-0.1	SEDUP01	SEDUP02	SE003_0.2-0.4
				15-AUG-2012 15:00	14-AUG-2012 15:00	14-AUG-2012 15:00	15-AUG-2012 15:00	16-AUG-2012 15:00
Compound	CAS Number	LOR	Unit	ES1223062-021	ES1223062-022	ES1223062-023	ES1223062-024	ES1223062-025
EA150: Particle Sizing								
+75µm	----	1	%	----	----	----	----	18
+150µm	----	1	%	----	----	----	----	6
+300µm	----	1	%	----	----	----	----	2
+425µm	----	1	%	----	----	----	----	1
+600µm	----	1	%	----	----	----	----	<1
+1180µm	----	1	%	----	----	----	----	<1
+2.36mm	----	1	%	----	----	----	----	<1
+4.75mm	----	1	%	----	----	----	----	<1
+9.5mm	----	1	%	----	----	----	----	<1
+19.0mm	----	1	%	----	----	----	----	<1
+37.5mm	----	1	%	----	----	----	----	<1
+75.0mm	----	1	%	----	----	----	----	<1
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	63.8	41.6	48.2	63.2	----
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	----	----	----	----	28
Silt (2-60 µm)	----	1	%	----	----	----	----	47
Sand (0.06-2.00 mm)	----	1	%	----	----	----	----	25
Gravel (>2mm)	----	1	%	----	----	----	----	<1
Cobbles (>6cm)	----	1	%	----	----	----	----	<1
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	0.3	151	0.6	1.6	----
EN33: TCLP Leach								
Initial pH	----	0.1	pH Unit	5.4	4.1	6.0	4.6	----
After HCl pH	----	0.1	pH Unit	1.8	----	1.7	----	----
Extraction Fluid Number	----	1	-	1	1	1	1	----
Final pH	----	0.1	pH Unit	4.9	4.9	4.9	4.9	----



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				SE002_0.5-0.7	SE011_0.7-0.9	SE004_0.2-0.3	SE004_0.4-0.6	SE033_0.0-0.05
				14-AUG-2012 15:00	14-AUG-2012 15:00	16-AUG-2012 15:00	16-AUG-2012 15:00	15-AUG-2012 15:00
Compound	CAS Number	LOR	Unit	ES1223062-026	ES1223062-027	ES1223062-028	ES1223062-029	ES1223062-030
EA150: Particle Sizing								
+75µm	----	1	%	22	12	20	14	11
+150µm	----	1	%	10	8	11	7	8
+300µm	----	1	%	3	5	3	2	7
+425µm	----	1	%	1	5	2	1	6
+600µm	----	1	%	1	4	1	<1	5
+1180µm	----	1	%	<1	3	<1	<1	4
+2.36mm	----	1	%	<1	<1	<1	<1	3
+4.75mm	----	1	%	<1	<1	<1	<1	<1
+9.5mm	----	1	%	<1	<1	<1	<1	<1
+19.0mm	----	1	%	<1	<1	<1	<1	<1
+37.5mm	----	1	%	<1	<1	<1	<1	<1
+75.0mm	----	1	%	<1	<1	<1	<1	<1
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	36	63	36	39	55
Silt (2-60 µm)	----	1	%	41	25	44	47	30
Sand (0.06-2.00 mm)	----	1	%	23	11	20	14	12
Gravel (>2mm)	----	1	%	<1	1	<1	<1	3
Cobbles (>6cm)	----	1	%	<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				SE033_0.2-0.4	SE033_0.4-0.6	SE063_0.0-0.1	SE063_0.2-0.3	SE063_0.4-0.6
				15-AUG-2012 15:00	15-AUG-2012 15:00	15-AUG-2012 15:00	15-AUG-2012 15:00	15-AUG-2012 15:00
Compound	CAS Number	LOR	Unit	ES1223062-031	ES1223062-032	ES1223062-033	ES1223062-034	ES1223062-035
EA150: Particle Sizing								
+75µm	----	1	%	23	9	14	6	9
+150µm	----	1	%	11	8	12	4	8
+300µm	----	1	%	2	6	11	2	7
+425µm	----	1	%	2	5	10	2	6
+600µm	----	1	%	1	5	9	2	6
+1180µm	----	1	%	<1	3	6	1	4
+2.36mm	----	1	%	<1	1	3	<1	2
+4.75mm	----	1	%	<1	<1	<1	<1	<1
+9.5mm	----	1	%	<1	<1	<1	<1	<1
+19.0mm	----	1	%	<1	<1	<1	<1	<1
+37.5mm	----	1	%	<1	<1	<1	<1	<1
+75.0mm	----	1	%	<1	<1	<1	<1	<1
EA150: Soil Classification based on Particle Size								
Clay (<2 µm)	----	1	%	24	80	68	57	64
Silt (2-60 µm)	----	1	%	54	11	12	36	27
Sand (0.06-2.00 mm)	----	1	%	22	8	17	6	7
Gravel (>2mm)	----	1	%	<1	1	3	1	2
Cobbles (>6cm)	----	1	%	<1	<1	<1	<1	<1



Analytical Results

Sub-Matrix: TCLP LEACHATE

Client sample ID

Client sampling date / time

				BH032_0.3-0.5	BHDUP01	BH012_0.0-0.1	BHDUP08	BH073_1.0-1.2
				14-AUG-2012 15:00	14-AUG-2012 15:00	16-AUG-2012 15:00	16-AUG-2012 15:00	15-AUG-2012 15:00
Compound	CAS Number	LOR	Unit	ES1223062-001	ES1223062-002	ES1223062-003	ES1223062-004	ES1223062-005
EG005C: Leachable Metals by ICPAES								
Aluminium	7429-90-5	0.1	mg/L	2.5	2.0	4.7	3.9	1.7
Antimony	7440-36-0	0.1	mg/L	3.1	2.5	<0.1	<0.1	<0.1
Arsenic	7440-38-2	0.1	mg/L	14.4	19.2	<0.1	<0.1	<0.1
Cadmium	7440-43-9	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium	7440-47-3	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/L	0.2	0.2	<0.1	<0.1	1.6
Lead	7439-92-1	0.1	mg/L	0.1	<0.1	<0.1	<0.1	11.6
Nickel	7440-02-0	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/L	0.4	0.4	0.9	0.8	4.8
EG035C: Leachable Mercury by FIMS								
Mercury	7439-97-6	0.0010	mg/L	0.0011	<0.0010	<0.0010	<0.0010	<0.0010



Analytical Results

Sub-Matrix: TCLP LEACHATE

Client sample ID

Client sampling date / time

				BH077_0.0-0.2	BH077_2.0-2.2	BH101_0.0-0.2	BH022_0.5-0.7	BH028_0.0-0.2
				14-AUG-2012 15:00	14-AUG-2012 15:00	16-AUG-2012 15:00	16-AUG-2012 15:00	16-AUG-2012 15:00
Compound	CAS Number	LOR	Unit	ES1223062-006	ES1223062-007	ES1223062-008	ES1223062-009	ES1223062-010
EG005C: Leachable Metals by ICPAES								
Aluminium	7429-90-5	0.1	mg/L	3.4	4.0	1.2	6.2	0.6
Antimony	7440-36-0	0.1	mg/L	<0.1	0.4	6.1	1.7	4.2
Arsenic	7440-38-2	0.1	mg/L	<0.1	<0.1	0.2	0.2	1.6
Cadmium	7440-43-9	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium	7440-47-3	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/L	<0.1	<0.1	0.5	<0.1	<0.1
Lead	7439-92-1	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	7440-02-0	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/L	0.3	1.5	0.1	0.7	0.1
EG035C: Leachable Mercury by FIMS								
Mercury	7439-97-6	0.0010	mg/L	<0.0010	<0.0010	0.0011	<0.0010	<0.0010



Analytical Results

Sub-Matrix: TCLP LEACHATE

Client sample ID

Client sampling date / time

				BH028_0.3-0.5	BH020_0.0-0.2	SE014_0.2-0.4	SE067_0.0-0.1	SE068_0.0-0.1
				16-AUG-2012 15:00	16-AUG-2012 15:00	15-AUG-2012 15:00	15-AUG-2012 15:00	04-OCT-2012 12:00
Compound	CAS Number	LOR	Unit	ES1223062-011	ES1223062-012	ES1223062-013	ES1223062-014	ES1223062-015
EG005C: Leachable Metals by ICPAES								
Aluminium	7429-90-5	0.1	mg/L	1.5	1.5	5.1	1.2	1.0
Antimony	7440-36-0	0.1	mg/L	0.3	<0.1	1.0	0.6	1.1
Arsenic	7440-38-2	0.1	mg/L	<0.1	<0.1	0.6	0.1	0.3
Cadmium	7440-43-9	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium	7440-47-3	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/L	<0.1	1.1	<0.1	<0.1	<0.1
Lead	7439-92-1	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	7440-02-0	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/L	0.2	1.2	9.1	1.4	10.6
EG035C: Leachable Mercury by FIMS								
Mercury	7439-97-6	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010



Analytical Results

Sub-Matrix: TCLP LEACHATE

Client sample ID

Client sampling date / time

				SE064_0.2-0.3	SE001_0.4-0.6	SE042_0.2-0.4	SE041_0.0-0.05	SE041_0.1-0.3
				04-OCT-2012 12:00	04-OCT-2012 12:00	04-OCT-2012 12:00	04-OCT-2012 12:00	04-OCT-2012 12:00
Compound	CAS Number	LOR	Unit	ES1223062-016	ES1223062-017	ES1223062-018	ES1223062-019	ES1223062-020
EG005C: Leachable Metals by ICPAES								
Aluminium	7429-90-5	0.1	mg/L	12.2	5.9	6.3	1.5	4.0
Antimony	7440-36-0	0.1	mg/L	<0.1	0.1	0.1	5.6	1.3
Arsenic	7440-38-2	0.1	mg/L	<0.1	<0.1	<0.1	0.2	<0.1
Cadmium	7440-43-9	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05
Chromium	7440-47-3	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Copper	7440-50-8	0.1	mg/L	<0.1	<0.1	<0.1	0.4	<0.1
Lead	7439-92-1	0.1	mg/L	<0.1	<0.1	<0.1	0.8	<0.1
Nickel	7440-02-0	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1
Zinc	7440-66-6	0.1	mg/L	7.7	6.8	5.1	7.9	7.2
EG035C: Leachable Mercury by FIMS								
Mercury	7439-97-6	0.0010	mg/L	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010



Analytical Results

Sub-Matrix: TCLP LEACHATE

Client sample ID

Client sampling date / time

				SE050_0.4-0.6	SE032_0.0-0.1	SEDUP01	SEDUP02	----
				04-OCT-2012 12:00	04-OCT-2012 12:00	04-OCT-2012 12:00	04-OCT-2012 12:00	----
Compound	CAS Number	LOR	Unit	ES1223062-021	ES1223062-022	ES1223062-023	ES1223062-024	----
EG005C: Leachable Metals by ICPAES								
Aluminium	7429-90-5	0.1	mg/L	2.9	1.2	8.4	5.4	----
Antimony	7440-36-0	0.1	mg/L	0.2	8.8	0.7	3.4	----
Arsenic	7440-38-2	0.1	mg/L	0.1	3.8	0.1	0.6	----
Cadmium	7440-43-9	0.05	mg/L	<0.05	<0.05	<0.05	<0.05	----
Chromium	7440-47-3	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	----
Copper	7440-50-8	0.1	mg/L	<0.1	<0.1	<0.1	0.2	----
Lead	7439-92-1	0.1	mg/L	<0.1	1.6	<0.1	0.2	----
Nickel	7440-02-0	0.1	mg/L	<0.1	<0.1	<0.1	<0.1	----
Zinc	7440-66-6	0.1	mg/L	7.0	0.9	5.6	9.4	----
EG035C: Leachable Mercury by FIMS								
Mercury	7439-97-6	0.0010	mg/L	<0.0010	0.0082	<0.0010	<0.0010	----

Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES1223935	Page	: 1 of 6
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR BEN LUFFMAN	Contact	: Angelene Kumar
Address	: 230 HARBOUR DRIVE PO Box 1340 COFFS HARBOUR NSW, AUSTRALIA 2450	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ben_luffman@ghd.com	E-mail	: angelene.kumar@alsglobal.com
Telephone	: +61 02 6650 5600	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 6652 6021	Facsimile	: +61 2 8784 8555
Project	: 2216251	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: REBATCH OF ES1223062	Date Samples Received	: 08-OCT-2012
C-O-C number	: ----	Issue Date	: 10-OCT-2012
Sampler	: JS	No. of samples received	: 19
Site	: HILLSIDE DR, URUNGA	No. of samples analysed	: 19
Quote number	: SY/270/12		

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
Evie.Sidarta	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



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				BH032_0.3-0.5	BHDUP01	BH012_0.0-0.1	BHDUP08	BH073_1.0-1.2
				14-AUG-2012 15:00	14-AUG-2012 15:00	16-AUG-2012 15:00	16-AUG-2012 15:00	15-AUG-2012 15:00
Compound	CAS Number	LOR	Unit	ES1223935-001	ES1223935-002	ES1223935-003	ES1223935-004	ES1223935-005
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	35.9	33.6	41.2	44.1	17.0
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	3450	3120	13100	13400	8630
Antimony	7440-36-0	5	mg/kg	6070	6070	<5	9	72
Iron	7439-89-6	50	mg/kg	17600	21200	25400	29400	2720
Arsenic	7440-38-2	5	mg/kg	3620	4000	16	12	13
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	34	44	15	15	11
Copper	7440-50-8	5	mg/kg	231	111	12	13	120
Lead	7439-92-1	5	mg/kg	996	1450	12	12	518
Nickel	7440-02-0	2	mg/kg	<2	<2	5	5	<2
Zinc	7440-66-6	5	mg/kg	39	42	8	9	305



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				BH077_0.0-0.2	BH077_2.0-2.2	BH101_0.0-0.2	BH022_0.5-0.7	BH028_0.0-0.2
				14-AUG-2012 15:00	14-AUG-2012 15:00	16-AUG-2012 15:00	16-AUG-2012 15:00	16-AUG-2012 15:00
Compound	CAS Number	LOR	Unit	ES1223935-006	ES1223935-007	ES1223935-008	ES1223935-009	ES1223935-010
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	17.1	72.5	27.2	18.4	5.2
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	6180	16100	4100	5240	1150
Antimony	7440-36-0	5	mg/kg	388	144	5400	544	12600
Iron	7439-89-6	50	mg/kg	6660	8020	26000	24600	11000
Arsenic	7440-38-2	5	mg/kg	432	165	2540	132	5000
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	10	20	34	9	3
Copper	7440-50-8	5	mg/kg	19	22	272	29	23
Lead	7439-92-1	5	mg/kg	80	21	474	23	11
Nickel	7440-02-0	2	mg/kg	2	18	<2	<2	<2
Zinc	7440-66-6	5	mg/kg	10	15	47	13	27



Analytical Results

Sub-Matrix: SOIL

Client sample ID

Client sampling date / time

				BH028_0.3-0.5	BH020_0.0-0.2	SE014_0.2-0.4	SE068_0.0-0.1	SE064_0.2-0.3
				16-AUG-2012 15:00	16-AUG-2012 15:00	15-AUG-2012 15:00	15-AUG-2012 15:00	15-AUG-2012 15:00
Compound	CAS Number	LOR	Unit	ES1223935-011	ES1223935-012	ES1223935-013	ES1223935-014	ES1223935-015
EA055: Moisture Content								
Moisture Content (dried @ 103°C)	----	1.0	%	10.4	13.6	37.1	73.4	41.6
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	5760	7520	8320	7700	7010
Antimony	7440-36-0	5	mg/kg	978	59	107	180	<5
Iron	7439-89-6	50	mg/kg	21200	27400	3800	6610	2870
Arsenic	7440-38-2	5	mg/kg	599	58	138	148	8
Cadmium	7440-43-9	1	mg/kg	<1	11	<1	4	<1
Chromium	7440-47-3	2	mg/kg	7	12	10	10	12
Copper	7440-50-8	5	mg/kg	8	724	10	138	13
Lead	7439-92-1	5	mg/kg	10	25	12	31	9
Nickel	7440-02-0	2	mg/kg	<2	4	4	7	4
Zinc	7440-66-6	5	mg/kg	8	695	12	624	12



Analytical Results

Sub-Matrix: SOIL				Client sample ID	SE001_0.4-0.6	SE042_0.2-0.4	SE041_0.1-0.3	SE050_0.4-0.6	----
Client sampling date / time				14-AUG-2012 15:00	14-AUG-2012 15:00	14-AUG-2012 15:00	14-AUG-2012 15:00	15-AUG-2012 15:00	----
Compound	CAS Number	LOR	Unit	ES1223935-016	ES1223935-017	ES1223935-018	ES1223935-018	ES1223935-019	----
EA055: Moisture Content									
Moisture Content (dried @ 103°C)	----	1.0	%	65.9	35.4	50.1	63.8	----	----
EG005T: Total Metals by ICP-AES									
Aluminium	7429-90-5	50	mg/kg	9970	10300	11000	14400	----	----
Antimony	7440-36-0	5	mg/kg	274	43	279	37	----	----
Iron	7439-89-6	50	mg/kg	6670	4340	7840	11600	----	----
Arsenic	7440-38-2	5	mg/kg	293	115	858	1680	----	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	----	----
Chromium	7440-47-3	2	mg/kg	20	12	12	15	----	----
Copper	7440-50-8	5	mg/kg	136	22	41	20	----	----
Lead	7439-92-1	5	mg/kg	40	19	12	15	----	----
Nickel	7440-02-0	2	mg/kg	7	5	8	6	----	----
Zinc	7440-66-6	5	mg/kg	42	44	120	27	----	----



ANALYTICAL REPORT



CLIENT DETAILS

Contact Ben Luffman
Client GHD Pty Ltd
Address (PO Box 1340, COFFS HARBOUR NSW 2450)
230 Harbour Drive
COFFS HARBOUR NSW 2450

Telephone (02) 6650 5613
Facsimile (02) 6652 6021
Email ben.luffman@ghd.com.au

Project **2216251**
Order Number **Apply credit against invoice SY00100799**
Samples 4

LABORATORY DETAILS

Manager Huong Crawford
Laboratory SGS Alexandria Environmental
Address Unit 16, 33 Maddox St
Alexandria NSW 2015

Telephone +61 2 8594 0400
Facsimile +61 2 8594 0499
Email au.environmental.sydney@sgs.com

SGS Reference **SE111292 R0**
Report Number 0000038525
Date Reported 28 Aug 2012
Date Received 22 Aug 2012

COMMENTS

Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

SIGNATORIES

Dong Liang
Inorganics Metals Team Leader

Huong Crawford
Laboratory Manager

Ly Kim Ha
Organics Supervisor



ANALYTICAL REPORT

SE111292 R0

		Sample Number	SE111292.001	SE111292.002	SE111292.003	SE111292.004
		Sample Matrix	Soil	Soil	Soil	Soil
		Sample Date	21 Aug 2012	21 Aug 2012	21 Aug 2012	21 Aug 2012
		Sample Name	SELABDUP1	BHLABDUP01	BHLABDUP02	BHLABDUP03
Parameter	Units	LOR				

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: AN040/AN320

Aluminium, Al	mg/kg	1	840	-	-	-
Antimony, Sb	mg/kg	3	270	55	7800	7100
Arsenic, As	mg/kg	3	450	51	2200	4700
Cadmium, Cd	mg/kg	0.3	<0.3	0.5	0.4	<0.3
Chromium, Cr	mg/kg	0.3	1.4	10	27	9.8
Copper, Cu	mg/kg	0.5	22	52	250	18
Lead, Pb	mg/kg	1	39	17	73	180
Nickel, Ni	mg/kg	0.5	<0.5	2.3	1.6	12
Zinc, Zn	mg/kg	0.5	18	22	70	25

Mercury in Soil Method: AN312

Mercury	mg/kg	0.05	0.85	0.18	42	15
---------	-------	------	------	------	----	----

Moisture Content Method: AN002

% Moisture	%	0.5	12	40	9.7	24
------------	---	-----	----	----	-----	----

MB blank results are compared to the Limit of Reporting

LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.

DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Mercury in Soil Method: ME-(AU)-[ENV]AN312

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Mercury	LB025365	mg/kg	0.05	<0.05	4%	103%	91%

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest Method: ME-(AU)-[ENV]AN040/AN320

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Aluminium, Al	LB025363	mg/kg	1	<1		102%	
Antimony, Sb	LB025363	mg/kg	3	<3		97%	
Arsenic, As	LB025363	mg/kg	3	<3	10%	95%	88%
Cadmium, Cd	LB025363	mg/kg	0.3	<0.3	0%	95%	92%
Chromium, Cr	LB025363	mg/kg	0.3	<0.3	4%	99%	93%
Copper, Cu	LB025363	mg/kg	0.5	<0.5	6%	97%	96%
Lead, Pb	LB025363	mg/kg	1	<1	6%	97%	88%
Nickel, Ni	LB025363	mg/kg	0.5	<0.5	0%	98%	95%
Zinc, Zn	LB025363	mg/kg	0.5	<0.5	14%	96%	29%

METHOD

METHODOLOGY SUMMARY

AN002	The test is carried out by drying (at either 40°C or 105°C) a known mass of sample in a weighed evaporating basin. After fully dry the sample is re-weighed. Samples such as sludge and sediment having high percentages of moisture will take some time in a drying oven for complete removal of water.
AN040	A portion of sample is digested with Nitric acid to decompose organic matter and Hydrochloric acid to complete the digestion of metals and then filtered for analysis by ASS or ICP as per USEPA Method 200.8.
AN312	Mercury by Cold Vapour AAS in Soils: After digestion with nitric acid, hydrogen peroxide and hydrochloric acid, mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500

FOOTNOTES

IS	Insufficient sample for analysis.	QFH	QC result is above the upper tolerance
LNR	Sample listed, but not received.	QFL	QC result is below the lower tolerance
*	This analysis is not covered by the scope of accreditation.	-	The sample was not analysed for this analyte
^	Performed by outside laboratory.	NVL	Not Validated
LOR	Limit of Reporting		
↑↓	Raised or Lowered Limit of Reporting		

Samples analysed as received.
Solid samples expressed on a dry weight basis.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here:
<http://www.sgs.com.au/pv.sgs.v3/~media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf>

This document is issued, on the Client's behalf, by the Company under its General Conditions of Service available on request and accessible at http://www.au.sgs.com/terms_and_conditions_au. The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any other holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents.

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Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: ES1220550	Page	: 1 of 8
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR BEN LUFFMAN	Contact	: Angelene Kumar
Address	: 230 HARBOUR DRIVE PO Box 1340 COFFS HARBOUR NSW, AUSTRALIA 2450	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ben_luffman@ghd.com	E-mail	: angelene.kumar@alsglobal.com
Telephone	: +61 02 6650 5600	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 6652 6021	Facsimile	: +61 2 8784 8555
Project	: 2216251	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 24-AUG-2012
C-O-C number	: ----	Issue Date	: 30-AUG-2012
Sampler	: ----	No. of samples received	: 14
Site	: HILLSIDE DR, Urunga	No. of samples analysed	: 14
Quote number	: SY/270/12		

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
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

- **ED041G:LOR raised for SO4 analysis on sample ID(GW006) due to sample matrix.**
- **EG020: It is recognised that total concentration is less than dissolved for some metal analytes. However, the difference is within experimental variation of the methods.**
- **TDS by method EA-015 may bias high for sample #12 due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.**



Analytical Results

Sub-Matrix: WATER

Client sample ID

Client sampling date / time

				SW001	SW002	SW003	SW004	SW005
				22-AUG-2012 15:00	22-AUG-2012 15:00	22-AUG-2012 15:00	22-AUG-2012 15:00	22-AUG-2012 15:00
Compound	CAS Number	LOR	Unit	ES1220550-001	ES1220550-002	ES1220550-003	ES1220550-004	ES1220550-005
EA015: Total Dissolved Solids								
Total Dissolved Solids @180°C	GIS-210-010	10	mg/L	129	126	107	106	104
EA025: Suspended Solids								
Suspended Solids (SS)	----	5	mg/L	43	9	9	<5	6
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	8	9	4	4	4
Total Alkalinity as CaCO3	----	1	mg/L	8	9	4	4	4
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	<1	2	2	2
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	48	44	33	32	32
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	3	3	2	2	2
Magnesium	7439-95-4	1	mg/L	3	3	2	2	2
Sodium	7440-23-5	1	mg/L	24	23	18	18	18
Potassium	7440-09-7	1	mg/L	1	1	1	1	1
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.09	0.11	0.19	0.19	0.21
Antimony	7440-36-0	0.001	mg/L	0.010	0.145	0.120	0.139	0.133
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.028	0.118	0.073	0.071
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	0.001	0.008	0.012	0.012	0.012
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.003	0.003	0.003
Zinc	7440-66-6	0.005	mg/L	0.018	0.018	0.032	0.028	0.031
Iron	7439-89-6	0.05	mg/L	0.54	1.05	1.21	1.09	1.15
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.36	0.19	0.25	0.22	0.22
Antimony	7440-36-0	0.001	mg/L	0.022	0.171	0.139	0.116	0.151
Arsenic	7440-38-2	0.001	mg/L	0.008	0.077	0.171	0.104	0.092
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	0.001	0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	0.021	0.011	0.017	0.013	0.014
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				SW001	SW002	SW003	SW004	SW005
				22-AUG-2012 15:00	22-AUG-2012 15:00	22-AUG-2012 15:00	22-AUG-2012 15:00	22-AUG-2012 15:00
Compound	CAS Number	LOR	Unit	ES1220550-001	ES1220550-002	ES1220550-003	ES1220550-004	ES1220550-005
EG020T: Total Metals by ICP-MS - Continued								
Lead	7439-92-1	0.001	mg/L	0.001	0.002	0.005	0.005	0.004
Zinc	7440-66-6	0.005	mg/L	0.016	0.016	0.026	0.030	0.032
Iron	7439-89-6	0.05	mg/L	5.38	2.94	1.72	1.57	1.52
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK026G: Total Cyanide By Discrete Analyser								
Total Cyanide	57-12-5	0.004	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004
EN055: Ionic Balance								
Total Anions	----	0.01	meq/L	1.51	1.42	1.05	1.02	1.02
Total Cations	----	0.01	meq/L	1.47	1.42	1.07	1.07	1.07



Analytical Results

Sub-Matrix: WATER

Client sample ID

Client sampling date / time

				SW006	SW007	SW008	SW009	SWDUP01
				22-AUG-2012 15:00	22-AUG-2012 15:00	22-AUG-2012 15:00	22-AUG-2012 15:00	22-AUG-2012 15:00
Compound	CAS Number	LOR	Unit	ES1220550-006	ES1220550-007	ES1220550-008	ES1220550-009	ES1220550-010
EA015: Total Dissolved Solids								
Total Dissolved Solids @180°C	GIS-210-010	10	mg/L	105	112	194	157	106
EA025: Suspended Solids								
Suspended Solids (SS)	----	5	mg/L	8	8	15	6	9
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	7	6	<1	1	4
Total Alkalinity as CaCO3	----	1	mg/L	7	6	<1	1	4
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	2	1	5	20	2
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	36	36	101	67	33
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	2	2	4	5	2
Magnesium	7439-95-4	1	mg/L	2	2	6	6	2
Sodium	7440-23-5	1	mg/L	20	20	48	36	18
Potassium	7440-09-7	1	mg/L	1	1	1	2	1
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.18	0.13	0.06	0.03	0.21
Antimony	7440-36-0	0.001	mg/L	0.073	0.061	0.155	0.012	0.112
Arsenic	7440-38-2	0.001	mg/L	0.043	0.038	0.040	0.002	0.116
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	0.0005	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	0.010	0.008	0.008	0.010	0.011
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.003	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L	0.003	0.002	0.002	<0.001	0.003
Zinc	7440-66-6	0.005	mg/L	0.047	0.025	0.124	0.820	0.031
Iron	7439-89-6	0.05	mg/L	1.05	0.97	0.32	0.13	1.23
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.24	0.20	0.09	0.05	0.25
Antimony	7440-36-0	0.001	mg/L	0.083	0.070	0.244	0.018	0.154
Arsenic	7440-38-2	0.001	mg/L	0.063	0.056	0.069	0.016	0.171
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	0.0006	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	0.001	<0.001
Copper	7440-50-8	0.001	mg/L	0.013	0.012	0.007	0.016	0.014
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.003	<0.001	<0.001



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				SW006	SW007	SW008	SW009	SWDUP01
				22-AUG-2012 15:00	22-AUG-2012 15:00	22-AUG-2012 15:00	22-AUG-2012 15:00	22-AUG-2012 15:00
Compound	CAS Number	LOR	Unit	ES1220550-006	ES1220550-007	ES1220550-008	ES1220550-009	ES1220550-010
EG020T: Total Metals by ICP-MS - Continued								
Lead	7439-92-1	0.001	mg/L	0.006	0.004	0.002	<0.001	0.006
Zinc	7440-66-6	0.005	mg/L	0.048	0.041	0.114	0.848	0.030
Iron	7439-89-6	0.05	mg/L	1.74	1.48	0.54	0.81	1.71
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
EK026G: Total Cyanide By Discrete Analyser								
Total Cyanide	57-12-5	0.004	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004
EN055: Ionic Balance								
Total Anions	----	0.01	meq/L	1.20	1.16	2.95	2.33	1.05
Total Cations	----	0.01	meq/L	1.16	1.16	2.81	2.36	1.07



Analytical Results

Sub-Matrix: WATER

Client sample ID

Client sampling date / time

				GW004	GW006	GW007	GW013	
				22-AUG-2012 15:00	22-AUG-2012 15:00	22-AUG-2012 15:00	22-AUG-2012 15:00	----
Compound	CAS Number	LOR	Unit	ES1220550-011	ES1220550-012	ES1220550-013	ES1220550-014	----
EA015: Total Dissolved Solids								
Total Dissolved Solids @180°C	GIS-210-010	10	mg/L	----	970	560	412	----
EA025: Suspended Solids								
Suspended Solids (SS)	----	5	mg/L	----	1190	356	408	----
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	----	285	172	160	----
Total Alkalinity as CaCO3	----	1	mg/L	----	285	172	160	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	----	<10	<1	<1	----
ED045G: Chloride Discrete analyser								
Chloride	16887-00-6	1	mg/L	----	184	150	78	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	----	12	9	12	----
Magnesium	7439-95-4	1	mg/L	----	20	14	14	----
Sodium	7440-23-5	1	mg/L	----	194	132	71	----
Potassium	7440-09-7	1	mg/L	----	8	7	6	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	1.15	2.19	0.67	0.05	----
Antimony	7440-36-0	0.001	mg/L	1.17	1.39	1.45	1.21	----
Arsenic	7440-38-2	0.001	mg/L	5.56	72.6	37.0	34.5	----
Cadmium	7440-43-9	0.0001	mg/L	0.0001	<0.0001	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	0.132	0.014	0.006	0.011	----
Copper	7440-50-8	0.001	mg/L	0.027	0.011	0.006	0.010	----
Nickel	7440-02-0	0.001	mg/L	4.07	0.013	0.013	0.022	----
Lead	7439-92-1	0.001	mg/L	0.017	0.125	0.020	0.002	----
Zinc	7440-66-6	0.005	mg/L	0.208	0.063	0.051	0.074	----
Iron	7439-89-6	0.05	mg/L	9.05	37.4	29.3	90.5	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.0026	0.0005	0.0002	----
EK026G: Total Cyanide By Discrete Analyser								
Total Cyanide	57-12-5	0.004	mg/L	----	0.597	0.060	<0.004	----
EN055: Ionic Balance								
Total Anions	----	0.01	meq/L	----	10.9	7.67	5.40	----
Total Cations	----	0.01	meq/L	----	10.9	7.52	----	----
Total Cations	----	0.01	meq/L	----	----	----	5.22	----



Analytical Results

Sub-Matrix: WATER

				Client sample ID	GW004	GW006	GW007	GW013	
				Client sampling date / time	22-AUG-2012 15:00	22-AUG-2012 15:00	22-AUG-2012 15:00	22-AUG-2012 15:00	----
Compound	CAS Number	LOR	Unit		ES1220550-011	ES1220550-012	ES1220550-013	ES1220550-014	----
EN055: Ionic Balance - Continued									
Ionic Balance	----	0.01	%		----	0.02	0.99	----	----
Ionic Balance	----	0.01	%		----	----	----	1.60	----



ANALYTICAL REPORT



CLIENT DETAILS

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Project **2216251 - Hillside Dr, Urunga**
Order Number (Not specified)
Samples 1

LABORATORY DETAILS

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SGS Reference **SE111416 R0**
Report Number 0000038986
Date Reported 03 Sep 2012
Date Received 27 Aug 2012

COMMENTS

Accredited for compliance with ISO/IEC 17025. NATA accredited laboratory 2562(4354).

SIGNATORIES

Dong Liang
Inorganics Metals Team Leader

Snezana Kostoska
Inorganics Chemist



ANALYTICAL REPORT

SE111416 R0

		Sample Number	SE111416.001
		Sample Matrix	Water
		Sample Date	22 Aug 2012
		Sample Name	GWLABDUP01
Parameter	Units	LOR	

Total Cyanide in water by Discrete Analyser (Aquakem) Method: AN077/AN287

Total Cyanide	mg/L	0.005	1.3
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Total Dissolved Solids (TDS) in water Method: AN113

Total Dissolved Solids Dried at 180°C	mg/L	10	960
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Total and Volatile Suspended Solids (TSS / VSS) Method: AN114

Total Suspended Solids Dried at 105°C	mg/L	5	15000
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Anions by Ion Chromatography in Water Method: AN245

Chloride	mg/L	0.05	170
Sulphate, SO ₄	mg/L	0.1	29

Alkalinity Method: AN135

Total Alkalinity as CaCO ₃	mg/L	5	300
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Metals in Water (Dissolved) by ICPOES Method: AN320/AN321

Calcium, Ca	mg/L	0.1	13
Magnesium, Mg	mg/L	0.1	21
Potassium, K	mg/L	0.2	8.5
Sodium, Na	mg/L	0.1	190

Trace Metals (Dissolved) in Water by ICPMS Method: AN318

Aluminium, Al	µg/L	1	2000
Antimony, Sb	µg/L	1	5100
Arsenic, As	µg/L	1	20000
Cadmium, Cd	µg/L	0.1	<0.1
Chromium, Cr	µg/L	1	13
Copper, Cu	µg/L	1	10
Iron, Fe	µg/L	5	6100
Lead, Pb	µg/L	1	160
Nickel, Ni	µg/L	1	10
Zinc, Zn	µg/L	1	36



ANALYTICAL REPORT

SE111416 R0

			Sample Number	SE111416.001
			Sample Matrix	Water
			Sample Date	22 Aug 2012
			Sample Name	GWLABDUP01
Parameter	Units	LOR		

Trace Metals (Total) in Water by ICPMS Method: AN318

Total Aluminium	µg/L	5	42000
Total Antimony	µg/L	1	30000
Total Arsenic	µg/L	1	47000
Total Cadmium	µg/L	0.1	0.7
Total Chromium	µg/L	1	250
Total Copper	µg/L	1	420
Total Iron	µg/L	5	72000
Total Lead	µg/L	1	8500
Total Nickel	µg/L	1	65
Total Zinc	µg/L	1	170

Mercury (dissolved) in Water Method: AN311/AN312

Mercury	mg/L	0.0001	0.0034
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Mercury (total) in Water Method: AN311/AN312

Total Mercury	mg/L	0.0001	0.17
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MB blank results are compared to the Limit of Reporting

LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.

DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Alkalinity Method: ME-(AU)-[ENV]AN135

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Total Alkalinity as CaCO ₃	LB025626	mg/L	5	<5	3%	115%

Anions by Ion Chromatography in Water Method: ME-(AU)-[ENV]AN245

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Chloride	LB025582	mg/L	0.05	<0.05	0%	95%
Sulphate, SO ₄	LB025582	mg/L	0.1	<0.1		94%

Mercury (dissolved) in Water Method: ME-(AU)-[ENV]AN311/AN312

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Mercury	LB025745	mg/L	0.0001	<0.00010	0%	96%	94%

Mercury (total) in Water Method: ME-(AU)-[ENV]AN311/AN312

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Total Mercury	LB025746	mg/L	0.0001	<0.0001	NA

Metals in Water (Dissolved) by ICPOES Method: ME-(AU)-[ENV]AN320/AN321

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Calcium, Ca	LB025586	mg/L	0.1	<0.1	0%	98%
Magnesium, Mg	LB025586	mg/L	0.1	<0.1	1%	91%
Potassium, K	LB025586	mg/L	0.2	<0.2	1%	96%
Sodium, Na	LB025586	mg/L	0.1	<0.1	1%	99%

Total and Volatile Suspended Solids (TSS / VSS) Method: ME-(AU)-[ENV]AN114

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Total Suspended Solids Dried at 105°C	LB025664	mg/L	5	<5	96%

MB blank results are compared to the Limit of Reporting

LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.

DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula: *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Total Cyanide in water by Discrete Analyser (Aquakem) Method: ME-(AU)-[ENV]AN077/AN287

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Total Cyanide	LB025759	mg/L	0.005	<0.005	111%

Total Dissolved Solids (TDS) in water Method: ME-(AU)-[ENV]AN113

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Total Dissolved Solids Dried at 180°C	LB025665	mg/L	10	<10	7%	94 - 95%

Trace Metals (Dissolved) in Water by ICPMS Method: ME-(AU)-[ENV]AN318

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Aluminium, Al	LB025684	µg/L	1	<1		90%
Antimony, Sb	LB025684	µg/L	1	<1		93%
Arsenic, As	LB025684	µg/L	1	<1	0%	86%
Cadmium, Cd	LB025684	µg/L	0.1	<0.1	0%	96%
Chromium, Cr	LB025684	µg/L	1	<1	0%	98%
Copper, Cu	LB025684	µg/L	1	<1	0%	92%
Iron, Fe	LB025684	µg/L	5	<5		86%
Lead, Pb	LB025684	µg/L	1	<1	0%	98%
Nickel, Ni	LB025684	µg/L	1	<1	0%	92%
Zinc, Zn	LB025684	µg/L	1	<1	25%	92%

Trace Metals (Total) in Water by ICPMS Method: ME-(AU)-[ENV]AN318

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Total Aluminium	LB025685	µg/L	5	<5	5%	104%
Total Antimony	LB025685	µg/L	1	<1	3%	107%
Total Arsenic	LB025685	µg/L	1	<1	0%	96%
Total Cadmium	LB025685	µg/L	0.1	<0.1	1%	106%
Total Chromium	LB025685	µg/L	1	<1	4%	114%
Total Copper	LB025685	µg/L	1	<1	2%	104%
Total Iron	LB025685	µg/L	5	<5	1%	NA
Total Lead	LB025685	µg/L	1	<1	1%	112%
Total Nickel	LB025685	µg/L	1	<1	1%	107%
Total Zinc	LB025685	µg/L	1	<1	3%	102%

METHOD

METHODOLOGY SUMMARY

AN020	Unpreserved water sample is filtered through a 0.45µm membrane filter and acidified with nitric acid similar to APHA3030B.
AN022	The water sample is digested with Nitric Acid and made up to the original volume similar to APHA3030E.
AN077	Hydrogen cyanide is liberated from an acidified sample by distillation and purging with air. The hydrogen cyanide gas is then collected by passing it through a sodium hydroxide scrubbing solution. The scrubbing solution will then be analysed for cyanide by the appropriate method.
AN113	Total Dissolved Solids: A well-mixed filtered sample of known volume is evaporated to dryness at 180°C and the residue weighed. Approximate methods for correlating chemical analysis with dissolved solids are available. Reference APHA 2540 C.
AN114	Total Suspended and Volatile Suspended Solids: The sample is homogenised by shaking and a known volume is filtered through a pre-weighed GF/C filter paper and washed well with deionised water. The filter paper is dried and reweighed. The TSS is the residue retained by the filter per unit volume of sample. Reference APHA 2540 D. Internal Reference AN114
AN135	Alkalinity (and forms of) by Titration: The sample is titrated with standard acid to pH 8.3 (P titre) and pH 4.5 (T titre) and permanent and/or total alkalinity calculated. The results are expressed as equivalents of calcium carbonate or recalculated as bicarbonate, carbonate and hydroxide. Reference APHA 2320. Internal Reference AN135
AN135	Free and Total Carbon Dioxide may be calculated using alkalinity forms only when the samples TDS is <500mg/L. If TDS is >500mg/L free or total carbon dioxide cannot be reported. APHA4500CO2 D.
AN245	Anions by Ion Chromatography: A water sample is injected into an eluent stream that passes through the ion chromatographic system where the anions of interest ie Br, Cl, NO2, NO3 and SO4 are separated on their relative affinities for the active sites on the column packing material. Changes to the conductivity and the UV-visible absorbance of the eluent enable identification and quantitation of the anions based on their retention time and peak height or area. APHA 4110 B
AN287	A buffered distillate or water sample is treated with chloramine/barbituric acid reagents and the intensity of the colour developed is proportional to the cyanide concentration by Aquakem DA.
AN311/AN312	Mercury by Cold Vapour AAS in Waters: Mercury ions are reduced by stannous chloride reagent in acidic solution to elemental mercury. This mercury vapour is purged by nitrogen into a cold cell in an atomic absorption spectrometer or mercury analyser. Quantification is made by comparing absorbances to those of the calibration standards. Reference APHA 3112/3500.
AN318	Determination of elements at trace level in waters by ICP-MS technique, in accordance with USEPA 6020A.
AN320/AN321	Metals by ICP-OES: Samples are preserved with 10% nitric acid for a wide range of metals and some non-metals. This solution is measured by Inductively Coupled Plasma. Solutions are aspirated into an argon plasma at 8000-10000K and emit characteristic energy or light as a result of electron transitions through unique energy levels. The emitted light is focused onto a diffraction grating where it is separated into components.
AN320/AN321	Photomultipliers or CCDs are used to measure the light intensity at specific wavelengths. This intensity is directly proportional to concentration. Corrections are required to compensate for spectral overlap between elements. Reference APHA 3120 B.



FOOTNOTES

IS	Insufficient sample for analysis.	QFH	QC result is above the upper tolerance
LNR	Sample listed, but not received.	QFL	QC result is below the lower tolerance
*	This analysis is not covered by the scope of accreditation.	-	The sample was not analysed for this analyte
^	Performed by outside laboratory.	NVL	Not Validated
LOR	Limit of Reporting		
↑↓	Raised or Lowered Limit of Reporting		

Samples analysed as received.

Solid samples expressed on a dry weight basis.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

The QC criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here:
<http://www.sgs.com.au.pv.sgs.v3/~media/Local/Australia/Documents/Technical%20Documents/MP-AU-ENV-QU-022%20QA%20QC%20Plan.pdf>

This document is issued, on the Client's behalf, by the Company under its General Conditions of Service available on request and accessible at http://www.au.sgs.com/terms_and_conditions_au. The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any other holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents.

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Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1219239	Page	: 1 of 5
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR BEN LUFFMAN	Contact	: Angelene Kumar
Address	: 230 HARBOUR DRIVE PO Box 1340 COFFS HARBOUR NSW, AUSTRALIA 2450	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ben_luffman@ghd.com	E-mail	: angelene.kumar@alsglobal.com
Telephone	: +61 02 6650 5600	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 6652 6021	Facsimile	: +61 2 8784 8555
Project	: 2216251-URUNGA	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: ----	Date Samples Received	: 08-AUG-2012
C-O-C number	: 158501	Issue Date	: 10-AUG-2012
Sampler	: JS	No. of samples received	: 4
Order number	: ----	No. of samples analysed	: 3
Quote number	: SY/270/12		

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 Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA055: Moisture Content								
Soil Glass Jar - Unpreserved (EA055-103) BH006_0.0-0.3, BH23_0.5-0.7	BH23_0.0-0.2,	03-AUG-2012	----	----	----	08-AUG-2012	17-AUG-2012	✓
EG005T: Total Metals by ICP-AES								
Soil Glass Jar - Unpreserved (EG005T) BH006_0.0-0.3, BH23_0.5-0.7	BH23_0.0-0.2,	03-AUG-2012	08-AUG-2012	30-JAN-2013	✓	09-AUG-2012	30-JAN-2013	✓
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved (EG035T) BH006_0.0-0.3, BH23_0.5-0.7	BH23_0.0-0.2,	03-AUG-2012	08-AUG-2012	31-AUG-2012	✓	09-AUG-2012	31-AUG-2012	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	1	13	7.7	10.0	✖	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	2	20	10.0	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	2	20	10.0	10.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Total Mercury by FIMS	EG035T	1	20	5.0	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	1	20	5.0	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Total Mercury by FIMS	EG035T	1	20	5.0	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	1	20	5.0	5.0	✔	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Total Mercury by FIMS	EG035T	1	20	5.0	5.0	✔	ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	1	20	5.0	5.0	✔	ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2010 Draft) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Total Metals by ICP-AES	EG005T	SOIL	(APHA 21st ed., 3120; USEPA SW 846 - 6010) (ICPAES) Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3)
Total Mercury by FIMS	EG035T	SOIL	AS 3550, APHA 21st ed., 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (1999) Schedule B(3)
Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	USEPA 200.2 Mod. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (1999) Schedule B(3) (Method 202)



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

Matrix: **SOIL**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
Method	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Moisture Content	1	13	7.7	10.0	NEPM 1999 Schedule B(3) and ALS QCS3 requirement

Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1220305	Page	: 1 of 18
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR BEN LUFFMAN	Contact	: Angelene Kumar
Address	: 230 HARBOUR DRIVE PO Box 1340 COFFS HARBOUR NSW, AUSTRALIA 2450	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ben_luffman@ghd.com	E-mail	: angelene.kumar@alsglobal.com
Telephone	: +61 02 6650 5600	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 6652 6021	Facsimile	: +61 2 8784 8555
Project	: 2216251	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: HILLSIDE DR, URUNGA	Date Samples Received	: 22-AUG-2012
C-O-C number	: ----	Issue Date	: 07-SEP-2012
Sampler	: JS	No. of samples received	: 131
Order number	: ----	No. of samples analysed	: 92
Quote number	: SY/270/12		

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 Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA002 : pH (Soils)								
Soil Glass Jar - Unpreserved (EA002)								
SE001_0.0-0.1, SE002_0.0-0.1, SE003_0.0-0.1, SE010_0.1-0.3, SE011_0.0-0.1, SE012_0.3-0.5, SE020_0.2-0.4, SE030_0.0-0.1, SE031_0.0-0.1, SE051_0.0-0.1, SE052_0.0-0.1, BH053_1.5-1.7, BH024_0.3-0.5, BH024_2.0-2.2, BH077_1.0-1.2, SE011_0.3-0.5	SE001_0.1-0.2, SE002_0.3-0.5, SE003_0.2-0.4, SE010_0.6-0.8, SE012_0.0-0.1, SE020_0.0-0.1, SE021_0.0-0.1, SE030_0.3-0.5, SE040_0.3-0.5, SE051_0.3-0.5, BH053_0.3-0.5, BH053_3.2-3.5, BH024_1.0-1.2, BH077_0.3-0.5, BH077_1.5-1.7,	14-AUG-2012	24-AUG-2012	21-AUG-2012	✖	24-AUG-2012	25-AUG-2012	✔
Soil Glass Jar - Unpreserved (EA002)								
BH074_0.8-1.0, BH064_0.3-0.5, BH073_0.5-0.7, BH060_0.0-0.2, BH034_0.0-0.1, BH071_0.5-0.7, SE050_0.0-0.1, SEDUP03, SE061_0.0-0.1, SE022_0.0-0.05, SE064_0.0-0.1, SE062_0.2-0.3, BH084_1.0-1.2,	BH064_0.0-0.2, BH073_0.0-0.2, BH056_0.3-0.5, BH82_1.5-1.7, BH014_0.0-0.1, BH091_0.0-0.1, SE050_0.2-0.4, SE056_0.05-0.15, SE014_0.0-0.05, SE043_0.1-0.3, SE062_0.0-0.1, SE066_0.0-0.1, BH084_1.5-1.7	15-AUG-2012	24-AUG-2012	22-AUG-2012	✖	24-AUG-2012	25-AUG-2012	✔
Soil Glass Jar - Unpreserved (EA002)								
SEDUP04, SE005_0.0-0.1, SE013_0.0-0.1, SE004_0.0-0.1	SE057_0.2-0.4, SEDUP05, BH001_0.3-0.5,	16-AUG-2012	24-AUG-2012	23-AUG-2012	✖	24-AUG-2012	25-AUG-2012	✔



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA055: Moisture Content									
Snap Lock Bag (EA055-103) BRICK01,		BRICK02	17-AUG-2012	----	----	----	29-AUG-2012	31-AUG-2012	✓
Soil Glass Jar - Unpreserved (EA055-103) SE001_0.0-0.1, SE002_0.0-0.1, SE003_0.0-0.1, SE010_0.1-0.3, SE011_0.0-0.1, SE012_0.3-0.5, SE020_0.2-0.4, SE030_0.0-0.1, SE031_0.0-0.1, SE042_0.0-0.1, SE051_0.3-0.5, BH053_0.3-0.5, BH053_3.2-3.5, BH024_1.0-1.2, BH077_0.3-0.5, BH077_1.5-1.7,		SE001_0.1-0.2, SE002_0.3-0.5, SE003_0.2-0.4, SE010_0.6-0.8, SE012_0.0-0.1, SE020_0.0-0.1, SE021_0.0-0.1, SE030_0.3-0.5, SE040_0.3-0.5, SE051_0.0-0.1, SE052_0.0-0.1, BH053_1.5-1.7, BH024_0.3-0.5, BH024_2.0-2.2, BH077_1.0-1.2, SE011_0.3-0.5	14-AUG-2012	----	----	----	24-AUG-2012	28-AUG-2012	✓
Soil Glass Jar - Unpreserved (EA055-103) BH074_0.8-1.0, BH064_0.3-0.5, BH073_0.5-0.7, BH075_1.8-2.0, BH82_1.5-1.7, BH014_0.0-0.1, BH091_0.0-0.1, SE050_0.2-0.4, SE053_0.0-0.1, SE055_0.0-0.1, SE061_0.0-0.1, SE022_0.0-0.05, SE043_0.1-0.3, SE062_0.0-0.1, SE066_0.0-0.1, BH084_1.0-1.2,		BH064_0.0-0.2, BH073_0.0-0.2, BH056_0.3-0.5, BH060_0.0-0.2, BH034_0.0-0.1, BH071_0.5-0.7, SE050_0.0-0.1, SEDUP03, SE054_0.0-0.1, SE056_0.05-0.15, SE014_0.0-0.05, SE022_0.2-0.4, SE064_0.0-0.1, SE062_0.2-0.3, BH031_1.0-1.2, BH084_1.5-1.7	15-AUG-2012	----	----	----	24-AUG-2012	29-AUG-2012	✓
Soil Glass Jar - Unpreserved (EA055-103) BH002_0.5-0.7, SE013_0.3-0.5, SEDUP04, SE005_0.0-0.1, SE013_0.0-0.1, BHDUP06, BH004_0.0-0.2,		BH004_1.0-1.2, SE102_0.0-0.2, SE057_0.2-0.4, SEDUP05, BHDUP07, BH001_0.3-0.5, SE004_0.0-0.1	16-AUG-2012	----	----	----	24-AUG-2012	30-AUG-2012	✓



Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA150: Particle Sizing								
Snap Lock Bag (EA150H) BH034_0.0-0.1,	BH014_0.0-0.1	15-AUG-2012	---	11-FEB-2013	----	29-AUG-2012	11-FEB-2013	✓
Soil Glass Jar - Unpreserved (EA150H) BH031_0.0-0.2, BH031_1.8-2.0	BH031_0.5-0.7,	15-AUG-2012	---	11-FEB-2013	----	29-AUG-2012	11-FEB-2013	✓
EA150: Soil Classification based on Particle Size								
Snap Lock Bag (EA150H) BH034_0.0-0.1,	BH014_0.0-0.1	15-AUG-2012	---	11-FEB-2013	----	29-AUG-2012	11-FEB-2013	✓
Soil Glass Jar - Unpreserved (EA150H) BH031_0.0-0.2, BH031_1.8-2.0	BH031_0.5-0.7,	15-AUG-2012	---	11-FEB-2013	----	29-AUG-2012	11-FEB-2013	✓
ED007: Exchangeable Cations								
Snap Lock Bag (ED007) BH014_0.0-0.1		15-AUG-2012	29-AUG-2012	12-SEP-2012	✓	03-SEP-2012	12-SEP-2012	✓
Soil Glass Jar - Unpreserved (ED007) SE002_0.0-0.1, SE021_0.0-0.1, SE040_0.3-0.5, BH053_1.5-1.7, BH077_0.3-0.5, BH077_1.5-1.7	SE011_0.0-0.1, SE030_0.0-0.1, BH053_0.3-0.5, BH053_3.2-3.5, BH077_1.0-1.2,	14-AUG-2012	29-AUG-2012	11-SEP-2012	✓	03-SEP-2012	11-SEP-2012	✓
Soil Glass Jar - Unpreserved (ED007) BH034_0.0-0.1, SE060_0.0-0.1, SE014_0.0-0.05,	BH071_0.5-0.7, SE061_0.0-0.1, SE064_0.0-0.1	15-AUG-2012	29-AUG-2012	12-SEP-2012	✓	03-SEP-2012	12-SEP-2012	✓
Soil Glass Jar - Unpreserved (ED007) SE033_0.0-0.05		16-AUG-2012	29-AUG-2012	13-SEP-2012	✓	03-SEP-2012	13-SEP-2012	✓
EG005C: Leachable Metals by ICPAES								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG005C) BH034_0.0-0.1, BH071_0.5-0.7, BH053_0.3-0.5, BH053_3.2-3.5, BH024_1.0-1.2, BH077_0.3-0.5, BH077_1.5-1.7, BH084_1.5-1.7	BH014_0.0-0.1, BH091_0.0-0.1, BH053_1.5-1.7, BH024_0.3-0.5, BH024_2.0-2.2, BH077_1.0-1.2, BH084_1.0-1.2,	28-AUG-2012	28-AUG-2012	24-FEB-2013	✓	28-AUG-2012	24-FEB-2013	✓

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EG005-SDH: 1M HCl-Extractable Metals by ICPAES								
Soil Glass Jar - Unpreserved (EG005-SDH) SE002_0.0-0.1, SE021_0.0-0.1, SE031_0.0-0.1, SE051_0.0-0.1,	SE011_0.0-0.1, SE030_0.0-0.1, SE040_0.3-0.5, SE052_0.0-0.1	14-AUG-2012	27-AUG-2012	10-FEB-2013	✓	30-AUG-2012	10-FEB-2013	✓
Soil Glass Jar - Unpreserved (EG005-SDH) SE053_0.0-0.1, SE056_0.05-0.15, SE014_0.0-0.05, SE043_0.1-0.3, SE062_0.0-0.1, SE066_0.0-0.1	SE054_0.0-0.1, SE061_0.0-0.1, SE022_0.0-0.05, SE064_0.0-0.1, SE062_0.2-0.3,	15-AUG-2012	27-AUG-2012	11-FEB-2013	✓	30-AUG-2012	11-FEB-2013	✓
Soil Glass Jar - Unpreserved (EG005-SDH) SE057_0.2-0.4, SEDUP05, SE004_0.0-0.1	SE005_0.0-0.1, SE013_0.0-0.1,	16-AUG-2012	27-AUG-2012	12-FEB-2013	✓	30-AUG-2012	12-FEB-2013	✓



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG005T: Total Metals by ICP-AES								
Snap Lock Bag (EG005T) BRICK01, BRICK02		17-AUG-2012	29-AUG-2012	13-FEB-2013	✓	29-AUG-2012	13-FEB-2013	✓
Soil Glass Jar - Unpreserved (EG005T) TB01 - (AKA TRIP BLANK 8)		06-AUG-2012	28-AUG-2012	02-FEB-2013	✓	29-AUG-2012	02-FEB-2013	✓
Soil Glass Jar - Unpreserved (EG005T) TB02 - (AKA TRIP BLANK 9)		06-AUG-2012	29-AUG-2012	02-FEB-2013	✓	29-AUG-2012	02-FEB-2013	✓
Soil Glass Jar - Unpreserved (EG005T) SE001_0.0-0.1, SE002_0.0-0.1, SE003_0.0-0.1, SE010_0.1-0.3, SE011_0.0-0.1, SE012_0.3-0.5, SE020_0.2-0.4, SE030_0.0-0.1, SE031_0.0-0.1, SE042_0.0-0.1, SE001_0.1-0.2, SE002_0.3-0.5, SE003_0.2-0.4, SE010_0.6-0.8, SE012_0.0-0.1, SE020_0.0-0.1, SE021_0.0-0.1, SE030_0.3-0.5, SE040_0.3-0.5,		14-AUG-2012	28-AUG-2012	10-FEB-2013	✓	28-AUG-2012	10-FEB-2013	✓
Soil Glass Jar - Unpreserved (EG005T) SE051_0.0-0.1, SE052_0.0-0.1, BH053_1.5-1.7, BH024_0.3-0.5, BH024_2.0-2.2, BH077_1.0-1.2, SE051_0.3-0.5, BH053_0.3-0.5, BH053_3.2-3.5, BH024_1.0-1.2, BH077_0.3-0.5, BH077_1.5-1.7		14-AUG-2012	28-AUG-2012	10-FEB-2013	✓	29-AUG-2012	10-FEB-2013	✓
Soil Glass Jar - Unpreserved (EG005T) SE011_0.3-0.5		14-AUG-2012	29-AUG-2012	10-FEB-2013	✓	29-AUG-2012	10-FEB-2013	✓
Soil Glass Jar - Unpreserved (EG005T) BH074_0.8-1.0, BH064_0.3-0.5, BH073_0.5-0.7, BH075_1.8-2.0, BH064_0.0-0.2, BH073_0.0-0.2, BH056_0.3-0.5, BH060_0.0-0.2		15-AUG-2012	27-AUG-2012	11-FEB-2013	✓	28-AUG-2012	11-FEB-2013	✓
Soil Glass Jar - Unpreserved (EG005T) BH82_1.5-1.7, BH014_0.0-0.1, BH091_0.0-0.1, BH034_0.0-0.1, BH071_0.5-0.7,		15-AUG-2012	28-AUG-2012	11-FEB-2013	✓	28-AUG-2012	11-FEB-2013	✓
Soil Glass Jar - Unpreserved (EG005T) SE050_0.0-0.1, SEDUP03, SE054_0.0-0.1, SE056_0.05-0.15, SE014_0.0-0.05, SE022_0.2-0.4, SE064_0.0-0.1, SE062_0.2-0.3, BH031_1.0-1.2, BH084_1.5-1.7, SE050_0.2-0.4, SE053_0.0-0.1, SE055_0.0-0.1, SE061_0.0-0.1, SE022_0.0-0.05, SE043_0.1-0.3, SE062_0.0-0.1, SE066_0.0-0.1, BH084_1.0-1.2,		15-AUG-2012	28-AUG-2012	11-FEB-2013	✓	29-AUG-2012	11-FEB-2013	✓
Soil Glass Jar - Unpreserved (EG005T)								



Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG005T: Total Metals by ICP-AES - Continued								
BH002_0.5-0.7, SE013_0.3-0.5, SEDUP04	BH004_1.0-1.2, SE102_0.0-0.2,	16-AUG-2012	28-AUG-2012	12-FEB-2013	✓	28-AUG-2012	12-FEB-2013	✓
Soil Glass Jar - Unpreserved (EG005T) SE057_0.2-0.4, SEDUP05, BHDUP07, BH001_0.3-0.5,	SE005_0.0-0.1, SE013_0.0-0.1, BHDUP06, BH004_0.0-0.2	16-AUG-2012	28-AUG-2012	12-FEB-2013	✓	29-AUG-2012	12-FEB-2013	✓
Soil Glass Jar - Unpreserved (EG005T) SE004_0.0-0.1		16-AUG-2012	29-AUG-2012	12-FEB-2013	✓	29-AUG-2012	12-FEB-2013	✓
EG020-SDH: 1M HCl Extractable metals by ICPMS								
Soil Glass Jar - Unpreserved (EG020-SDH) SE002_0.0-0.1, SE021_0.0-0.1, SE031_0.0-0.1, SE051_0.0-0.1,	SE011_0.0-0.1, SE030_0.0-0.1, SE040_0.3-0.5, SE052_0.0-0.1	14-AUG-2012	27-AUG-2012	10-FEB-2013	✓	27-AUG-2012	10-FEB-2013	✓
Soil Glass Jar - Unpreserved (EG020-SDH) SE053_0.0-0.1, SE056_0.05-0.15, SE014_0.0-0.05, SE043_0.1-0.3, SE062_0.0-0.1, SE066_0.0-0.1	SE054_0.0-0.1, SE061_0.0-0.1, SE022_0.0-0.05, SE064_0.0-0.1, SE062_0.2-0.3,	15-AUG-2012	27-AUG-2012	11-FEB-2013	✓	27-AUG-2012	11-FEB-2013	✓
Soil Glass Jar - Unpreserved (EG020-SDH) SE057_0.2-0.4, SEDUP05, SE004_0.0-0.1	SE005_0.0-0.1, SE013_0.0-0.1,	16-AUG-2012	27-AUG-2012	12-FEB-2013	✓	27-AUG-2012	12-FEB-2013	✓
EG035C: Leachable Mercury by FIMS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035C) BH034_0.0-0.1, BH071_0.5-0.7, BH053_0.3-0.5, BH053_3.2-3.5, BH024_1.0-1.2, BH077_0.3-0.5, BH077_1.5-1.7, BH084_1.5-1.7	BH014_0.0-0.1, BH091_0.0-0.1, BH053_1.5-1.7, BH024_0.3-0.5, BH024_2.0-2.2, BH077_1.0-1.2, BH084_1.0-1.2,	28-AUG-2012	----	----	----	31-AUG-2012	25-SEP-2012	✓



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG035T: Total Recoverable Mercury by FIMS								
Snap Lock Bag (EG035T) BRICK01,	BRICK02	17-AUG-2012	29-AUG-2012	14-SEP-2012	✓	30-AUG-2012	14-SEP-2012	✓
Soil Glass Jar - Unpreserved (EG035T) SE001_0.0-0.1, SE002_0.0-0.1, SE003_0.0-0.1, SE010_0.1-0.3, SE011_0.0-0.1, SE012_0.3-0.5, SE020_0.2-0.4, SE030_0.0-0.1, SE031_0.0-0.1, SE042_0.0-0.1, SE051_0.3-0.5, BH053_0.3-0.5, BH053_3.2-3.5, BH077_1.0-1.2,	SE001_0.1-0.2, SE002_0.3-0.5, SE003_0.2-0.4, SE010_0.6-0.8, SE012_0.0-0.1, SE020_0.0-0.1, SE021_0.0-0.1, SE030_0.3-0.5, SE040_0.3-0.5, SE051_0.0-0.1, SE052_0.0-0.1, BH053_1.5-1.7, BH077_0.3-0.5, BH077_1.5-1.7	14-AUG-2012	28-AUG-2012	11-SEP-2012	✓	28-AUG-2012	11-SEP-2012	✓
Soil Glass Jar - Unpreserved (EG035T) SE011_0.3-0.5		14-AUG-2012	29-AUG-2012	11-SEP-2012	✓	30-AUG-2012	11-SEP-2012	✓
Soil Glass Jar - Unpreserved (EG035T) BH074_0.8-1.0, BH064_0.3-0.5, BH073_0.5-0.7, BH075_1.8-2.0,	BH064_0.0-0.2, BH073_0.0-0.2, BH056_0.3-0.5, BH060_0.0-0.2	15-AUG-2012	27-AUG-2012	12-SEP-2012	✓	28-AUG-2012	12-SEP-2012	✓
Soil Glass Jar - Unpreserved (EG035T) BH82_1.5-1.7, BH014_0.0-0.1, BH091_0.0-0.1, SE050_0.2-0.4, SE053_0.0-0.1, SE055_0.0-0.1, SE061_0.0-0.1, SE022_0.0-0.05, SE043_0.1-0.3, SE062_0.0-0.1, SE066_0.0-0.1, BH084_1.0-1.2,	BH034_0.0-0.1, BH071_0.5-0.7, SE050_0.0-0.1, SEDUP03, SE054_0.0-0.1, SE056_0.05-0.15, SE014_0.0-0.05, SE022_0.2-0.4, SE064_0.0-0.1, SE062_0.2-0.3, BH031_1.0-1.2, BH084_1.5-1.7	15-AUG-2012	28-AUG-2012	12-SEP-2012	✓	28-AUG-2012	12-SEP-2012	✓
Soil Glass Jar - Unpreserved (EG035T) BH002_0.5-0.7, SE013_0.3-0.5, SEDUP04, SE005_0.0-0.1, SE013_0.0-0.1, BHDUP06, BH004_0.0-0.2	BH004_1.0-1.2, SE102_0.0-0.2, SE057_0.2-0.4, SEDUP05, BHDUP07, BH001_0.3-0.5,	16-AUG-2012	28-AUG-2012	13-SEP-2012	✓	28-AUG-2012	13-SEP-2012	✓
Soil Glass Jar - Unpreserved (EG035T) SE004_0.0-0.1		16-AUG-2012	29-AUG-2012	13-SEP-2012	✓	30-AUG-2012	13-SEP-2012	✓



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK026G: Total Cyanide By Discrete Analyser									
Soil Glass Jar - Unpreserved (EK026G)	SE001_0.0-0.1, SE002_0.0-0.1, SE003_0.0-0.1, SE010_0.1-0.3, SE011_0.0-0.1, SE012_0.3-0.5, SE020_0.2-0.4, SE030_0.0-0.1, SE031_0.0-0.1, SE051_0.0-0.1, SE052_0.0-0.1, BH053_1.5-1.7, BH024_0.3-0.5, BH024_2.0-2.2, BH077_1.0-1.2, SE011_0.3-0.5	SE001_0.1-0.2, SE002_0.3-0.5, SE003_0.2-0.4, SE010_0.6-0.8, SE012_0.0-0.1, SE020_0.0-0.1, SE021_0.0-0.1, SE030_0.3-0.5, SE040_0.3-0.5, SE051_0.3-0.5, BH053_0.3-0.5, BH053_3.2-3.5, BH024_1.0-1.2, BH077_0.3-0.5, BH077_1.5-1.7,	14-AUG-2012	29-AUG-2012	21-AUG-2012	✖	29-AUG-2012	12-SEP-2012	✔
Soil Glass Jar - Unpreserved (EK026G)	BH074_0.8-1.0, BH064_0.3-0.5, BH073_0.5-0.7, BH060_0.0-0.2, BH034_0.0-0.1, BH071_0.5-0.7, SE050_0.0-0.1, SEDUP03, SE061_0.0-0.1, SE022_0.0-0.05, SE064_0.0-0.1, SE062_0.2-0.3, BH084_1.0-1.2,	BH064_0.0-0.2, BH073_0.0-0.2, BH056_0.3-0.5, BH82_1.5-1.7, BH014_0.0-0.1, BH091_0.0-0.1, SE050_0.2-0.4, SE056_0.05-0.15, SE014_0.0-0.05, SE043_0.1-0.3, SE062_0.0-0.1, SE066_0.0-0.1, BH084_1.5-1.7	15-AUG-2012	29-AUG-2012	22-AUG-2012	✖	29-AUG-2012	12-SEP-2012	✔
Soil Glass Jar - Unpreserved (EK026G)	SEDUP04, SE005_0.0-0.1, SE013_0.0-0.1, SE004_0.0-0.1	SE057_0.2-0.4, SEDUP05, BH001_0.3-0.5,	16-AUG-2012	29-AUG-2012	23-AUG-2012	✖	29-AUG-2012	12-SEP-2012	✔
EN33: TCLP Leach									
Lab Split : Leach for Hg, Cr(VI) and other metal (EN33a)	BH053_0.3-0.5, BH053_3.2-3.5, BH024_1.0-1.2, BH077_0.3-0.5, BH077_1.5-1.7	BH053_1.5-1.7, BH024_0.3-0.5, BH024_2.0-2.2, BH077_1.0-1.2,	14-AUG-2012	---	11-SEP-2012	----	28-AUG-2012	11-SEP-2012	✔
Lab Split : Leach for Hg, Cr(VI) and other metal (EN33a)	BH034_0.0-0.1, BH071_0.5-0.7, BH084_1.0-1.2,	BH014_0.0-0.1, BH091_0.0-0.1, BH084_1.5-1.7	15-AUG-2012	---	12-SEP-2012	----	28-AUG-2012	12-SEP-2012	✔



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP003: Total Organic Carbon (TOC) in Soil								
Pulp Bag (EP003) SE002_0.0-0.1, SE021_0.0-0.1, SE040_0.3-0.5, BH053_1.5-1.7, BH077_0.3-0.5, BH077_1.5-1.7	SE011_0.0-0.1, SE030_0.0-0.1, BH053_0.3-0.5, BH053_3.2-3.5, BH077_1.0-1.2,	14-AUG-2012	28-AUG-2012	21-AUG-2012	✖	28-AUG-2012	25-SEP-2012	✔
Pulp Bag (EP003) BH034_0.0-0.1, BH071_0.5-0.7, SE061_0.0-0.1,	BH014_0.0-0.1, SE060_0.0-0.1, SE014_0.0-0.05	15-AUG-2012	28-AUG-2012	22-AUG-2012	✖	28-AUG-2012	25-SEP-2012	✔
Pulp Bag (EP003) SE033_0.0-0.05,	SE064_0.0-0.1	16-AUG-2012	28-AUG-2012	23-AUG-2012	✖	28-AUG-2012	25-SEP-2012	✔

Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EG020T: Total Metals by ICP-MS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) RB01, RB04	RB02,	15-AUG-2012	27-AUG-2012	11-FEB-2013	✔	27-AUG-2012	11-FEB-2013	✔
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T) RB03,	RB05	16-AUG-2012	27-AUG-2012	12-FEB-2013	✔	27-AUG-2012	12-FEB-2013	✔

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Evaluation: ✖ = Quality Control frequency not within specification : ✔ = Quality Control frequency within specification.

Matrix: **WATER** Evaluation: **x** = Quality Control frequency not within specification ; **✓** = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Leachable Mercury by FIMS	EG035C	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Leachable Metals by ICPAES	EG005C	2	15	13.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite A	EG020A-T	4	36	11.1	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							



Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Control Samples (LCS) - Continued							
Leachable Mercury by FIMS	EG035C	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Leachable Metals by ICPAES	EG005C	1	15	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite A	EG020A-T	3	39	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Leachable Mercury by FIMS	EG035C	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Leachable Metals by ICPAES	EG005C	1	15	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite A	EG020A-T	3	39	7.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Leachable Mercury by FIMS	EG035C	1	20	5.0	5.0	✓	ALS QCS3 requirement
Leachable Metals by ICPAES	EG005C	1	15	6.7	5.0	✓	ALS QCS3 requirement
Total Metals by ICP-MS - Suite A	EG020A-T	2	36	5.6	5.0	✓	ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH (1:5)	EA002	SOIL	(APHA 21st ed., 4500H+) pH is determined on soil samples after a 1:5 soil/water leach. This method is compliant with NEPM (1999) Schedule B(3) (Method 103)
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2010 Draft) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Particle Size Analysis (Sieving)	EA150	SOIL	Particle Size Analysis by Sieving according to AS1289.3.6.1 - 2009
Particle Size Analysis by Hydrometer	EA150H	SOIL	Particle Size Analysis by Hydrometer according to AS1289.3.6.3 - 2003
Exchangeable Cations	ED007	SOIL	Rayment & Higginson (1992) Method 15A1. Cations are exchanged from the sample by contact with Ammonium Chloride. They are then quantitated in the final solution by ICPAES and reported as meq/100g of original soil. This method is compliant with NEPM (1999) Schedule B(3) (Method 301)
Leachable Metals by ICPAES	EG005C	SOIL	APHA 21st ed., 3120; USEPA SW 846 - 6010 The ICPAES technique ionises leachate sample atoms emitting a characteristic spectrum. This spectrum is then compared against matrix matched standards for quantification. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
1M HCl Extractable Metals	EG005-SDH	SOIL	APHA 21st ed., 3120; USEPA SW 846 - 6010. Metals are determined via ICPAES following weak acid extraction. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3). LORs per NAGD.
Total Metals by ICP-AES	EG005T	SOIL	(APHA 21st ed., 3120; USEPA SW 846 - 6010) (ICPAES) Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3)
1M HCl Extractable Metals by ICPMS	EG020-SDH	SOIL	APHA 21st ed., 3125; USEPA SW846 - 6020. Metals are determined via ICPMS following weak acid extraction. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector. Analyte list and LORs per NAGD.
Leachable Mercury by FIMS	EG035C	SOIL	AS 3550, APHA 21st ed. 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the TCLP solution. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Total Mercury by FIMS	EG035T	SOIL	AS 3550, APHA 21st ed., 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (1999) Schedule B(3)



Analytical Methods	Method	Matrix	Method Descriptions
Total Cyanide by Segmented Flow Analyser	EK026SF	SOIL	APHA 4500-CN-O. Caustic leachates of soil samples are introduced into an automated segmented flow analyser. Complex bound cyanide is decomposed in a continuously flowing stream, at a pH of 3.8, by the effect of UV light. A UV-B lamp (312 nm) and a decomposition spiral of borosilicate glass are used to filter out UV light with a wavelength of less than 290 nm thus preventing the conversion of thiocyanate into cyanide. The hydrogen cyanide present at a pH of 3.8 is separated by gas dialysis. The hydrogen cyanide is then determined photometrically, based on the reaction of cyanide with chloramine-T to form cyanogen chloride. This then reacts with 4-pyridine carboxylic acid and 1,3-dimethylbarbituric acid to give a red colour which is measured at 600 nm. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Total Organic Carbon	EP003	SOIL	In-house C-IR17. Dried and pulverised sample is reacted with acid to remove inorganic Carbonates, then combusted in a LECO furnace in the presence of strong oxidants / catalysts. The evolved (Organic) Carbon (as CO ₂) is automatically measured by infra-red detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.

Preparation Methods	Method	Matrix	Method Descriptions
NaOH leach for CN in Soils	CN-PR	SOIL	In-house, APHA 4500 CN. Samples are extracted by end-over-end tumbling with NaOH.
Exchangeable Cations Preparation Method	ED007PR	SOIL	Rayment & Higginson (1992) method 15A1. A 1M NH ₄ Cl extraction by end over end tumbling at a ratio of 1:20. There is no pretreatment for soluble salts. Extracts can be run by ICP for cations.
Digestion for Total Recoverable Metals in TCLP Leachate	EN25C	SOIL	USEPA SW846-3005 Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
TCLP for Non & Semivolatile Analytes	EN33a	SOIL	(USEPA SW846-1311, ALS QWI-EN/33) The TCLP procedure is designed to determine the mobility of both organic and inorganic analytes present in wastes. The standard TCLP leach is for non-volatile and Semivolatile test parameters.
1:5 solid / water leach for soluble analytes	EN34	SOIL	10 g of soil is mixed with 50 mL of distilled water and tumbled end over end for 1 hour. Water soluble salts are leached from the soil by the continuous suspension. Samples are settled and the water filtered off for analysis.
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	USEPA 200.2 Mod. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (1999) Schedule B(3) (Method 202)
1M HCl Extraction for Metals in Sediments (1 hour)	EN71	SOIL	In house, Allen (1993) Mod. 1g of sample is leached at room temperature for 1 hour in 10% hydrochloric acid. The resultant extract is filtered and bulked for analysis of extracted metals.
Digestion for Total Recoverable Metals	EN25	WATER	USEPA SW846-3005 Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Duplicate (DUP) RPDs							
EG005-SDH: 1M HCl-Extractable Metals by ICPAES	ES1220305-018	SE002_0.0-0.1	Arsenic	7440-38-2	25.5 %	0-20%	RPD exceeds LOR based limits
EG005-SDH: 1M HCl-Extractable Metals by ICPAES	ES1220305-018	SE002_0.0-0.1	Copper	7440-50-8	31.5 %	0-20%	RPD exceeds LOR based limits
EG005T: Total Metals by ICP-AES	ES1220305-044	SE050_0.0-0.1	Aluminium	7429-90-5	20.9 %	0-20%	RPD exceeds LOR based limits
EG005T: Total Metals by ICP-AES	ES1220305-086	BH004_0.0-0.2	Copper	7440-50-8	29.8 %	0-20%	RPD exceeds LOR based limits
Matrix Spike (MS) Recoveries							
EG005T: Total Metals by ICP-AES	ES1220305-034	SEDUP04	Arsenic	7440-38-2	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EG005T: Total Metals by ICP-AES	ES1220305-009	BH82_1.5-1.7	Arsenic	7440-38-2	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EG005T: Total Metals by ICP-AES	ES1220305-044	SE050_0.0-0.1	Arsenic	7440-38-2	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

- ### Regular Sample Surrogates

- ### Outliers : Analysis Holding Time Compliance

Method	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA002 : pH (Soils)						

<i>Method</i>		<i>Extraction / Preparation</i>			<i>Analysis</i>		
<i>Container / Client Sample ID(s)</i>		<i>Date extracted</i>	<i>Due for extraction</i>	<i>Days overdue</i>	<i>Date analysed</i>	<i>Due for analysis</i>	<i>Days overdue</i>
EA002 : pH (Soils) - Analysis Holding Time Compliance							
Soil Glass Jar - Unpreserved							
SE001_0.0-0.1,	SE001_0.1-0.2,	24-AUG-2012	21-AUG-2012	3	----	----	----
SE002_0.0-0.1,	SE002_0.3-0.5,						
SE003_0.0-0.1,	SE003_0.2-0.4,						
SE010_0.1-0.3,	SE010_0.6-0.8,						
SE011_0.0-0.1,	SE012_0.0-0.1,						
SE012_0.3-0.5,	SE020_0.0-0.1,						
SE020_0.2-0.4,	SE021_0.0-0.1,						
SE030_0.0-0.1,	SE030_0.3-0.5,						
SE031_0.0-0.1,	SE040_0.3-0.5,						
SE051_0.0-0.1,	SE051_0.3-0.5,						
SE052_0.0-0.1,	BH053_0.3-0.5,						
BH053_1.5-1.7,	BH053_3.2-3.5,						
BH024_0.3-0.5,	BH024_1.0-1.2,						
BH024_2.0-2.2,	BH077_0.3-0.5,						
BH077_1.0-1.2,	BH077_1.5-1.7,						
SE011_0.3-0.5							
Soil Glass Jar - Unpreserved							
BH074_0.8-1.0,	BH064_0.0-0.2,	24-AUG-2012	22-AUG-2012	2	----	----	----
BH064_0.3-0.5,	BH073_0.0-0.2,						
BH073_0.5-0.7,	BH056_0.3-0.5,						
BH060_0.0-0.2,	BH82_1.5-1.7,						
BH034_0.0-0.1,	BH014_0.0-0.1,						
BH071_0.5-0.7,	BH091_0.0-0.1,						
SE050_0.0-0.1,	SE050_0.2-0.4,						
SEDUP03,	SE056_0.05-0.15,						
SE061_0.0-0.1,	SE014_0.0-0.05,						
SE022_0.0-0.05,	SE043_0.1-0.3,						
SE064_0.0-0.1,	SE062_0.0-0.1,						
SE062_0.2-0.3,	SE066_0.0-0.1,						
BH084_1.0-1.2,	BH084_1.5-1.7,						
Soil Glass Jar - Unpreserved							
SEDUP04,	SE057_0.2-0.4,	24-AUG-2012	23-AUG-2012	1	----	----	----
SE005_0.0-0.1,	SEDUP05,						
SE013_0.0-0.1,	BH001_0.3-0.5,						
SE004_0.0-0.1							

EK026G: Total Cyanide By Discrete Analyser

Method	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EK026G: Total Cyanide By Discrete Analyser - Analysis Holding Time Compliance						
Soil Glass Jar - Unpreserved						
SE001_0.0-0.1, SE002_0.0-0.1, SE003_0.0-0.1, SE010_0.1-0.3, SE011_0.0-0.1, SE012_0.3-0.5, SE020_0.2-0.4, SE030_0.0-0.1, SE031_0.0-0.1, SE051_0.0-0.1, SE052_0.0-0.1, BH053_1.5-1.7, BH024_0.3-0.5, BH024_2.0-2.2, BH077_1.0-1.2, SE011_0.3-0.5	SE001_0.1-0.2, SE002_0.3-0.5, SE003_0.2-0.4, SE010_0.6-0.8, SE012_0.0-0.1, SE020_0.0-0.1, SE021_0.0-0.1, SE030_0.3-0.5, SE040_0.3-0.5, SE051_0.3-0.5, BH053_0.3-0.5, BH053_3.2-3.5, BH024_1.0-1.2, BH077_0.3-0.5, BH077_1.5-1.7,	29-AUG-2012	21-AUG-2012	8	----	----
Soil Glass Jar - Unpreserved						
BH074_0.8-1.0, BH064_0.3-0.5, BH073_0.5-0.7, BH060_0.0-0.2, BH034_0.0-0.1, BH071_0.5-0.7, SE050_0.0-0.1, SEDUP03, SE061_0.0-0.1, SE022_0.0-0.05, SE064_0.0-0.1, SE062_0.2-0.3, BH084_1.0-1.2,	BH064_0.0-0.2, BH073_0.0-0.2, BH056_0.3-0.5, BH82_1.5-1.7, BH014_0.0-0.1, BH091_0.0-0.1, SE050_0.2-0.4, SE056_0.05-0.15, SE014_0.0-0.05, SE043_0.1-0.3, SE062_0.0-0.1, SE066_0.0-0.1, BH084_1.5-1.7	29-AUG-2012	22-AUG-2012	7	----	----
Soil Glass Jar - Unpreserved						
SEDUP04, SE005_0.0-0.1, SE013_0.0-0.1, SE004_0.0-0.1	SE057_0.2-0.4, SEDUP05, BH001_0.3-0.5,	29-AUG-2012	23-AUG-2012	6	----	----
EP003: Total Organic Carbon (TOC) in Soil						
Pulp Bag						
SE002_0.0-0.1, SE021_0.0-0.1, SE040_0.3-0.5, BH053_1.5-1.7, BH077_0.3-0.5, BH077_1.5-1.7	SE011_0.0-0.1, SE030_0.0-0.1, BH053_0.3-0.5, BH053_3.2-3.5, BH077_1.0-1.2,	28-AUG-2012	21-AUG-2012	7	----	----



Matrix: SOIL

Method		Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EP003: Total Organic Carbon (TOC) in Soil - Analysis Holding Time Compliance							
Pulp Bag							
BH034_0.0-0.1,	BH014_0.0-0.1,	28-AUG-2012	22-AUG-2012	6	----	----	----
BH071_0.5-0.7,	SE060_0.0-0.1,						
SE061_0.0-0.1,	SE014_0.0-0.05						
Pulp Bag							
SE033_0.0-0.05,	SE064_0.0-0.1	28-AUG-2012	23-AUG-2012	5	----	----	----

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.

Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1220402	Page	: 1 of 5
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR BEN LUFFMAN	Contact	: Angelene Kumar
Address	: 230 HARBOUR DRIVE PO Box 1340 COFFS HARBOUR NSW, AUSTRALIA 2450	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ben_luffman@ghd.com	E-mail	: angelene.kumar@alsglobal.com
Telephone	: +61 02 6650 5600	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 6652 6021	Facsimile	: +61 2 8784 8555
Project	: 2216251	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: HILLSIDE DR, URUNGA	Date Samples Received	: 22-AUG-2012
C-O-C number	: ----	Issue Date	: 28-AUG-2012
Sampler	: JS	No. of samples received	: 19
Order number	: ----	No. of samples analysed	: 19
Quote number	: SY/270/12		

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 Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA037: Ass Field Screening Analysis								
Snap Lock Bag (EA037) BH054_0.0-0.2, BH054_1.0-1.2, BH032_0.3-0.5,	BH054_0.7-0.9, BH032_0.0-0.2, BH32_1.0-1.2	14-AUG-2012	24-AUG-2012	15-AUG-2012	✖	28-AUG-2012	15-AUG-2012	✖
Snap Lock Bag (EA037) BH031_0.0-0.2, BH031_1.8-2.0	BH031_0.5-0.7,	15-AUG-2012	24-AUG-2012	16-AUG-2012	✖	28-AUG-2012	16-AUG-2012	✖
Snap Lock Bag (EA037) SE001-0.1, SE011-0.4, SE031-0.5, SEDUP04, SE050-0.3,	SE003-0.3, SE013-0.4, SE054-03, SE050-0.1, SE004-0.1	16-AUG-2012	24-AUG-2012	17-AUG-2012	✖	28-AUG-2012	17-AUG-2012	✖



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
ASS Field Screening Analysis	EA037	3	23	13.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
ASS Field Screening Analysis	* EA037	SOIL	Acid Sulfate Soils Laboratory Methods Guidelines, version 2.1 June 2004. As received samples are tested for pH field and pH fox and assessed for a reaction rating.



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

Matrix: SOIL

Method		Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA037: Ass Field Screening Analysis							
Snap Lock Bag BH054_0.0-0.2, BH054_1.0-1.2, BH032_0.3-0.5, BH054_0.7-0.9, BH032_0.0-0.2, BH32_1.0-1.2		24-AUG-2012	15-AUG-2012	9	28-AUG-2012	15-AUG-2012	13
Snap Lock Bag BH031_0.0-0.2, BH031_1.8-2.0 BH031_0.5-0.7,		24-AUG-2012	16-AUG-2012	8	28-AUG-2012	16-AUG-2012	12
Snap Lock Bag SE001-0.1, SE011-0.4, SE031-0.5, SEDUP04, SE050-0.3, SE003-0.3, SE013-0.4, SE054-03, SE050-0.1, SE004-0.1		24-AUG-2012	17-AUG-2012	7	28-AUG-2012	17-AUG-2012	11

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.

Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: EB1225565	Page	: 1 of 7
Client	: GHD PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: MR BEN LUFFMAN	Contact	: Angelene Kumar
Address	: 230 HARBOUR DRIVE PO Box 1340 COFFS HARBOUR NSW, AUSTRALIA 2450	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: ben_luffman@ghd.com	E-mail	: angelene.kumar@alsglobal.com
Telephone	: +61 02 6650 5600	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 6652 6021	Facsimile	: +61 2 8784 8555
Project	: 2216251	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: Hillside Dr, Urunga	Date Samples Received	: 26-SEP-2012
C-O-C number	: ----	Issue Date	: 05-OCT-2012
Sampler	: J. Simkus	No. of samples received	: 9
Order number	: ----	No. of samples analysed	: 9
Quote number	: SY/270/12		

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 Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA029-H: Acid Base Accounting								
80* dried soil (EA029) BH032_0.0-0.2, BH032_1.0-1.2	BH032_0.3-0.5,	14-AUG-2012	03-OCT-2012	14-AUG-2013	✓	03-OCT-2012	01-JAN-2013	✓
80* dried soil (EA029) BH031_0.0-0.2, BH031_1.8-2.0	BH031_0.5-0.7,	15-AUG-2012	03-OCT-2012	15-AUG-2013	✓	03-OCT-2012	01-JAN-2013	✓
80* dried soil (EA029) SE013_0.3-0.5, SE031_0.5-0.7	SE003_0.2-0.4,	16-AUG-2012	03-OCT-2012	16-AUG-2013	✓	03-OCT-2012	01-JAN-2013	✓
EA029-B: Acidity Trail								
80* dried soil (EA029) BH032_0.0-0.2, BH032_1.0-1.2	BH032_0.3-0.5,	14-AUG-2012	03-OCT-2012	14-AUG-2013	✓	03-OCT-2012	01-JAN-2013	✓
80* dried soil (EA029) BH031_0.0-0.2, BH031_1.8-2.0	BH031_0.5-0.7,	15-AUG-2012	03-OCT-2012	15-AUG-2013	✓	03-OCT-2012	01-JAN-2013	✓
80* dried soil (EA029) SE013_0.3-0.5, SE031_0.5-0.7	SE003_0.2-0.4,	16-AUG-2012	03-OCT-2012	16-AUG-2013	✓	03-OCT-2012	01-JAN-2013	✓
EA029-D: Calcium Values								
80* dried soil (EA029) BH032_0.0-0.2, BH032_1.0-1.2	BH032_0.3-0.5,	14-AUG-2012	03-OCT-2012	14-AUG-2013	✓	03-OCT-2012	01-JAN-2013	✓
80* dried soil (EA029) BH031_0.0-0.2, BH031_1.8-2.0	BH031_0.5-0.7,	15-AUG-2012	03-OCT-2012	15-AUG-2013	✓	03-OCT-2012	01-JAN-2013	✓
80* dried soil (EA029) SE013_0.3-0.5, SE031_0.5-0.7	SE003_0.2-0.4,	16-AUG-2012	03-OCT-2012	16-AUG-2013	✓	03-OCT-2012	01-JAN-2013	✓



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA029-F: Excess Acid Neutralising Capacity								
80* dried soil (EA029) BH032_0.0-0.2, BH032_1.0-1.2	BH032_0.3-0.5,	14-AUG-2012	03-OCT-2012	14-AUG-2013	✔	03-OCT-2012	01-JAN-2013	✔
80* dried soil (EA029) BH031_0.0-0.2, BH031_1.8-2.0	BH031_0.5-0.7,	15-AUG-2012	03-OCT-2012	15-AUG-2013	✔	03-OCT-2012	01-JAN-2013	✔
80* dried soil (EA029) SE013_0.3-0.5, SE031_0.5-0.7	SE003_0.2-0.4,	16-AUG-2012	03-OCT-2012	16-AUG-2013	✔	03-OCT-2012	01-JAN-2013	✔
EA029-E: Magnesium Values								
80* dried soil (EA029) BH032_0.0-0.2, BH032_1.0-1.2	BH032_0.3-0.5,	14-AUG-2012	03-OCT-2012	14-AUG-2013	✔	03-OCT-2012	01-JAN-2013	✔
80* dried soil (EA029) BH031_0.0-0.2, BH031_1.8-2.0	BH031_0.5-0.7,	15-AUG-2012	03-OCT-2012	15-AUG-2013	✔	03-OCT-2012	01-JAN-2013	✔
80* dried soil (EA029) SE013_0.3-0.5, SE031_0.5-0.7	SE003_0.2-0.4,	16-AUG-2012	03-OCT-2012	16-AUG-2013	✔	03-OCT-2012	01-JAN-2013	✔
EA029-A: pH Measurements								
80* dried soil (EA029) BH032_0.0-0.2, BH032_1.0-1.2	BH032_0.3-0.5,	14-AUG-2012	03-OCT-2012	14-AUG-2013	✔	03-OCT-2012	01-JAN-2013	✔
80* dried soil (EA029) BH031_0.0-0.2, BH031_1.8-2.0	BH031_0.5-0.7,	15-AUG-2012	03-OCT-2012	15-AUG-2013	✔	03-OCT-2012	01-JAN-2013	✔
80* dried soil (EA029) SE013_0.3-0.5, SE031_0.5-0.7	SE003_0.2-0.4,	16-AUG-2012	03-OCT-2012	16-AUG-2013	✔	03-OCT-2012	01-JAN-2013	✔
EA029-G: Retained Acidity								
80* dried soil (EA029) BH032_0.0-0.2, BH032_1.0-1.2	BH032_0.3-0.5,	14-AUG-2012	03-OCT-2012	14-AUG-2013	✔	03-OCT-2012	01-JAN-2013	✔
80* dried soil (EA029) BH031_0.0-0.2, BH031_1.8-2.0	BH031_0.5-0.7,	15-AUG-2012	03-OCT-2012	15-AUG-2013	✔	03-OCT-2012	01-JAN-2013	✔
80* dried soil (EA029) SE013_0.3-0.5, SE031_0.5-0.7	SE003_0.2-0.4,	16-AUG-2012	03-OCT-2012	16-AUG-2013	✔	03-OCT-2012	01-JAN-2013	✔

Page : 4 of 7
 Work Order : EB1225565
 Client : GHD PTY LTD
 Project : 2216251



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA029-C: Sulfur Trail								
80* dried soil (EA029) BH032_0.0-0.2, BH032_1.0-1.2	BH032_0.3-0.5,	14-AUG-2012	03-OCT-2012	14-AUG-2013	✓	03-OCT-2012	01-JAN-2013	✓
80* dried soil (EA029) BH031_0.0-0.2, BH031_1.8-2.0	BH031_0.5-0.7,	15-AUG-2012	03-OCT-2012	15-AUG-2013	✓	03-OCT-2012	01-JAN-2013	✓
80* dried soil (EA029) SE013_0.3-0.5, SE031_0.5-0.7	SE003_0.2-0.4,	16-AUG-2012	03-OCT-2012	16-AUG-2013	✓	03-OCT-2012	01-JAN-2013	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	2	15	13.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	1	15	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	1	15	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Suspension Peroxide Oxidation-Combined Acidity and Sulphate	EA029	SOIL	Ahern et al 2004 - a suspension peroxide oxidation method following the 'sulfur trail' by determining the level of 1M KCL extractable sulfur and the sulfur level after oxidation of soil sulphides. The 'acidity trail' is followed by measurement of TAA, TPA and TSA. Liming Rate is based on results for samples as submitted and incorporates a minimum safety factor of 1.5.
Preparation Methods	Method	Matrix	Method Descriptions
Drying at 85 degrees, bagging and labelling (ASS)	EN020PR	SOIL	In house



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.

Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1223062	Page	: 1 of 9
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR BEN LUFFMAN	Contact	: Angelene Kumar
Address	: 230 HARBOUR DRIVE PO Box 1340 COFFS HARBOUR NSW, AUSTRALIA 2450	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ben_luffman@ghd.com	E-mail	: angelene.kumar@alsglobal.com
Telephone	: +61 02 6650 5600	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 6652 6021	Facsimile	: +61 2 8784 8555
Project	: 2216251	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: HILLSIDE DR, URUNGA	Date Samples Received	: 26-SEP-2012
C-O-C number	: ----	Issue Date	: 04-OCT-2012
Sampler	: JS	No. of samples received	: 35
Order number	: ----	No. of samples analysed	: 35
Quote number	: SY/270/12		

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 Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EA055: Moisture Content								
Soil Glass Jar - Unpreserved (EA055-103) BH032_0.3-0.5, BH077_0.0-0.2, SE001_0.4-0.6, SE041_0.0-0.05, SE032_0.0-0.1,	BHDUP01, BH077_2.0-2.2, SE042_0.2-0.4, SE041_0.1-0.3, SEDUP01	14-AUG-2012	----	----	----	27-SEP-2012	28-AUG-2012	✖
Soil Glass Jar - Unpreserved (EA055-103) BH073_1.0-1.2, SE067_0.0-0.1, SE064_0.2-0.3, SEDUP02	SE014_0.2-0.4, SE068_0.0-0.1, SE050_0.4-0.6,	15-AUG-2012	----	----	----	27-SEP-2012	29-AUG-2012	✖
Soil Glass Jar - Unpreserved (EA055-103) BH012_0.0-0.1, BH101_0.0-0.2, BH028_0.0-0.2, BH020_0.0-0.2	BHDUP08, BH022_0.5-0.7, BH028_0.3-0.5,	16-AUG-2012	----	----	----	27-SEP-2012	30-AUG-2012	✖
EA150: Particle Sizing								
Soil Glass Jar - Unpreserved (EA150H) SE002_0.5-0.7,	SE011_0.7-0.9	14-AUG-2012	---	10-FEB-2013	----	03-OCT-2012	10-FEB-2013	✔
Soil Glass Jar - Unpreserved (EA150H) SE033_0.0-0.05, SE033_0.4-0.6, SE063_0.2-0.3,	SE033_0.2-0.4, SE063_0.0-0.1, SE063_0.4-0.6	15-AUG-2012	---	11-FEB-2013	----	03-OCT-2012	11-FEB-2013	✔
Soil Glass Jar - Unpreserved (EA150H) SE003_0.2-0.4, SE004_0.4-0.6	SE004_0.2-0.3,	16-AUG-2012	---	12-FEB-2013	----	03-OCT-2012	12-FEB-2013	✔
EA150: Soil Classification based on Particle Size								
Soil Glass Jar - Unpreserved (EA150H) SE002_0.5-0.7,	SE011_0.7-0.9	14-AUG-2012	---	10-FEB-2013	----	03-OCT-2012	10-FEB-2013	✔
Soil Glass Jar - Unpreserved (EA150H) SE033_0.0-0.05, SE033_0.4-0.6, SE063_0.2-0.3,	SE033_0.2-0.4, SE063_0.0-0.1, SE063_0.4-0.6	15-AUG-2012	---	11-FEB-2013	----	03-OCT-2012	11-FEB-2013	✔
Soil Glass Jar - Unpreserved (EA150H) SE003_0.2-0.4, SE004_0.4-0.6	SE004_0.2-0.3,	16-AUG-2012	---	12-FEB-2013	----	03-OCT-2012	12-FEB-2013	✔



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EG005C: Leachable Metals by ICPAES								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG005C) SE068_0.0-0.1, SE001_0.4-0.6, SE041_0.0-0.05, SE050_0.4-0.6, SEDUP01,	SE064_0.2-0.3, SE042_0.2-0.4, SE041_0.1-0.3, SE032_0.0-0.1, SEDUP02	04-OCT-2012	04-OCT-2012	02-APR-2013	✔	04-OCT-2012	02-APR-2013	✔
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG005C) BH032_0.3-0.5, BH077_0.0-0.2,	BHDUP01, BH077_2.0-2.2	14-AUG-2012	28-SEP-2012	27-MAR-2013	✔	28-SEP-2012	27-MAR-2013	✔
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG005C) BH073_1.0-1.2, SE067_0.0-0.1	SE014_0.2-0.4,	15-AUG-2012	28-SEP-2012	27-MAR-2013	✔	28-SEP-2012	27-MAR-2013	✔
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG005C) BH012_0.0-0.1, BH101_0.0-0.2, BH028_0.0-0.2, BH020_0.0-0.2	BHDUP08, BH022_0.5-0.7, BH028_0.3-0.5,	16-AUG-2012	28-SEP-2012	27-MAR-2013	✔	28-SEP-2012	27-MAR-2013	✔
EG035C: Leachable Mercury by FIMS								
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035C) SE068_0.0-0.1, SE001_0.4-0.6, SE041_0.0-0.05, SE050_0.4-0.6, SEDUP01,	SE064_0.2-0.3, SE042_0.2-0.4, SE041_0.1-0.3, SE032_0.0-0.1, SEDUP02	04-OCT-2012	----	----	----	04-OCT-2012	01-NOV-2012	✔
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035C) BH032_0.3-0.5, BH077_0.0-0.2,	BHDUP01, BH077_2.0-2.2	14-AUG-2012	----	----	----	02-OCT-2012	11-SEP-2012	✖
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035C) BH073_1.0-1.2, SE067_0.0-0.1	SE014_0.2-0.4,	15-AUG-2012	----	----	----	02-OCT-2012	12-SEP-2012	✖
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035C) BH012_0.0-0.1, BH101_0.0-0.2, BH028_0.0-0.2, BH020_0.0-0.2	BHDUP08, BH022_0.5-0.7, BH028_0.3-0.5,	16-AUG-2012	----	----	----	02-OCT-2012	13-SEP-2012	✖



Matrix: **SOIL**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EG035T: Total Recoverable Mercury by FIMS								
Soil Glass Jar - Unpreserved (EG035T) BH032_0.3-0.5, BH077_0.0-0.2, SE001_0.4-0.6, SE041_0.0-0.05, SE032_0.0-0.1,	BHDUP01, BH077_2.0-2.2, SE042_0.2-0.4, SE041_0.1-0.3, SEDUP01	14-AUG-2012	28-SEP-2012	11-SEP-2012	✖	28-SEP-2012	11-SEP-2012	✖
Soil Glass Jar - Unpreserved (EG035T) BH073_1.0-1.2, SE067_0.0-0.1, SE064_0.2-0.3, SEDUP02	SE014_0.2-0.4, SE068_0.0-0.1, SE050_0.4-0.6,	15-AUG-2012	28-SEP-2012	12-SEP-2012	✖	28-SEP-2012	12-SEP-2012	✖
Soil Glass Jar - Unpreserved (EG035T) BH012_0.0-0.1, BH101_0.0-0.2, BH028_0.0-0.2, BH020_0.0-0.2	BHDUP08, BH022_0.5-0.7, BH028_0.3-0.5,	16-AUG-2012	28-SEP-2012	13-SEP-2012	✖	28-SEP-2012	13-SEP-2012	✖
EN33: TCLP Leach								
Lab Split : Leach for Hg, Cr(VI) and other metal (EN33a) SE001_0.4-0.6, SE041_0.0-0.05, SE032_0.0-0.1,	SE042_0.2-0.4, SE041_0.1-0.3, SEDUP01	14-AUG-2012	---	11-SEP-2012	----	03-OCT-2012	11-SEP-2012	✖
Lab Split : Leach for Hg, Cr(VI) and other metal (EN33a) BH032_0.3-0.5, BH077_0.0-0.2,	BHDUP01, BH077_2.0-2.2	14-AUG-2012	---	11-SEP-2012	----	28-SEP-2012	11-SEP-2012	✖
Lab Split : Leach for Hg, Cr(VI) and other metal (EN33a) SE068_0.0-0.1, SE050_0.4-0.6,	SE064_0.2-0.3, SEDUP02	15-AUG-2012	---	12-SEP-2012	----	03-OCT-2012	12-SEP-2012	✖
Lab Split : Leach for Hg, Cr(VI) and other metal (EN33a) BH073_1.0-1.2, SE067_0.0-0.1	SE014_0.2-0.4,	15-AUG-2012	---	12-SEP-2012	----	28-SEP-2012	12-SEP-2012	✖
Lab Split : Leach for Hg, Cr(VI) and other metal (EN33a) BH012_0.0-0.1, BH101_0.0-0.2, BH028_0.0-0.2, BH020_0.0-0.2	BHDUP08, BH022_0.5-0.7, BH028_0.3-0.5,	16-AUG-2012	---	13-SEP-2012	----	28-SEP-2012	13-SEP-2012	✖



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	3	25	12.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Mercury by FIMS	EG035T	4	35	11.4	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Total Mercury by FIMS	EG035T	2	35	5.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Total Mercury by FIMS	EG035T	2	35	5.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Total Mercury by FIMS	EG035T	2	35	5.7	5.0	✓	ALS QCS3 requirement

Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Leachable Mercury by FIMS	EG035C	4	34	11.8	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Leachable Metals by ICPAES	EG005C	4	28	14.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Leachable Mercury by FIMS	EG035C	2	34	5.9	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Leachable Metals by ICPAES	EG005C	2	28	7.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Leachable Mercury by FIMS	EG035C	2	34	5.9	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Leachable Metals by ICPAES	EG005C	2	28	7.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Leachable Mercury by FIMS	EG035C	2	34	5.9	5.0	✓	ALS QCS3 requirement
Leachable Metals by ICPAES	EG005C	2	28	7.1	5.0	✓	ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2010 Draft) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Particle Size Analysis by Hydrometer	EA150H	SOIL	Particle Size Analysis by Hydrometer according to AS1289.3.6.3 - 2003
Leachable Metals by ICPAES	EG005C	SOIL	APHA 21st ed., 3120; USEPA SW 846 - 6010 The ICPAES technique ionises leachate sample atoms emitting a characteristic spectrum. This spectrum is then compared against matrix matched standards for quantification. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Leachable Mercury by FIMS	EG035C	SOIL	AS 3550, APHA 21st ed. 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the TCLP solution. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Total Mercury by FIMS	EG035T	SOIL	AS 3550, APHA 21st ed., 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. Mercury in solids are determined following an appropriate acid digestion. Ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (1999) Schedule B(3)
Preparation Methods	Method	Matrix	Method Descriptions
TCLP for Non & Semivolatile Analytes	EN33a	SOIL	(USEPA SW846-1311, ALS QWI-EN/33) The TCLP procedure is designed to determine the mobility of both organic and inorganic analytes present in wastes. The standard TCLP leach is for non-volatile and Semivolatile test parameters.
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	USEPA 200.2 Mod. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (1999) Schedule B(3) (Method 202)

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EG005C: Leachable Metals by ICPAES	ES1223062-016	SE064_0.2-0.3	Zinc	7440-66-6	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

- ## Regular Sample Surrogates

- ### Outliers : Analysis Holding Time Compliance

Method	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA055: Moisture Content						
Soil Glass Jar - Unpreserved BH032_0.3-0.5, BH077_0.0-0.2, SE001_0.4-0.6, SE041_0.0-0.05, SE032_0.0-0.1, BHDUP01, BH077_2.0-2.2, SE042_0.2-0.4, SE041_0.1-0.3, SEDUP01	----	----	----	27-SEP-2012	28-AUG-2012	30
Soil Glass Jar - Unpreserved BH073_1.0-1.2, SE067_0.0-0.1, SE064_0.2-0.3, SEDUP02 SE014_0.2-0.4, SE068_0.0-0.1, SE050_0.4-0.6,	----	----	----	27-SEP-2012	29-AUG-2012	29
Soil Glass Jar - Unpreserved BH012_0.0-0.1, BH101_0.0-0.2, BH028_0.0-0.2, BH020_0.0-0.2 BHDUP08, BH022_0.5-0.7, BH028_0.3-0.5,	----	----	----	27-SEP-2012	30-AUG-2012	28
EG035C: Leachable Mercury by FIMS						



Matrix: **SOIL**

Method		Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EG035C: Leachable Mercury by FIMS - Analysis Holding Time Compliance							
Clear Plastic Bottle - Nitric Acid; Unfiltered BH032_0.3-0.5, BH077_0.0-0.2,	BHDUP01, BH077_2.0-2.2	----	----	----	02-OCT-2012	11-SEP-2012	21
Clear Plastic Bottle - Nitric Acid; Unfiltered BH073_1.0-1.2, SE067_0.0-0.1	SE014_0.2-0.4,	----	----	----	02-OCT-2012	12-SEP-2012	20
Clear Plastic Bottle - Nitric Acid; Unfiltered BH012_0.0-0.1, BH101_0.0-0.2, BH028_0.0-0.2, BH020_0.0-0.2	BHDUP08, BH022_0.5-0.7, BH028_0.3-0.5,	----	----	----	02-OCT-2012	13-SEP-2012	19
EG035T: Total Recoverable Mercury by FIMS							
Soil Glass Jar - Unpreserved BH032_0.3-0.5, BH077_0.0-0.2, SE001_0.4-0.6, SE041_0.0-0.05, SE032_0.0-0.1,	BHDUP01, BH077_2.0-2.2, SE042_0.2-0.4, SE041_0.1-0.3, SEDUP01	28-SEP-2012	11-SEP-2012	17	28-SEP-2012	11-SEP-2012	17
Soil Glass Jar - Unpreserved BH073_1.0-1.2, SE067_0.0-0.1, SE064_0.2-0.3, SEDUP02	SE014_0.2-0.4, SE068_0.0-0.1, SE050_0.4-0.6,	28-SEP-2012	12-SEP-2012	16	28-SEP-2012	12-SEP-2012	16
Soil Glass Jar - Unpreserved BH012_0.0-0.1, BH101_0.0-0.2, BH028_0.0-0.2, BH020_0.0-0.2	BHDUP08, BH022_0.5-0.7, BH028_0.3-0.5,	28-SEP-2012	13-SEP-2012	15	28-SEP-2012	13-SEP-2012	15
EN33: TCLP Leach							
Lab Split : Leach for Hg, Cr(VI) and other metal SE001_0.4-0.6, SE041_0.0-0.05, SE032_0.0-0.1,	SE042_0.2-0.4, SE041_0.1-0.3, SEDUP01	----	----	----	03-OCT-2012	11-SEP-2012	22
Lab Split : Leach for Hg, Cr(VI) and other metal BH032_0.3-0.5, BH077_0.0-0.2,	BHDUP01, BH077_2.0-2.2	----	----	----	28-SEP-2012	11-SEP-2012	17
Lab Split : Leach for Hg, Cr(VI) and other metal SE068_0.0-0.1, SE050_0.4-0.6,	SE064_0.2-0.3, SEDUP02	----	----	----	03-OCT-2012	12-SEP-2012	21
Lab Split : Leach for Hg, Cr(VI) and other metal BH073_1.0-1.2, SE067_0.0-0.1	SE014_0.2-0.4,	----	----	----	28-SEP-2012	12-SEP-2012	16



Matrix: SOIL

Method		Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EN33: TCLP Leach - Analysis Holding Time Compliance							
Lab Split : Leach for Hg, Cr(VI) and other metal							
BH012_0.0-0.1,	BHDUP08,	----	----	----	28-SEP-2012	13-SEP-2012	15
BH101_0.0-0.2,	BH022_0.5-0.7,						
BH028_0.0-0.2,	BH028_0.3-0.5,						
BH020_0.0-0.2							

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.

Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1223935	Page	: 1 of 5
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR BEN LUFFMAN	Contact	: Angelene Kumar
Address	: 230 HARBOUR DRIVE PO Box 1340 COFFS HARBOUR NSW, AUSTRALIA 2450	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ben_luffman@ghd.com	E-mail	: angelene.kumar@alsglobal.com
Telephone	: +61 02 6650 5600	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 6652 6021	Facsimile	: +61 2 8784 8555
Project	: 2216251	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: HILLSIDE DR, URUNGA	Date Samples Received	: 08-OCT-2012
C-O-C number	: ----	Issue Date	: 10-OCT-2012
Sampler	: JS	No. of samples received	: 19
Order number	: REBATCH OF ES1223062	No. of samples analysed	: 19
Quote number	: SY/270/12		

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 Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **SOIL**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA055: Moisture Content							
Lab Split: Managed Moisture for Dry Weight Det. (EA055-103) BH032_0.3-0.5, BHDUP01, BH077_0.0-0.2, BH077_2.0-2.2, SE001_0.4-0.6, SE042_0.2-0.4, SE041_0.1-0.3	14-AUG-2012	----	----	----	09-OCT-2012	10-FEB-2013	✓
Lab Split: Managed Moisture for Dry Weight Det. (EA055-103) BH073_1.0-1.2, SE014_0.2-0.4, SE068_0.0-0.1, SE064_0.2-0.3, SE050_0.4-0.6	15-AUG-2012	----	----	----	09-OCT-2012	11-FEB-2013	✓
Lab Split: Managed Moisture for Dry Weight Det. (EA055-103) BH012_0.0-0.1, BHDUP08, BH101_0.0-0.2, BH022_0.5-0.7, BH028_0.0-0.2, BH028_0.3-0.5, BH020_0.0-0.2	16-AUG-2012	----	----	----	09-OCT-2012	12-FEB-2013	✓
EG005T: Total Metals by ICP-AES							
Soil Glass Jar - Unpreserved (EG005T) BH032_0.3-0.5, BHDUP01, BH077_0.0-0.2, BH077_2.0-2.2, SE001_0.4-0.6, SE042_0.2-0.4, SE041_0.1-0.3	14-AUG-2012	09-OCT-2012	10-FEB-2013	✓	09-OCT-2012	10-FEB-2013	✓
Soil Glass Jar - Unpreserved (EG005T) BH073_1.0-1.2, SE014_0.2-0.4, SE068_0.0-0.1, SE064_0.2-0.3, SE050_0.4-0.6	15-AUG-2012	09-OCT-2012	11-FEB-2013	✓	09-OCT-2012	11-FEB-2013	✓
Soil Glass Jar - Unpreserved (EG005T) BH012_0.0-0.1, BHDUP08, BH101_0.0-0.2, BH022_0.5-0.7, BH028_0.0-0.2, BH028_0.3-0.5, BH020_0.0-0.2	16-AUG-2012	09-OCT-2012	12-FEB-2013	✓	09-OCT-2012	12-FEB-2013	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **SOIL**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Moisture Content	EA055-103	2	19	10.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-AES	EG005T	4	36	11.1	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Total Metals by ICP-AES	EG005T	2	36	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Total Metals by ICP-AES	EG005T	2	36	5.6	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Total Metals by ICP-AES	EG005T	2	36	5.6	5.0	✓	ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Moisture Content	EA055-103	SOIL	A gravimetric procedure based on weight loss over a 12 hour drying period at 103-105 degrees C. This method is compliant with NEPM (2010 Draft) Schedule B(3) Section 7.1 and Table 1 (14 day holding time).
Total Metals by ICP-AES	EG005T	SOIL	(APHA 21st ed., 3120; USEPA SW 846 - 6010) (ICPAES) Metals are determined following an appropriate acid digestion of the soil. The ICPAES technique ionises samples in a plasma, emitting a characteristic spectrum based on metals present. Intensities at selected wavelengths are compared against those of matrix matched standards. This method is compliant with NEPM (1999) Schedule B(3)
Preparation Methods	Method	Matrix	Method Descriptions
Hot Block Digest for metals in soils sediments and sludges	EN69	SOIL	USEPA 200.2 Mod. Hot Block Acid Digestion 1.0g of sample is heated with Nitric and Hydrochloric acids, then cooled. Peroxide is added and samples heated and cooled again before being filtered and bulked to volume for analysis. Digest is appropriate for determination of selected metals in sludge, sediments, and soils. This method is compliant with NEPM (1999) Schedule B(3) (Method 202)



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.



STATEMENT OF QA/QC PERFORMANCE

SE111292 R0

CLIENT DETAILS

Contact Ben Luffman
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Project **2216251**
Order Number **Apply credit against invoice SY00100799**
Samples 4

LABORATORY DETAILS

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SGS Reference SE111292 R0
Report Number 0000038516
Date Reported 28 Aug 2012

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS Environmental Services' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document and was supplied by the Client. This QA/QC Statement must be read in conjunction with the referenced Analytical Report. The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

Matrix Spike

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

1 item

SAMPLE SUMMARY

Sample counts by matrix	4 Soils	Type of documentation received	COC
Date documentation received	22/8/2012	Samples received in good order	Yes
Samples received without headspace	Yes	Sample temperature upon receipt	3.4°C
Sample container provider	Other Lab	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice Bricks	Samples clearly labelled	Yes
Complete documentation received	Yes		



HOLDING TIME SUMMARY

SE111292 R0

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SELABDUP1	SE111292.001	LB025365	21 Aug 2012	22 Aug 2012	18 Sep 2012	22 Aug 2012	18 Sep 2012	23 Aug 2012
BHLABDUP01	SE111292.002	LB025365	21 Aug 2012	22 Aug 2012	18 Sep 2012	22 Aug 2012	18 Sep 2012	23 Aug 2012
BHLABDUP02	SE111292.003	LB025365	21 Aug 2012	22 Aug 2012	18 Sep 2012	22 Aug 2012	18 Sep 2012	23 Aug 2012
BHLABDUP03	SE111292.004	LB025365	21 Aug 2012	22 Aug 2012	18 Sep 2012	22 Aug 2012	18 Sep 2012	23 Aug 2012

Moisture Content

Method: ME-(AU)-[ENV]AN002

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SELABDUP1	SE111292.001	LB025382	21 Aug 2012	22 Aug 2012	04 Sep 2012	23 Aug 2012	28 Aug 2012	27 Aug 2012
BHLABDUP01	SE111292.002	LB025382	21 Aug 2012	22 Aug 2012	04 Sep 2012	23 Aug 2012	28 Aug 2012	27 Aug 2012
BHLABDUP02	SE111292.003	LB025382	21 Aug 2012	22 Aug 2012	04 Sep 2012	23 Aug 2012	28 Aug 2012	27 Aug 2012
BHLABDUP03	SE111292.004	LB025382	21 Aug 2012	22 Aug 2012	04 Sep 2012	23 Aug 2012	28 Aug 2012	27 Aug 2012

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
SELABDUP1	SE111292.001	LB025363	21 Aug 2012	22 Aug 2012	17 Feb 2013	22 Aug 2012	17 Feb 2013	23 Aug 2012
BHLABDUP01	SE111292.002	LB025363	21 Aug 2012	22 Aug 2012	17 Feb 2013	22 Aug 2012	17 Feb 2013	23 Aug 2012
BHLABDUP02	SE111292.003	LB025363	21 Aug 2012	22 Aug 2012	17 Feb 2013	22 Aug 2012	17 Feb 2013	23 Aug 2012
BHLABDUP03	SE111292.004	LB025363	21 Aug 2012	22 Aug 2012	17 Feb 2013	22 Aug 2012	17 Feb 2013	23 Aug 2012



Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No surrogates were required for this job.



METHOD BLANKS

SE111292 R0

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury in Soil			Method: ME-(AU)-(ENV)AN312	
Sample Number	Parameter	Units	LOR	Result
LB025365.001	Mercury	mg/kg	0.05	<0.05

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest			Method: ME-(AU)-(ENV)AN040/AN320	
Sample Number	Parameter	Units	LOR	Result
LB025363.001	Aluminium, Al	mg/kg	1	<1
	Antimony, Sb	mg/kg	3	<3
	Arsenic, As	mg/kg	3	<3
	Cadmium, Cd	mg/kg	0.3	<0.3
	Chromium, Cr	mg/kg	0.3	<0.3
	Copper, Cu	mg/kg	0.5	<0.5
	Lead, Pb	mg/kg	1	<1
	Nickel, Ni	mg/kg	0.5	<0.5
	Zinc, Zn	mg/kg	0.5	<0.5



DUPLICATES

SE111292 R0

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: $RPD = | \text{OriginalResult} - \text{ReplicateResult} | \times 100 / \text{Mean}$

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: $MAD = 100 \times \text{SDL} / \text{Mean} + \text{LR}$

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE111306.004	LB025365.014	Mercury	mg/kg	0.05	0.02247075260	0.0232991456	74	4

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE111306.003	LB025363.014	Arsenic, As	mg/kg	3	8.79890312517	9.594376489	66	10
		Cadmium, Cd	mg/kg	0.3	0.04488394100	0.0567483798	200	0
		Chromium, Cr	mg/kg	0.3	8.96742843729	3.786904569	33	4
		Copper, Cu	mg/kg	0.5	2.58164281242	2.7290530685	49	6
		Lead, Pb	mg/kg	1	7.87201390858	3.312355056	42	6
		Nickel, Ni	mg/kg	0.5	0.26376532760	3.055484424	200	0
		Zinc, Zn	mg/kg	0.5	2.63523307133	0.0391356914	48	14



LABORATORY CONTROL SAMPLES

SE111292 R0

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Mercury in Soil

Method: ME-(AU)-[ENV]AN312

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB025365.002	Mercury	mg/kg	0.05	0.21	0.2	70 - 130	103

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-[ENV]AN040/AN320

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB025363.002	Aluminium, Al	mg/kg	1	51	50	80 - 120	102
	Antimony, Sb	mg/kg	3	48	50	80 - 120	97
	Arsenic, As	mg/kg	3	48	50	80 - 120	95
	Cadmium, Cd	mg/kg	0.3	48	50	80 - 120	95
	Chromium, Cr	mg/kg	0.3	50	50	80 - 120	99
	Copper, Cu	mg/kg	0.5	49	50	80 - 120	97
	Lead, Pb	mg/kg	1	48	50	80 - 120	97
	Nickel, Ni	mg/kg	0.5	49	50	80 - 120	98
	Zinc, Zn	mg/kg	0.5	48	50	80 - 120	96



MATRIX SPIKES

SE111292 R0

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub-sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-(ENV)QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury in Soil

Method: ME-(AU)-(ENV)AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE111276.026	LB025365.004	Mercury	mg/kg	0.05	0.20	0.01590669642	0.2	91

Total Recoverable Metals in Soil by ICPOES from EPA 200.8 Digest

Method: ME-(AU)-(ENV)AN040/AN320

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE111276.025	LB025363.004	Arsenic, As	mg/kg	3	47	2.89734193786	50	88
		Cadmium, Cd	mg/kg	0.3	46	0.26764555226	50	92
		Chromium, Cr	mg/kg	0.3	61	14.56640976331	50	93
		Copper, Cu	mg/kg	0.5	61	13.20368959566	50	96
		Lead, Pb	mg/kg	1	70	26.02282963510	50	88
		Nickel, Ni	mg/kg	0.5	52	4.87633012820	50	95
		Zinc, Zn	mg/kg	0.5	220	0.07142135108	50	29 @



Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: $RPD = | \text{OriginalResult} - \text{ReplicateResult} | \times 100 / \text{Mean}$

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: $MAD = 100 \times \text{SDL} / \text{Mean} + \text{LR}$

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spike duplicates were required for this job.



Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here:
<http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-11.pdf>

- * Non-accredited analysis.
- Sample not analysed for this analyte.
- ^ Analysis performed by external laboratory.

IS Insufficient sample for analysis.
LNR Sample listed, but not received.
LOR Limit of reporting.
QFH QC result is above the upper tolerance.
QFL QC result is below the lower tolerance.

- ① At least 2 of 3 surrogates are within acceptance criteria.
- ② RPD failed acceptance criteria due to sample heterogeneity.
- ③ Results less than 5 times LOR preclude acceptance criteria for RPD.
- ④ Recovery failed acceptance criteria due to matrix interference.
- ⑤ Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
- ⑥ LOR was raised due to sample matrix interference.
- ⑦ LOR was raised due to dilution of significantly high concentration of analyte in sample.
- ⑧ Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
- ⑨ Recovery failed acceptance criteria due to sample heterogeneity.
- † Refer to Analytical Report comments for further information.

This document is issued, on the Client's behalf, by the Company under its General Conditions of Service, available on request and accessible at http://www.sgs.com/terms_and_conditions.htm. The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

Any other holder of this document is advised that information contained herein reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents.

This test report shall not be reproduced, except in full.

Environmental Division

INTERPRETIVE QUALITY CONTROL REPORT

Work Order	: ES1220550	Page	: 1 of 8
Client	: GHD PTY LTD	Laboratory	: Environmental Division Sydney
Contact	: MR BEN LUFFMAN	Contact	: Angelene Kumar
Address	: 230 HARBOUR DRIVE PO Box 1340 COFFS HARBOUR NSW, AUSTRALIA 2450	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ben_luffman@ghd.com	E-mail	: angelene.kumar@alsglobal.com
Telephone	: +61 02 6650 5600	Telephone	: +61 2 8784 8555
Facsimile	: +61 02 6652 6021	Facsimile	: +61 2 8784 8555
Project	: 2216251	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Site	: HILLSIDE DR, Urunga	Date Samples Received	: 24-AUG-2012
C-O-C number	: ----	Issue Date	: 30-AUG-2012
Sampler	: ----	No. of samples received	: 14
Order number	: ----	No. of samples analysed	: 14
Quote number	: SY/270/12		

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 Interpretive Quality Control Report contains the following information:

- Analysis Holding Time Compliance
- Quality Control Parameter Frequency Compliance
- Brief Method Summaries
- Summary of Outliers



Analysis Holding Time Compliance

The following report summarises extraction / preparation and analysis times and compares with recommended holding times. Dates reported represent first date of extraction or analysis and precludes subsequent dilutions and reruns. Information is also provided re the sample container (preservative) from which the analysis aliquot was taken. Elapsed period to analysis represents number of days from sampling where no extraction / digestion is involved or period from extraction / digestion where this is present. For composite samples, sampling date is assumed to be that of the oldest sample contributing to the composite. Sample date for laboratory produced leachates is assumed as the completion date of the leaching process. Outliers for holding time are based on USEPA SW 846, APHA, AS and NEPM (1999). A listing of breaches is provided in the Summary of Outliers.

Holding times for leachate methods (excluding elutriates) vary according to the analytes being determined on the resulting solution. For non-volatile analytes, the holding time compliance assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These soil holding times are: Organics (14 days); Mercury (28 days) & other metals (180 days). A recorded breach therefore does not guarantee a breach for all non-volatile parameters.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA015: Total Dissolved Solids								
Clear Plastic Bottle - Natural (EA015H)		22-AUG-2012	----	----	----	29-AUG-2012	29-AUG-2012	✓
SW001,	SW002,							
SW003,	SW004,							
SW005,	SW006,							
SW007,	SW008,							
SW009,	SWDUP01,							
GW006,	GW007,							
GW013								
EA025: Suspended Solids								
Clear Plastic Bottle - Natural (EA025H)		22-AUG-2012	----	----	----	28-AUG-2012	29-AUG-2012	✓
SW001,	SW002,							
SW003,	SW004,							
SW005,	SW006,							
SW007,	SW008,							
SW009,	SWDUP01,							
GW006,	GW007,							
GW013								
ED037P: Alkalinity by PC Titrator								
Clear Plastic Bottle - Natural (ED037-P)		22-AUG-2012	---	05-SEP-2012	----	28-AUG-2012	05-SEP-2012	✓
SW001,	SW002,							
SW003,	SW004,							
SW005,	SW006,							
SW007,	SW008,							
SW009,	SWDUP01,							
GW006,	GW007,							
GW013								
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Clear Plastic Bottle - Natural (ED041G)		22-AUG-2012	---	19-SEP-2012	----	27-AUG-2012	19-SEP-2012	✓
SW001,	SW002,							
SW003,	SW004,							
SW005,	SW006,							
SW007,	SW008,							
SW009,	SWDUP01,							
GW006,	GW007,							
GW013								

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED045G: Chloride Discrete analyser							
Clear Plastic Bottle - Natural (ED045G)							
SW001, SW003, SW005, SW007, SW009, GW006, GW013	SW002, SW004, SW006, SW008, SWDUP01, GW007,	22-AUG-2012	---	19-SEP-2012	----	27-AUG-2012	19-SEP-2012 ✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Natural (ED093F)							
SW001, SW003, SW005, SW007, SW009, GW006, GW013	SW002, SW004, SW006, SW008, SWDUP01, GW007,	22-AUG-2012	---	29-AUG-2012	----	27-AUG-2012	29-AUG-2012 ✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
SW001, SW003, SW005, SW007, SW009, GW004, GW007,	SW002, SW004, SW006, SW008, SWDUP01, GW006, GW013	22-AUG-2012	---	18-FEB-2013	----	27-AUG-2012	18-FEB-2013 ✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)							
SW001, SW003, SW005, SW007, SW009,	SW002, SW004, SW006, SW008, SWDUP01	22-AUG-2012	27-AUG-2012	18-FEB-2013	✓	27-AUG-2012	18-FEB-2013 ✓
EG035F: Dissolved Mercury by FIMS							
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)							
SW001, SW003, SW005, SW007, SW009, GW004, GW007,	SW002, SW004, SW006, SW008, SWDUP01, GW006, GW013	22-AUG-2012	---	19-SEP-2012	----	28-AUG-2012	19-SEP-2012 ✓



Matrix: WATER

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method		Sample Date	Extraction / Preparation			Analysis		
Container / Client Sample ID(s)			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK026G: Total Cyanide By Discrete Analyser								
Clear Plastic Bottle - NaOH (EK026G)		22-AUG-2012	26-AUG-2012	05-SEP-2012	✔	26-AUG-2012	05-SEP-2012	✔
SW001,	SW002,							
SW003,	SW004,							
SW005,	SW006,							
SW007,	SW008,							
SW009,	SWDUP01,							
GW006,	GW007,							
GW013								



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(where) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	Method	QC	Regular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	4	40	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	2	15	13.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	4	39	10.3	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	2	19	10.5	9.5	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Cyanide By Discrete Analyser	EK026G	4	40	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	4	33	12.1	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite A	EG020A-T	2	19	10.5	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	2	40	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Chloride by Discrete Analyser	ED045G	2	20	10.0	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	15	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	2	39	5.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	1	19	5.3	4.8	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Cyanide By Discrete Analyser	EK026G	2	40	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	4	33	12.1	10.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	5.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Method Blanks (MB)							
Chloride by Discrete Analyser	ED045G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	15	6.7	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Major Cations - Dissolved	ED093F	2	39	5.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Suspended Solids (High Level)	EA025H	1	19	5.3	4.8	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Cyanide By Discrete Analyser	EK026G	2	40	5.0	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Dissolved Solids (High Level)	EA015H	2	33	6.1	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	5.3	5.0	✓	NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	20	5.0	5.0	✓	ALS QCS3 requirement
Dissolved Mercury by FIMS	EG035F	1	15	6.7	5.0	✓	ALS QCS3 requirement
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.0	5.0	✓	ALS QCS3 requirement
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.0	5.0	✓	ALS QCS3 requirement
Total Cyanide By Discrete Analyser	EK026G	2	40	5.0	5.0	✓	ALS QCS3 requirement
Total Metals by ICP-MS - Suite A	EG020A-T	1	19	5.3	5.0	✓	ALS QCS3 requirement



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Total Dissolved Solids (High Level)	EA015H	WATER	In-House, APHA 21st ed., 2540C A gravimetric procedure that determines the amount of 'filterable' residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Suspended Solids (High Level)	EA025H	WATER	In-House, APHA 21st ed., 2540D A gravimetric procedure employed to determine the amount of 'non-filterable' residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Alkalinity by PC Titrator	ED037-P	WATER	APHA 21st ed., 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	APHA 21st ed., 4500-SO4 Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Chloride by Discrete Analyser	ED045G	WATER	APHA 21st ed., 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the liberated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	Major Cations is determined based on APHA 21st ed., 3120; USEPA SW 846 - 6010 The ICPAES technique ionises the 0.45um filtered sample atoms emitting a characteristic spectrum. This spectrum is then compared against matrix matched standards for quantification. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2) Sodium Absorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2) Hardness parameters are calculated based on APHA 21st ed., 2340 B. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): Samples are 0.45 um filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	(APHA 21st ed., 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020): The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.



Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Mercury by FIMS	EG035F	WATER	AS 3550, APHA 21st ed. 3112 Hg - B (Flow-injection (SnCl ₂)(Cold Vapour generation) AAS) Samples are 0.45 um filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl ₂ which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Total Cyanide By Discrete Analyser	EK026G	WATER	APHA 21st ed., 4500-CN-C & N Total Cyanide is determined from aqueous solutions after distillation with sulphuric acid. The resultant distillate is then captured in a caustic absorber solution followed by Discrete Analyser. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	APHA 21st Ed. 1030F. The Ionic Balance is calculated based on the major Anions and Cations. The major anions include Alkalinity, Chloride and Sulfate which determined by PCT and DA. The Cations are determined by Turbi SO4 by DA. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Preparation Methods	Method	Matrix	Method Descriptions
Total Cyanide	EK026-PR	WATER	APHA 21st ed., 4500 CN- C&N. The sample is distilled with H ₂ SO ₄ releasing all bound cyanides as HCN. The CN is trapped in a caustic solution, and quantified by colourimetry on FIA. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)
Digestion for Total Recoverable Metals	EN25	WATER	USEPA SW846-3005 Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (1999) Schedule B(3) (Appdx. 2)



Summary of Outliers

Outliers : Quality Control Samples

The following report highlights outliers flagged in the Quality Control (QC) Report. Surrogate recovery limits are static and based on USEPA SW846 or ALS-QWI/EN/38 (in the absence of specific USEPA limits). This report displays QC Outliers (breaches) only.

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

- For all matrices, no Method Blank value outliers occur.
- For all matrices, no Duplicate outliers occur.
- For all matrices, no Laboratory Control outliers occur.
- For all matrices, no Matrix Spike outliers occur.

Regular Sample Surrogates

- For all regular sample matrices, no surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

This report displays Holding Time breaches only. Only the respective Extraction / Preparation and/or Analysis component is/are displayed.

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

The following report highlights breaches in the Frequency of Quality Control Samples.

- No Quality Control Sample Frequency Outliers exist.



STATEMENT OF QA/QC PERFORMANCE

SE111416 R0

CLIENT DETAILS

Contact Ben Luffman
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Email ben.luffman@ghd.com.au

Project **2216251 - Hillside Dr, Urunga**
Order Number (Not specified)
Samples 1

LABORATORY DETAILS

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Laboratory SGS Alexandria Environmental
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SGS Reference SE111416 R0
Report Number 0000038987
Date Reported 03 Sep 2012

COMMENTS

All the laboratory data for each environmental matrix was compared to SGS Environmental Services' stated Data Quality Objectives (DQO). Comments arising from the comparison were made and are reported below.

The data relating to sampling was taken from the Chain of Custody document and was supplied by the Client. This QA/QC Statement must be read in conjunction with the referenced Analytical Report. The Statement and the Analytical Report must not be reproduced except in full.

All Data Quality Objectives were met with the exception of the following:

Extraction Date	Alkalinity	1 item
Analysis Date	Alkalinity	1 item

SAMPLE SUMMARY

Sample counts by matrix	1 Water	Type of documentation received	COC
Date documentation received	27/8/2012	Samples received in good order	Yes
Samples received without headspace	No	Sample temperature upon receipt	2.5°C
Sample container provider	SGS	Turnaround time requested	Standard
Samples received in correct containers	Yes	Sufficient sample for analysis	Yes
Sample cooling method	Ice	Samples clearly labelled	Yes
Complete documentation received	Yes		

SGS holding time criteria are drawn from current regulations and are highly dependent on sample container preservation as specified in the SGS "Field Sampling Guide for Containers and Holding Time" (ref: GU-(AU)-ENV.001). Soil samples guidelines are derived from NEPM "Schedule B(3) Guideline on Laboratory Analysis of Potentially Contaminated Soils". Water sample guidelines are derived from "AS/NZS 5667.1 : 1998 Water Quality - sampling part 1" and APHA "Standard Methods for the Examination of Water and Wastewater" 21st edition 2005.

Extraction and analysis holding time due dates listed are calculated from the date sampled, although holding times may be extended after laboratory extraction for some analytes. The due dates are the suggested dates that samples may be held before extraction or analysis and still be considered valid.

Extraction and analysis dates are shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria. If the sampled date is not supplied then compliance with criteria cannot be determined. If the received date is after one or both due dates then holding time will fail by default.

Alkalinity

Method: ME-(AU)-[ENV]AN135

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
GWLABDUP01	SE111416.001	LB025626	22 Aug 2012	27 Aug 2012	23 Aug 2012	28 Aug 2012†	23 Aug 2012	28 Aug 2012†

Anions by Ion Chromatography in Water

Method: ME-(AU)-[ENV]AN245

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
GWLABDUP01	SE111416.001	LB025582	22 Aug 2012	27 Aug 2012	19 Sep 2012	28 Aug 2012	19 Sep 2012	30 Aug 2012

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311/AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
GWLABDUP01	SE111416.001	LB025745	22 Aug 2012	27 Aug 2012	19 Sep 2012	30 Aug 2012	19 Sep 2012	31 Aug 2012

Mercury (total) in Water

Method: ME-(AU)-[ENV]AN311/AN312

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
GWLABDUP01	SE111416.001	LB025746	22 Aug 2012	27 Aug 2012	19 Sep 2012	30 Aug 2012	19 Sep 2012	03 Sep 2012

Metals in Water (Dissolved) by ICPOES

Method: ME-(AU)-[ENV]AN320/AN321

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
GWLABDUP01	SE111416.001	LB025586	22 Aug 2012	27 Aug 2012	18 Feb 2013	28 Aug 2012	18 Feb 2013	28 Aug 2012

Total and Volatile Suspended Solids (TSS / VSS)

Method: ME-(AU)-[ENV]AN114

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
GWLABDUP01	SE111416.001	LB025664	22 Aug 2012	27 Aug 2012	29 Aug 2012	29 Aug 2012	05 Sep 2012	03 Sep 2012

Total Cyanide in water by Discrete Analyser (Aquakem)

Method: ME-(AU)-[ENV]AN077/AN287

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
GWLABDUP01	SE111416.001	LB025759	22 Aug 2012	27 Aug 2012	05 Sep 2012	30 Aug 2012	05 Sep 2012	31 Aug 2012

Total Dissolved Solids (TDS) in water

Method: ME-(AU)-[ENV]AN113

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
GWLABDUP01	SE111416.001	LB025665	22 Aug 2012	27 Aug 2012	29 Aug 2012	29 Aug 2012	29 Aug 2012	29 Aug 2012

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
GWLABDUP01	SE111416.001	LB025684	22 Aug 2012	27 Aug 2012	18 Feb 2013	29 Aug 2012	18 Feb 2013	30 Aug 2012

Trace Metals (Total) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Name	Sample No.	QC Ref	Sampled	Received	Extraction Due	Extracted	Analysis Due	Analysed
GWLABDUP01	SE111416.001	LB025685	22 Aug 2012	27 Aug 2012	18 Feb 2013	29 Aug 2012	18 Feb 2013	30 Aug 2012



Surrogate results are evaluated against upper and lower limit criteria established in the SGS QA/QC plan (Ref: MP-(AU)-[ENV]QU-022). At least two of three routine level soil sample surrogate spike recoveries for BTEX/VOC are to be within 70-130% where control charts have not been developed and within the established control limits for charted surrogates. Matrix effects may void this as an acceptance criterion. Water sample surrogate spike recoveries are to be within 40-130%. The presence of emulsions, surfactants and particulates may void this as an acceptance criterion.

Result is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No surrogates were required for this job.



METHOD BLANKS

SE111416 R0

Blank results are evaluated against the limit of reporting (LOR), for the chosen method and its associated instrumentation, typically 2.5 times the statistically determined method detection limit (MDL).

Result is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Alkalinity

Method: ME-(AU)-[ENV]AN135

Sample Number	Parameter	Units	LOR	Result
LB025626.001	Total Alkalinity as CaCO ₃	mg/L	5	<5

Anions by Ion Chromatography in Water

Method: ME-(AU)-[ENV]AN245

Sample Number	Parameter	Units	LOR	Result
LB025582.001	Chloride	mg/L	0.05	<0.05
	Sulphate, SO ₄	mg/L	0.1	<0.1

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311/AN312

Sample Number	Parameter	Units	LOR	Result
LB025745.001	Mercury	mg/L	0.0001	<0.00010

Mercury (total) in Water

Method: ME-(AU)-[ENV]AN311/AN312

Sample Number	Parameter	Units	LOR	Result
LB025746.001	Total Mercury	mg/L	0.0001	<0.0001

Metals in Water (Dissolved) by ICPOES

Method: ME-(AU)-[ENV]AN320/AN321

Sample Number	Parameter	Units	LOR	Result
LB025586.001	Calcium, Ca	mg/L	0.1	<0.1
	Magnesium, Mg	mg/L	0.1	<0.1
	Potassium, K	mg/L	0.2	<0.2
	Sodium, Na	mg/L	0.1	<0.1

Total Cyanide in water by Discrete Analyser (Aquakem)

Method: ME-(AU)-[ENV]AN077/AN287

Sample Number	Parameter	Units	LOR	Result
LB025759.001	Total Cyanide	mg/L	0.005	<0.005

Total Dissolved Solids (TDS) in water

Method: ME-(AU)-[ENV]AN113

Sample Number	Parameter	Units	LOR	Result
LB025665.001	Total Dissolved Solids Dried at 180°C	mg/L	10	<10
LB025665.008	Total Dissolved Solids Dried at 180°C	mg/L	10	<10

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result
LB025684.001	Aluminium, Al	µg/L	1	<1
	Antimony, Sb	µg/L	1	<1
	Arsenic, As	µg/L	1	<1
	Cadmium, Cd	µg/L	0.1	<0.1
	Chromium, Cr	µg/L	1	<1
	Copper, Cu	µg/L	1	<1
	Iron, Fe	µg/L	5	<5
	Lead, Pb	µg/L	1	<1
	Nickel, Ni	µg/L	1	<1
	Zinc, Zn	µg/L	1	<1

Trace Metals (Total) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result
LB025685.001	Total Aluminium	µg/L	5	<5
	Total Antimony	µg/L	1	<1
	Total Arsenic	µg/L	1	<1
	Total Cadmium	µg/L	0.1	<0.1
	Total Chromium	µg/L	1	<1
	Total Copper	µg/L	1	<1
	Total Lead	µg/L	1	<1
	Total Nickel	µg/L	1	<1
	Total Zinc	µg/L	1	<1

Duplicates are calculated as Relative Percentage Difference (RPD) using the formula: $RPD = | \text{OriginalResult} - \text{ReplicateResult} | \times 100 / \text{Mean}$

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: $MAD = 100 \times \text{SDL} / \text{Mean} + \text{LR}$

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Alkalinity

Method: ME-(AU)-[ENV]JAN135

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE111416.001	LB025626.004	Total Alkalinity as CaCO ₃	mg/L	5	300	290	17	3

Anions by Ion Chromatography in Water

Method: ME-(AU)-[ENV]JAN245

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE111398.001	LB025582.004	Chloride	mg/L	0.05	<0.05	<0.05	200	0

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]JAN311/AN312

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE111470.021	LB025745.014	Mercury	µg/L	0.0001	<0.00010	<0.00010	200	0

Metals in Water (Dissolved) by ICPOES

Method: ME-(AU)-[ENV]JAN320/AN321

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE111416.001	LB025586.006	Calcium, Ca	mg/L	0.1	13	13	17	0
		Magnesium, Mg	mg/L	0.1	21	21	15	1
		Potassium, K	mg/L	0.2	8.5	8.5	17	1
		Sodium, Na	mg/L	0.1	190	190	15	1

Total Dissolved Solids (TDS) in water

Method: ME-(AU)-[ENV]JAN113

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE111382.004	LB025665.007	Total Dissolved Solids Dried at 180°C	mg/L	10	19400	18000	15	7

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]JAN318

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE111445.005	LB025684.012	Arsenic, As	µg/L	1	0.294	0.329	200	0
		Cadmium, Cd	µg/L	0.1	-0.003	-0.003	200	0
		Chromium, Cr	µg/L	1	0.311	0.281	200	0
		Copper, Cu	µg/L	1	0.398	0.373	200	0
		Lead, Pb	µg/L	1	0.031	0.019	200	0
		Nickel, Ni	µg/L	1	-0.026	-0.022	200	0
		Zinc, Zn	µg/L	1	1.413	1.1	95	25

Trace Metals (Total) in Water by ICPMS

Method: ME-(AU)-[ENV]JAN318

Original	Duplicate	Parameter	Units	LOR	Original	Duplicate	Criteria %	RPD %
SE111416.001	LB025685.004	Total Aluminium	µg/L	5	42000	40000	15	5
		Total Antimony	µg/L	1	30000	31000	15	3
		Total Arsenic	µg/L	1	47000	47000	15	0
		Total Cadmium	µg/L	0.1	0.7	0.7	29	1
		Total Chromium	µg/L	1	250	260	15	4
		Total Copper	µg/L	1	420	410	15	2
		Total Iron	µg/L	5	72000	71000	15	1
		Total Lead	µg/L	1	8500	8400	15	1
		Total Nickel	µg/L	1	65	64	17	1
		Total Zinc	µg/L	1	170	160	16	3

Laboratory Control Standard (LCS) results are evaluated against an expected result, typically the concentration of analyte spiked into the control during the sample preparation stage, producing a percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA /QC plan (Ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended dagger symbol (†) when outside suggested criteria.

Alkalinity

Method: ME-(AU)-[ENV]AN135

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB025626.002	Total Alkalinity as CaCO ₃	mg/L	5	68	59.5	80 - 120	115

Anions by Ion Chromatography in Water

Method: ME-(AU)-[ENV]AN245

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB025582.002	Chloride	mg/L	0.05	19	20	80 - 120	95
	Sulphate, SO ₄	mg/L	0.1	19	20	80 - 120	94

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311/AN312

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB025745.002	Mercury	mg/L	0.0001	0.0076	0.008	80 - 120	96

Metals in Water (Dissolved) by ICPOES

Method: ME-(AU)-[ENV]AN320/AN321

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB025586.002	Calcium, Ca	mg/L	0.1	2.0	2	80 - 120	98
	Magnesium, Mg	mg/L	0.1	1.8	2	80 - 120	91
	Potassium, K	mg/L	0.2	19	20	80 - 120	96
	Sodium, Na	mg/L	0.1	2.0	2	80 - 120	99

Total and Volatile Suspended Solids (TSS / VSS)

Method: ME-(AU)-[ENV]AN114

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB025664.002	Total Suspended Solids Dried at 105°C	mg/L	5	96	100	80 - 120	96

Total Cyanide in water by Discrete Analyser (Aquakem)

Method: ME-(AU)-[ENV]AN077/AN287

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB025759.002	Total Cyanide	mg/L	0.005	0.028	0.025	80 - 120	111

Total Dissolved Solids (TDS) in water

Method: ME-(AU)-[ENV]AN113

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB025665.002	Total Dissolved Solids Dried at 180°C	mg/L	10	278	293	80 - 120	95
LB025665.009	Total Dissolved Solids Dried at 180°C	mg/L	10	275	293	80 - 120	94

Trace Metals (Dissolved) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB025684.002	Aluminium, Al	µg/L	1	18	20	80 - 120	90
	Antimony, Sb	µg/L	1	19	20	80 - 120	93
	Arsenic, As	µg/L	1	17	20	80 - 120	86
	Cadmium, Cd	µg/L	0.1	19	20	80 - 120	96
	Chromium, Cr	µg/L	1	20	20	80 - 120	98
	Copper, Cu	µg/L	1	18	20	80 - 120	92
	Iron, Fe	µg/L	5	17	20	80 - 120	86
	Lead, Pb	µg/L	1	20	20	80 - 120	98
	Nickel, Ni	µg/L	1	18	20	80 - 120	92
	Zinc, Zn	µg/L	1	18	20	80 - 120	92

Trace Metals (Total) in Water by ICPMS

Method: ME-(AU)-[ENV]AN318

Sample Number	Parameter	Units	LOR	Result	Expected	Criteria %	Recovery %
LB025685.002	Total Aluminium	µg/L	5	20	20	80 - 120	104
	Total Antimony	µg/L	1	20	20	80 - 120	107
	Total Arsenic	µg/L	1	18	20	80 - 120	96
	Total Cadmium	µg/L	0.1	20	20	80 - 120	106
	Total Chromium	µg/L	1	22	20	80 - 120	114
	Total Copper	µg/L	1	20	20	80 - 120	104
	Total Lead	µg/L	1	21	20	80 - 120	112
	Total Nickel	µg/L	1	20	20	80 - 120	107
	Total Zinc	µg/L	1	20	20	80 - 120	102



MATRIX SPIKES

SE111416 R0

Matrix Spike (MS) results are evaluated as the percentage recovery of an expected result, typically the concentration of analyte spiked into a field sub -sample during the sample preparation stage. The original sample's result is subtracted from the sub-sample result before determining the percentage recovery. The criteria applied to the percentage recovery is established in the SGS QA/QC plan (ref: MP-(AU)-[ENV]QU-022). For more information refer to the footnotes in the concluding page of this report.

Recovery is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

Mercury (dissolved) in Water

Method: ME-(AU)-[ENV]AN311/AN312

QC Sample	Sample Number	Parameter	Units	LOR	Result	Original	Spike	Recovery%
SE111381.001	LB025745.004	Mercury	mg/L	0.0001	0.0075	<0.0001	0.008	94



Matrix spike duplicates are calculated as Relative Percent Difference (RPD) using the formula: $RPD = | \text{OriginalResult} - \text{ReplicateResult} | \times 100 / \text{Mean}$

The original result is the analyte concentration of the matrix spike. The Duplicate result is the analyte concentration of the matrix spike duplicate.

The RPD is evaluated against the Maximum Allowable Difference (MAD) criteria and can be graphically represented by a curve calculated from the Statistical Detection Limit (SDL) and Limiting Repeatability (LR) using the formula: $MAD = 100 \times \text{SDL} / \text{Mean} + \text{LR}$

Where the Maximum Allowable Difference evaluates to a number larger than 200 it is displayed as 200.

RPD is shown in **Green** when within suggested criteria or **Red** with an appended reason identifier when outside suggested criteria. Refer to the footnotes section at the end of this report for failure reasons.

No matrix spike duplicates were required for this job.



Samples analysed as received.

Solid samples expressed on a dry weight basis.

QC criteria are subject to internal review according to the SGS QA/QC plan and may be provided on request or alternatively can be found here:
<http://www.au.sgs.com/sgs-mp-au-env-qu-022-qa-qc-plan-en-11.pdf>

- * Non-accredited analysis.
- Sample not analysed for this analyte.
- ^ Analysis performed by external laboratory.

IS Insufficient sample for analysis.
LNR Sample listed, but not received.
LOR Limit of reporting.
QFH QC result is above the upper tolerance.
QFL QC result is below the lower tolerance.

- ① At least 2 of 3 surrogates are within acceptance criteria.
- ② RPD failed acceptance criteria due to sample heterogeneity.
- ③ Results less than 5 times LOR preclude acceptance criteria for RPD.
- ④ Recovery failed acceptance criteria due to matrix interference.
- ⑤ Recovery failed acceptance criteria due to the presence of significant concentration of analyte (i.e. the concentration of analyte exceeds the spike level).
- ⑥ LOR was raised due to sample matrix interference.
- ⑦ LOR was raised due to dilution of significantly high concentration of analyte in sample.
- ⑧ Reanalysis of sample in duplicate confirmed sample heterogeneity and inconsistency of results.
- ⑨ Recovery failed acceptance criteria due to sample heterogeneity.
- † Refer to Analytical Report comments for further information.

This document is issued, on the Client's behalf, by the Company under its General Conditions of Service, available on request and accessible at http://www.sgs.com/terms_and_conditions.htm. The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein.

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CHAIN OF CUSTODY
ALS Laboratory:
please tick →

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Ph: 02 4225 3125 E: portkentia@alsglobal.com

CLIENT: **GHD**

OFFICE: **COFFS HARBOUR**

PROJECT: **2216251- URUNGA**

PURCHASE ORDER NUMBER:

PROJECT MANAGER: **BEN LUFFMAN**

TURNAROUND REQUIREMENTS:
(Standard TAT may be longer for some tests e.g. Ultra Trace Organics)

ALS QUOTE NO.: **SY-270-12**

CONTACT PH: **0266505600**

☐ Standard TAT (List due date):
☒ Non Standard or urgent TAT (List due date):
Reqd 10/8/12

COC SEQUENCE NUMBER (Circle)

COC: **0** 2 3 4 5 6 7
OF: **1** 2 3 4 5 6 7

FOR LABORATORY USE ONLY (Circle)

Custody Seal Intact? Yes No N/A
Free ice / frozen ice bricks present upon receipt? Yes No N/A
Random Sample Temperature on Receipt: °C
Other comment:

SAMPLER: **J. SIMKUS** SAMPLER MOBILE: **0404542354**

COC emailed to ALS? (YES / **NO**) EDD FORMAT (or default):

Email Reports to (will default to PM if no other addresses are listed):

Email Invoice to (will default to PM if no other addresses are listed):

RELINQUISHED BY: **BRIAN CORK**

DATE/TIME: **3/8/10 3pm**

RECEIVED BY: **Dan J**

DATE/TIME: **8/8 082,**

RELINQUISHED BY:

DATE/TIME:

RECEIVED BY:

DATE/TIME:

COMMENTS/ SPECIAL HANDLING/STORAGE OR DISPOSAL:

ben.luffman@ghd.com, brian.cork@ghd.com

ALS USE	SAMPLE DETAILS MATRIX - SOLID (S), WATER (W)			CONTAINER INFORMATION	ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).				Additional Information
LAB ID	SAMPLE ID	DATE/ TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL CONTAINERS	As, Sb	Hg	hcd	Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	BH006-0.0-0.3	3/8/12	S			✓	✓		TAT
2	BH006-0.5-0.8							✓	
3	BH034-0.0-0.2					✓	✓		
4	BH034-0.5-0.7					✓	✓		
5	BH034-1.0-1.3							✓	
6	BH034-1.8-2.0							✓	
TOTAL						3	3	3	

Environmental Division
Sydney
Work Order
ES1219239



Telephone : +61-2-8784 8555

158501

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Air V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved S; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Solis; B = Unpreserved Bag.

Impact zone

Soil

CHAIN OF CUSTODY DOCUMENTATION

CLIENT: GHD		SAMPLER: J. Simkus		 Australian Laboratory Services Pty Ltd																	
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW		MOBILE: 0404542354																			
PROJECT MANAGER (PM): Ben Luffman		PHONE: 0266505600																			
PROJECT ID: 2216251		EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com																			
SITE: Hillside Dr, Urunga		P.O. NO.:		EMAIL INVOICE TO: (if different to report) - ben.luffman@ghd.com																	
RESULTS REQUIRED (Date): standard		QUOTE NO.: SY/270/12		ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)																	
FOR LABORATORY USE ONLY COOLER SEAL (circle appropriate) Intact: Yes No N/A SAMPLE TEMPERATURE CHILLED: Yes No		COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL: 		Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.																	
SAMPLE INFORMATION (note: S = Soil, W = Water)		CONTAINER INFORMATION																			
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG0085T (Al)	EG005T (As, Sb)	EG035T (Hg)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EN 33 (TCLP for metals)	EN80 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold	
1	BH074-0.8-1.0	soil	15/8		JAR	jar		✓	✓		✓									✓	
2	BH064-0.0-0.2		15/8		JAR	jar		✓	✓		✓									✓	
3	BH064-0.3-0.5		↓		JAR	↓		✓	✓		✓									✓	
4	BH073-0.0-0.2		15/8		JAR	jar		✓	✓		✓									✓	
5	BH073-0.5-0.7		↓		JAR	↓		✓	✓		✓									✓	
6	BH056-0.3-0.5		15/8		JAR	jar		✓	✓		✓									✓	
7	BH075-1.8-2.0				JAR	jar		✓		✓											
8	BH060-0.0-0.2		15/8		JAR	jar		✓	✓		✓									✓	
9	BH082-1.5-1.7	✓	14/8		JAR	jar		✓	✓		✓									✓	
RELINQUISHED BY:						RECEIVED BY						METHOD OF SHIPMENT									
Name: J. Simkus			Date: 21/8/12			Name: David			22/8			Con' Note No:									
Of: GHD			Time:			Of: AS			0800												
Name:			Date:			Name:						Transport Co:									
Of:			Time:			Of:															
Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulphuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.																					

AUSTRALIAN LABORATORY SERVICES P/L

COC Page 1 of 15

Soil

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CLIENT: GHD	SAMPLER: J. Simkus
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW	MOBILE: 0404542354
PROJECT MANAGER (PM): Ben Luffman	PHONE: 0266505600
PROJECT ID: 2216251	EMAIL: ben.luffman@ghd.com, brian.cork@ghd.com
SITE: Hillside Dr, Urunga	EMAIL INVOICE TO: (If different to report)

RESULTS REQUIRED (Date): standard	QUOTE NO.: SY270/12	ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)
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FOR LABORATORY USE ONLY COOLER SEAL (circle appropriate) Intact: Yes No N/A SAMPLE TEMPERATURE CHILLED: Yes No	COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL: 	Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.
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ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG0085 (Al)	EG0057 (Sb)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EG005-SDH (Hd extractable metals)	EP003 (TOC)	ED007 (OEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))			
16	SE001-0.1	soil				Jar + bag	✓	✓	✓	✓						✓		✓		
17	SE001-0.2					Jar														
18	SE002-0.1					↓	✓				✓	✓	✓	✓						
19	SE002-0.4					↓														
20	SE003-0.1					↓	✓													
21	SE003-0.3					Jar + bag										✓				
22	SE010-0.2					Jar	✓													
23	SE010-0.7					↓														
24	SE011-0.1					↓					✓	✓	✓	✓						
25	SE011-0.4					Jar + bag										✓				
26	SE012-0.1					Jar	✓	✓												
27	SE012-0.4					Jar		✓	✓	✓										

RELINQUISHED BY:		RECEIVED BY:		METHOD OF SHIPMENT
Name: J. Simkus	Date: 21/8/12	Name: David	Date: 22/8	Con' Note No:
Of: GHD	Time:	Of: AL	Time: 0900	
Name:	Date:	Name:	Date:	Transport Co:
Of:	Time:	Of:	Time:	

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PROJECT MANAGER (PM): Ben Luffman	PHONE: 0266505600
PROJECT ID: 2216251	EMAIL: ben.luffman@ghd.com, brian.cork@ghd.com
SITE: Hillside Dr, Urunga	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date): standard	QUOTE NO.: SY/270/12
ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)	

FOR LABORATORY USE ONLY					COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:														Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.
COOLER SEAL (circle appropriate)																			
Intact: Yes No N/A																			
SAMPLE TEMPERATURE																			
CHILLED: Yes No																			
SAMPLE INFORMATION (note: S = Soil, W = Water)						CONTAINER INFORMATION		EG0085T (Al)	EG005T (Sb)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EG005-SDH (Hcl extractable metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles													
95	SE050 - 0.3	soil				jar + bag		✓	✓	✓						✓		✓	
46	SE046 - 0.3									✓								✓	
47	SE051 - 0.1									✓	✓							✓	
48	SE051 - 0.4									✓								✓	
49	SE052 - 0.1									✓	✓							✓	
50	SE053 - 0.1					jar + bag					✓								
51	SE054 - 0.1										✓								
52	SE055 - 0.1											✓							
53	SE056 - 0.1									✓	✓							✓	
54	SE057 - 0.3									✓	✓							✓	
55	SE061 - 0.1									✓	✓	✓	✓	✓				✓	
	SE061 - 0.1									✓	✓							✓	

RELINQUISHED BY:				RECEIVED BY:				METHOD OF SHIPMENT	
Name: J. Simkus	Date: 21/8/12	Name: David	Date: 22/8	Con' Note No:					
Of: GHD	Time:	Of: AL	Time: 0800						
Name:	Date:	Name:	Date:	Transport Co:					
Of:	Time:	Of:	Time:						

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved;
V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Solids; B = Unpreserved Bag.

Sed'

CHAIN OF CUSTODY DOCUMENTATION										 Australian Laboratory Services Pty Ltd									
CLIENT: GHD					SAMPLER: J. Simkus														
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW					MOBILE: 0 404542354														
PROJECT MANAGER (PM): Ben Luffman					PHONE: 0 266505600														
PROJECT ID: 2216251					EMAIL: ben.luffman@ghd.com, brian.cork@ghd.com														
SITE: Hillside Dr, Urunga					P.O. NO.:					EMAIL INVOICE TO: (if different to report)									
RESULTS REQUIRED (Date): standard					QUOTE NO.: SY270/12					ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)									
FOR LABORATORY USE ONLY		COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:								Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.									
COOLER SEAL (circle appropriate)																			
Intact: Yes No N/A																			
SAMPLE TEMPERATURE																			
CHILLED: Yes No																			
SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION														
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG0085T (Al)	EG005T (Sb)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Fe))			EK026 (CN)	EG005-SDH (Hd extractable metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-II (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))
	SE004-0.1	soil				Jar + bag	✓	✓	✓	✓	✓				✓		✓		
56	SE005-0.1					Jar				✓	✓						✓		
57	SE006-0.1					Jar + bag				✓	✓						✓		
58	SE014-0.1					Jar				✓	✓	✓	✓	✓			✓		
59	SE022-0.1						✓			✓	✓						✓		
60	SE022-0.3																		
61	SE043-0.3									✓	✓						✓		
62	SE064-0.1						✓			✓	✓	✓	✓	✓			✓		
63	SE062-0.1						✓			✓	✓						✓		
64	SE062-0.3						✓			✓	✓						✓		
65	SE066-0.1									✓	✓						✓		
66	SE013-0.1						✓	✓	✓	✓	✓						✓		
RELINQUISHED BY:					RECEIVED BY:					METHOD OF SHIPMENT									
Name: J. Simkus			Date: 21/8/12		Name: David			Date: 22/8		Con' Note No:									
Of: GHD			Time:		Of: ALI			Time: 0800											
Name:			Date:		Name:			Date:		Transport Co:									
Of:			Time:		Of:			Time:											
Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bad for Acid Sulphate Soils; B = Unpreserved Bag.																			

CHAIN OF CUSTODY DOCUMENTATION

CLIENT: GHD				SAMPLER: J. Simkus				 Australian Laboratory Services Pty Ltd												
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW				MOBILE: 0404542354																
PROJECT MANAGER (PM): Ben Luffman				PHONE: 0266505600																
PROJECT ID: 2216251				EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com																
SITE: Hillside Dr, Urunga P.O. NO.:				EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com																
RESULTS REQUIRED (Date): standard QUOTE NO.: SY/270/12				ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)																
FOR LABORATORY USE ONLY		COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:		Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.																
COOLER SEAL (circle appropriate)																				
Intact: Yes No N/A																				
SAMPLE TEMPERATURE																				
CHILLED: Yes No																				
SAMPLE INFORMATION (note: S = Soil, W=Water)				CONTAINER INFORMATION																
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG0085T (Al)	EG005T (As, Sb)	EG0035T (Hg)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EN 33 (TCLP for metals)	EN80 (ASLP for metals)	EP003 (TOC)	ED007 (OEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold
67	BH031-0.0-0.2	soil	15/8			bag/jar										✓	✓			
68	BH031-0.5-0.7					↓										✓	✓			
69	BH031-1.8-2.0					↓										✓	✓			
70	BH031-1.0-1.2					↓		✓		✓										
71	BH054-0.0-0.2		14/8			bag														
72	BH054-0.7-0.9					↓														
73	BH054-1.0-1.2					↓														
74	BH054-1.0-1.2		16/8			↓		✓		✓										
75	BH032-0.0-0.2		14/8			bag														
76	BH032-0.3-0.5					↓														
77	BH32-1.0-1.2					↓														
78	BH054-0.0-0.2		16/8			↓		✓		✓										
RELINQUISHED BY:				RECEIVED BY:				METHOD OF SHIPMENT												
Name: J. Simkus		Date: 21/8/12		Name: David		22/8		Con' Note No:												
Of: GHD		Time:		Of: A.S.		0.800														
Name:		Date:		Name:				Transport Co:												
Of:		Time:		Of:																
Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulphuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Specialisation bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.																				

CHAIN OF CUSTODY DOCUMENTATION

CLIENT: GHD				SAMPLER: J. Simkus				 Australian Laboratory Services Pty Ltd													
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW				MOBILE: 0404542354																	
PROJECT MANAGER (PM): Ben Luffman				PHONE: 0266505600																	
PROJECT ID: 2216251				EMAIL REPORT TO: ben.luffman@ghd.com; brian.cork@ghd.com																	
SITE: Hillside Dr, Urunga				P.O. NO.:				EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com													
RESULTS REQUIRED (Date): standard				QUOTE NO.: SY/270/12				ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)													
FOR LABORATORY USE ONLY COOLER SEAL, (circle appropriate) Intact: Yes No N/A SAMPLE TEMPERATURE CHILLED: Yes No				COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:				Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.													
SAMPLE INFORMATION (note: S = Soil, W = Water)				CONTAINER INFORMATION																	
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG0085T (Al)	EG005T (As, Sb)	EG035T (Hg)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EN 33 (TCLP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold	
79	BH053-0.3-0.5	soil	14/8		Jar		✓	✓		✓	✓	✓	✓	✓	✓				✓		
80	BH053-1.5-1.7						✓	✓		✓	✓	✓	✓	✓	✓				✓		
81	BH053-3.2-3.5						✓	✓		✓	✓	✓	✓	✓	✓				✓		
82	BH001-0.3-0.5		16/8		Jar + bag		✓	✓	✓	✓	✓								✓		
83	BH024-0.3-0.5		14/8		Jar			✓			✓	✓	✓						✓		
84	BH024-1.0-1.2							✓			✓	✓	✓						✓		
85	BH024-2.0-2.2							✓			✓	✓	✓						✓		
86	BH004-0.0-0.2		16/8					✓		✓											
RELINQUISHED BY:						RECEIVED BY:						METHOD OF SHIPMENT:									
Name: J. Simkus			Date: 21/8/12			Name: David			Date: 22/8			Con' Note No:									
Of: GHD			Time:			Of: A1			Time: 0800												
Name:			Date:			Name:			Date:			Transport Co:									
Of:			Time:			Of:			Time:												
Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.																					

Blanks (Soil)
+ Rinsates.
(water)

CHAIN OF CUSTODY DOCUMENTATION

CLIENT: GHD	SAMPLER: J. Simkus	 Australian Laboratory Services Pty Ltd
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW	MOBILE: 0404542354	
PROJECT MANAGER (PM): Ben Luffman	PHONE: 0266505600	
PROJECT ID: 2216251	EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com	
SITE: Hillside Dr, Urunga P.O. NO.:	EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com	
RESULTS REQUIRED (Date): standard	QUOTE NO.: SY270/12	ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY COOLER SEAL (circle appropriate) Intact: Yes No N/A SAMPLE TEMPERATURE CHILLED: Yes No	COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL: 	Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.
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SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION															
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG008ST (Al)	EG005T (As, Sb)	EG035T (Hg)	S-2 Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg)	EK026 (CN)	EN 33 (TCLP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold
96	TB01 (aka Trip Blank)	soil	6/8					✓												
97	TB02 (aka Trip Blank)	soil	6/8					✓												
	RB01	W																		
	RB02																			
	RB03																			
	RB04																			
	RB05																			
98	RB01	water	15/8																	
99	RB02		15/8																	
100	RB03		16/8																	
101	RB04		16/8																	
102	RB05		16/8																	

RELINQUISHED BY:		RECEIVED BY:		METHOD OF SHIPMENT
Name: J. Simkus	Date: 21/8/12	Name: D...	22/8	Con' Note No:
Of: GHD	Time:	Of: ALS	0800	
Name:	Date:	Name:		Transport Co:
Of:	Time:	Of:		

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved;
 V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
 Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY DOCUMENTATION

COC Page 12 of 15

CHAIN OF CUSTODY DOCUMENTATION

CLIENT: GHD							SAMPLER: J. Simkus								 Australian Laboratory Services Pty Ltd						
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW							MOBILE: 0404542354														
PROJECT MANAGER (PM): Ben Luffman							PHONE: 0266505600														
PROJECT ID: 2216251							EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com														
SITE: Hillside Dr, Urunga P.O. NO.:							EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com-														
RESULTS REQUIRED (Date): standard QUOTE NO.: SY270/12							ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)														
FOR LABORATORY USE ONLY			COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:																Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.		
COOLER SEAL (circle appropriate) Intact: Yes No N/A																					
SAMPLE TEMPERATURE CHILLED: Yes No																					
SAMPLE INFORMATION (note: S = Soil, W=Water)							CONTAINER INFORMATION														
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG008ST (Al)	EG005T (As,Sb)	EG035T (Hg)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EN 33 (TCLP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (OEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold	
113	BH001-0.0-0.2	s				Bag															✓
114	BH001-0.7-0.9																				
115	BH001 1-1.2																				
116	BH002-1.0-1.2																				
117	BH002 1.2-1.4																				
118	BH003 0.5-0.7																				
119	BH003 1.0-1.2																				
120	BH011-0.1-																				
121	BH011-0.3																				
122	BH011-0.5																				
123	BH020-0.0-0.2																				
124	BH020 0.3-0.5																				
RELINQUISHED BY:							RECEIVED BY							METHOD OF SHIPMENT							
Name: J. Simkus			Date: 21/8/12				Name: Dan			22/8				Con' Note No:							
Of: GHD			Time:				Of: D			0800											
Name:			Date:				Name:							Transport Co:							
Of:			Time:				Of:														
Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulphuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.																					

CHAIN OF CUSTODY DOCUMENTATION

CLIENT: GHD				SAMPLER: J. Simkus				 Australian Laboratory Services Pty Ltd													
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW				MOBILE: 0404542354																	
PROJECT MANAGER (PM): Ben Luffman				PHONE: 0266505600																	
PROJECT ID: 2216251				EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com																	
SITE: Hillside Dr, Urunga P.O. NO.:				EMAIL INVOICE TO: (if different to report) - ben.luffman@ghd.com																	
RESULTS REQUIRED (Date): standard QUOTE NO.: SY/270/12				ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)																	
FOR LABORATORY USE ONLY		COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL: Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.																			
COOLER SEAL (circle appropriate)																					
Intact: Yes No N/A																					
SAMPLE TEMPERATURE																					
CHILLED: Yes No																					
SAMPLE INFORMATION (note: S = Soil, W=Water)						CONTAINER INFORMATION															
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG0085T (Al)	EG005T (As, Sb)	EG035T (Hg)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EN 33 (TCCLP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1-5))	Hold	
121	B4020-1.0-1.2	s				3ag															✓
126	B4028-0.3-0.5																				
127	B4028-0.8-1.0																				
128	B4024-0.5-0.7																				
129	B4039-0.5-0.7																				
130	B4046-0.5-0.7																				
131	B4047-0.0-0.2																				
132	B4022-0.5-0.7																				
133	B4050-0.2-0.4																				
134	B4052-0.0-0.2																				
135	B4052-0.5-0.7																				
136	B4052-1.8-2.8																				
RELINQUISHED BY:							RECEIVED BY							METHOD OF SHIPMENT							
Name: J. Simkus			Date: 21/8/12				Name: D... ..			22/8					Con' Note No:						
Of: GHD			Time:				Of:			0800											
Name:			Date:				Name:								Transport Co:						
Of:			Time:				Of:														
Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bad for Acid Sulphate Soils; B = Unpreserved Bag.																					

Sed

AUSTRALIAN LABORATORY SERVICES P/L

Impact zone
Soil

CHAIN OF CUSTODY DOCUMENTATION										 Australian Laboratory Services Pty Ltd										
CLIENT: GHD					SAMPLER: J. Simkus															
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW					MOBILE: 0404542354															
PROJECT MANAGER (PM): Ben Luffman					PHONE: 0266505600															
PROJECT ID: 2216251					EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com															
SITE: Hillside Dr, Urunga					P.O. NO.:					EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com NTLEAP@GHD.COM										
RESULTS REQUIRED (Date): standard					QUOTE NO.: SY/270/12					ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)										
FOR LABORATORY USE ONLY		COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:								Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.										
COOLER SEAL (circle appropriate)																				
Intact: Yes No N/A																				
SAMPLE TEMPERATURE																				
CHILLED: Yes No																				
SAMPLE INFORMATION (note: S = Soil, W = Water)										CONTAINER INFORMATION										
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG0085T (Al)	EG005T (As,Sb)	EG005T (Hg)	S-2 Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg)	EK026 (CN)	EN 33 (TCUP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold
1	BH074-0.8-1.0	soil	15/8		JAR	jar		✓	✓		✓								✓	
2	BH064-0.0-0.2		15/8		JAR	jar		✓	✓		✓								✓	
3	BH064-0.3-0.5		↓		JAR	↓		✓	✓		✓								✓	
4	BH073-0.0-0.2		15/8		JAR	jar		✓	✓		✓								✓	
5	BH073-0.5-0.7		↓		JAR	↓		✓	✓		✓								✓	
6	BH056-0.3-0.5		15/8		JAR	jar		✓	✓		✓								✓	
7	BH075-1.8-2.0				JAR	jar		✓		✓										
8	BH060-0.0-0.2		15/8		JAR	jar		✓	✓		✓								✓	
9	BH082-1.5-1.7		14/8		JAR	jar		✓	✓		✓								✓	
RELINQUISHED BY:					RECEIVED BY:					METHOD OF SHIPMENT										
Name: J. Simkus					Date: 21/8/12					Name: David		22/8		Con' Note No:						
Of: GHD					Time:					Of: AS		0800		Transport Co:						
Name:					Date:					Name:										
Of:					Time:					Of:										
Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCL Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulphuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Specialion bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; L = Lead Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.										Organised By: David										

Environmental Division
Sydney
Work Order
ES1220305



Telephone : +61-2-8784 8555

Courier: AUSTRALIAN LABORATORY SERVICES P/L

PO / Internal Sheet

Relinquished By: David
Connote: 1220305
WO No: 1220305
Attach by PC / Internal Sheet

Soil

CHAIN OF CUSTODY DOCUMENTATION										 Australian Laboratory Services Pty Ltd											
CLIENT: GHD					SAMPLER: J. Simkus																
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW					MOBILE: 0404542354																
PROJECT MANAGER (PM): Ben Luffman					PHONE: 0266505600																
PROJECT ID: 2216251					EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com																
SITE: Hillside Dr, Urunga					P.O. NO.:					EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com NTLEAP@GHD.COM											
RESULTS REQUIRED (Date): standard					QUOTE NO.: SY270/12					ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)											
FOR LABORATORY USE ONLY			COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:																		
COOLER SEAL (circle appropriate)																					
Intact: Yes No N/A																					
SAMPLE TEMPERATURE																					
CHILLED: Yes No																					
SAMPLE INFORMATION (note: S = Soil, W=Water)						CONTAINER INFORMATION															
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG0035T (Al)	EG005T (As, Sb)	EG035T (Hg)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EN 33 (ICLP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1-5))	Hold	
10	BH034-0.1	soil	15/8		Jar+bag		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
11	BH014-0.1		16/8		Jar+2bags		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
12	BH071-0.5-0.7		15/8		Jar		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
13	BH091-0.1		15/8		Jar			✓	✓		✓	✓	✓								
14	BH002-0.5-0.7		16/8		Jar			✓		✓											
15	BH004-1.0-1.2		✓		Jar+bag			✓		✓											
RELINQUISHED BY:							RECEIVED BY							METHOD OF SHIPMENT							
Name: J. Simkus				Date: 21/8/12			Name: David				Date: 22/8			Con' Note No:							
Of: GHD				Time:			Of: ALS				Time: 0800										
Name:				Date:			Name:							Transport Co:							
Of:				Time:			Of:														
Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bad for Acid Sulphate Soils; B = Unpreserved Bag.																					

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CHAIN OF CUSTODY DOCUMENTATION



Australian Laboratory Services Pty Ltd

CLIENT: GHD

SAMPLER: J. Simkus

ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW

MOBILE: 0404542354

PROJECT MANAGER (PM): Ben Luffman

PHONE: 0266505600

PROJECT ID: 2216251

EMAIL: ben.luffman@ghd.com, brian.cork@ghd.com

SITE: Hillside Dr, Urunga

P.O. NO.:

EMAIL INVOICE TO: (if different to report)

RESULTS REQUIRED (Date): standard

QUOTE NO.: SY/270/12

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

COOLER SEAL: (circle appropriate)

Intact: Yes No N/A

SAMPLE TEMPERATURE

CHILLED: Yes No

Notes: e.g. Highly contaminated samples
e.g. "High PAHs expected".
Extra volume for QC or trace LORs etc.

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION	
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
16	SE001-0.1	soil				Jar+bag
17	SE001-0.2					Jar
18	SE002-0.1					
19	SE002-0.4					
20	SE003-0.1					
21	SE003-0.3					Jar+bag
22	SE010-0.2					Jar
23	SE010-0.7					
24	SE011-0.1					
25	SE011-0.4					Jar+bag
26	SE012-0.1					Jar
27	SE012-0.4					Jar

EG0085T (Al)	EG005T (Sb)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EG005-SDH (Hd extractable metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold
✓	✓	✓	✓					✓		✓	
				✓	✓	✓	✓				
									✓		
✓											
✓											
					✓	✓	✓				
								✓			
✓											

RELINQUISHED BY:		RECEIVED BY:		METHOD OF SHIPMENT
Name: J. Simkus	Date: 21/8/12	Name: David	Date: 22/8	Con' Note No:
Of: GHD	Time:	Of: Als	Time: 0900	
Name:	Date:	Name:	Date:	Transport Co:
Of:	Time:	Of:	Time:	

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved;
V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulphuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Specialion bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

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COC Page 3 of 15

Sed!

CHAIN OF CUSTODY DOCUMENTATION										 Australian Laboratory Services Pty Ltd														
CLIENT: GHD					SAMPLER: J. Simkus																			
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW					MOBILE: 0404542354																			
PROJECT MANAGER (PM): Ben Luffman					PHONE: 0266505600																			
PROJECT ID: 2216251					EMAIL: ben.luffman@ghd.com, brian.cork@ghd.com																			
SITE: Hillside Dr, Urunga					P.O. NO.:					EMAIL INVOICE TO: (if different to report)														
RESULTS REQUIRED (Date): standard					QUOTE NO.: SY/270/12					ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)														
FOR LABORATORY USE ONLY COOLER SEAL (circle appropriate) Intact: Yes No N/A SAMPLE TEMPERATURE CHILLED: Yes No					COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL: 					Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.														
SAMPLE INFORMATION (note: S = Soil, W=Water)										CONTAINER INFORMATION														
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG0085T (AI)	EG005T (SB)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EG005-SDH (Hd extractable metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold						
28	SE013-0.4	SO ₁				Bag Jar		✓	✓						✓									
29	SE060-0.1					Jar						✓	✓	✓										
30	SE033-0.05					Jar						✓	✓	✓										
SE031-0.05																								
31	SE102-0.02							✓	✓															
32	SE031-0.05					Bag									✓									
33	SE031-0.05																							
34	SE054-03					Jar									✓									
RELINQUISHED BY:																								
Name: J. Simkus					Date: 21/8/12					Name: David					Date: 22/8					METHOD OF SHIPMENT				
Of: GHD					Time:					Of: AL					Time: 0800					Con' Note No:				
Name:					Date:					Name:					Date:					Transport Co:				
Of:					Time:					Of:					Time:									
Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.																								

Sed'

CHAIN OF CUSTODY DOCUMENTATION										 Australian Laboratory Services Pty Ltd									
CLIENT: GHD					SAMPLER: J. Simkus														
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW					MOBILE: 0 404542354														
PROJECT MANAGER (PM): Ben Luffman					PHONE 0266505600														
PROJECT ID: 2216251					EMAIL ben.luffman@ghd.com, brian.cork@ghd.com														
SITE: Hillside Dr, Urunga P.O. NO.:					EMAIL INVOICE TO: (if different to report)														
RESULTS REQUIRED (Date): standard QUOTE NO.: SY/270/12					ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)														
FOR LABORATORY USE ONLY			COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:																
COOLER SEAL (circle appropriate)																			
Intact: Yes No N/A																			
SAMPLE TEMPERATURE																			
CHILLED: Yes No																			
SAMPLE INFORMATION (note: S = Soil, W = Water)					CONTAINER INFORMATION														
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG0085T (Al)	EG005T (Sb)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EG005-SDH (Hcl extractable metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA028 (SPOCAS)	EA002 (pH (1-5))	Hold	Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.
45	SE050 - 0.3	soil				1 jar + bag		✓	✓	✓					✓		✓		
46	SE051 - 0.3									✓							✓		
47	SE051 - 0.1									✓	✓						✓		
48	SE051 - 0.4									✓							✓		
49	SE052 - 0.1									✓	✓						✓		
50	SE053 - 0.1					1 jar + bag					✓								
51	SE054 - 0.1										✓								
52	SE055 - 0.1										✓								
53	SE056 - 0.1									✓	✓						✓		
54	SE057 - 0.3									✓	✓						✓		
55	SE061 - 0.1									✓	✓	✓	✓	✓			✓		
	BEACH																		
RELINQUISHED BY:					RECEIVED BY:					METHOD OF SHIPMENT									
Name: J. Simkus			Date: 21/8/12		Name: David			Date: 22/8		Con' Note No:									
Of: GHD			Time:		Of: AL			Time: 0800											
Name:			Date:		Name:			Date:		Transport Co:									
Of:			Time:		Of:			Time:											
Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.																			

Sed'



Australian Laboratory Services Pty Ltd

Notes: e.g. Highly contaminated samples
e.g. "High PAHs expected",
Extra volume for QC or trace LORs etc.

METHOD OF SHIPMENT	
Con' Note No:	
Transport Co:	

Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bad for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY DOCUMENTATION										 Australian Laboratory Services Pty Ltd										
CLIENT: GHD					SAMPLER: J. Simkus															
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW					MOBILE: 0404542354															
PROJECT MANAGER (PM): Ben Luffman					PHONE: 0266505600															
PROJECT ID: 2216251					EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com															
SITE: Hillside Dr, Urunga					P.O. NO.:					EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com										
RESULTS REQUIRED (Date): standard					QUOTE NO.: SY/270/12					ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)										
FOR LABORATORY USE ONLY COOLER SEAL (circle appropriate) Intact: Yes No N/A SAMPLE TEMPERATURE CHILLED: Yes No			COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL: 			Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.														
SAMPLE INFORMATION (note: S = Soil, W=Water)			CONTAINER INFORMATION																	
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG005T (Al)	EG005T (As, Sb)	EG035T (Hg)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK025 (Cv)	EN 33 (TCLP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold
67	BH031-0.0-0.2	soil	15/8			bag/jar														
68	BH031-0.5-0.7																			
69	BH031-1.8-2.0																			
70	BH031-1.0-1.2																			
71	BH054-0.0-0.2		14/8			bag														
72	BH054-0.7-0.9																			
73	BH054-1.0-1.2																			
74	BH054-1.0-1.2		16/8																	
75	BH054-1.0-1.2																			
76	BH032-0.0-0.2		14/8			bag														
77	BH032-0.3-0.5																			
78	BH032-1.0-1.2																			
79	BH032-1.0-1.2																			
80	BH032-1.0-1.2																			
81	BH032-1.0-1.2																			
82	BH032-1.0-1.2																			
83	BH032-1.0-1.2																			
84	BH032-1.0-1.2																			
85	BH032-1.0-1.2																			
86	BH032-1.0-1.2																			
87	BH032-1.0-1.2																			
88	BH032-1.0-1.2																			
89	BH032-1.0-1.2																			
90	BH032-1.0-1.2																			
91	BH032-1.0-1.2																			
92	BH032-1.0-1.2																			
93	BH032-1.0-1.2																			
94	BH032-1.0-1.2																			
95	BH032-1.0-1.2																			
96	BH032-1.0-1.2																			
97	BH032-1.0-1.2																			
98	BH032-1.0-1.2																			
99	BH032-1.0-1.2																			
100	BH032-1.0-1.2																			
RELINQUISHED BY:					RECEIVED BY:					METHOD OF SHIPMENT:										
Name: J. Simkus					Date: 21/8/12					Name: David		22/8		Con' Note No:						
Of: GHD					Time:					Of: AS		0800								
Name:					Date:					Name:				Transport Co:						
Of:					Time:					Of:										
Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.																				

CHAIN OF CUSTODY DOCUMENTATION

CLIENT: GHD					SAMPLER: J. Simkus					 Australian Laboratory Services Pty Ltd										
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW					MOBILE: 0404542354															
PROJECT MANAGER (PM): Ben Luffman					PHONE: 0266505600															
PROJECT ID: 2216251					EMAIL REPORT TO: ben.luffman@ghd.com; brian.cork@ghd.com															
SITE: Hillside Dr, Urunga					P.O. NO.:					EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com										
RESULTS REQUIRED (Date): standard					QUOTE NO.: SY/270/12					ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)										
FOR LABORATORY USE ONLY					COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:					Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.										
COOLER SEAL (circle appropriate)																				
Intact: Yes No N/A																				
SAMPLE TEMPERATURE																				
CHILLED: Yes No																				
SAMPLE INFORMATION (note: S = Soil, W = Water)					CONTAINER INFORMATION															
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG0085T (Al)	EG005T (As, Sb)	EG0035T (Hg)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EN 33 (TCPLP for metals)	EN62 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold
79	BH053-0.3-0.5	soil	14/8		jar		✓	✓		✓	✓	✓	✓	✓	✓				✓	
80	BH053-1.5-1.7						✓	✓		✓	✓	✓	✓	✓	✓				✓	
91	BH053-3.2-3.5						✓	✓		✓	✓	✓	✓	✓	✓				✓	
82	BH001-0.3-0.5		16/8		jar + bag		✓	✓	✓	✓									✓	
83	BH024-0.3-0.5		14/8		jar			✓			✓	✓	✓						✓	
84	BH024-1.0-1.2							✓			✓	✓	✓						✓	
85	BH024-2.0-2.2							✓			✓	✓	✓						✓	
86	BH004-0.0-0.2		16/8					✓		✓										
RELINQUISHED BY:					RECEIVED BY:					METHOD OF SHIPMENT:										
Name: J. Simkus			Date: 21/8/12		Name: D. J. J.			Date: 22/8/12			Con' Note No:									
Of: GHD			Time:		Of: A. J.			Time: 0800												
Name:			Date:		Name:			Date:			Transport Co:									
Of:			Time:		Of:			Time:												

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulphuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

CHAIN OF CUSTODY DOCUMENTATION										 Australian Laboratory Services Pty Ltd										
CLIENT: GHD					SAMPLER: J. Simkus															
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW					MOBILE: 0 404542354															
PROJECT MANAGER (PM): Ben Luffman					PHONE: 0 266505600															
PROJECT ID: 2216251					EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com															
SITE: Hillside Dr, Urunga P.O. NO.:					EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com															
RESULTS REQUIRED (Date): standard QUOTE NO.: SY/270/12					ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)															
FOR LABORATORY USE ONLY COOLER SEAL (circle appropriate) Intact: Yes No N/A SAMPLE TEMPERATURE CHILLED: Yes No			COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:			Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.														
SAMPLE INFORMATION (note: S = Soil, W = Water)			CONTAINER INFORMATION																	
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG0085T (Al)	EG005T (As, Sb)	EG003T (Hg)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EN 33 (TCLP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150H150H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold
87	BH077-0.3-0.5	soil	14/8			Jar	✓	✓		✓	✓	✓	✓	✓	✓				✓	
88	BH077-0.5-0.7						✓	✓		✓	✓	✓	✓	✓	✓				✓	
89	BH077-1.0-1.2						✓	✓		✓	✓	✓	✓	✓	✓				✓	
90	BH077-1.5-1.7						✓	✓		✓	✓	✓	✓	✓	✓				✓	
91	BH084-1.0-1.2		15/8			Jar		✓	✓		✓	✓	✓						✓	
92	BH084-1.5-1.7							✓	✓		✓	✓	✓						✓	
93	BH078-0.3-0.5		14/8			Jar	✓	✓		✓	✓	✓	✓						✓	
94	BH078-1.0-1.2						✓	✓		✓	✓	✓	✓						✓	
95	BH078-1.5-1.7						✓	✓		✓	✓	✓	✓						✓	
RELINQUISHED BY:					RECEIVED BY:					METHOD OF SHIPMENT										
Name: J. Simkus Date: 21/8/12					Name: D... Date: 22/8					Con' Note No:										
Of: GHD Time:					Of: ALS Date: 0800															
Name: Date:					Name: Date:					Transport Co:										
Of: Time:					Of: Time:															
Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Special bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.																				

Stockpiles +
Bricks

CHAIN OF CUSTODY DOCUMENTATION										 Australian Laboratory Services Pty Ltd										
CLIENT: GHD					SAMPLER: J. Simkus															
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW					MOBILE: 0404542354															
PROJECT MANAGER (PM): Ben Luffman					PHONE: 0266505600															
PROJECT ID: 2218251					EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com															
SITE: Hillside Dr, Urunga					P.O. NO.:					EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com										
RESULTS REQUIRED (Date): standard					QUOTE NO.: SY/270/12					ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)										
FOR LABORATORY USE ONLY COOLER SEAL (circle appropriate): Intact: Yes No N/A SAMPLE TEMPERATURE CHILLED: Yes No			COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:			Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.														
SAMPLE INFORMATION (note: S = Soil, W=Water)			CONTAINER INFORMATION																	
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG0065T (As)	EG005T (As, Sb)	EG035T (Hg)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK025 (Cu)	EN 33 (TCLP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold
103	SP01A	soil	17/8		Jar MB															✓
104	SP01B	↓	↓		Jar + Bag															↓
105	SP02	↓	↓		↓															↓
106	SP03	↓	↓		↓															↓
107	SPDUPO1	↓	↓		↓															↓
108	PA01	Frag	↓		Bag															↓
109	PA02	↓	↓		↓															↓
110	PA03	↓	↓		↓															↓
111	BRICK01	↓	↓		↓	*	✓		✓	MB										Please crush *
112	BRICK02	↓	↓		↓	*	✓		✓	MB										Please crush *
RELINQUISHED BY:					RECEIVED BY:					METHOD OF SHIPMENT										
Name: J. Simkus			Date: 21/8/12		Name: David			22/8			Con' Note No:									
Of: GHD			Time:		Of: AL			0900												
Name:			Date:		Name:						Transport Co:									
Of:			Time:		Of:															
Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.																				

PASS

CHAIN OF CUSTODY DOCUMENTATION										 Australian Laboratory Services Pty Ltd		
CLIENT: GHD					SAMPLER: J. Simkus							
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW					MOBILE: 0404542354							
PROJECT MANAGER (PM): Ben Luffman					PHONE: 0266505600							
PROJECT ID: 2216251					EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com							
SITE: Hillside Dr, Urunga					P.O. NO.:					EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com		
RESULTS REQUIRED (Date): standard					QUOTE NO.: SY/270/12					ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)		
FOR LABORATORY USE ONLY			COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:			EG0085T (Al) EG005T (As, Sn) EG035T (Hg) S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg)) EK026 (CN) EN 33 (TCLP for metals) EN60 (ASLP for metals) EP003 (TOC) ED007 (CEC) EA150/150-H (P-SA) EA037 (ASS field screen) EA029 (SPOCAS) EA002 (pH (1:5)) Hold Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.						
COOLER SEAL (circle appropriate)												
Intact: Yes No N/A												
SAMPLE TEMPERATURE												
CHILLED: Yes No												
SAMPLE INFORMATION (note: S = Soil, W = Water)			CONTAINER INFORMATION									
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles						
113	B4001-0.0-0.2	S				Bag						✓
114	B4001-0.7-0.9											
115	B4001-1-1.2											
116	B4002-1.0-1.2											
117	B4002-1.2-1.4											
118	B4003-0.5-0.7											
119	B4003-1.0-1.2											
120	B4011-0.1-											
121	B4011-0.3											
122	B4011-0.5											
123	B4020-0.0-0.2											
124	B4020-0.3-0.5											
RELINQUISHED BY:					RECEIVED BY					METHOD OF SHIPMENT		
Name: J. Simkus			Date: 21/8/12		Name: Daniel			22/8			Con' Note No:	
Of: GHD			Time:		Of: Ali			0800				
Name:			Date:		Name:						Transport Co:	
Of:			Time:		Of:							
Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulphuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.												

CHAIN OF CUSTODY DOCUMENTATION										 Australian Laboratory Services Pty Ltd										
CLIENT: GHD					SAMPLER: J. Simkus															
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW					MOBILE: 0404542354															
PROJECT MANAGER (PM): Ben Luffman					PHONE: 0266505600															
PROJECT ID: 2216251					EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com															
SITE: Hillside Dr, Urunga					P.O. NO.:					EMAIL INVOICE TO: (if different to report) - ben.luffman@ghd.com										
RESULTS REQUIRED (Date): standard					QUOTE NO.: SY/270/12					ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)										
FOR LABORATORY USE ONLY			COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:								Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.									
COOLER SEAL (circle appropriate)																				
Intact: Yes No N/A																				
SAMPLE TEMPERATURE																				
CHILLED: Yes No																				
SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION															
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG0385T (Al)	EG035T (As, Sb)	EG035T (Hg)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK028 (CN)	EN 33 (TCLP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold
125	B4020-1.0-1.2	s				Bag														✓
126	B4028-0.3-0.5																			
127	B4028-0.8-1.0																			
128	B4024-0.5-0.7																			
129	B4039-0.5-0.7																			
130	B4046-0.5-0.7																			
131	B4047-0.0-0.2																			
132	B4022-0.5-0.7																			
133	B4050-0.2-0.4																			
134	B4052-0.0-0.2																			
135	B4052-0.5-0.7																			
136	B4052-1.8-2.8																			↓
RELINQUISHED BY:					RECEIVED BY:					METHOD OF SHIPMENT										
Name: J. Simkus			Date: 2/8/12		Name: David			22/8			Con' Note No:									
Of: GHD			Time:		Of: DJ			0800												
Name:			Date:		Name:						Transport Co:									
Of:			Time:		Of:															
Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.																				

Sed'

CHAIN OF CUSTODY DOCUMENTATION										 Australian Laboratory Services Pty Ltd									
CLIENT: GHD					SAMPLER: J. Simkus														
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW					MOBILE: 404542354														
PROJECT MANAGER (PM): Ben Luffman					PHONE: 266505600														
PROJECT ID: 2216251					EMAIL: ben.luffman@ghd.com, brian.cork@ghd.com														
SITE: Hillside Dr, Urunga					P.O. NO.:					EMAIL INVOICE TO: (if different to report)									
RESULTS REQUIRED (Date): standard					QUOTE NO.: SY270/12					ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)									
FOR LABORATORY USE ONLY COOLER SEAL (circle appropriate): Intact: Yes No N/A SAMPLE TEMPERATURE CHILLED: Yes No		COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:			Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.														
SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION														
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG0085T (Al)	EG005T (Sb)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EG005-SDH (Hcl extractable metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA028 (SPOCAS)	EA002 (pH (1:5))		Hold
137	BH084-2.0-2.2	s				Bag													✓
138	BH082-2.3-2.5																		
139	SE001-0.4																		
140	SE014-0.4																		
	SE016-0.4																		
141	SE021-0.4																		
142	SE050-0.5																		
143	SEDUP04																		
RELINQUISHED BY:					RECEIVED BY:					METHOD OF SHIPMENT:									
Name: J. Simkus			Date: 21/8/12		Name: D. G. J.			Date: 22/8		Con' Note No:									
Of: GHD			Time:		Of: ALS			Time: 0800											
Name:			Date:		Name:			Date:		Transport Co:									
Of:			Time:		Of:			Time:											
Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulphuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.																			

Impact zone

Soil

CHAIN OF CUSTODY DOCUMENTATION

CLIENT: GHD

SAMPLER: J. Simkus

ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW

MOBILE: 0404542354

PROJECT MANAGER (PM): Ben Luffman

PHONE: 0266505600

PROJECT ID: 2216251

EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com

SITE: Hillside Dr, Urunga

P.O. NO.:

EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com NTLEAP@GHD.COM

RESULTS REQUIRED (Date): standard

QUOTE NO.: SY/270/12

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

COOLER SEAL (circle appropriate)

Intact: Yes No N/A

SAMPLE TEMPERATURE

CHILLED: Yes No

SAMPLE INFORMATION (note: S = Soil, W = Water)

CONTAINER INFORMATION

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
1	BH074-0.8-1.0	soil	15/8		JAR	jar
2	BH064-0.0-0.2		15/8		JAR	jar
3	BH064-0.3-0.5		↓		JAR	↓
4	BH073-0.0-0.2		15/8		JAR	jar
5	BH073-0.5-0.7		↓		JAR	↓
6	BH056-0.3-0.5		15/8		JAR	jar
7	BH075-1.8-2.0				JAR	jar
8	BH060-0.0-0.2		15/8		JAR	jar
9	BH082-1.5-1.7		14/8		JAR	jar

EG0085T (Al)	EG005T (As,Sb)	EG0035T (Hg)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK028 (CN)	EN 33 (TCLP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold
	✓	✓		✓								✓	
	✓	✓		✓								✓	
	✓	✓		✓								✓	
	✓	✓		✓								✓	
	✓	✓		✓								✓	
	✓	✓		✓								✓	
	✓	✓		✓								✓	
	✓	✓		✓								✓	

Notes: e.g. Highly contaminated samples
e.g. "High PAHs expected".
Extra volume for QC or trace LORs etc.Environmental Division
Sydney

Work Order

ES1220305



Telephone: +61-2-8784 8555

RELINQUISHED BY:

RECEIVED BY:

METHOD OF SHIPMENT

Name: J. Simkus

Date: 21/8/12

Name: David

22/8

Con' Note No:

Of: GHD

Time:

Of: AJS

0800

Name:

Date:

Name:

Transport Co:

Of:

Time:

Of:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCL Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = Ethanol Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

Courier:

AUSTRALIAN LABORATORY SERVICES P/L

PO / Internal Sheet

Relinquished by: David 22/8/12

Connote: 1220305

WO No: ES1220305

Attach by PC / Internal Sheet

Brick 01 / Brick 02 sent to Orange for crushing

Soil

CHAIN OF CUSTODY DOCUMENTATION										 Australian Laboratory Services Pty Ltd											
CLIENT: GHD					SAMPLER: J. Simkus																
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW					MOBILE: 0404542354																
PROJECT MANAGER (PM): Ben Luffman					PHONE: 0266505600																
PROJECT ID: 2216251					EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com																
SITE: Hillside Dr, Urunga					P.O. NO.:					EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com NTLEAP@GHD.COM											
RESULTS REQUIRED (Date): standard					QUOTE NO.: SY/270/12					ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)											
FOR LABORATORY USE ONLY			COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:																		
COOLER SEAL (circle appropriate)																					
Intact: Yes No N/A																					
SAMPLE TEMPERATURE																					
CHILLED: Yes No																					
SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION																
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG0085T (Al)	EG005T (As, Sb)	EG035T (Hg)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg)	EK026 (CN)	EN 33 (TCLP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold	Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.
10	BH034-0.1	soil	15/8		Jar+bags		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		
11	BH014-0.1		16/8		Jar+2bags		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		
12	BH07(20507)		15/8		Jar		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		
13	BH091-0.1		15/8		Jar			✓	✓		✓	✓	✓						✓		
14	BH002-0.5-0.7		16/8		Jar			✓		✓											
15	BH004-1.0-1.2		✓		Jar+bags			✓		✓											
RELINQUISHED BY:					RECEIVED BY:					METHOD OF SHIPMENT											
Name: J. Simkus					Date: 21/8/12					Name: David					22/8						
Of: GHD					Time:					Of: ALS					0800						
Name:					Date:					Name:					Transport Co:						
Of:					Time:					Of:											
Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.																					

2ed

CHAIN OF CUSTODY DOCUMENTATION



Australian Laboratory Services Pty Ltd

CLIENT: GHD
 ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW
 PROJECT MANAGER (PM): Ben Luffman
 PROJECT ID: 2216251

SAMPLER: J. Simkus
 MOBILE: 0404542354
 PHONE: 0266505600
 EMAIL: ben.luffman@ghd.com, brian.cork@ghd.com

SITE: Hillside Dr, Urunga P.O. NO.:

EMAIL INVOICE TO: (if different to report)

RESULTS REQUIRED (Date): standard QUOTE NO.: SY/270/12

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY
 COOLER SEAL (circle appropriate)
 Intact: Yes No N/A
 SAMPLE TEMPERATURE
 CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

EG0085T (Al)	EG005T (Sb)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK028 (CN)	EG005-SDH (HCl extractable metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA028 (SPOCAS)	EA002 (pH (1:5))	Hold
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Notes: e.g. Highly contaminated samples e.g. "High PAHs expected".
 Extra volume for QC or trace LORs etc.

SAMPLE INFORMATION (note: S = Soil, W = Water)					CONTAINER INFORMATION	
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
16	SE001-0.1	soil			Jar + bag	✓
17	SE001-0.2				Jar	✓
18	SE002-0.1					✓
19	SE002-0.4					✓
20	SE003-0.1					✓
21	SE003-0.3				Jar + bag	✓
22	SE010-0.2				Jar	✓
23	SE010-0.7					✓
24	SE011-0.1					✓
145 25	SE011-0.4				Jar + Bag	✓
26	SE012-0.1				Jar	✓
27	SE012-0.4				Jar	✓

RELINQUISHED BY:
 Name: J. Simkus
 Of: GHD
 Name:
 Of:

RECEIVED BY:
 Name: David
 Of: ALS
 Name:
 Of:

METHOD OF SHIPMENT
 Con' Note No:
 Transport Co:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved;
 V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulphuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass;
 Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

See!

AUSTRALIAN LABORATORY SERVICES P/L

Sed'

CHAIN OF CUSTODY DOCUMENTATION



Australian Laboratory Services Pty Ltd

CLIENT: GHD
 ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW
 PROJECT MANAGER (PM) Ben Luffman
 PROJECT ID: 2216251
 SITE: Hillside Dr, Urunga P.O. NO.:
 RESULTS REQUIRED (Date): standard QUOTE NO.: SY/270/12

SAMPLER: J. Simkus
 MOBILE: 0404542354
 PHONE: 0266505600
 EMAIL: ben.luffman@ghd.com, brian.cork@ghd.com
 EMAIL INVOICE TO: (if different to report)
 ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY:
 COOLER SEAL (circle appropriate)
 Intact: Yes No N/A
 SAMPLE TEMPERATURE
 CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

EG005T (AI)	EG005T (SB)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EG005-SDH (HCl extractable metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold
-------------	-------------	---	------------	------------------------------------	-------------	-------------	-------------------	--------------------------	----------------	------------------	------

Notes: e.g. Highly contaminated samples e.g. "High PAHs expected".
 Extra volume for QC or trace LORs etc.

SAMPLE INFORMATION (note: S = Soil, W = Water)					CONTAINER INFORMATION	
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
	SE013-0.1					
34	SE014-0.1	Soil				2 x 100ml
35	SE014 SE020-0.1					2 x 100ml
36	SE020-0.4					
37	SE021-0.1					
38	SE021-0.3					
39	SE030-0.1					
40	SE030-0.4					
41	SE031-0.1					
42	SE040-0.4					
43	SE042-0.1					
44	SE050-0.1					2 x 100ml

SNR

RELINQUISHED BY:
 Name: J. Simkus
 Of: GHD
 Name:
 Of:

RECEIVED BY:
 Name: David
 Of: PLS
 Name:
 Of:

METHOD OF SHIPMENT
 Con' Note No:
 Transport Co:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved;
 V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
 Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

Sed

CHAIN OF CUSTODY DOCUMENTATION



Australian Laboratory Services Pty Ltd

CLIENT: GHD

SAMPLER: J. Simkus

ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW

MOBILE: 0 404542354

PROJECT MANAGER (PM): Ben Luffman

PHONE: 0266505600

PROJECT ID: 2216251

EMAIL: ben.luffman@ghd.com, brian.cork@ghd.com

SITE: Hillside Dr, Urunga

P.O. NO.:

EMAIL INVOICE TO: (if different to report)

RESULTS REQUIRED (Date): standard

QUOTE NO.: SY/270/12

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

COOLER SEAL (circle appropriate)

Intact: Yes No N/A

SAMPLE TEMPERATURE

CHILLED: Yes No

SAMPLE INFORMATION (note: S = Soil, W=Water)

CONTAINER INFORMATION

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
95	SE050 - 0.3	soil				1 jar + bag
46	SE050 - 0.3					
47	SE051 - 0.1					
48	SE051 - 0.4					
49	SE052 - 0.1					
50	SE053 - 0.1					1 jar + bag
51	SE054 - 0.1					
52	SE055 - 0.1					
53	SE056 - 0.1					
54	SE057 - 0.3					
55	SE061 - 0.1					
	SE061					

EG0085T (Al)	EG005T (Sb)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EG005-SDH (HCl extractable metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold
	✓	✓	✓					✓		✓	
			✓							✓	
			✓	✓						✓	
			✓	✓						✓	
			✓	✓						✓	
				✓							
				✓							
				✓							
			✓	✓						✓	
			✓	✓						✓	
			✓	✓	✓	✓	✓			✓	

Notes: e.g. Highly contaminated samples e.g. "High PAHs expected".
Extra volume for QC or trace LORs etc.

RELINQUISHED BY:

RECEIVED BY:

METHOD OF SHIPMENT

Name: J. Simkus

Date: 21/8/12

Name: David

Date: 22/8

Con' Note No:

Of: GHD

Time:

Of: AL

Time: 0800

Name:

Date:

Name:

Date:

Transport Co:

Of:

Time:

Of:

Time:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved;

V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulphuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass;

Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

AUSTRALIAN LABORATORY SERVICES P/L

COC Page 6 of 15

Sed'

CHAIN OF CUSTODY DOCUMENTATION										 Australian Laboratory Services Pty Ltd								
CLIENT: GHD					SAMPLER: J. Simkus													
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW					MOBILE: 0404542354													
PROJECT MANAGER (PM): Ben Luffman					PHONE: 0266505600													
PROJECT ID: 2216251					EMAIL: ben.luffman@ghd.com, brian.cork@ghd.com													
SITE: Hillside Dr, Urunga					P.O. NO.:					EMAIL INVOICE TO: (if different to report)								
RESULTS REQUIRED (Date): standard					QUOTE NO.: SY127012					ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)								
FOR LABORATORY USE ONLY			COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:			Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.												
COOLER SEAL (circle appropriate)																		
Intact: Yes No N/A																		
SAMPLE TEMPERATURE																		
CHILLED: Yes No																		
SAMPLE INFORMATION (note: S = Soil, W = Water)										CONTAINER INFORMATION								
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG0085T (Al)	EG005T (Sb)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EG005-SPH (Hd extractable metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold
144	SE004-0.1	SOIL			Ja + bag		✓	✓	✓	✓	✓				✓		✓	
56	SE005-0.1				Jar					✓	✓						✓	
57	SE005-0.1				Jar + bag					✓	✓						✓	
58	SE014-0.1				Jar					✓	✓	✓	✓	✓			✓	
59	SE022-0.1						✓			✓	✓						✓	
60	SE022-0.3																	
61	SE043-0.3									✓	✓						✓	
62	SE064-0.1									✓	✓	✓	✓	✓			✓	
63	SE062-0.1						✓			✓	✓						✓	
64	SE062-0.3						✓			✓	✓						✓	
65	SE066-0.1									✓	✓						✓	
66	SE013-0.1						✓	✓	✓	✓	✓						✓	
RELINQUISHED BY:							RECEIVED BY:							METHOD OF SHIPMENT				
Name: J. Simkus			Date: 21/8/12		Of: GHD		Name: David			Date: 22/8		Of: AL		Con' Note No:				
Name:			Date:		Of:		Name:			Date:		Of:		Transport Co:				
Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.																		

Australian Laboratory Services Pty Ltd

CLIENT: GHD				SAMPLER: J. Simkus				 Australian Laboratory Services Pty Ltd													
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW				MOBILE: 0404542354																	
PROJECT MANAGER (PM): Ben Luffman				PHONE: 0266505600																	
PROJECT ID: 2216251				EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com																	
SITE: Hillside Dr, Urunga P.O. NO.:				EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com																	
RESULTS REQUIRED (Date): standard QUOTE NO.: SY/270/12				ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)																	
FOR LABORATORY USE ONLY COOLER SEAL: (circle appropriate) Intact: Yes No N/A SAMPLE TEMPERATURE CHILLED: Yes No				COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:				Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.													
SAMPLE INFORMATION (note: S = Soil, W=Water)				CONTAINER INFORMATION																	
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG0085T (Al)	EG005T (As,Sb)	EG035T (Hg)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	ER026 (CN)	EN 33 (TCLP for metals)	EN80 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold	
67	BH031_0.0-0.2	soil	15/8			bag/jar											✓	✓			
68	BH031_0.5-0.7																✓	✓			
69	BH031_1.8-2.0																✓	✓			
70	BH031_1.0-1.2																				
71	BH054_0.0-0.2		14/8			bag															
72	BH054_0.7-0.9																				
73	BH054_1.0-1.2																				
74	BH0VP07		16/8																		
75	BH032_0.0-0.2		14/8			bag															
76	BH032_0.3-0.5																				
77	BH32_1.0-1.2																				
78	BH0VP06		16/8																		
RELINQUISHED BY:							RECEIVED BY							METHOD OF SHIPMENT							
Name: J. Simkus			Date: 21/8/12		Time:		Name: David			Date: 22/8		Time: 0800		Con' Note No:							
Of: GHD			Time:				Of: AL														
Name:			Date:				Name:							Transport Co:							
Of:			Time:				Of:														
Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.																					

CHAIN OF CUSTODY DOCUMENTATION

CLIENT: GHD

SAMPLER: J. Simkus

ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW

MOBILE: 0404542354

PROJECT MANAGER (PM): Ben Luffman

PHONE: 0266505600

PROJECT ID: 2216251

EMAIL REPORT TO: ben.luffman@ghd.com; brian.cork@ghd.com

SITE: Hillside Dr, Urunga

P.O. NO.:

EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com

RESULTS REQUIRED (Date): standard

QUOTE NO.: SY/270/12

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

COOLER SEAL (circle appropriate)

Intact: Yes No: N/A

SAMPLE TEMPERATURE

CHILLED: Yes No:

Notes: e.g. Highly contaminated samples
e.g. "High PAHs expected".
Extra volume for QC or trace LORs etc.

SAMPLE INFORMATION (note: S = Soil, W=Water)

CONTAINER INFORMATION

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
79	BH053-0.3-0.5	soil	14/8		Jar	
80	BH053-1.5-1.7					
81	BH053-3.2-3.5					
82	BH001-0.3-0.5		16/8		Jar + bag	
83	BH024-0.3-0.5		14/8		Jar	
84	BH024-1.0-1.2					
85	BH024-2.0-2.2					
86	BH004-0.0-0.2		16/8			

EG0085T (A)	EG005T (As, Sb)	EG035T (Hg)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EN 33 (TCCLP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold
✓	✓		✓	✓	✓	✓	✓	✓				✓	
✓	✓		✓	✓	✓	✓	✓	✓				✓	
✓	✓		✓	✓	✓	✓	✓	✓				✓	
✓	✓	✓	✓	✓								✓	
	✓			✓	✓	✓						✓	
	✓			✓	✓	✓						✓	
	✓												
	✓	✓											

RELINQUISHED BY:

RECEIVED BY

METHOD OF SHIPMENT

Name: J. Simkus

Date: 21/8/12

Name: David

Date: 22/8

Con' Note No:

Of: GHD

Time:

Of: Ali

0800

Name:

Date:

Name:

Transport Co:

Of:

Time:

Of:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved;

V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;

Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

Blanks (Soil)
+ Rinsates.
(water)

CHAIN OF CUSTODY DOCUMENTATION



Australian Laboratory Services Pty Ltd

CLIENT: GHD	SAMPLER: J. Simkus
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW	MOBILE: 0404542354
PROJECT MANAGER (PM): Ben Luffman	PHONE: 0266505600
PROJECT ID: 2216251	EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com
SITE: Hillside Dr, Urunga	P.O. NO.:
RESULTS REQUIRED (Date): standard	QUOTE NO.: SY270/12
ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)	

FOR LABORATORY USE ONLY	COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:
COOLER SEAL (circle appropriate)	
Intact: Yes No N/A	
SAMPLE TEMPERATURE	
CHILLED: Yes No	

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION																
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG0085T	EG005T	EG035T	S-2 (Mn, Cr, Cu, Ni, Pb, Zn, Hg)	EK026	EN 33	EN60 (As, Sb, Cd, Cr, Cu, Ni, Pb, Zn, Hg)	EP003	ED007	EA150/150-H	EA037	EA029	EA002	Hold	
96	TB01 (aka Trip Blank)	soil	6/8					✓													
97	TB02 (aka Trip Blank)	soil	6/8					✓													
	RB01	W						✓													
	RB02							✓													
	RB03							✓													
	RB04							✓													
	RB05							✓													
98	RB01	water	15/8																		
99	RB02		15/8																		
100	RB03		16/8																		
101	RB04		16/8																		
102	RB05		16/8																		

RELINQUISHED BY:		RECEIVED BY:		METHOD OF SHIPMENT	
Name: J. Simkus	Date: 21/8/12	Name: D...	22/8	Con' Note No:	
Of: GHD	Time:	Of: ALS	0800		
Name:	Date:	Name:		Transport Co:	
Of:	Time:	Of:			

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulphuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

Stockpiles + Bricks

CHAIN OF CUSTODY DOCUMENTATION										 Australian Laboratory Services Pty Ltd																																																																																																																																																																																																																																																														
CLIENT: GHD					SAMPLER: J. Simkus																																																																																																																																																																																																																																																																			
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW					MOBILE: 0404542354																																																																																																																																																																																																																																																																			
PROJECT MANAGER (PM): Ben Luffman					PHONE: 0266505600																																																																																																																																																																																																																																																																			
PROJECT ID: 2216251					EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com																																																																																																																																																																																																																																																																			
SITE: Hillside Dr, Ununga					P.O. NO.:					EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com																																																																																																																																																																																																																																																														
RESULTS REQUIRED (Date): standard					QUOTE NO.: SY/270/12					ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)																																																																																																																																																																																																																																																														
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Notes: e.g. Highly contaminated samples
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[illegible]

METHOD OF SHIPMENT

Con' Note No:

Transport Co:	
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Transport Co:	
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11. *Journal of the American Medical Association*, 277, 1996, 1000-1001.

Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

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Soil



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AUSTRALIAN LABORATORY SERVICES P/L

COC Page 2 of 15

Deed

CHAIN OF CUSTODY DOCUMENTATION



Australian Laboratory Services Pty Ltd

CLIENT: GHD

SAMPLER: J. Simkus

ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW

MOBILE: 0404542354

PROJECT MANAGER (PM): Ben Luffman

PHONE: 0266505600

PROJECT ID: 2216251

EMAIL: ben.luffman@ghd.com, brian.cork@ghd.com

SITE: Hillside Dr, Urunga

EMAIL INVOICE TO: (if different to report)

RESULTS REQUIRED (Date): standard

NO.:

E NO.: SY270/12

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY		COMMENTS /
COOLER SEAL (circle appropriate)		
Intact:	Yes No N/A	
SAMPLE TEMPERATURE		
CHILLED: Yes No		

HANDLING / STORAGE OR DISPOSAL:

CONTAINER INFORMATION

SAMPLE INFORMATION (note: S = Soil, W = Water)

ALS ID	SAMPLE ID	MATRIX	DATE
1	SE001-0.1	soil	
2	SE001-0.2		
3	SE002-0.1		
4	SE002-0.4		
5	SE003-0.1		
6	SE003-0.3		
7	SE010-0.2		
8	SE010-0.7		
9	SE011-0.1		
10	SE011-0.4		
11	SE012-0.1		
12	SE012-0.4		

Type / Code	Total bottles
Jar + bag	✓
Jar	✓
Jar	✓
Jar	✓
Jar + bag	✓
Jar	✓
Jar + bag	✓
Jar	✓
Jar	✓
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✓	✓	✓	✓					✓		✓	
✓				✓	✓	✓	✓				
✓											
✓											
✓								✓			
✓											
✓					✓	✓	✓				
✓								✓			
✓											

Notes: e.g. Highly contaminated samples
e.g. "High PAHs expected".
Extra volume for QC or trace LORs etc.

RELINQUISHED BY:

RECEIVED BY:

METHOD OF SHIPMENT

Name: J. Simkus

Date: 21/8/12

Name: David

Date: 22/8

Con' Note No:

Of: GHD

Time:

Of: AL

Time: 0900

Name:

Date:

Name:

Date:

Transport Co:

Of:

Time:

Of:

Time:

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AUSTRALIAN LABORATORY SERVICES P/L

COC Page 3 of 15

Seed

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SITE: Hillside Dr, Urunga					P.O. NO.:					EMAIL INVOICE TO: (if different to report)														
RESULTS REQUIRED (Date): standard					QUOTE NO.: SY270/12					ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)														
FOR LABORATORY USE ONLY		COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL								Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.														
COOLER SEAL (circle appropriate)																								
In tact: Yes No N/A																								
SAMPLE TEMPERATURE																								
CHILLED: Yes No																								
SAMPLE INFORMATION (note: S = Soil, W = Water)						CONTAINER INFORMATION																		
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG0085T (A)	EG005T (S)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EG005-SDH (HCl extractable metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SIPOCAS)	EA002 (pH (1:5))		Hold					
4	SE013-0.4	soil			Bag 1 Jar			✓	✓						✓									
	SE060-0.1				Jar							✓	✓	✓										
	SE033-0.05				so							✓	✓	✓										
~~~~~																								
	SE102-0-0.2							✓	✓															
5	SE031-0.5				Bag										✓									
	<del>SE031-0.5</del>																							
6	SE054-03				Jar										✓									
RELINQUISHED BY:										RECEIVED BY:					METHOD OF SHIPMENT:									
Name: J. Simkus					Date: 21/8/12					Name: Dan					Date: 22/8					Con' Note No:				
Of: GHD					Time:					Of: AL					Time: 0900									
Name:					Date:					Name:					Date:					Transport Co:				
Of:					Time:					Of:					Time:									
<b>Water Container Codes:</b> P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.																								

Sed

7

Sed

CHAIN OF CUSTODY DOCUMENTATION										 Australian Laboratory Services Pty Ltd													
CLIENT: GHD					SAMPLER: J. Simkus																		
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW					MOBILE: 0404542354																		
PROJECT MANAGER (PM): Ben Luffman					PHONE: 0266505600																		
PROJECT ID: 2216251					EMAIL: ben.luffman@ghd.com, brian.cork@ghd.com																		
SITE: Hillside Dr, Urunga					P.O. NO.:					EMAIL INVOICE TO: (if different to report)													
RESULTS REQUIRED (Date): standard					QUOTE NO.: SY270/12					ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)													
<b>FOR LABORATORY USE ONLY</b>					COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:					Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.													
COOLER SEAL (circle appropriate)																							
Intact: Yes No N/A																							
SAMPLE TEMPERATURE:																							
CHILLED: Yes No																							
SAMPLE INFORMATION (note: S = Soil, W = Water)										CONTAINER INFORMATION													
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG008T (Al)	EG005T (Si)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EG005-SDH (HCl extractable metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCCAS)	EA002 (pH (1:5))	Hold					
95	SE050 - 0.3	soil				1 jar + bag		✓	✓	✓					✓		✓						
96	SE051 - 0.3									✓							✓						
97	SE051 - 0.1									✓	✓						✓						
98	SE051 - 0.4									✓							✓						
99	SE052 - 0.1									✓	✓						✓						
99	SE053 - 0.1					1 jar + bag					✓												
99	SE054 - 0.1										✓												
99	SE055 - 0.1										✓												
99	SE056 - 0.1									✓	✓						✓						
99	SE057 - 0.3									✓	✓						✓						
99	SE061 - 0.1									✓	✓	✓	✓	✓			✓						
RELINQUISHED BY:										RECEIVED BY:					METHOD OF SHIPMENT								
Name: J. Simkus					Date: 21/8/12					Name: D. J. J.					Date: 22/8					Con' Note No:			
Of: GHD					Time:					Of: AL					Time: 0900								
Name:					Date:					Name:					Date:					Transport Co:			
Of:					Time:					Of:					Time:								
<b>Water Container Codes:</b> P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; --- Zinc Ascorbic Preserved Bottle; P = PPTA Preserved Bottle; ST = Starlin Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.																							

AUSTRALIAN LABORATORY SERVICES P/L

COC Page 6 of 15

Sed

# CHAIN OF CUSTODY DOCUMENTATION



Australian Laboratory Services Pty Ltd

CLIENT: GHD

SAMPLER: J. Simkus

ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW

MOBILE: 0404542354

PROJECT MANAGER (PM): Ben Luffman

PHONE: 0266505600

PROJECT ID: 2216251

EMAIL: ben.luffman@ghd.com, brian.cork@ghd.com

SITE: Hillside Dr, Urunga

P.O. NO.:

EMAIL INVOICE TO: (if different to report)

RESULTS REQUIRED (Date): standard

QUOTE NO.: SY/270/12

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY:

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

COOLER/SEAL: (circle appropriate)

Intact: Yes No N/A

SAMPLE TEMPERATURE

CHILLED: Yes No

Notes: e.g. Highly contaminated samples  
e.g. "High PAHs expected".  
Extra volume for QC or trace LORs etc.

SAMPLE INFORMATION (note: S = Soil, W=Water)

CONTAINER INFORMATION

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG0065T (Al)	EG005T (Sb)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EG005-SDH (Hd extractable metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH: (1.5))	Hold
10	SE004-0.1	soil			Jar + bag		✓	✓	✓	✓	✓				✓		✓	
11	SE005-0.1				Jar				✓	✓	✓						✓	
12	SE005				Jar + bag				✓	✓	✓						✓	
13	SE014-0.1				Jar				✓	✓	✓	✓	✓	✓			✓	
14	SE022-0.1						✓		✓	✓							✓	
15	SE022-0.3								✓	✓								
16	SE043-0.3								✓	✓							✓	
17	SE064-0.1						✓		✓	✓	✓	✓	✓	✓			✓	
18	SE062-0.1						✓		✓	✓	✓						✓	
19	SE062-0.3						✓		✓	✓	✓						✓	
20	SE066-0.1						✓	✓	✓	✓	✓						✓	
21	SE013-0.1						✓	✓	✓	✓	✓						✓	

RELINQUISHED BY:

RECEIVED BY:

METHOD OF SHIPMENT

Name: J. Simkus

Date: 21/8/12

Name: David

Date: 22/8

Con' Note No:

Of: GHD

Time:

Of: AL

Time: 0800

Name:

Date:

Name:

Date:

Transport Co:

Of:

Time:

Of:

Time:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved;

V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulphuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass;

Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottle; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

AUSTRALIAN LABORATORY SERVICES P/L

COC Page 7 of 15



## CHAIN OF CUSTODY DOCUMENTATION

CLIENT: GHD

ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW

PROJECT MANAGER (PM): Ben Luffman

PROJECT ID: 2216251

SITE: Hillside Dr, Urunga

P.O. NO.:

RESULTS REQUIRED (Date): standard

QUOTE NO.: SY/270/12

SAMPLER: J. Simkus

MOBILE: 0404542354

PHONE: 0266505600

EMAIL REPORT TO: ben.luffman@ghd.com; brian.cork@ghd.com

EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com



Australian Laboratory Services Pty Ltd

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY

COOLER SEAL (circle appropriate)

Intact: Yes No N/A

SAMPLE TEMPERATURE

CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

Notes: e.g. Highly contaminated samples  
e.g. "High PAHs expected".  
Extra volume for QC or trace LORs etc.

SAMPLE INFORMATION (note: S = Soil, W = Water)

CONTAINER INFORMATION

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
79	BH053-0.3-0.5	soil	14/8		Jar	
80	BH053-1.5-1.7					
81	BH053-3.2-3.5					
82	BH001-0.3-0.5		16/8		Jar + bag	
83	BH024-0.3-0.5		14/8		Jar	
84	BH024-1.0-1.2					
85	BH024-2.0-2.2					
86	BH004-0.0-0.2		16/8			

EG0085T (Al)	EG005T (As, Sb)	EG035T (Hg)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EN 33 (TCLP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold
✓	✓		✓	✓	✓	✓	✓	✓				✓	
✓	✓		✓	✓	✓	✓	✓	✓				✓	
✓	✓		✓	✓	✓	✓	✓	✓				✓	
✓	✓	✓	✓	✓								✓	
	✓		✓	✓	✓	✓						✓	
	✓		✓	✓	✓	✓						✓	
	✓		✓	✓	✓	✓						✓	
	✓		✓										

RELINQUISHED BY:

RECEIVED BY

METHOD OF SHIPMENT

Name: J. Simkus

Date: 21/8/12

Name: David

22/8

Of: GHD

Time:

Of: A.V.

0800

Name:

Date:

Name:

Of:

Time:

Of:

Con' Note No:

Transport Co:

**Water Container Codes:** P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved;

V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulphuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass;

Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

AUSTRALIAN LABORATORY SERVICES P/L

COC Page 9 of 15

## CHAIN OF CUSTODY DOCUMENTATION

CLIENT: GHD

SAMPLER: J. Simkus

ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW

MOBILE: 0404542354

PROJECT MANAGER (PM): Ben Luffman

PHONE: 0266505600

PROJECT ID: 2216251

EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com

SITE: Hillside Dr, Urunga

P.O. NO.:

EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com

RESULTS REQUIRED (Date): standard

QUOTE NO.: SY/270/12

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

COOLER SEAL (circle appropriate)

Intact: Yes No N/A

SAMPLE TEMPERATURE

CHILLED: Yes No

Notes: e.g. Highly contaminated samples  
e.g. "High PAHs expected".  
Extra volume for QC or trace LORs etc.

SAMPLE INFORMATION (note: S = Soil, W = Water)					CONTAINER INFORMATION	
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
77	BH077-0.3-0.5	soil	14/8		Jar	
88	BH077-0.5-0.7					
89	BH077-1.0-1.2					
90	BH077-1.5-1.7					
91	BH084-1.0-1.2		15/8		Jar	
92	BH084-1.5-1.7					
93	BH078-0.3-0.5		14/8		Jar	
94	BH078-1.0-1.2					
95	BH078-1.5-1.7					

EG0085T (Al)	EG003T (As, Sb)	EG035T (Hg)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (Cu)	EN33 (TCLP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold
✓	✓		✓	✓	✓	✓	✓	✓				✓	
✓	✓		✓	✓	✓	✓	✓	✓				✓	
✓	✓		✓	✓	✓	✓	✓	✓				✓	
✓	✓		✓	✓	✓	✓	✓	✓				✓	
	✓	✓		✓	✓	✓						✓	
	✓	✓		✓	✓	✓						✓	
✓	✓		✓	✓	✓	✓						✓	
✓	✓		✓	✓	✓	✓						✓	
✓	✓		✓	✓	✓	✓						✓	

RELINQUISHED BY:

RECEIVED BY

METHOD OF SHIPMENT

Name: J. Simkus

Date: 21/8/12

Name: Dewi

22/8

Of: GHD

Time:

Of: A.S.

0800

Name:

Date:

Name:

Of:

Time:

Of:

Con' Note No:

Transport Co:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved;

V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulphuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass;

Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

AUSTRALIAN LABORATORY SERVICES P/L

COC Page 10 of 15

Blanks (Soil)  
+ Rinsates.  
(water)

CHAIN OF CUSTODY DOCUMENTATION										 Australian Laboratory Services Pty Ltd															
CLIENT: GHD					SAMPLER: J. Simkus																				
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW					MOBILE: 0404542354																				
PROJECT MANAGER (PM): Ben Luffman					PHONE: 0266505600																				
PROJECT ID: 2216251					EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com																				
SITE: Hillside Dr, Urunga					P.O. NO.:					EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com															
RESULTS REQUIRED (Date): standard					QUOTE NO.: SY/270/12					ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)															
FOR LABORATORY USE ONLY			COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:			Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.             <table border="1" style="font-size: 8px;"> <tr> <td>EG008ST (Al)</td> <td>EG005T (As, Sb)</td> <td>EG005T (Hg)</td> <td>S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))</td> <td>EK026 (CN)</td> <td>EN 33 (TCLP for metals)</td> <td>EN60 (ASLP for metals)</td> <td>EP003 (TOC)</td> <td>ED007 (CEC)</td> <td>EA150/150-H (PSA)</td> <td>EA037 (ASS field screen)</td> <td>EA029 (SPOCAS)</td> <td>EA002 (pH (1:5))</td> <td>Hold</td> </tr> </table>						EG008ST (Al)	EG005T (As, Sb)	EG005T (Hg)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EN 33 (TCLP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold
EG008ST (Al)	EG005T (As, Sb)	EG005T (Hg)										S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EN 33 (TCLP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold			
COOLER SEAL (circle appropriate)																									
Intact: Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>																									
SAMPLE TEMPERATURE																									
CHILLED: Yes <input type="checkbox"/> No <input type="checkbox"/>																									
SAMPLE INFORMATION (note: S = Soil, W = Water)					CONTAINER INFORMATION																				
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG008ST (Al)	EG005T (As, Sb)	EG005T (Hg)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EN 33 (TCLP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold					
97	TB01 (aka Trip Blank)	soil	6/8					✓																	
97	TB02 (aka Trip Blank)	soil	6/8					✓																	
	<del>RB01</del>	<del>W</del>																							
	<del>RB02</del>	<del>W</del>																							
	<del>RB03</del>	<del>W</del>																							
	<del>RB04</del>	<del>W</del>																							
	<del>RB05</del>	<del>W</del>																							
98	RB01	water	15/8																						
99	RB02		15/8																						
100	RB03		16/8																						
101	RB04		16/8																						
102	RB05		16/8																						
RELINQUISHED BY:					RECEIVED BY					METHOD OF SHIPMENT															
Name: J. Simkus					Name: David					Con' Note No:															
Of: GHD					Of: ALS					22/8															
Name:					Name:					Transport Co:															
Of:					Of:																				
Date: 21/8/12					Date:																				
Time:					Time:																				

**Water Container Codes:** P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulphuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.



PASS

CHAIN OF CUSTODY DOCUMENTATION										 <b>Australian Laboratory Services Pty Ltd</b>																														
CLIENT: GHD					SAMPLER: J. Simkus																																			
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW					MOBILE: 0404542354																																			
PROJECT MANAGER (PM): Ben Luffman					PHONE: 0266505600																																			
PROJECT ID: 2216251					EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com																																			
SITE: Hillside Dr, Urunga					P.O. NO.:					EMAIL INVOICE TO: (if different to report) <del>ben.luffman@ghd.com</del>																														
RESULTS REQUIRED (Date): standard					QUOTE NO.: SY270/12					ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)																														
<b>FOR LABORATORY USE ONLY</b> COOLER SEAL (circle appropriate) Intact: Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> SAMPLE TEMPERATURE CHILLED: Yes <input type="checkbox"/> No <input type="checkbox"/>			<b>COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:</b>  			<table border="1" style="width:100%; border-collapse: collapse; font-size: 8px;"> <tr> <td style="width: 5%;">EG0085T (Al)</td> <td style="width: 5%;">EG005T (As, Sb)</td> <td style="width: 5%;">EG005T (Hg)</td> <td style="width: 10%;">S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))</td> <td style="width: 5%;">EK026 (CN)</td> <td style="width: 5%;">EN 33 (TCCLP for metals)</td> <td style="width: 5%;">EN60 (ASLP for metals)</td> <td style="width: 5%;">EP003 (TOC)</td> <td style="width: 5%;">ED007 (CEC)</td> <td style="width: 10%;">EA150/150-H (PSA)</td> <td style="width: 5%;">EA037 (ASS field screen)</td> <td style="width: 5%;">EA023 (SPOCAS)</td> <td style="width: 5%;">EA002 (pH (1-5))</td> <td style="width: 5%;">Hold</td> </tr> <tr> <td colspan="14" style="padding: 2px;">           Notes: e.g. Highly contaminated samples            e.g. "High PAHs expected".            Extra volume for QC or trace LORs etc.         </td> </tr> </table>							EG0085T (Al)	EG005T (As, Sb)	EG005T (Hg)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EN 33 (TCCLP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA023 (SPOCAS)	EA002 (pH (1-5))	Hold	Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.													
EG0085T (Al)	EG005T (As, Sb)	EG005T (Hg)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EN 33 (TCCLP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA023 (SPOCAS)	EA002 (pH (1-5))	Hold																											
Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.																																								
<table border="1" style="width:100%; border-collapse: collapse; font-size: 8px;"> <tr> <th colspan="5" style="text-align: left;">SAMPLE INFORMATION (note: S = Soil, W=Water)</th> <th colspan="2" style="text-align: left;">CONTAINER INFORMATION</th> </tr> <tr> <th style="width: 10%;">ALS ID</th> <th style="width: 20%;">SAMPLE ID</th> <th style="width: 10%;">MATRIX</th> <th style="width: 10%;">DATE</th> <th style="width: 10%;">Time</th> <th style="width: 10%;">Type / Code</th> <th style="width: 10%;">Total bottles</th> </tr> </table>										SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles																	
SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION																																			
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles																																		
413	BH001-0.0-0.2	s				Bag																																		
114	BH001-0.7-0.9																																							
115	BH001 1-1.2																																							
116	BH002-1.0-1.2																																							
117	BH002-1.2-1.4																																							
118	BH003-0.5-0.7																																							
119	BH003-1.0-1.2																																							
120	BH011-0.1-																																							
121	BH011-0.3																																							
122	BH011-0.5																																							
123	BH020-0.0-0.2																																							
124	BH020-0.3-0.5																																							
RELINQUISHED BY:					RECEIVED BY:					METHOD OF SHIPMENT																														
Name: J. Simkus					Name: <u>Dani</u>					Con' Note No:																														
Of: GHD					Of: <u>AL</u>																																			
Name:					Name:					Transport Co:																														
Of:					Of:																																			
<b>Water Container Codes:</b> P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulphuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.																																								



sed

**ANALYSIS REQUIRED** including **SUITES** (note - suite codes must be listed to attract suite prices)

Notes: e.g. Highly contaminated samples  
e.g. "High PAHs expected".  
Extra volume for QC or trace LORs etc.

**Water Container Codes:** P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

Impact zone

Soil

CHAIN OF CUSTODY DOCUMENTATION										 Australian Laboratory Services Pty Ltd										
CLIENT: GHD					SAMPLER: J. Simkus															
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW					MOBILE: 0404542354															
PROJECT MANAGER (PM): Ben Luffman					PHONE: 0266505600															
PROJECT ID: 2216251					EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com															
SITE: Hillside Dr, Urunga					P.O. NO.:					EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com										
RESULTS REQUIRED (Date): standard					QUOTE NO.: SY/270/12					ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)										
FOR LABORATORY USE ONLY COOLER SEAL (circle appropriate) Intact: Yes No N/A SAMPLE TEMPERATURE CHILLED: Yes No		COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:			Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.															
SAMPLE INFORMATION (note: S = Soil, W = Water)					CONTAINER INFORMATION															
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG0085T (Al)	EG0085T (As, Sb)	EG035T (Hg)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EN 33 (ICLP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (DEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold
1	BH074-0.8-1.0	soil	15/8		JAR	jar		✓	✓		✓								✓	
2	BH064-0.0-0.2		15/8		JAR	jar		✓	✓		✓								✓	
3	BH064-0.3-0.5		↓		JAR	↓		✓	✓		✓								✓	
4	BH073-0.0-0.2		15/8		JAR	jar		✓	✓		✓								✓	
5	BH073-0.5-0.7		↓		JAR	↓		✓	✓		✓								✓	
6	BH056-0.3-0.5		15/8		JAR	jar		✓	✓		✓								✓	
7	BH075-1.8-2.0				JAR	jar		✓		✓										
8	BH060-0.0-0.2		15/8		JAR	jar		✓	✓		✓								✓	
9	BH082-1.5-1.7	✓	14/8		JAR	jar		✓	✓		✓								✓	
RELINQUISHED BY:					RECEIVED BY:					METHOD OF SHIPMENT:										
Name: J. Simkus					Date: 21/8/12					Name: David					22/8		Con' Note No:			
Of: GHD					Time:					Of: AS					0800					
Name:					Date:					Name:							Transport Co:			
Of:					Time:					Of:										
<b>Water Container Codes:</b> P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulphuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.																				

 Environmental Division  
 Sydney  
 Work Order  
**ES1220402**


Telephone : +61-2-8784 8555

## Soil

**AUSTRALIAN LABORATORY SERVICES P/L**

Deed

# CHAIN OF CUSTODY DOCUMENTATION



Australian Laboratory Services Pty Ltd

CLIENT: GHD

SAMPLER: J. Simkus

ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW

MOBILE: 0404542354

PROJECT MANAGER (PM): Ben Luffman

PHONE: 0266505600

PROJECT ID: 2216251

EMAIL: ben.luffman@ghd.com, brian.cork@ghd.com

SITE: Hillside Dr, Urunga

NO.:

EMAIL INVOICE TO: (if different to report)

RESULTS REQUIRED (Date): standard

E NO.: SY/270/12

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY		COMMENTS /
COOLER SEAL (circle appropriate)		
Intact:	Yes No N/A	
SAMPLE TEMPERATURE		
CHILLED:	Yes No	

HANDLING / STORAGE OR DISPOSAL:

CONTAINER INFORMATION

SAMPLE INFORMATION (note: S = Soil, W = Water)

ALS ID	SAMPLE ID	MATRIX	DATE
1	SE001-0.1	soil	
2	SE001-0.2		
3	SE002-0.1		
4	SE002-0.4		
5	SE003-0.1		
6	SE003-0.3		
7	SE010-0.2		
8	SE010-0.7		
9	SE011-0.1		
10	SE011-0.4		
11	SE012-0.1		
12	SE012-0.4		

Type / Code	Total bottles
jar & bag	✓
jar	✓
jar	✓
jar & bag	✓
jar	✓
jar & bag	✓
jar	✓
jar & bag	✓
jar	✓
jar	✓
jar	✓

EG0085T (Al)	EG0085T (Sb)	S-2 Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg)	EG0086 (CN)	EG0086-SDH (Hd extractable metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
✓				✓	✓	✓	✓				
✓											
✓											
✓											
✓											
✓											
✓											
✓											
✓											
✓											

Notes: e.g. Highly contaminated samples  
e.g. "High PAHs expected".  
Extra volume for QC or trace LORs etc.

RELINQUISHED BY:

RECEIVED BY:

METHOD OF SHIPMENT

Name: J. Simkus

Date: 21/8/12

Name: David

Date: 22/8

Of: GHD

Time:

Of: A1

Time: 0900

Name:

Date:

Name:

Date:

Of:

Time:

Of:

Time:

Con' Note No:

Transport Co:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved;  
V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulphuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass;  
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

AUSTRALIAN LABORATORY SERVICES P/L

COC Page 3 of 15

Seed

# CHAIN OF CUSTODY DOCUMENTATION



Australian Laboratory Services Pty Ltd

CLIENT: GHD

SAMPLER: J. Simkus

ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW

MOBILE: 0404542354

PROJECT MANAGER (PM): Ben Luffman

PHONE: 266505600

PROJECT ID: 2216251

EMAIL: ben.luffman@ghd.com, brian.cork@ghd.com

SITE: Hillside Dr, Urunga

P.O. NO.:

EMAIL INVOICE TO: (if different to report)

RESULTS REQUIRED (Date): standard

QUOTE NO.: SY270/12

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

COOLER SEAL (circle appropriate):

Intact: Yes No N/A

SAMPLE TEMPERATURE:

CHILLED: Yes No

SAMPLE INFORMATION (note: S = Soil, W = Water)

CONTAINER INFORMATION

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
27	SE013-0.4	soil				Bag / Jar
29	SE060-0.1					Jar
30	SE033-0.05					Sc
31	SE102-0.0.2					
32	SE031-0.05					Bag
33	SE054-03					Jar

EG0085T (A)	EG005T (Sb)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EG0026 (CN)	EG0005-SDH (Hcl extractable metals)	EP003 (TOC)	ED007 (OEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1-5))	Hold
	✓	✓				✓	✓	✓			
					✓	✓	✓				
	✓	✓									
								✓			
								✓			

Notes: e.g. Highly contaminated samples  
e.g. "High PAHs expected",  
Extra volume for QC or trace LORs etc.

RELINQUISHED BY:

RECEIVED BY:

METHOD OF SHIPMENT

Name: J. Simkus

Date: 21/8/12

Name: David

Date: 22/8

Of: GHD

Time:

Of: AL

Time: 0800

Name:

Date:

Name:

Date:

Of:

Time:

Of:

Time:

Con' Note No:

Transport Co:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved;

V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulphuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass;

Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

AUSTRALIAN LABORATORY SERVICES P/L

COC Page 4 of 15

Sed

# CHAIN OF CUSTODY DOCUMENTATION

CLIENT: GHD

ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW

PROJECT MANAGER (PM): Ben Luffman

PROJECT ID: 2216251

SITE: H7/150 Dr, Urunga

P.O. NO.:

RESULTS REQUIRED (Date): standard

QUOTE NO.: SY270/12

SAMPLER: J. Simkus

MOBILE: 404542354

PHONE: 266505600

EMAIL: ben.luffman@ghd.com, brian.cork@ghd.com

EMAIL INVOICE TO: (if different to report)



Australian Laboratory Services Pty Ltd

## FOR LABORATORY USE ONLY

COOLER SEAL (circle appropriate):

Intact: Yes No N/A

## SAMPLE TEMPERATURE

CHILLED: Yes No

## COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

## ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

Notes: e.g. Highly contaminated samples  
e.g. "High PAHs expected".  
Extra volume for QC or trace LORs etc.

## SAMPLE INFORMATION (note: S = Soil, W = Water)

## CONTAINER INFORMATION

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
7-39	SE003-0.1	Soil			(double up on COC)	2
35	SE020-0.1					2
36	SE020-0.4					
37	SE021-0.1					
38	SE021-0.3					
39	SE030-0.1					
40	SE030-0.4					
41	SE031-0.1					
42	SE040-0.4					
43	SE042-0.1					
44	SE050-0.1					2

EG0085T (A)	EG005T (SB)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EG005-SPH (HCl extractable metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA028 (SPOCAS)	EA002 (pH (1:5))	Hold
✓	✓	✓	✓								
✓	✓	✓	✓					✓		✓	
✓											
				✓	✓	✓	✓				
				✓	✓	✓	✓				
✓				✓	✓	✓	✓				
				✓							
				✓	✓	✓	✓				
✓	✓	✓	✓					✓		✓	

## RELINQUISHED BY:

## RECEIVED BY:

## METHOD OF SHIPMENT

Name: J. Simkus

Date: 21/8/12

Name: David

Date: 22/8

Of: GHD

Time:

Of: AJS

Time: 08:45

Con' Note No:

Name:

Date:

Name:

Date:

Transport Co:

Of:

Time:

Of:

Time:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;

Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

AUSTRALIAN LABORATORY SERVICES P/L

COC Page 5 of 15

Sed

# CHAIN OF CUSTODY DOCUMENTATION



Australian Laboratory Services Pty Ltd

CLIENT: GHD

SAMPLER: J. Simkus

ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW

MOBILE: 0 404542354

PROJECT MANAGER (PM): Ben Luffman

PHONE 0266505600

PROJECT ID: 2216251

EMAIL ben.luffman@ghd.com, brian.cork@ghd.com

SITE: Hillside Dr, Urunga

P.O. NO.:

EMAIL INVOICE TO: (if different to report)

RESULTS REQUIRED (Date): standard

QUOTE NO.: SY1270/12

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

COOLER SEAL (circle appropriate)

Intact: Yes No N/A

SAMPLE TEMPERATURE:

CHILLED: Yes No

Notes: e.g. Highly contaminated samples  
e.g. "High PAHs expected".  
Extra volume for QC or trace LORs etc.

SAMPLE INFORMATION (note: S = Soil, W=Water)

CONTAINER INFORMATION

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
9	SE050 - 0.3	soil				1 jar + 2 bags
46	SE051 - 0.3					
47	SE051 - 0.1					
48	SE051 - 0.4					
49	SE052 - 0.1					
50	SE053 - 0.1					1 jar + bag
51	SE054 - 0.1					
52	SE055 - 0.1					
53	SE056 - 0.1					
54	SE057 - 0.3					
55	SE061 - 0.1					
	BEACH					

EG0085T (Al)	EG005T (Sb)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EG005-SDH (Hd extractable metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold
	✓	✓	✓					✓		✓	
			✓							✓	
			✓	✓						✓	
			✓	✓						✓	
				✓							
				✓							
				✓							
			✓	✓						✓	
			✓	✓						✓	
			✓	✓	✓	✓	✓			✓	

RELINQUISHED BY:

RECEIVED BY:

METHOD OF SHIPMENT

Name: J. Simkus

Date: 21/8/12

Name: Davi

Date: 22/8

Of: GHD

Time:

Of: Als

Time: 0800

Con' Note No:

Name:

Date:

Name:

Date:

Transport Co:

Of:

Time:

Of:

Time:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved;

V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;

Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

AUSTRALIAN LABORATORY SERVICES P/L

COC Page 6 of 15

Sed'

10



## CHAIN OF CUSTODY DOCUMENTATION

CLIENT: GHD

ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW

PROJECT MANAGER (PM): Ben Luffman

PROJECT ID: 2216251

SITE: Hillside Dr, Urunga

P.O. NO.:

RESULTS REQUIRED (Date): standard

QUOTE NO.: SY270/12

FOR LABORATORY USE ONLY

COOLER SEAL (circle appropriate)

Intact: Yes No N/A

SAMPLE TEMPERATURE

CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

SAMPLER: J. Simkus

MOBILE: 0404542354

PHONE: 0266505600

EMAIL REPORT TO: ben.luffman@ghd.com; brian.cork@ghd.com

EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)



Australian Laboratory Services Pty Ltd

Notes: e.g. Highly contaminated samples  
e.g. "High PAHs expected".  
Extra volume for QC or trace LORs etc.

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION	
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
79	BH053-0.3-0.5	soil	14/8		Jar	
80	BH053-1.5-1.7					
81	BH053-3.2-3.5					
82	BH001-0.3-0.5		16/8		Jar + bag	
83	BH024-0.3-0.5		14/8		Jar	
84	BH024-1.0-1.2					
85	BH024-2.0-2.2					
86	BH004-0.0-0.2		16/8			

RELINQUISHED BY:

RECEIVED BY

METHOD OF SHIPMENT

Name: J. Simkus

Date: 21/8/12

Name: D. J.

22/8

Of: GHD

Time:

Of: A. J.

0800

Name:

Date:

Name:

Of:

Time:

Of:

Con' Note No:

Transport Co:

**Water Container Codes:** P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved;  
V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulphuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass;  
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

AUSTRALIAN LABORATORY SERVICES P/L

COC Page 9 of 15

Impact zone Soil

## CHAIN OF CUSTODY DOCUMENTATION

CLIENT: GHD

ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW

PROJECT MANAGER (PM): Ben Luffman

PROJECT ID: 2216251

SITE: Hillside Dr, Urunga

P.O. NO.:

RESULTS REQUIRED (Date): standard

QUOTE NO.: SY270/12

SAMPLER: J. Simkus

MOBILE: 0404542354

PHONE: 0266505600

EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com

EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com



Australian Laboratory Services Pty Ltd

FOR LABORATORY USE ONLY

COOLER SEAL (circle appropriate)

Intact: Yes No N/A

SAMPLE TEMPERATURE:

CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

Notes: e.g. Highly contaminated samples  
e.g. "High PAHs expected".  
Extra volume for QC or trace LORs etc.

SAMPLE INFORMATION (note: S = Soil, W = Water)

CONTAINER INFORMATION

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
77	BH077-0.3-0.5	soil	14/8			Jar
88	BH077-0.5-0.7					
89	BH077-1.0-1.2					
90	BH077-1.5-1.7					
91	BH084-1.0-1.2		15/8			Jar
92	BH084-1.5-1.7					
93	BH078-0.3-0.5		14/8			Jar
94	BH078-1.0-1.2					
95	BH078-1.5-1.7					

EG0085T (Al)	EG0005T (As Sb)	EG0035T (Hg)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EN 33 (TCLP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold
✓	✓		✓	✓	✓	✓	✓	✓				✓	
✓	✓		✓	✓	✓	✓	✓	✓				✓	
✓	✓		✓	✓	✓	✓	✓	✓				✓	
✓	✓		✓	✓	✓	✓	✓	✓				✓	
	✓	✓		✓	✓	✓						✓	
	✓	✓		✓	✓	✓						✓	
✓	✓		✓	✓	✓	✓						✓	
✓	✓		✓	✓	✓	✓						✓	
✓	✓		✓	✓	✓	✓						✓	

RELINQUISHED BY:

RECEIVED BY:

METHOD OF SHIPMENT

Name: J. Simkus

Date: 21/8/12

Name: D. ...

22/8

Of: GHD

Time:

Of: A. ...

0800

Name:

Date:

Name:

Con' Note No:

Of:

Time:

Of:

Transport Co:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved;

V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;

Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

AUSTRALIAN LABORATORY SERVICES P/L

COC Page 10 of 15



## CHAIN OF CUSTODY DOCUMENTATION

**ANALYSIS REQUIRED** including **SUITES** (note - suite codes must be listed to attract suite prices)

Notes: e.g. Highly contaminated samples  
e.g. "High PAHs expected".  
Extra volume for QC or trace LORs etc.

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
103	SPO1A	soil	11/8		Jar <del>ANALY</del>	
104	SPO1B	↓	↓		Jar + Bag	
105	SPO2	↓	↓		↓	
106	SPO3	↓	↓		↓	
107	SPDUO1	↓	↓		↓	
108	PA01	Frag	↓		Bag	
109	PA02	↓	↓		↓	
110	PA03	↓	↓		↓	
111	BRICK01	↓	↓		↓	*
112	BRICK02	↓	↓		↓	*

#### METHOD OF SHIPMENT

Of:

Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

COC Page 12 of 15

PASS

CHAIN OF CUSTODY DOCUMENTATION										 <b>Australian Laboratory Services Pty Ltd</b>																															
CLIENT: GHD					SAMPLER: J. Simkus																																				
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW					MOBILE: 0404542354																																				
PROJECT MANAGER (PM): Ben Luffman					PHONE: 0266505600																																				
PROJECT ID: 2216251					EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com																																				
SITE: Hillside Dr, Urunga					P.O. No.:					EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com																															
RESULTS REQUIRED (Date): standard					QUOTE NO.: SY/270/12					ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)																															
<b>FOR LABORATORY USE ONLY</b> COOLER SEAL (circle appropriate) Intact: Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> SAMPLE TEMPERATURE CHILLED: Yes <input type="checkbox"/> No <input type="checkbox"/>			<b>COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:</b>  			<table border="1" style="width:100%; border-collapse: collapse; font-size: 8px;"> <tr> <td style="width: 3.33%;">EG0085T (Al)</td> <td style="width: 3.33%;">EG005T (As, Sb)</td> <td style="width: 3.33%;">EG035T (Hg)</td> <td style="width: 3.33%;">S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))</td> <td style="width: 3.33%;">EK026 (CN)</td> <td style="width: 3.33%;">EN33 (TCLP for metals)</td> <td style="width: 3.33%;">EN60 (ASLP for metals)</td> <td style="width: 3.33%;">EP003 (TOC)</td> <td style="width: 3.33%;">ED007 (CEC)</td> <td style="width: 3.33%;">EA150/150-H (PSA)</td> <td style="width: 3.33%;">EA037 (ASS field screen)</td> <td style="width: 3.33%;">EA028 (SPOCAS)</td> <td style="width: 3.33%;">EA002 (pH (1-5))</td> <td style="width: 3.33%;">Hold</td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>						EG0085T (Al)	EG005T (As, Sb)	EG035T (Hg)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EN33 (TCLP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA028 (SPOCAS)	EA002 (pH (1-5))	Hold															Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.	
EG0085T (Al)	EG005T (As, Sb)	EG035T (Hg)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EN33 (TCLP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA028 (SPOCAS)	EA002 (pH (1-5))	Hold																												
SAMPLE INFORMATION (note: S = Soil, W = Water)					CONTAINER INFORMATION																																				
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles																																			
413	BH001-0.0-0.2	S				Bag																																			
114	BH001-0.7-0.9																																								
115	BH001-1-1.2																																								
116	BH002-1.0-1.2																																								
117	BH002-1.2-1.4																																								
118	BH003-0.5-0.7																																								
119	BH003-1.0-1.2																																								
120	BH011-0.1-																																								
121	BH011-0.3																																								
122	BH011-0.5																																								
123	BH020-0.0-0.2																																								
124	BH020-0.3-0.5																																								
RELINQUISHED BY:					RECEIVED BY:					METHOD OF SHIPMENT																															
Name: J. Simkus			Date: 21/8/12		Name: David			Date: 22/8			Con' Note No:																														
Of: GHD			Time:		Of: DLP			Time: 0800																																	
Name:			Date:		Name:						Transport Co:																														
Of:			Time:		Of:																																				
<b>Water Container Codes:</b> P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.																																									

PASS

## CHAIN OF CUSTODY DOCUMENTATION

CLIENT: GHD						SAMPLER: J. Simkus						 Australian Laboratory Services Pty Ltd									
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW						MOBILE: 0404542354															
PROJECT MANAGER (PM): Ben Luffman						PHONE: 0266505600															
PROJECT ID: 2216251						EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com															
SITE: Hillside Dr, Urunga P.O. NO.:						EMAIL INVOICE TO: (if different to report) - ben.luffman@ghd.com															
RESULTS REQUIRED (Date): standard QUOTE NO.: SY270/12						ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)															
FOR LABORATORY USE ONLY COOLER SEAL (circle appropriate) Intact: Yes No N/A SAMPLE TEMPERATURE CHILLED: Yes No						COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL: Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.															
SAMPLE INFORMATION (note: S = Soil, W = Water)						CONTAINER INFORMATION															
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG008ET (Al)	EG005T (As, Sb)	EG035T (Hg)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EN 33 (TCLP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold	
122	BH020-1.0-1.2	S				Bag															✓
121	BH028-0.3-0.5																				
127	BH028-0.8-1.0																				
129	BH029-0.5-0.7																				
124	BH039-0.5-0.7																				
120	BH046-0.5-0.7																				
121	BH047-0.0-0.2																				
122	BH022-0.5-0.7																				
123	BH050-0.2-0.4																				
124	BH052-0.0-0.2																				
125	BH052-0.5-0.7																				
126	BH052-1.8-2.8																				
RELINQUISHED BY:						RECEIVED BY:						METHOD OF SHIPMENT									
Name: J. Simkus			Date: 21/8/12			Name: David			Date: 22/8			Con' Note No:									
Of: GHD			Time:			Of: DJ			Time: 0800			Transport Co:									
Name:			Date:			Name:			Date:												
Of:			Time:			Of:			Time:												
Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.																					

AUSTRALIAN LABORATORY SERVICES P/L

COC Page 14 of 15

CHAIN OF CUSTODY DOCUMENTATION										 <b>Australian Laboratory Services Pty Ltd</b>									
CLIENT: GHD					SAMPLER: J. Simkus														
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW					MOBILE: 404542354														
PROJECT MANAGER (PM): Ben Luffman					PHONE: 266505600														
PROJECT ID: 2216251					EMAIL: ben.luffman@ghd.com, brian.cork@ghd.com														
SITE: Hillside Dr, Urunga					P.O. NO.:														
RESULTS REQUIRED (Date): standard					QUOTE NO.: SY270/12					ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)									
<b>FOR LABORATORY USE ONLY</b> COOLER SEAL (circle appropriate) Intact: Yes No N/A SAMPLE TEMPERATURE CHILLED: Yes No			<b>COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:</b>			Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.													
<b>SAMPLE INFORMATION (note: S = Soil, W = Water)</b>			<b>CONTAINER INFORMATION</b>																
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG0085T (A)	EG005T (Sb)	S-2 (Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Hg))	EK026 (CN)	EG005-SDH (Hd extractable metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA028 (SPOCAS)	EA002 (pH (1:5))	Hold	
137	BH054-2.0-2.2	S				Bag													✓
138	BH052-2.3-2.5																		
139	SE001-0.4																		
140	SE014-0.4																		
	<del>SE016-0.4</del>																		
141	SE021-0.4																		
142	SE050-0.5																		
143	SEDUP04																		Δ
RELINQUISHED BY:					RECEIVED BY:					METHOD OF SHIPMENT									
Name: J. Simkus			Date: 21/8/12		Name: David			Date: 22/8		Con' Note No:									
Of: GHD			Time:		Of: ALS			Time: 0800											
Name:			Date:		Name:			Date:		Transport Co:									
Of:			Time:		Of:			Time:											
<b>Water Container Codes:</b> P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.																			

**AUSTRALIAN LABORATORY SERVICES P/L**

COC Page 15 of 15

# CHAIN OF CUSTODY DOCUMENTATION

CLIENT: GHD

ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW

PROJECT MANAGER (PM): Ben Luffman

PROJECT ID: 2216251

SITE: Hillside Dr, Urunga

P.O. NO.:

RESULTS REQUIRED (Date): standard

QUOTE NO.: SY270/12

SAMPLER: J. Simkus

MOBILE: 404542354

PHONE: 266505600

EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com

EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com



Australian Laboratory Services Pty Ltd

FOR LABORATORY USE ONLY

COOLER SEAL (circle appropriate)

Intact: Yes No N/A

SAMPLE TEMPERATURE

CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

Notes: e.g. Highly contaminated samples  
e.g. "High PAHs expected".  
Extra volume for QC or trace LORs etc.

SAMPLE INFORMATION (note: S = Soil, W = Water)

CONTAINER INFORMATION

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
1	BH032_0.3-0.5	S	14/8/12			jar
2	BHDUP01	S	"			
3	BH012_0.0-0.1	S	16/8/12			
4	BHDUP08	S	"			
5	BH073_1.0-1.2	S	15/8/12			
6	BH077_0.0-0.2	S	14/8/12			
7	BH077_2.0-2.2	S	"			
8	BH101_0.0-0.2	S	16/8/12			
9	BH022_0.5-0.7	S	"			
10	BH028_0.0-0.2	S	"			
11	BH028_0.3-0.5	S	"			
12	BH020_0.0-0.2	S	"			

EG035F (Hg)	EG020F Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Al, Sb, Fe)	EK026 (CN)	EN 33 (TCLP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (OEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1.5))	Hold
x			x								
x			x								
x			x								
x			x								
x			x								
x			x								
x			x								
x			x								
x			x								
x			x								
x			x								
x			x								

Environmental Division  
Sydney  
Work Order  
**ES1223062**



Telephone: +61-2-8784 8555

RELINQUISHED BY:

RECEIVED BY:

METHOD OF SHIPMENT

Name: B. Cork

Date: 25/09/2012

Name: Frank

26-9-12

Of: GHD

Time: 14:00

Of: ALS

0810

Name:

Date:

Name:

Of:

Time:

Of:

Con' Note No:

Transport Co:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved;

V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;

Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

AUSTRALIAN LABORATORY SERVICES P/L

COC Page ___ of ___

# CHAIN OF CUSTODY DOCUMENTATION

CLIENT: GHD

ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW

PROJECT MANAGER (PM): Ben Luffman

PROJECT ID: 2216251

SITE: Hillside Dr, Urunga

P.O. NO.:

RESULTS REQUIRED (Date): standard

QUOTE NO.: SY/270/12

SAMPLER: J. Simkus

MOBILE:

404542354

PHONE

266505600

EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com

EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com



Australian Laboratory Services Pty Ltd

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY

COOLER SEAL (circle appropriate)

Intact: Yes No N/A

SAMPLE TEMPERATURE

CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

Notes: e.g. Highly contaminated samples  
e.g. "High PAHs expected".  
Extra volume for QC or trace LORs etc.

SAMPLE INFORMATION (note: S = Soil, W = Water)

CONTAINER INFORMATION

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
13	SE014_0.2-0.4	S	15/8/12			Jar
14	SE067_0.0-0.1	S	"			
15	SE068_0.0-0.1	S	"			
16	SE064_0.2-0.3	S	"			
17	SE001_0.4-0.6	S	14/9/12			
18	SE042_0.2-0.4	S	"			
19	SE041_0.0-0.05	S	"			
20	SE041_0.1-0.3	S	"			
21	SE050_0.4-0.6	S	15/8/12			
22	SE032_0.0-0.1	S	14/8/12			
23	SEDUP01	S	"			
24	SEDUP02	S	15/8/12			

EG035F (Hg)	EG035F Metals Suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Al, Sb, Fe)	EK026 (CN)	EN 33 (TCLP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold
x			x								
x			x								
x			x								
x			x								
x			x								
x			x								
x			x								
x			x								
x			x								
x			x								
x			x								
x			x								
x			x								

RELINQUISHED BY:

RECEIVED BY:

METHOD OF SHIPMENT

Name: B. Cork

Date: 25/09/2012

Name: Frank

26-9-12

Con' Note No:

Of: GHD

Time: 14:00

Of: AL

0810

Name:

Date:

Name:

Transport Co:

Of:

Time:

Of:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved;

V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;

Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

# CHAIN OF CUSTODY DOCUMENTATION



Australian Laboratory Services Pty Ltd

CLIENT: GHD  
 ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW  
 PROJECT MANAGER (PM): Ben Luffman  
 PROJECT ID: 2216251  
 SITE: Hillside Dr, Urunga  
 RESULTS REQUIRED (Date): standard

SAMPLER: J. Simkus  
 MOBILE: 404542354  
 PHONE: 266505600  
 EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com  
 EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com  
 ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

FOR LABORATORY USE ONLY		COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:
COOLER SEAL (circle appropriate)		
Intact:	Yes No N/A	
SAMPLE TEMPERATURE		
CHILLED: Yes No		

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION	
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
15	SE003_0.2-0.4	S	16/8/12		Jar	
26	SE002_0.5-0.7	S	14/8/12			
27	SE011_0.7-0.9	S	"			
28	SE004_0.2-0.3	S	16/8/12			
29	SE004_0.4-0.6	S	"			
30	SE033_0.0-0.05	S	15/8/12			
31	SE033_0.2-0.4	S	"			
32	SE033_0.4-0.6	S	"			
33	SE063_0.0-0.1	S	"			
34	SE063_0.2-0.3	S	"			
35	SE063_0.4-0.6	S	"			

EQ035F (Hg)	EQ020F Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Al, Sb, Fe)	EK026 (CN)	EN 33 (ICLP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1.5))	Hold
							X				
							X				
							X				
							X				
							X				
							X				
							X				
							X				
							X				
							X				
							X				
							X				

Notes: e.g. Highly contaminated samples e.g. "High PAHs expected".  
 Extra volume for QC or trace LORs etc.

RELINQUISHED BY:		RECEIVED BY:		METHOD OF SHIPMENT
Name: B. Cork	Date: 25/09/2012	Name: Frank	26-9-12	Con' Note No:
Of: GHD	Time: 14:00	Of: ALS	0810	
Name:	Date:	Name:		Transport Co:
Of:	Time:	Of:		

**Water Container Codes:** P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved;  
 V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;  
 Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

# CHAIN OF CUSTODY DOCUMENTATION

CLIENT: GHD  
 ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW  
 PROJECT MANAGER (PM): Ben Luffman  
 PROJECT ID: 2216251  
 SITE: Hillside Dr, Ununga P.O. NO.:  
 RESULTS REQUIRED (Date): standard QUOTE NO.: SY/270/12

SAMPLER: J. Simkus  
 MOBILE: 404542354  
 PHONE: 266505600  
 EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com  
 EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com  
 ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)



Australian Laboratory Services Pty Ltd

FOR LABORATORY USE ONLY  
 COOLER SEAL (time appropriate)  
 Intact: Yes No N/A  
 SAMPLE TEMPERATURE  
 CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG035F (Hg)	EG020F Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Al, Sb, Fe)	EK026 (CN)	EN 33 (TCLP for metals)	EN60 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold
--------	-----------	--------	------	------	-------------	---------------	-------------	--------------------------------------------------------------	------------	-------------------------	------------------------	-------------	-------------	-------------------	--------------------------	----------------	------------------	------

Notes: e.g. Highly contaminated samples  
 e.g. "High PAHs expected".  
 Extra volume for QC or trace LORs etc.

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
1	BH031_0.0-0.2	S	15/8/12		bag	
2	BH031_0.5-0.7	S	"			
3	BH031_1.8-2.0	S	"			
4	BH032_0.0-0.2	S	14/8/12			
5	BH032_0.3-0.5	S	"			
6	BH032_1.0-1.2	S	"			
7	SE013_0.3-0.5	S	16/8/12			
8	SE003_0.2-0.4	S	"			
9	SE031_0.5-0.7	S	14/8/12	16:00	12 -	✓

ES1220402-011																		
ES1220402-012																		
ES1220402-013																		
ES1220402-017																		
ES1220402-018																		
ES1220402-019																		
ES1220305-28																		
ES1220305-21																		
ES1220402-025																		

Already held by ALS  
 5706  
 5710-716, 760  
 5760-716, 760  
 5706

Environmental Division  
 Brisbane  
 Work Order  
**EB1225565**



Telephone: +61-7-3243 722

RELINQUISHED BY:	RECEIVED BY:	METHOD OF SHIPMENT:
Name: B. Cork	Name:	Con' Note No:
Of: GHD	Of:	
Date: 25/09/2012	Date:	
Time: 14:00	Time:	
Name:	Name:	Transport Co:
Of:	Of:	

**Water Container Codes:** P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved;  
 V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulphuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass;  
 Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bad for Acid Sulphate Soils; B = Unpreserved Bag.

# CHAIN OF CUSTODY DOCUMENTATION

CLIENT: GHD

ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW

PROJECT MANAGER (PM): Ben Luffman

PROJECT ID: 2216251

SITE: Hillside Dr, Urunga

P.O. NO.:

RESULTS REQUIRED (Date): standard

QUOTE NO.: SY/270/12

SAMPLER: J. Simkus

MOBILE: 404542354

PHONE: 266505600

EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com

EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com



Australian Laboratory Services Pty Ltd

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COOLER SEAL (circle appropriate)

Intact: Yes No NA

SAMPLE TEMPERATURE

CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

Notes: e.g. Highly contaminated samples  
e.g. "High PAHs expected".  
Extra volume for QC or trace LORs etc.

SAMPLE INFORMATION (note: S = Soil, W = Water)

CONTAINER INFORMATION

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
1	BH032_0.3-0.5	1	S			
2	BHDUP01	2	S			
3	BH012_0.0-0.1	3	S			
4	BHDUP08	4	S			
5	BH073_1.0-1.2	5	S			
6	BH077_0.0-0.2	6	S			
7	BH077_2.0-2.2	7	S			
8	BH101_0.0-0.2	8	S			
9	BH022_0.5-0.7	9	S			
10	BH028_0.0-0.2	10	S			
11	BH028_0.3-0.5	11	S			
12	BH020_0.0-0.2	12	S			

EG035F (Hg)	EG020F Metals suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Al, Sb, Fe)	EK026 (CN)	EN 33 (TCLP for metals)	EN80 (ASLP for metals)	EP003 (TOC)	ED007 (CEC)	EA150/150-H (PSA)	EA037 (ASS field screen)	EA029 (SPOCAS)	EA002 (pH (1:5))	Hold
	x										
	x										
	x										
	x										
	x										
	x										
	x										
	x										
	x										
	x										
	x										
	x										

Environmental Division  
Sydney

Work Order

**ES1223935**



Telephone : +61-2-8784 8555

RELINQUISHED BY:

RECEIVED BY

METHOD OF SHIPMENT

Name: B. Cork

Date: 25/09/2012

Name: *FAO*

8/10/12

Con' Note No:

Of: GHD

Time:

Of: *AY*

3:30pm

Name:

Date:

Name:

Transport Co:

Of:

Time:

Of:

**Water Container Codes:** P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved;

V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Special bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;

Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bad for Acid Sulphate Soils; B = Unpreserved Bag.

AUSTRALIAN LABORATORY SERVICES P/L

COC Page ____ of ____

# CHAIN OF CUSTODY DOCUMENTATION



Australian Laboratory Services Pty Ltd

CLIENT: GHD

SAMPLER: J. Simkus

ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW

MOBILE: 404542354

PROJECT MANAGER (PM): Ben Luffman

PHONE: 266505600

PROJECT ID: 2216251

EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com

SITE: Hillside Dr, Urunga

P.O. NO.:

EMAIL INVOICE TO: (if different to report) ben.luffman@ghd.com

RESULTS REQUIRED (Date): standard

QUOTE NO.: SY/270/12

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

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COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

COOLER SEAL (circle appropriate)

Intact: Yes No NA

SAMPLE TEMPERATURE

CHILLED: Yes No

SAMPLE INFORMATION (note: S = Soil, W = Water)

CONTAINER INFORMATION

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
13	SE014_0.2-0.4	S				
14	SE067_0.0-0.1	S	Empty	SW		
15	SE068_0.0-0.1	S				
16	SE064_0.2-0.3	S				
17	SE001_0.4-0.6	S				
18	SE042_0.2-0.4	S				
19	SE041_0.0-0.05	S	Empty	SW		
20	SE041_0.1-0.3	S				
21	SE050_0.4-0.6	S				
22	SE032_0.0-0.1	S	Empty	SW		
23	SEDUP01	S	Empty	SW		
24	SEDUP02	S	Empty	SW		

EG039F (Hg)

EG020F Metals Suite (As, Cd, Cr, Cu, Ni, Pb, Zn, Al, Sb, Fe)

EK026 (CN)

EN 33 (TCLP for metals)

EN60 (ASLP for metals)

EP003 (TOC)

ED007 (CEC)

EA150/150-H (PSA)

EA037 (ASS field screen)

EA029 (SPOCAS)

EA002 (pH (1:5))

Hold

Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.

RELINQUISHED BY:

RECEIVED BY

METHOD OF SHIPMENT

Name: B. Cork

Date: 25/09/2012

Name: B. Cork

9/10/12

Con' Note No:

Of: GHD

Time:

Of:

3:20pm

Name:

Date:

Name:

Transport Co:

Of:

Time:

Of:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved;

V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;

Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

**Fadi Soro**

Fadi   
8/10/12  
3:30pm

**From:** Angelene Kumar  
**Sent:** Monday, 8 October 2012 2:52 PM  
**To:** Wael Saleh; Fadi Soro  
**Cc:** Jacob Waugh  
**Subject:** FW: Additional Analysis_Urunga  
**Attachments:** COC - ALS_08_10_2012 submission.xls

**Importance:** High

Hi Fadi,

Can you please re-batch workorder ES1223062. Client requires additional analysis on a 2 day TAT.

Samples are in trays S78-S79.

Wael,

Can you please have the samples logged in for analysis of metals only for a 2 day TAT.

Thanks

*How was your customer experience? [Please send us your feedback \(click link\)](#)*

Kind regards,

**Angelene Kumar**  
PROJECT MANAGER

**ALS | Environmental Division**

**Address**  
277-289 Woodpark Road  
Smithfield, NSW, 2164

PHONE +61 2 8784 8555  
FAX +61 2 8784 8500

Winner of the inaugural CARE Award 2011 - Sustainable Technology & Innovation:  
Reduction in Sample Volumes - Improving quality, safety, efficiency and sustainability in environmental practices



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---

**From:** Brian Cork [mailto:Brian.Cork@ghd.com]  
**Sent:** Monday, 8 October 2012 11:52 AM  
**To:** Angelene Kumar  
**Subject:** Additional Analysis_Urunga

Hi Angelene,

Regarding these samples for ALSE Workorder : ES1223062. Are there enough samples left to run the standard metals suite as outlined in the attached COC?

I am just waiting to see if I have approval to run shorter turn around times.

Regards

**Brian Cork**  
**Senior Environmental Engineer**  
**GHD**

T: +61 2 6650 5666 | V: 225666 | M: +61 43903 7488 | E: [brian.cork@ghd.com](mailto:brian.cork@ghd.com)  
230 Harbour Drive, Coffs Harbour, NSW, 2450, Australia | <http://www.ghd.com/>  
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Subcon / Forward Lab / Split WO

Lab / Analysis: SGS

Organised By / Date: _____

Relinquished By / Date: _____

Connote / Carrier: _____

## CHAIN OF CUSTODY DOCUMENTATION

CLIENT: GHD

ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW

PROJECT MANAGER (PM): Ben Luffman

PROJECT ID: 2216251

SITE: Hillside Dr, Urunga

P.O. NO.:

RESULTS REQUIRED (Date): standard

QUOTE NO.: SY270/H2

FOR LABORATORY USE ONLY

COOLER SEAL (if applicable)

Intact: Yes No N/A

SAMPLE TEMPERATURE

CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

SAMPLE INFORMATION (note: S = Soil, W = Water)

CONTAINER INFORMATION

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
1	SW001	W	22/8		P, N, X, S, H	5
2	SW002					
3	SW003					
4	SW004					
5	SW005					
6	SW006					
7	SW007					
8	SW008					
9	SW009					
10	SWDUP01					

SAMPLER: J. Simkus

MOBILE: 0404542354

PHONE: 0266505600

EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com

EMAIL INVOICE TO: (if different to report) -ben.luffman@ghd.com- NTLEAP@GHD.COM

ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)

EG020F (dissolved metals  
(As, Cd, Cr, Cu, Ni, Pb, Zn, Al,  
Sb, Fe))EG020T (Total Metals)  
Same as dissolved  
plus Hg

EG025F (Hg)

EK026G (CN)

EA015H (TDS)

EA025H (TSS)

NT-1 (Major Cations)

NT-2 (Major Anions)

Hold

Notes: e.g. Highly contaminated samples  
e.g. "High PAHs expected".  
Extra volume for QC or trace LORs etc.Environmental Division  
Sydney

Work Order

ES1220550



Telephone : + 61-2-8784 8555

RELINQUISHED BY:

RECEIVED BY:

METHOD OF SHIPMENT

Name: J. Simkus

Date: 23/8

Name: D. ...

Date: 24/8

Con' Note No:

Of: GHD

Time:

Of: ALI

Time: 0930

Name:

Date:

Name:

Date:

Transport Co:

Of:

Time:

Of:

Time:

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved;

V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;

Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bad for Acid Sulphate Soils; B = Unpreserved Bag.

AUSTRALIAN LABORATORY SERVICES P/L

COC Page 1 of 2

**Australian Laboratory Services Pty Ltd**

CLIENT: GHD		SAMPLER: J. Simkus		 Australian Laboratory Services Pty Ltd
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW		MOBILE:	0404542354	
PROJECT MANAGER (PM): Ben Luffman		PHONE	0266505600	
PROJECT ID: 2216251		EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com		
SITE: Hillside Dr, Urunga	P.O. NO.:	EMAIL INVOICE TO: (if different to report) <del>ben.luffman@ghd.com</del> NTLEAP@GHD.COM		
RESULTS REQUIRED (Date): standard	QUOTE NO.: SYJ270/12	ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)		

FOR LABORATORY USE ONLY

COOLER SEAL (circle appropriate)

Intact:	Yes	No	N/A
---------	-----	----	-----

**SAMPLE TEMPERATURE**

CHILLED: Yes No

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

EG020F (dissolved metals (As, Cd, Cr, Cu, Ni, Pb, Zn, Al, Sb, Fe))

==G035F (H9)

EK026G (CN)

EA015H (TDS)

EA025H (TSS)

NT-1 (Major Cations)

NT-2 (Major Anions)

15

U

11

22

8

10

350

Notes: e.g. Highly contaminated samples  
e.g. "High PAHs expected".

Extra volume for QC or trace LORs etc.

Discussed sample GWO04 with Ben & ALS  
will only analyse dissolved metals

J.W. 24/8/11

insufficient sample...  
Metals priority, (total & dissolved)  
total not needed on 'low' samples

Hold

Please fwd to SGS for above analysis - w/ reference  
- "apply credit against invoice - \$400100799"

RELINQUISHED BY:		RECEIVED BY		METHOD OF SHIPMENT
Name: J. Simkus	Date: 23/8	Name: David	Date: 29/8	Con' Note No:
Of: GHD	Time:	Of: ALB	Time: 0930	
Name:	Date:	Name:	Date:	Transport Co:
Of:	Time:	Of:	Time:	

**Water Container Codes:** P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass; Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.

SW

CHAIN OF CUSTODY DOCUMENTATION												<b>Australian Laboratory Services Pty Ltd</b>																																
CLIENT: GHD						SAMPLER: J. Simkus																																						
ADDRESS / OFFICE: 230 Harbour Drive Coffs Harbour, NSW						MOBILE: 0404542354																																						
PROJECT MANAGER (PM): Ben Luffman						PHONE: 0266505600																																						
PROJECT ID: 2216251						EMAIL REPORT TO: ben.luffman@ghd.com, brian.cork@ghd.com																																						
SITE: Hillside Dr, Urunga P.O. NO.:						EMAIL INVOICE TO: (if different to report) <del>ben.luffman@ghd.com</del> <b>NTLEAP@GHD.COM</b>																																						
RESULTS REQUIRED (Date): standard QUOTE NO.: SY/270/12						ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)																																						
<b>FOR LABORATORY USE ONLY</b> COOLER SEAL: (circle appropriate) Intact: Yes No N/A SAMPLE TEMPERATURE CHILLED: Yes No				<b>COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:</b>   				Notes: e.g. Highly contaminated samples e.g. "High PAHs expected". Extra volume for QC or trace LORs etc.																																				
<table border="1" style="width:100%; border-collapse: collapse; font-size: 0.8em;"> <thead> <tr> <th colspan="5">SAMPLE INFORMATION (note: S = Soil, W=Water)</th> <th colspan="2">CONTAINER INFORMATION</th> <th colspan="10"></th> <th rowspan="2">Hold</th> </tr> <tr> <th>ALS ID</th> <th>SAMPLE ID</th> <th>MATRIX</th> <th>DATE</th> <th>Time</th> <th>Type / Code</th> <th>Total bottles</th> <th>EG020F (dissolved metals As, Cd, Cr, Cu, Ni, Pb, Zn, Al, Sb, Fe)</th> <th>EG020T (Total Metals)</th> <th>EG035F (Hg)</th> <th>EK026G (CN)</th> <th>EA015H (TDS)</th> <th>EA025H (TSS)</th> <th>NT-1 (Major Cations)</th> <th>NT-2 (Major Anions)</th> </tr> </thead> </table>												SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION												Hold	ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG020F (dissolved metals As, Cd, Cr, Cu, Ni, Pb, Zn, Al, Sb, Fe)	EG020T (Total Metals)	EG035F (Hg)	EK026G (CN)	EA015H (TDS)	EA025H (TSS)	NT-1 (Major Cations)	NT-2 (Major Anions)
SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION												Hold																											
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	EG020F (dissolved metals As, Cd, Cr, Cu, Ni, Pb, Zn, Al, Sb, Fe)	EG020T (Total Metals)	EG035F (Hg)	EK026G (CN)	EA015H (TDS)	EA025H (TSS)	NT-1 (Major Cations)	NT-2 (Major Anions)																														
1	SW001	W	22/8		P, N, V, S, H	5	X	X	X	X	X	X	X	X																														
2	SW002																																											
3	SW003																																											
4	SW004																																											
5	SW005																																											
6	SW006																																											
7	SW007																																											
8	SW008																																											
9	SW009																																											
10	SWDUP01																																											

Environmental Division  
Sydney  
Work Order  
**ES1220550**



Telephone : + 61-2-8784 8555

RELINQUISHED BY:				RECEIVED BY:				METHOD OF SHIPMENT	
Name: J. Simkus		Date: 23/8		Name: Da-11		Date: 24/8		Con' Note No:	
Of: GHD		Time:		Of: AL		Time: 0930			
Name:		Date:		Name:		Date:		Transport Co:	
Of:		Time:		Of:		Time:			

**Water Container Codes:** P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved;  
 V = VOA Vial HCl Preserved; VS = VOA Vial Sulphuric Preserved; SG = Sulphuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulphuric Preserved Plastic; F = Formaldehyde Preserved Glass;  
 Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag.



GHD

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Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	B. Cork	I. Gregson	<i>I. Gregson</i>	I. Gregson	<i>I. Gregson</i>	9/11/12
1	B. Cork	I. Gregson		I. Gregson		10/12/12

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## Appendix D Supplementary Investigation Report



# NSW Catchment and Lands- Crown Lands

## Former Antimony Processing Plant- Urunga NSW

### Detailed Investigation Report Addendum One- Supplementary Sampling Results

February 2013

# Executive summary

A supplementary sampling program was completed at the site of a former antimony processing facility located at Hillside Drive, Urunga, NSW to address data gaps identified in the Detailed Investigation Report (DIR) for that site. The data was to assist in the definition of the area requiring remediation and the development of the Remediation Action Plan.

The investigation incorporated data from the DIR and a field investigation comprising an additional ten soil and 14 sediment sample locations as well as samples from a soil stockpile and two solidified cores of waste concentrate (referred to as 'mercury plugs') that were identified following completion of the detailed investigation report.

Results from the supplementary sampling and analysis were used to update the Conceptual Site Model that was developed in the DIR. Changes were made regarding the horizontal extent of the impact on the soil such that it:

- Includes moderate impact downgradient of the 'mercury plugs'.
- Includes a portion of the vegetated area between the former ore stockpile area and the tailings area.
- Does not extend beyond the boundary fence to the west of the former processing facility.
- Extends approximately 30 m west of the site boundary, south of the former processing area, but is not fully delineated in the south western portion of the site.

Changes to the CSM were made regarding the extent of the impact on the sediment such that it:

- Extends further to the south east of the tailings deposit than interpreted in the DIR.
- Shows impact in the base of the 'L' Shaped canal to be generally less than that outside of the canal.
- Is of a similar area but of a lesser magnitude in the area to the east of the 'L Shaped' canal than interpreted in the DIR.

Revised estimates of the volumes of impacted soil and sediment were as follows:

**Soil** (adopted assessment criteria 310 mg/kg antimony, 200 mg/kg arsenic)

- 5,800 m³ exceeding 30 times the adopted assessment criteria.
- 14,000 m³ (encompassing the volumes above) exceeding 10 times the adopted assessment criteria.
- 28,300 m³ (encompassing the volumes above) exceeding the adopted assessment criteria.

**Sediment** (adopted assessment criteria 25 mg/kg antimony, 70 mg/kg arsenic)

- 2,600 m³ exceeding 30 times the adopted assessment criteria.
- 4,600 m³ (encompassing the volumes above) exceeding 10 times the adopted assessment criteria.
- 10,200 m³ (encompassing the volumes above) exceeding the adopted assessment criteria.

Results from the stockpile (Stockpile 4) indicated relatively minor exceedances of the adopted health based assessment criteria for antimony and arsenic only.

Results from the two 'mercury plugs' indicated significantly elevated concentrations of antimony (up to 41,900 mg/kg), mercury (up to 5,840 mg/kg) and arsenic (up to 1,660 mg/kg).

# Abbreviations

As	Arsenic
CN	Cyanide
CSM	Conceptual Site Model
Cr	Chromium
Cu	Copper
DIR	Detailed Investigation Report
DIR-SS	Detailed Investigation Report- Supplementary Sampling
DQO	Data Quality Objectives
EIL	Environmental Investigation Level
EPA	NSW Environment Protection Authority
EQL	Estimated Quantitation Limit
Hg	Mercury
HIL	Health Investigation Level
ISQG	Interim Sediment Quality Guideline
m	Metres
mbgs	Metres below ground surface
mg/kg	Milligrams per Kilogram
µg/L	Micrograms per Litre (generally equivalent to parts per billion)
NATA	National Association of Testing Authorities
NSW	New South Wales
OH&S or OHS	Occupational Health and Safety
Pb	Lead
PIR	Preliminary Investigation Report
PQL	Practical Quantitation Limit
RPD	Relative Percent Difference
QA	Quality Assurance
QC	Quality Control
RAP	Remediation Action Plan
Sb	Antimony
SCS	Soil Conservation Service
USCS	Unified Soil Classification System

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# 1. Introduction

## 1.1 Background

The Soil Conservation Service (SCS) has been engaged by NSW Catchment & Lands - Crown Lands (Crown Lands) to project manage the rehabilitation of a former antimony processing facility located at Hillside Drive, Urunga, NSW (the Site). GHD Pty Ltd (GHD) has been engaged to undertake a series of tasks relating to that project including

- A Preliminary Investigation Report (PIR), which has previously been completed¹ and included a data gap analysis and proposed Sampling Analysis and Quality Plan.
- A Detailed Investigation Report (DIR), which has previously been completed².
- A Remediation Action Plan (RAP).

Following a review of the DIR, additional sampling requirements were identified as outlined in Section 1.2 below. Those requirements have been addressed in this Detailed Investigation Report- Supplementary Sampling (DIR-SS) Report which is presented as an addendum to the DIR.

## 1.2 Scope and Objectives

The scope of the DIR-SS was defined in a proposal approved by the SCS (GHD 2012c) and is outlined in Section 2 below. The specific objectives of the DIR-SS were to:

- Address data gaps identified in the DIR. These included additional sampling points to define the extent and distribution of contaminants (as shown in Table 1).
- Provide an analysis of an additional soil stockpile and 'mercury plugs' identified after the completion of the DIR.
- Refine the Conceptual Site Model (CSM) developed in the DIR.

This report provides supplementary data for the DIR and assists in the definition of the area requiring remediation and the development the RAP.

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¹ GHD 2012a. Former Antimony Processing Plant- Urunga, NSW. Preliminary Investigation Report. Prepared for NSW Catchment and Lands- Crown Lands, July 2012. GHD reference 2216251/15184

² GHD 2012b. Former Antimony Processing Plant- Urunga, NSW. Detailed Investigation Report. Prepared for NSW Catchment and Lands- Crown Lands, December 2012. GHD reference 2216251/15352

## 2. Detailed Investigation- Supplementary Sampling Methodology

The DIR-SS methodology was based on that used in the DIR, which was reviewed and approved by the NSW Environmental Protection Authority (EPA). A summary of the rationale and details of the sampling are provided in the following subsections.

### 2.1 Sampling Locations

#### 2.1.1 Soil and Sediment

Ten soil and 14 sediment boreholes were advanced to enable an additional assessment of soil and sediment lithology and chemical parameters. Rationales for sampling locations are presented in Table 1. Generally, locations were selected to provide supplementary data to better delineate the impacted areas and provide a sampling density suitable for calculating impacted soil and sediment volume data required for the RAP. Soil and sediment sampling locations are presented in Figures 1 to 5, Appendix A.

**Table 1 Supplementary Sampling Location Rationale**

Area Description	Area Characteristics	Supplementary Sampling Locations
Between former ore stockpile and process areas	Limited data. Lack of vegetation suggests significant impact.	BH007
South west of processing plant and tailings area.	Little data regarding impact on neighbouring property and south western boundary. Assessment of soil in the vicinity of the 'mercury plugs' required to assess migration of contaminants.	BH102, BH103, BH104, BH105, BH106, BH107
Vegetated area between ore stockpile area and tailings area.	Dense vegetation, no indication of impact. Limited sampling.	BH085, BH086, BH087
Extremity of wetland to south east of tailings deposit.	Limited data. Significant impact exceeding 30 x sediment criteria in central area but vegetation does not show significant impact. Further delineation of extent and degree of contamination to assess remediation requirements.	SE015, SE023, SE024, SE035, SE036, SE045, SE103, SE104,
Wetland east of 'L Shaped' canal.	Limited data. Significant impact exceeding 30 x sediment criteria noted but vegetation does not show significant impact.	SE069, SE070, SE072
Base of 'L Shaped' canal	Little data. Significant depth likely to limit potential exposure. Further delineation of extent and degree of contamination to assess remediation requirements.	SE034, SE044. SE071

#### 2.1.2 Stockpile

Two samples were taken from soil stockpile of unknown origin (SP004) to assess the levels of contamination within the stockpile which may govern the remediation options.

### 2.1.3 Mercury Plugs

Three samples were taken from two solidified cores of waste concentrate (referred to as 'mercury plugs') identified following the completion of the DIR to assess the levels of contaminants which may govern disposal options.

## 2.2 Sampling Methodology

### 2.2.1 General

All site work during the supplementary sampling program was completed by GHD staff on December 10 to 12, 2012. Sampling methodology as outlined in the DIR was followed during the DIR-SS including:

- Health, Safety and Environment.
- Underground service location.
- Sample location recording.
- Field documentation.
- Equipment calibration.
- Photographic records.
- Quality assurance and quality control protocols.
- Sample handling, labelling and chain of custody.

No field analysis was conducted.

### 2.2.2 Soil

Soil boreholes were advanced using a hand auger. Sampling was conducted as follows:

- Boreholes were advanced to the proposed investigation depth.
- Samples were collected from each discrete strata unit.
- Soils were logged according to the Unified Soil Classification System (USCS), making observations of evidence of contamination (staining or odours), as appropriate.

Borehole logs were prepared for each soil borehole location showing lithology, moisture content, sampling depths and final depth. Borelogs are presented in Appendix D.

Upon completion of drilling, the boreholes were backfilled with soil cuttings, generally replaced in the same depth order as excavated. Care was taken to avoid backfilling uncontaminated portions of the borehole with any cuttings that were potentially contaminated.

### 2.2.3 Sediment

Sediment samples were collected using a specifically designed, sediment sampling, push tube device which was operated from a canoe or by foot (using waders). Sample cores were divided according to observable characteristics with depth, to allow separate analysis and assessment of shallower and deeper sediments and any underlying residual soils (if present).

### 2.2.4 Stockpile

The stockpile was sampled using a hand auger, following similar protocols to that used for the soil sampling. Two samples were taken from one location, in the centre of the stockpile, near surface and from material from further within the stockpile. The stockpile measured approximately 4 x 3 x 0.7 m.

### 2.2.5 Mercury Plugs

Samples were collected from each of the 'mercury plugs' using a hammer. Samples were collected that had minimal exposure to air. Deeper samples were not taken due to Health and Safety concerns.

## 2.3 Analytical Schedule

The analytical schedule used in the DIR-SS is presented in Table 2.

Table 2 Analytical Schedule

Sampling area/ sample name	Analysis	Rationale
Soil boreholes (BH007, BH085, BH086, BH087, BH102, BH104, BH106, BH107)	Sb, As	Identified, indicator contaminants of concern from DIR.
Soil boreholes (BH103, BH105)	Sb, As, Al, Cd, Cr, Cu, Fe, Pb, Hg, Ni, Zn	Identified, indicator contaminants of concern from DIR plus additional metals due to proximity to 'mercury plugs'.
Sediment boreholes (SE015, SE023, SE024, SE034, SE035, SE036, SE044, SE045, SE069, SE070, SE071, SE072, SE103, SE104)	1M HCl Extractable Sb and As.	Identified, indicator contaminants of concern from DIR. Extractable metals deemed to provide greatest assessment of ecological impact.
Stockpile (SP004)	Sb, As, Al, Cd, Cr, Cu, Fe, Pb, Hg, Ni, Zn	To assess the levels of contamination within the stockpile which may govern the remediation options
Mercury plugs (MP001 and MP002)	Sb, As, Al, Cd, Cr, Cu, Fe, Pb, Hg, Ni, Zn	To assess the levels contaminants within the 'mercury plugs' which may govern the disposal options.

## 2.4 Assessment Criteria

Assessment criteria outlined in the DIR were used in the DIR-SS.

## 2.5 Quality Assurance/ Quality Control

All fieldwork and laboratory analysis was conducted following the Quality Assurance/Quality Control (QA/QC) protocols outlined in the DIR with the exception of the use of rinsate sampling and trip blanks which were not used.

## 3. Supplementary Sampling Results

A summary of supplementary sampling results, along with the updated, interpreted impact extent are presented in Figures 1 to 5, Appendix A. Photographs showing site conditions during sampling are presented in Appendix B. Chemical analysis results are presented in tabular form in Appendix C. Borehole logs are presented in Appendix D. Laboratory results are presented in Appendix E.

### 3.1 Soil

#### 3.1.1 Lithology

Soil lithology was consistent with that noted in the DIR.

#### 3.1.2 Chemical Analysis

A summary of the impact of contaminants on the soil, based on the supplementary sampling results includes:

- To the west of the former processing area:
  - Where sampled (BH104, BH106, BH107), the impact does not extend beyond the boundary fence.
  - The impact along the western boundary (BH101 (from DIR), BH103, BH105) is limited to a depth of approximately 0.5 metres below ground surface (mbgs).
- In the vicinity of the 'mercury plugs' (BH103 and BH105):
  - The soil downgradient of the 'plugs' was moderately impacted by antimony and arsenic with one exceedance of the adopted assessment criteria (HIL E) for mercury (BH105), to a depth of approximately 0.3 mbgs.
- In the south western portion of the Site:
  - Impact was noted to a depth of at least 0.5 mbgs, approximately 30 m west of the Site boundary (BH102). This sample was taken at the edge of the wetland during a relatively dry period. During seasonal fluctuations, the borehole location would be inundated and hence likely subject to similar contaminant transport vectors (e.g. suspended sediment or dissolved in water) as the wetland area adjacent to the tailings deposit.
  - Further sampling would be required to delineate the extent of the impact to the soil in this area.
- In the area between the former ore stockpile area and the former processing area:
  - Impact exceeded ten times the adopted assessment criteria to a depth of approximately 0.3 mbgs (BH007).
- In the vegetated area between ore stockpile area and tailings area (former gravel processing area):
  - The extent of impact was noted to extend into the north western portion of the vegetated area (BH085 and BH086) with minor exceedances of the adopted threshold criteria.
  - The vertical extent of the impact was noted to be to approximately 0.2 mbgs.
  - The concentrations of contaminants in the south eastern portion of the vegetated area (BH030, BH087, BH041), were less than the adopted threshold criteria.

## 3.2 Sediment

### 3.2.1 Lithology

In summary, observations relating to sediment lithology include:

- Sediment lithology was generally consistent with that noted in the DIR.
- The grey layer that is interpreted to be sediment from the tailings deposit was evident in the area adjacent to the tailings deposit (SE023) but more difficult to discern with increasing distance from the tailings deposit, in all directions.
- Clay was noted at a depth of approximately 0.05 to 0.35 mbgs in the base of the 'L' Shaped canal (SE034, SE044 and SE071). The depth of water at the time of sampling, in the 'L' Shaped canal varied from approximately 2.4 to 2.7 m.

### 3.2.2 Chemical Analysis

In summary, the supplementary sampling results for antimony in the sediment showed that:

- The interpreted extent of impact in the area to the south-west of the tailing deposit (SE103 and SE104) was confirmed to be similar to that interpreted in the DIR.
- The extent of impact to the south east of the tailings deposit:
  - Was confirmed to exceed 30 times the assessment criteria to a depth of approximately 0.3 mbgs (SE023) but was found to extend further east (SE035) than interpreted in the DIR.
  - Was found to have an impact exceeding ten times the adopted assessment criteria that extended further east (SE036) than interpreted in the DIR.
  - Was found to have an interpreted impact exceeding the adopted threshold criteria that extended to the southern perimeter of the wetland (SE015, SE024, SE045). The depth of impact in this area was interpreted to be approximately 0.1 mbgs, based on samples taken during the DIR.
- The impact to the east of the 'L' Shaped canal was confirmed to exceed ten times the assessment criteria (SE069, SE070, SE072). This data also reduced the interpreted extent of the area exceeding 30 times the assessment criteria (SE062, from the DIR).
- The impact in the base of the 'L' Shaped canal (SE034, SE044, SE071) was generally less than that outside of the canal.

In summary, the supplementary sampling results for arsenic in the sediment showed that the interpreted extent of the impact in the DIR was confirmed with the exception of:

- The samples taken from the base of the 'L' Shaped canal which were less than the adopted assessment criteria.
- The area to the east of the 'L' Shaped canal which was noted to exceed the assessment criteria but be below ten times the assessment criteria.

## 3.3 Stockpile

One stockpile (Stockpile 4, photo 10, Appendix B) was identified following completion of the DIR. The stockpile measured approximately 4 x 3 x 0.7 m and contained soil material of unknown origin. The soil from the stockpile was analysed for metals. Results (Table C1, Appendix C) indicate relatively minor exceedances of the adopted assessment criteria for antimony and arsenic only. The metal concentrations and COCs in the stockpile were similar to

those found in the surrounding area, indicating the stockpile may have been created via scraping of surface material in that area.

### 3.4 Mercury plugs

Two 'mercury plugs' were identified following completion of the DIR and are shown in Photos 11 and 12, Appendix B. The 'plugs' are approximately 1.2 m in diameter and approximately 0.7 to 1.5 m in height. Anecdotal information suggests the plugs were formed by the collection of waste concentrate in steel drums or cylinders within the processing plant. The drums or steel cylinders have since corroded completely away. The location of the plugs is shown in Figure 2, Appendix A.

Analytical results, presented in Table C1, Appendix C show:

- Antimony concentrations up to 41,900 mg/kg.
- Mercury concentrations up to 5,840 mg/kg.
- Arsenic concentrations up to 1,660 mg/kg.
- Other analytes concentrations less than the adopted assessment criteria.
- Relatively consistent analyte concentrations in the four locations sampled.

As noted in Section 3.1.2, the soil downgradient of these 'plugs' was moderately impacted by antimony and arsenic with one exceedance of the adopted assessment criteria (HIL E) for mercury (BH105), to a depth of approximately 0.3 mbgs.

### 3.5 Data Quality Analysis

#### 3.5.1 Field QA/QC Programme

All fieldwork was conducted in general accordance with standard GHD Field Operation Procedure and QA/QC program used in the DIR including decontamination procedures, sample identification procedures, information requirements for soil bore logs, chain of custody information and sample duplicate frequency.

#### 3.5.2 Precision

Results for Relative Percent Differences (RPDs) between duplicate samples are presented in Table C3, Appendix C.

RPDs were less than 35% for all samples with the exception of antimony (SEDUP21) and arsenic (SEDUP20). The results were consistent with the degree of variability found in the DIR and are likely due to the non-homogenous nature of the soil and sediment.

Given the non-homogenous nature of the soil and sediment; the duplicate data indicates that the field QA/QC is of an acceptable quality for the assessment of the soil and sediment in relation to impacts from the historic site activities and the development of remediation options.

#### 3.5.3 Accuracy

The National Association of Testing Authorities (NATA) certified laboratory QA/QC sheets, as presented in Appendix E, refer to a QC program comprising the analysis of spikes, method blanks, surrogates, holding times and duplicate samples.

No QA/QC non-compliances were noted in the laboratory reports.

Based on a review of the laboratory QA / QC data, it is considered that the analytical results are reasonably representative of analyte concentrations at the time of the investigation.

## 4. Updated Conceptual Site Model

The following Updated CSM has been developed, based on information obtained from the CSM in the DIR and data obtained from the results presented in Section 0.

Details regarding the following factors were not changed from the CSM in the DIR:

- Site Description.
- Vertical extent of contamination in the soil or sediment.
- Hydrology.
- Hydrogeology.
- Groundwater and surface water contamination levels.
- Contaminants of Concern.
- Key contaminant properties.
- Contaminant media and fate.
- Exposure pathways.
- Contaminant receptors.
- Contaminant concentration/time relationship.

CSM characteristics that have been updated as a result of the supplementary investigation results are summarised in the following subsections.

### 4.1 Contaminant Delineation

The updated, interpreted extent of the contamination in the soil and sediment is presented in Figures 1 to 5, Appendix A.

Changes to the CSM were made regarding the horizontal extent of the impact on the soil such that it:

- Includes moderate impact downgradient of the 'mercury plugs'.
- Includes a portion of the vegetated area between the former ore stockpile area and the tailings area.
- Does not extend beyond the boundary fence to the west of the former processing facility.
- Extends approximately 30 m west of the site boundary, south of the former processing area, but is not fully delineated in the south western portion of the site.

Changes to the CSM were made regarding the extent of the impact on the sediment such that it:

- Extends further to the south east of the tailings deposit than interpreted in the DIR.
- Shows impact in the base of the 'L' Shaped canal to be generally less than that outside of the canal. This suggests that the canal was excavated after the main migration of impact into the wetland as previously suggested in the DIR.
- Is of a similar area but of a lesser magnitude in the area to the east of the 'L Shaped' canal than interpreted in the DIR.

## 4.2 Estimated Volume of Impacted Soil and Sediment

Based on the supplementary sampling results, updated estimated volumes of impacted soil and sediment are shown in Figures 6 and 7. As in the DIS, the results are deemed to be conservative in that the vertical extent of the impact was based on limited data (being samples that were advanced to a depth where no impact was identified) and it was assumed that contaminant impacts at the perimeter of an impacted area were at the same depth of impact noted at locations within and adjacent to that perimeter, rather than tapering up to the surface from those locations.

## 5. Conclusion

A supplementary sampling program was completed at the site of a former antimony processing facility located at Hillside Drive, Urunga, NSW to address data gaps identified in the DIR for that site. The data was to assist in the definition of the area requiring remediation and the development the RAP.

The investigation incorporated data from the DIR and a field investigation comprising an additional ten soil and 14 sediment sample locations as well as samples from a soil stockpile and two 'mercury plugs' that were identified following completion of the DIR.

Results from the supplementary sampling and analysis were used to update the CSM that was developed in the DIR. Changes were made regarding the horizontal extent of the impact on the soil such that it:

- Includes moderate impact downgradient of the 'mercury plugs'.
- Includes a portion of the vegetated area between the former ore stockpile area and the tailings area.
- Does not extend beyond the boundary fence to the west of the former processing facility.
- Extends approximately 30 m west of the site boundary, south of the former processing area, but is not fully delineated in the south western portion of the site.

Changes to the CSM were made regarding the extent of the impact on the sediment such that it:

- Extends further to the south east of the tailings deposit than interpreted in the DIR.
- Shows impact in the base of the 'L' Shaped canal to be generally less than that outside of the canal.
- Is of a similar area but of a lesser magnitude in the area to the east of the 'L Shaped' canal than interpreted in the DIR.

Revised estimates of the volumes of impacted soil and sediment were as follows:

**Soil** (adopted assessment criteria 310 mg/kg antimony, 200 mg/kg arsenic)

- 5,800 m³ exceeding 30 times the adopted assessment criteria.
- 14,000 m³ (encompassing the volumes above) exceeding 10 times the adopted assessment criteria.
- 28,300 m³ (encompassing the volumes above) exceeding the adopted assessment criteria.

**Sediment** (adopted assessment criteria 25 mg/kg antimony, 70 mg/kg arsenic)

- 2,600 m³ exceeding 30 times the adopted assessment criteria.
- 4,600 m³ (encompassing the volumes above) exceeding 10 times the adopted assessment criteria.
- 10,200 m³ (encompassing the volumes above) exceeding the adopted assessment criteria.

Results from the stockpile (Stockpile 4) indicated relatively minor exceedances of the adopted health based assessment criteria for antimony and arsenic only.

Results from the two 'mercury plugs' indicated significantly elevated concentrations of antimony (up to 41,900 mg/kg), mercury (up to 5,840 mg/kg) and arsenic (up to 1,660 mg/kg).

## 6. Limitations

This report: has been prepared by GHD for NSW Catchment and Lands- Crown Lands and may only be used and relied on by NSW Catchment and Lands- Crown Lands for the purpose agreed between GHD and the NSW Catchment and Lands- Crown Lands as set out in section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than NSW Catchment and Lands- Crown Lands arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

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The opinions, conclusions and any recommendations in this report are based on information obtained from, and testing undertaken at or in connection with, specific sample points. Site conditions at other parts of the site may be different from the site conditions found at the specific sample points.

Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

Site conditions (including the presence of hazardous substances and/or site contamination) may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating this report if the site conditions change.

This Report should be read in full and no excerpts are taken to be representative of the findings of this Report.

## 7. References

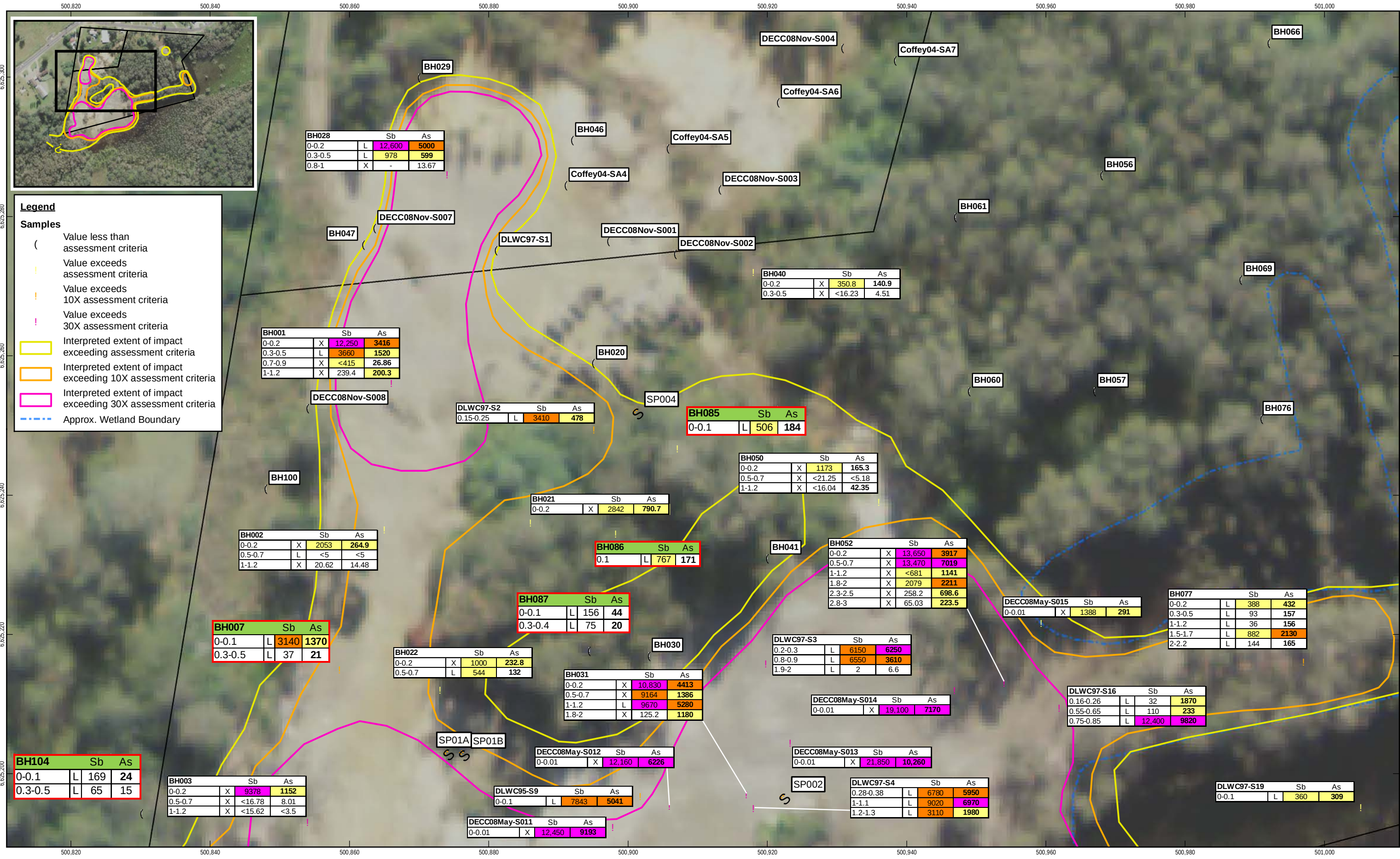
GHD 2012a. Former Antimony Processing Plant- Urunga, NSW. Preliminary Investigation Report. Prepared for NSW Catchment and Lands- Crown Lands, GHD Document 15184. July 2012.

GHD 2012b. Former Antimony Processing Plant- Urunga, NSW. Detailed Investigation Report. Prepared for NSW Catchment and Lands- Crown Lands, GHD Document 15352. December 2012.

GHD 2012c. Urunga Antimony Processing Plant Investigation and Remediation Additional Sampling and Analysis Fee Proposal, presented to Soil Conservation Service. GHD Document 15424. December 2012.

# Appendices

# Appendix A - Figures



1:500 Paper Size A3

0 2.5 5 10 15 20

Metres

Map Projection: Universal Transverse Mercator  
Horizontal Datum: GDA 1994  
Grid: GDA 1994 MGA Zone 56

0

Sample Ident. BH028

		Sb	As
0-0.2	L	12,600	5000
0.3-0.5	L	978	599
0.8-1	X	-	13.67

Sample depth

Data source X=XRF  
L=Laboratory

Antimony conc. (mg/kg)

Arsenic conc. (mg/kg)

- Value less than assessment criteria
- Value exceeds assessment criteria
- Value exceeds 10X assessment criteria
- Value exceeds 30X assessment criteria
- Supplementary sampling location
- Property Boundary

NSW Catchment and Lands - Crown Lands  
Former Antimony Processing Plant, Urunga NSW  
Supplementary Investigation Report

Soil Sampling Locations with Antimony and Arsenic Concentrations (NW Portion)

Job Number 22-16251  
Revision A  
Date 11 Feb 2013

Figure 01





1:500 Paper Size A3  
0 2.5 5 10 15 20  
Metres

Map Projection: Universal Transverse Mercator  
Horizontal Datum: GDA 1994  
Grid: GDA 1994 MGA Zone 56

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Sample Ident. **BH028**

		Sb	As
0-0.2	L	12,600	5000
0.3-0.5	L	978	599
0.8-1	X	-	13.67

Sample depth

Data source X=XRF L=Laboratory

Antimony conc. (mg/kg)

Arsenic conc. (mg/kg)

Value less than assessment criteria  
Value exceeds assessment criteria  
Value exceeds 10X assessment criteria  
Value exceeds 30X assessment criteria  
Property Boundary



NSW Catchment and Lands - Crown Lands  
Former Antimony Processing Plant, Urunga NSW  
Supplementary Investigation Report

Job Number 22-16251  
Revision A  
Date 11 Feb 2013

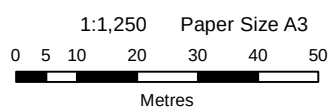
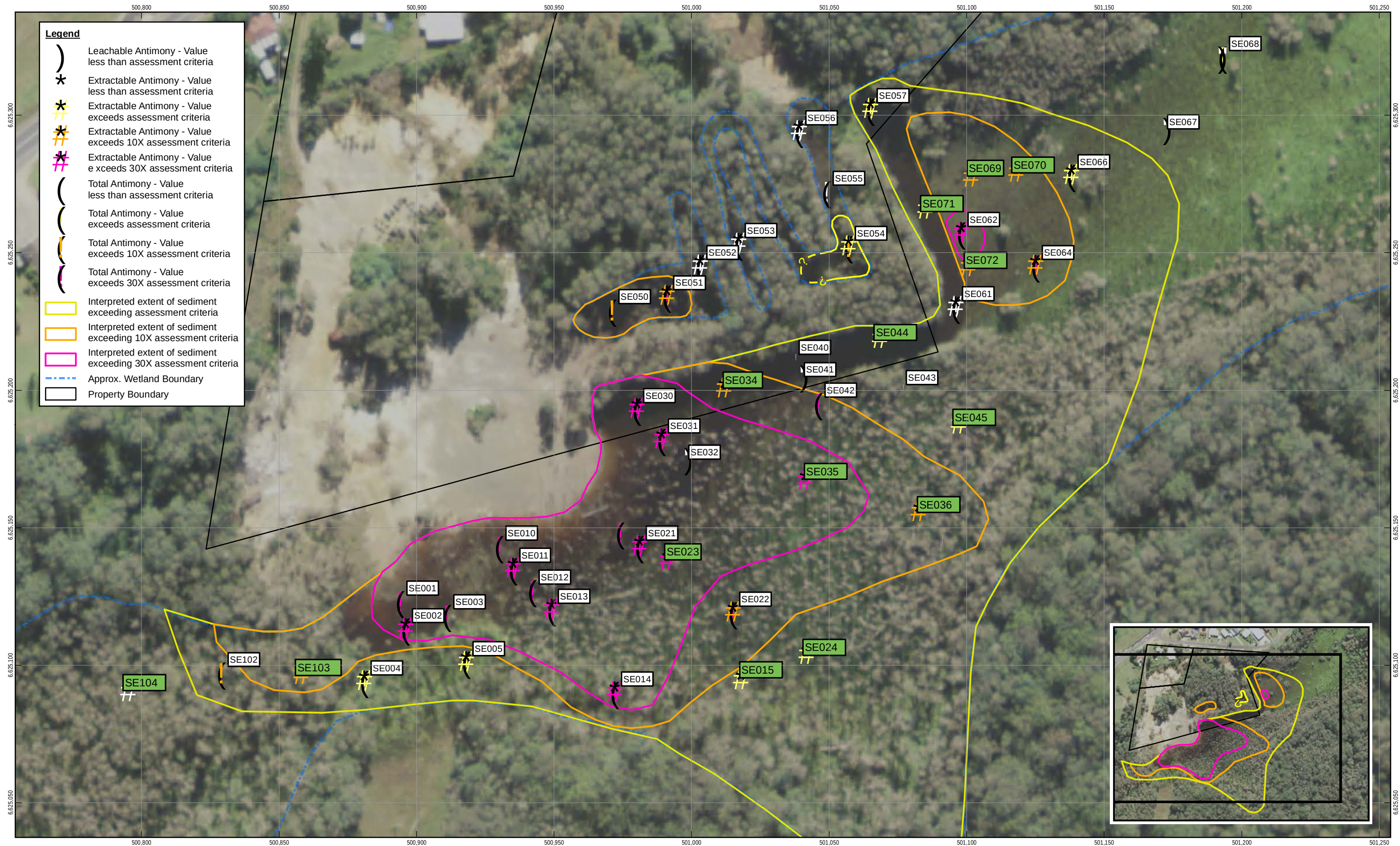
## Soil Sampling Locations with Antimony and Arsenic Concentrations (Eastern Portion) Figure 03

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Data source: DPI, Aerials, 2012, DLWC, Bores/1995,1997, Coffey, Bores/2004, DECC, Bores/2008, GHD,Bores,Wetland Boundary,(Digitized)/2012. Created by:sldouglas

230 Harbour Drive Coffs Harbour NSW 2450 T 61 2 6650 5600 F 61 2 6652 6021 E cfsmail@ghd.com W www.ghd.com.au



Map Projection: Universal Transverse Mercator  
Horizontal Datum: GDA 1994  
Grid: GDA 1994 MGA Zone 56

O

**NOTE:**  
Concentrations shown for the shallowest sample only (generally 0.0m to 0.1m)

**SE XXX** Supplementary Sediment Sampling Location



NSW Catchment and Lands - Crown Lands  
Former Antimony Processing Plant, Urunga NSW  
Supplementary Investigation Report

Job Number	22-16251
Revision	A
Date	11 Feb 2013

Sediment Antimony Concentrations

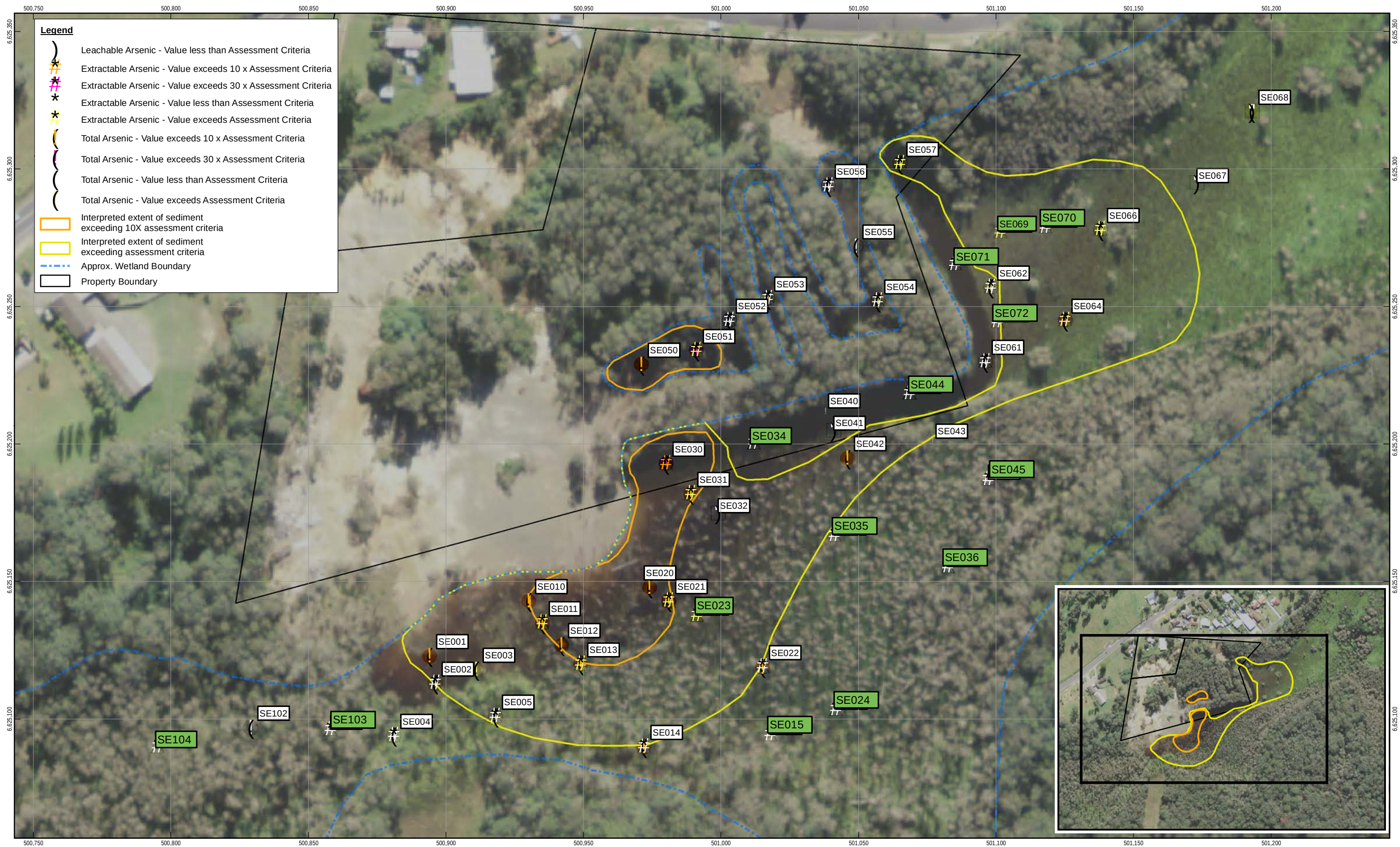
Figure 04

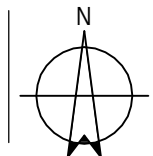
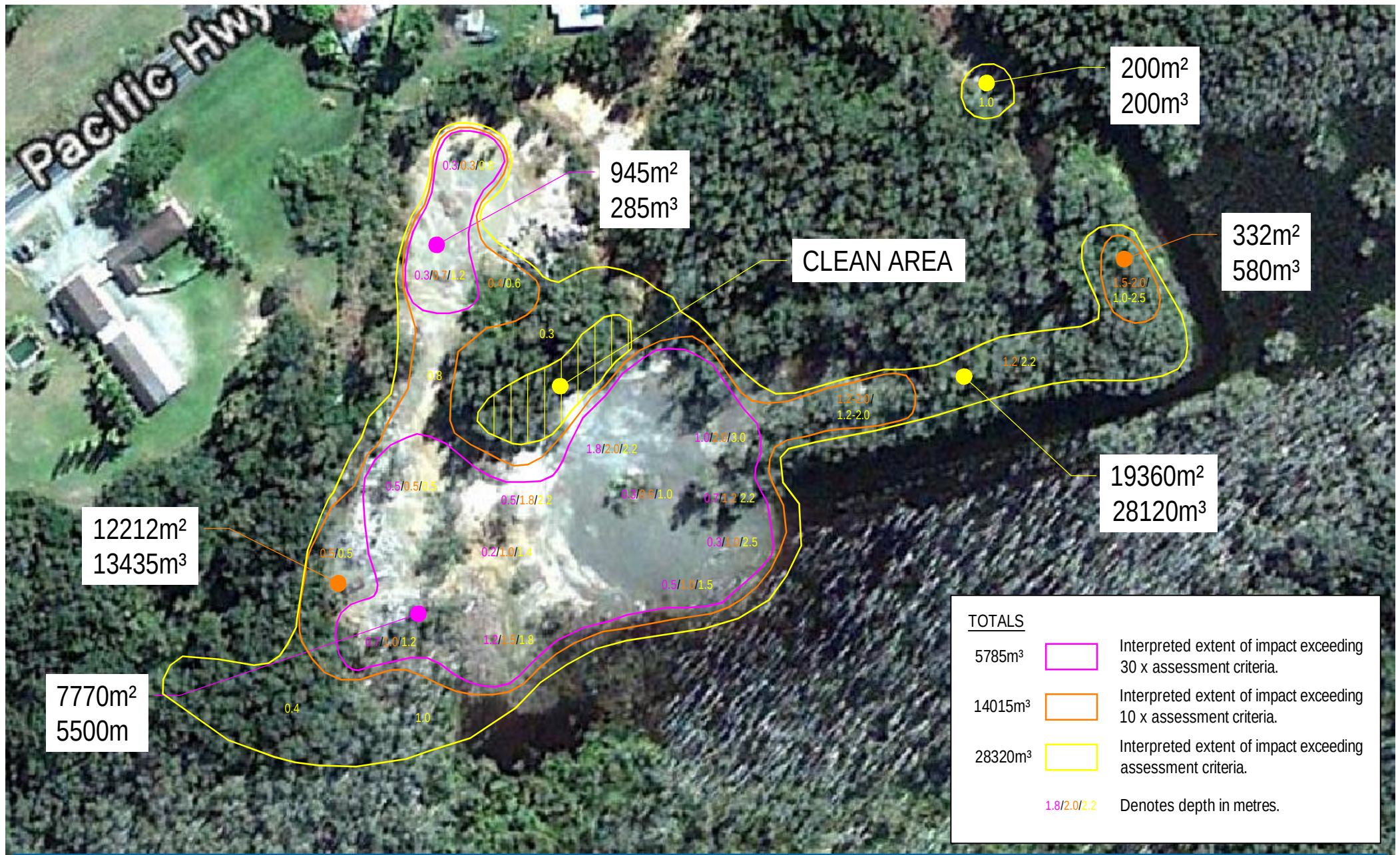
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Data source: DPI, Aerials, 2012, DWLC, Bores/1995,1997, Coffey, Bores/2004, DECC, Bores/2008, GHD,Bores,Wetland Boundary,(Digitized)/2012. Created by:sldouglas

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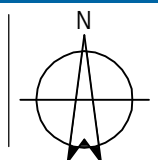
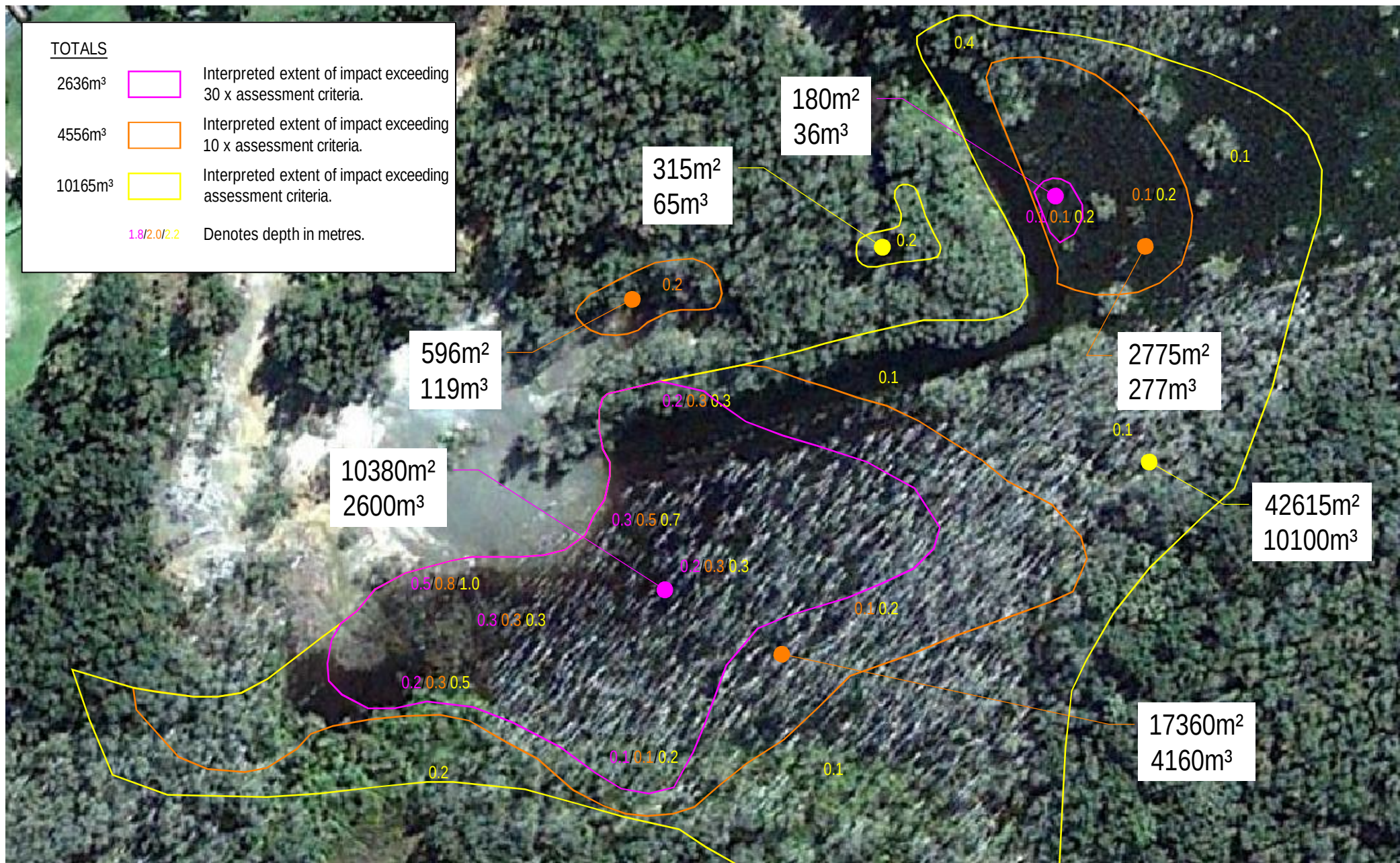




NSW Catchment & Lands - Crown Lands  
Former Antimony Processing Plant - Urunga  
Detailed Investigation Report  
**Estimated Area & Volume of  
Impacted Soil**

Job Number | 22-16251  
Revision | A  
Date | Oct 2012

**Figure 6**



NSW Catchment & Lands - Crown Lands  
Former Antimony Processing Plant - Urunga  
Detailed Investigation Report  
**Estimated Area & Volume  
of Impacted Sediment**

Job Number	22-16251
Revision	A
Date	Oct 2012

**Figure 7**

## Appendix B - Photographs



Photo 1: Site conditions during sampling, looking east across the tailings deposit



Photo 2: Looking east, along the 'L' Shaped Canal



Photo 3: South east of the 'L' Shaped canal



Photo 4: Wetland south of tailings deposit



Photo 5: Wetland east of 'L' Shaped canal



Photo 6: Sediment lithology at SE034 showing grey clay layer underlying organic matter and silty clay