



PNG LNG Project: UPSTREAM

Water and Sediment Quality Baseline

December 2008

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Document Control Information					
Date Printed	-				
Project Title	PNG LNG Project: UPSTREAM				
Project Manager	Adrian Flynn				
Job Number	CNS0801				
Report Number	CNS0801_R_3				
Document Title	Water and Sediment Quality Baseline				
Document File Name	Document Status	Originator(s)	Reviewed By	Authorised By	Date
CNS0801_R_3_US WQ Baseline_v1_SV	DRAFT	SV, AF	AF	AF	8/5/08
CNS0801_R_3_US WQ Baseline_v2_SV	DRAFT	SV, AF	AF	AF	23/6/08
CNS0801_R_3_US WQ Baseline_v3_SV	DRAFT	SV, AF	KS	SV	8/7/08
CNS0801_R_3_US WQ Baseline_v4_AF	DRAFT	AF	AF	AF	5/12/08
CNS0801_R_3_US WQ Baseline_v5_AF	FINAL	AF	AF	AF	23/12/08

Distribution			
Document File Name	Description	Issued To	Issued By
CNS0801_R_3_US WQ Baseline_v1_SV	DRAFT	Kate Sutherland	AF
CNS0801_R_3_US WQ Baseline_v2_SV	DRAFT	Kate Sutherland Carmel Coyne	AF
CNS0801_R_3_US WQ Baseline_v3_SV	DRAFT	Kate Sutherland	SV
CNS0801_R_3_US WQ Baseline_v4_AF	DRAFT	Amelia Jenkinson	AF
CNS0801_R_3_US WQ Baseline_v5_AF	FINAL	Amelia Jenkinson	AF

EXECUTIVE SUMMARY

The Papua New Guinea Liquefied Natural Gas (PNG LNG) Project involves the development of a number of gas fields and facilities in a series of development phases to produce liquefied natural gas (LNG) for export. The development will also produce condensate. The development of the Hides, Angore, and Juha gas fields and blowdown of the gas caps at the existing Kutubu, Agogo and Gobe oil fields will supply the gas resources. An extensive onshore and offshore pipeline network will enable transportation of the gas to a new LNG Plant near Port Moresby and stabilised condensate to the existing oil processing and storage, and offloading facilities at the Kutubu Central Processing Facility and Kumul Marine Terminal respectively. Small amounts of condensate are also produced at the LNG Facilities site. Esso Highlands Limited (Esso), a Papua New Guinea subsidiary of the Exxon Mobil Corporation (ExxonMobil), is the operator of the PNG LNG Project. The PNG LNG Project will be developed in five phases over a period of 10 years to ensure reliability and consistent quality of supply of LNG for over the 30-year life of the project.

The waters of the study area were generally of karstic origin. With the exception of some streams in the Tagari River catchment, the catchments were generally sparsely populated and water chemistry reflected background catchment influences, such as differing geology. Dissolved metals were generally below the detection limit, apart from manganese and aluminium. Dissolved arsenic was detected at two Baia River sites

Nutrient levels tended to be low, with elevated levels associated with sediment loads in the more turbid rivers. Higher total suspended solid concentrations at some sites were accompanied by higher total metal and higher total phosphorus concentrations. These elevated levels probably reflect the metal content of natural local geology.

Aluminium, chromium, copper, iron, nickel and zinc were detected in sediment at all sites in all areas. Arsenic was detected in all areas apart from the Hegigo River Area. Lead was detected in some sites in all study areas.

Chromium and cadmium concentrations exceeded the ANZECC/ARMCANZ (2000) low level Interim Sediment Quality Guidelines (ISQGs) at some sites in the Juha area, and nickel and arsenic concentrations at all sampled sites were elevated above the low level ISQGs. As this is a baseline study in a pristine environment, these levels probably reflect the natural geology of a mineralised area.

Mercury was detected at all but one Tagari River site, and at sites in the Juha Area. Mercury concentrations were around an order of magnitude higher than high level ISQGs at some sites in the Juha area. While there has been some gas exploration in the past in this area, it is not believed that this activity is likely to have introduced mercury to the stream beds. Further, there was no evidence of small scale mining or other activity in the area. Therefore, the high mercury concentrations in stream bed sediments appear to indicate a natural occurrence. Mercury concentrations in water were not elevated. Earthworks related to the construction of the pipeline and associated facilities at Juha have the potential to mobilise additional sediment-associated mercury to waterways, which may lead to liberation of

dissolved mercury in the waters. Further investigation of the high level mercury concentrations in the Juha area is recommended to locate the source and further inform the assessment of impacts.

This study represents a single snap-shot assessment of water and sediment quality. In the absence of climatic or river discharge data, it is not possible to confidently determine if the conditions experienced at the time of sampling represented 'median' conditions or particularly dry or wet conditions. For the purposes of the aquatic fauna impact assessment, it has been assumed that the rivers were in approximately 'median' flow conditions.

Apart from the elevated mercury concentrations in the sediment at Juha, this baseline report of water and sediment quality has not identified any particular metals or other elements of concern with respect to potential impacts of the construction and operation of the project. Metals detected in waters and sediments in the project area represent background geological concentrations and it is believed that earthworks related to the construction of the project, while potentially introducing sediment (and thus total metals) to the aquatic system, will generally not result in the significant elevation of bioavailable metals in waterways. Specifically, sediment input is of most concern for water quality in clearwater tributaries of the project area.

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1 INTRODUCTION

1.1 Background

The Papua New Guinea Liquefied Natural Gas (PNG LNG) Project involves the development of a number of gas fields and facilities in a series of development phases to produce liquefied natural gas (LNG) for export. The development will also produce condensate. The development of the Hides, Angore, and Juha gas fields and blowdown of the gas caps at the existing Kutubu, Agogo and Gobe oil fields will supply the gas resources. An extensive onshore and offshore pipeline network will enable transportation of the gas to a new LNG Plant near Port Moresby and stabilised condensate to the existing oil processing and storage, and offloading facilities at the Kutubu Central Processing Facility and Kumul Marine Terminal respectively. Small amounts of condensate are also produced at the LNG Facilities site.

Esso Highlands Limited (Esso), a Papua New Guinea subsidiary of the Exxon Mobil Corporation (ExxonMobil), is the operator of the PNG LNG Project. The PNG LNG Project will be developed in five phases over a period of 10 years to ensure reliability and consistent quality of supply of LNG for over the 30-year life of the project.

A list of the proposed developments is provided below, and Figure 1-1 shows a schematic of facilities and pipelines:

Upstream Development Components

- Hides gas field development:
 - Seven wellpads with a total of eight new wells and re-completion of two existing wells;
 - Hides gathering system including gas flowlines from new and re-completed Hides wells;
 - Hides spinline and mono-ethylene glycol (MEG) Pipeline in the same right of way (ROW);
 - Hides Gas Conditioning Plant.
 - Hides–Kutubu Condensate Pipeline in the same ROW as the LNG Project Gas Pipeline;
- Juha gas field development:
 - Three new wellpads with four new wells;
 - Juha gathering system including gas flowlines from new Juha wells;
 - Juha spines and MEG Pipeline in the same ROWs;
 - Juha Production Facility;

- Juha–Hides pipelines right of way (ROW) containing three pipelines including Juha–Hides Rich Gas Pipeline, Juha–Hides Liquids Pipeline and Hides–Juha MEG Pipeline.
- Angore gas field development:
 - Two new wellpads with two new wells;
 - Angore gathering system including gas flowlines from new Angore wells;
 - Angore spinline and Angore MEG Pipeline to Hides Gas Conditioning Plant, both in the same ROW.
- Gas from existing fields:
 - Gas treatment at the Agogo Production Facility and a new Agogo Gas Pipeline from the Agogo Production Facility to LNG Project Gas Pipeline;
 - Gas treatment at the Gobe Production Facility and a new Gobe Gas Pipeline from the Gobe Production Facility to LNG Project Gas Pipeline;
 - Gas treatment at the Kutubu Central Processing Facility and a new Kutubu Gas Pipeline from the Kutubu Central Processing Facility to the LNG Project Gas Pipeline;
 - South East Hedinia gas field development: one new wellpad and two new wells; new gathering system including gas flow lines from the South East Hedinia new wells to the Kutubu Central Processing Facility in the same ROW as the Kutubu Gas Pipeline.
- Kopi scraper station.
- LNG Project Gas Pipeline:
 - Onshore: from Hides Gas Conditioning Plant to Omati River Landfall;
 - Offshore: Omati River Landfall to Caution Bay Landfall.

LNG Facilities Development Components

- Onshore LNG Plant including gas processing and liquefaction trains, storage tanks, flare system and utilities;
- Marine facilities including jetty, LNG and condensate export berths, materials offloading facility and tug moorage.

Supporting Facilities and Infrastructure

In addition to the principal gas production, processing and transport, and LNG production and export facilities, the project will involve the following permanent infrastructure and facilities:

- New roads and upgrade of existing roads;
- New bridges and upgrade of existing bridges;
- Upgrade of two existing airfields (upstream at Komo and Tari);
- New helipads (multiple);
- New wharf and an upgrade of the existing Kopi roll-on, roll-off facility;
- Water supply systems and pipelines, wastewater and waste management facilities;
- Operations Camps (at Hides, Juha and Tari);
- A series of temporary works and access roads will also be required during the construction phase, including:
 - Construction camps (multiple);
 - Material/pipe laydown areas.

The present report deals only with the Juha to Hides and Homa deviation sections of the upstream project area. This report is designated as Hydrobiology 2008c and the downstream segment baseline water and sediment quality report is Hydrobiology 2008d. Coffey Natural Systems contracted Hydrobiology to undertake characterisation of baseline water and sediment survey in conjunction with aquatic ecological studies, and also hydrology and sediment transport surveys, for the upstream segment of the project. This characterisation baseline does not replace the need for further baseline sampling when the project definition firms and water quality monitoring as development proceeds.

1.2 Objectives

The objectives of this study were to:

- Describe the background water and sediment quality conditions of watercourses in the study area¹; and
- Where possible, use these data to assist in the assessment of aquatic fauna and habitats (handled in separate volume Hydrobiology 2008a).

¹ This information will feed into a water and sediment quality impact assessment that is being undertaken by Coffey Natural Systems.

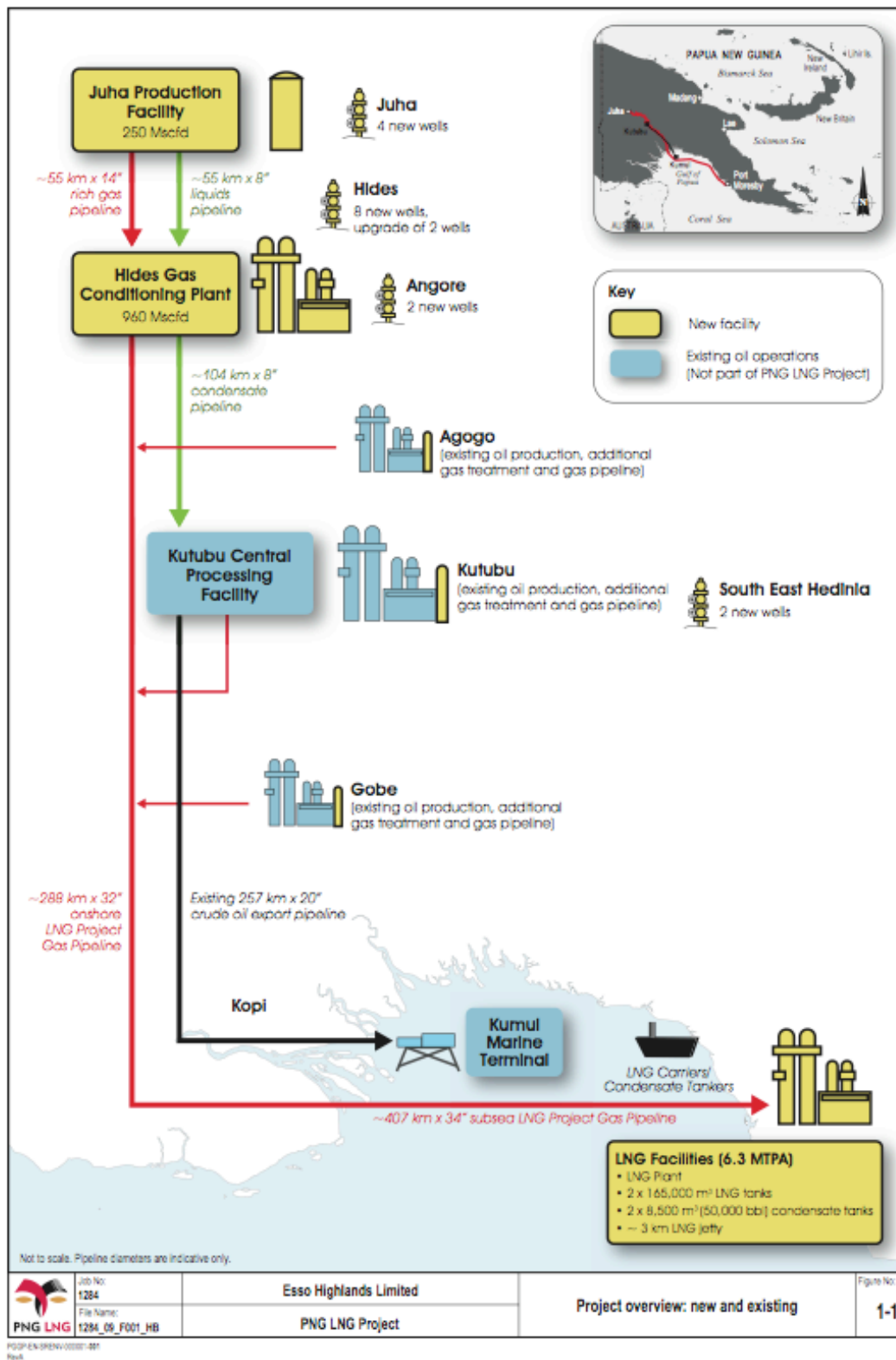


Figure 1-1 Project overview - new and existing

2 METHODS

2.1 Sampling Sites

Sampling sites for the water and sediment quality baseline were linked to the sites chosen for the broader aquatic biodiversity program (see Hydrobiology 2008a) and at sites upstream and downstream of the proposed HGCP site, as directed by Coffey Natural Systems. The sites sampled for water and sediment quality are listed in Table 2-1 and shown in Figure 2-1.

2.2 Overview of Analytes

In situ water quality measurements were taken at all water and sediment quality sites and at all aquatic biology sampling sites (see Hydrobiology 2008a).

Water quality parameters measured in water samples were:

- Dissolved (<0.45 µm) and total metals (boron, iron, selenium, aluminium, arsenic, cadmium, chromium, manganese, zinc, nickel, copper, lead, silver and mercury);
- Nutrients (total nitrogen, oxidised nitrogen (NO_x), total Kjeldahl nitrogen (TKN), and total phosphorus). Samples taken for nitrate, nitrite and filtered reactive phosphate (FRP) exceeded holding times and results from these analyses were not included in this report;
- Major anions and cations (calcium, magnesium, potassium, sodium, sulphate and chloride);
- Physical parameters (total suspended solids (TSS) and total organic carbon (TOC)); and
- Alkalinity (hydroxide alkalinity, carbonate alkalinity, bicarbonate alkalinity and total alkalinity).

Where applicable, metal data in water were compared against the *PNG Environment Act 2000* criteria in order to place results into context. Data were also compared to the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000)* (ANZECC/ARMCANZ, 2000) guidelines for the protection of freshwater aquatic ecosystems, where relevant. The values cited in the ANZECC/ARMCANZ (2000) document have been gathered from international ecotoxicity databases, and hence are indicative of potential ecotoxicological problems. Ecotoxicological guideline values from ANZECC/ARMCANZ (2000) for the protection of 99% and 95% of species in an aquatic ecosystem are used in this report to put results into context. Data is presented in Appendices 1-4.

Sediment metal concentrations (boron, iron, selenium, aluminium, arsenic, cadmium, chromium, manganese, zinc, nickel, copper, lead, silver and mercury) were measured in sediment in the <2 mm size fraction. Data were compared against ANZECC/ARMCANZ (2000) interim sediment quality guidelines (ISQGs) for the protection of freshwater aquatic ecosystems. Data are presented in Appendices 5-7.

Table 2-1 Sampling sites

Area	Site	Coordinates (WGS84)				Habitat	Water Sample	Sediment Sample
		Deg	Min	Deg	Min			
Juha	JUH2	5	54.116	142	26.073	Small creek	Y	N
Juha	JUH3	5	53.95	142	26.24	Sinkhole creek	Y	Y
Juha	JUH5	5	53.785	142	26.268	Sinkhole creek	Y	N
Juha	JUH6	5	54.384	142	26.218	Small creek	Y	Y
Juha	JUH8	5	54.14	142	25.893	Small creek	Y	Y
Juha	JUH9	5	54.218	142	26.305	Creek on line 1	N	N
Baia River	BAI1	6	1.228	142	32.844	Baia River	Y	Y
Baia River	BAI2	6	1.329	142	32.823	Swamp	Y	Y
Baia River	BAI4	6	1.171	142	33.041	Large tributary – Tikawe Ck	Y	N
Baia River	BAI5	6	1.12	142	33.037	Baia River	Y	N
Baia River	BAI6	6	1.69	142	32.289	Baia River	Y	N
Baia River	BAI7	6	1.593	142	32.535	Small creek	Y	N
Baia River	BAI8	6	1.532	142	32.642	Small creek	Y	Y
South Karius	KAR1	5	59.321	142	40.283	Baia River headwaters	Y	Y
South Karius	KAR2	5	59.454	142	40.216	Creek - tributary of Baia River	N	N
Tagari River	TAG1	5	57.29	142	48.313	Tagari R US HGCP	Y	Y
Tagari River	TAG3	5	59.702	142	51.743	Tagari R DS HGCP	Y	Y
Tagari River	TAG4	5	58.393	142	49.372	Creek draining HGCP	Y	Y
Tagari River	TAG5 b	5	59.528	142	50.39	Creek draining HGCP	Y	Y
Tagari River	TAG6	5	59.862	142	51.215	Timalia River	Y	Y
Tagari River	TAG7	5	56.506	142	47.144	Control creek	Y	Y
Hegigio River	HEG1	6	4.938	142	56.166	Hegigio River	Y	N
Hegigio River	HEG2	6	12.329	143	0.808	Hegigio River	Y	N
Hegigio River	H16	6	5.025	142	58.395	Bocari River	Y	Y
Hegigio River	H17	6	7.167	143	0.882	Moruba River	Y	Y
Hegigio River	H18	6	9.887	143	3.284	Creek on Homa-Idauwi deviation	Y	N
	Sediment samples collected, but not analysed. Samples on hold at laboratory							

Note: KAR2 and JUH9 were part of the biological survey, and only in-situ water quality measurements were taken at these sites

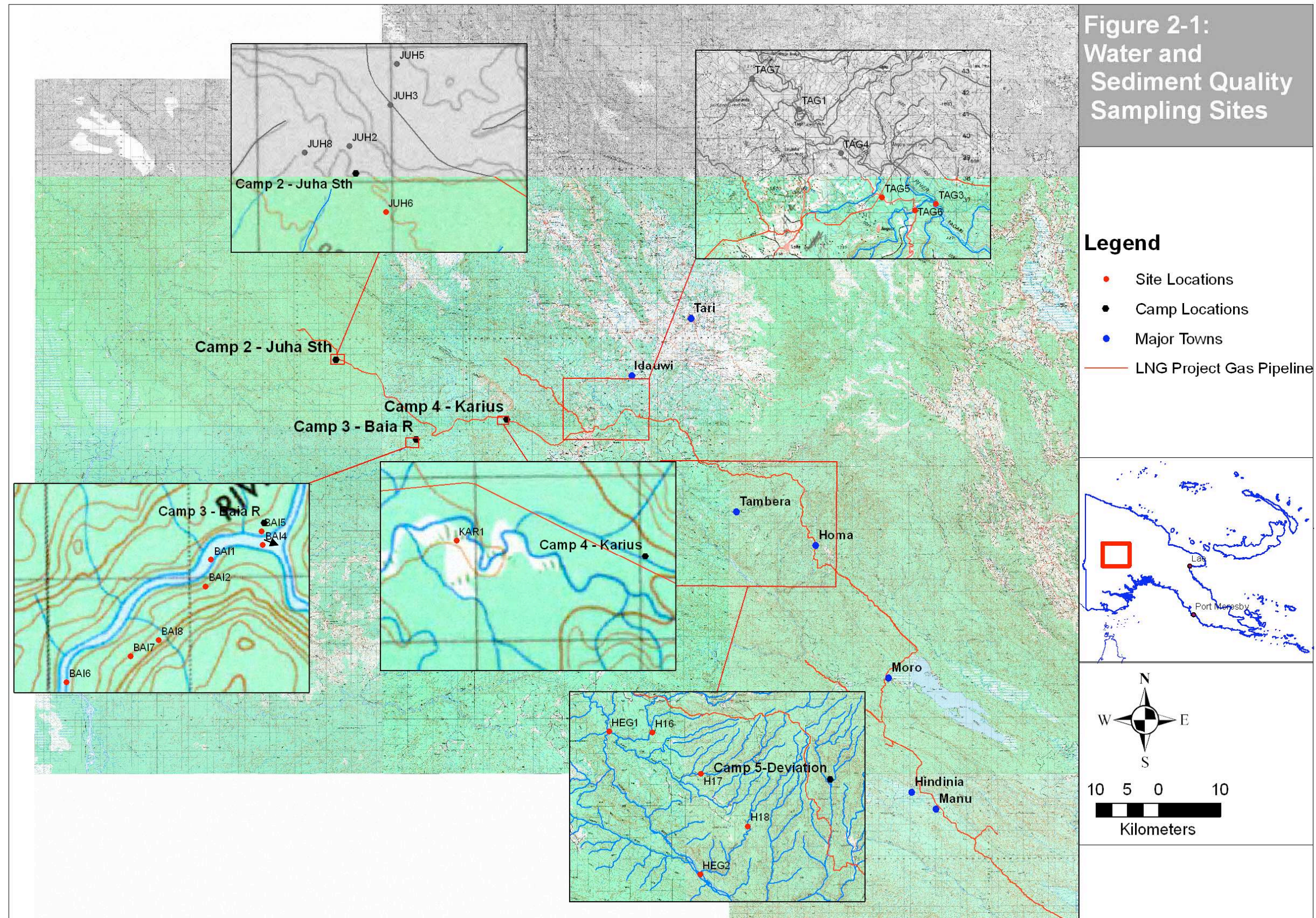


Figure 2-1 Location of water and sediment quality sampling sites

2.3 Sample Collection

2.3.1 In-situ Water Quality Parameters

In-situ water quality parameters were collected in the field using a HACH® Hydrolab DS5 water quality multiprobe. The following parameters were measured;

- pH;
- Temperature;
- Turbidity;
- Oxidation-reduction potential (ORP);
- Salinity;
- Dissolved oxygen; and
- Conductivity.

The instrument was calibrated by the manufacturer in Australia prior to departure into the field and routine daily calibrations of pH were performed in the field.

2.3.2 Water and Sediment Quality Parameters

Water sample bottles and sediment sample containers were delivered to the study site pre-treated with acid preservative where required (see Table 2-2 and Table 2-3). Samples were collected by hand, with the sampler wearing powder-free latex gloves, by entering the river and collecting water from approximately 2 cm under the surface. Care was taken to avoid spillage or removal of preservative in the bottles during filling. Dissolved metals samples were collected in a stock water sample bottle, returned to the 'science tent' and filtered into the appropriate bottle. Filtering was performed using sterile syringes with disposable 0.45 µm syringe-filters. Care was taken to control the filtering environment as far as practicable, by adhering to standard clean-technique practices, covering the work area with sheets of plastic, wearing gloves and avoiding filtering downwind of obvious sources of possible contamination (such as the kitchen or the generator house). Samples were refrigerated and at suitable intervals throughout the field program of approximately one month duration, samples were dispatched, via helicopter from the field fly camps, to Moro, where they were un-packed and re-refrigerated. When the most direct flight connection was able to be scheduled, the samples were then re-packed, flown to Port Moresby on the regular charter flight, delivered directly to TNT couriers in Port Moresby and consigned to ALS Brisbane on the same day. Detailed chain of custody information and importation documentation was required to ensure integrity of samples through this convoluted chain of custody. Every sample collected in the field was delivered successfully to ALS Brisbane and accounted for.

Table 2-2 Container type, preservative and holding times for water

Analyte	Container	Preservative	Holding Times
Total Metals (Al, As, B, Cd, Cr, Cu, Fe, Pb, Mn, Ni, Se, Ag, Zn)	Polyethylene (acid washed)	Nitric Acid to pH < 2	Six Months
Total Mercury	Polyethylene (acid washed)	Nitric Acid to pH < 2	28 Days
Dissolved Metals (Al, As, B, Cd, Cr, Cu, Fe, Pb, Mn, Ni, Se, Ag, Zn)	Polyethylene (acid washed)	Nitric Acid to pH < 2	Six Months
Dissolved Mercury	Polyethylene (acid washed)	Nitric Acid to pH < 2	28 Days
Suspended Solids	Polyethylene	Cool to 4°C	7 Days
Alkalinity	Polyethylene	Cool to 4°C	14 Days
Sulphate	Polyethylene	Cool to 4°C	28 Days
Chloride	Polyethylene		28 Days
Total Reactive Phosphorus	Polyethylene	Filter, cool to 4 °C	
Dissolved Major Cations – Na, K	Polyethylene	None Required	1 Month
Dissolved Major Cations – Mg, Ca	Polyethylene	None Required	1 Week
Total Organic Carbon		Add H ₂ SO ₄ to pH<2, cool to 4 °C	28 days
Nitrite plus Nitrate (NO _x)	Polyethylene	Add H ₂ SO ₄ to pH<2, cool to 4 °C	28 days
Total Phosphorus, Total Nitrogen, Kjeldahl Nitrogen	Polyethylene	Add H ₂ SO ₄ to pH<2, cool to 4°C	28 days

Table 2-3 Container type, preservative and holding times for sediment

Analyte	Container	Preservative	Holding Time
Metals	Plastic or glass	Cool to 4°C	6 Months
Particle Size Distribution	Ambient	Not Specified	-

Waters and sediments were analysed using standard laboratory methods, and these are listed in Table 2-4 and Table 2-5 respectively.

Table 2-4 Standard analytical methods for water quality

Analyte	Method
Total Metals (Al, As, Cd, Cr, Cu, Pb, Mn, Ni, Ag, Zn)	USEPA 6020 (ICP-MS)
Total Metals (B, Fe, Se)	USEPA 6010 (ICP-AES)
Total Mercury	APHA 3122 Hg-B (FIMS)
Dissolved Metals (Al, As, B, Cd, Cr, Cu, Fe, Pb, Mn, Ni, Se, Ag, Zn)	USEPA 6020 (ICP-MS)
Dissolved Metals (B, Fe, Se)	USEPA 6010 (ICP-AES)
Dissolved Mercury	APHA 3122 Hg-B (FIMS)
Suspended Solids	APHA 2540 D
Alkalinity	APHA 2320 B
Sulphate	APHA 3120
Chloride	APHA 4500 Cl ⁻ B
Total Reactive Phosphorus	APHA 4500 P-G
Dissolved Major Cations – Na, K	APHA 3120 (Ca, Mg, Na, K) - B
Dissolved Major Cations – Mg, Ca	APHA 3120 (Ca, Mg, Na, K) - B
Total Organic Carbon	APHA 5310 B
Nitrite plus Nitrate (NO _x)	APHA 4500-NO ₃ ⁻ I
Total Phosphorus, Total Nitrogen, Kjeldahl Nitrogen	APHA 4500-P H, APHA 4500-N _{org} /NH ₃ , APHA 4500-N _{org} D

Note: APHA (2001) 20th Ed.

Table 2-5 Standard analytical methods for sediment quality

Analyte	Method
Moisture Content	In-house
Sieving to <2000 µm	In-house
Total Metals (Al, As, Cd, Cr, Cu, Pb, Mn, Ni, Ag, Zn, B, Fe, Se)	USEPA 6020 (ICP-AES)
Total Mercury	APHA 3112 Hg-B (FIMS)
Particle Size Distribution	ASTEM 100 Hydrometer

Note: APHA (2001) 20th Ed.

2.4 Sample Processing and Quality Control

2.4.1 Quality Analysis

In order to assess data, it is common to calculate the relative percentage difference (RPD) between duplicates. The RPD is calculated as follows:

$$RPD(\%) = \frac{|X_1 - X_2|}{\bar{X}} \times 100$$

where: X_1 = 1st result
 X_2 = 2nd result
 $\bar{X}$ = mean of results

The calculated RPD is then compared to acceptable quality ranges. One of the major constraints on analysis of water quality data is the limit of reporting. The limit of reporting (LOR) is the lowest concentration of an analyte at which positive identification and quantification can be achieved with reasonable and/or previously determined confidence in a defined matrix using a specific analytical method.

The classification of data quality using RPD is dependent upon the result and the LOR. Due to the inherent uncertainties in the accuracy of the data where results are less than 10 times the LOR, a RPD in the range of 100-200% is acceptable depending upon the dataset. If samples have reported results above 10 times the LOR, good quality data is assessed as having a RPD of 30%.

The percentage of dissolved to total metals was also calculated, and where the dissolved metals were higher than the total metals, data were flagged.

2.4.2 Duplicates

Duplicates were collected at 10% of sites, and labelled so that the laboratory was unable to differentiate duplicate samples. Duplicate results were considered of good quality if the relative percentage difference (RPD) was less than 30%², or less than 200% for all data lower than 10 times the limit of reporting (LOR).

For water quality samples, the RPD for duplicate samples were below 20% (if detected), which indicated good precision. The exception to this was the RPD results for duplicates of dissolved zinc (JUH8 152.38%, H17 54.40%), indicating a quality issue with the dissolved zinc results (Appendix 1). For sediment samples, the RPD for chromium in duplicate samples was 35%, indicating a potential data quality issue. Mercury results for sediment had an RPD of 61.27%, indicating data of poor quality.

² Hydrobiology's internal quality control criterion.

Normal laboratory duplicates, method blanks, single control spikes and duplicate control spikes were run for each analysis batch. All laboratory quality control measures were checked against the certificate of analysis to ensure data were within certified limits (Appendix 2).

2.4.3 Total versus Dissolved Metals

A secondary quality control measure was the comparison of total and dissolved metal concentrations. Limits set for this measure were that dissolved metal concentrations should not exceed the respective total metal concentration by more than 15% RPD or 100% RPD for data less than 10 times the LOR.

Results from this measure indicated that some contamination had occurred. In particular, some dissolved zinc concentrations were higher than the total concentrations (Appendix 1), indicating contamination in the filtration steps (confirming poor duplicate results mentioned in section 2.4.1). Therefore, the dissolved zinc results were deemed unreliable and are not discussed further in the following sections.

At TAG1 the dissolved boron concentration was an order of magnitude higher than the total boron concentration, and the dissolved concentration of aluminium and chromium was double that of the total aluminium concentration, indicating a quality issue with these results.

Dissolved cadmium was significantly higher than the total cadmium concentration at the sample taken at BAI8 and in a field blank, indicating contamination of these samples.

2.4.4 Field Blanks

Analysis of field blanks indicated contamination with zinc and cadmium in the dissolved metals samples (discussed in section 2.4.3, see Appendix 1). This suggests that the filtering process may have introduced contamination with zinc and cadmium, and the commercially-supplied, reportedly sterile syringes, filters or bottles may have been responsible for the contamination.

3 WATER AND SEDIMENT QUALITY BASELINE

3.1 Water

3.1.1 Juha Area

Two types of streams were identified in the Juha area:

1. Creeks that were observed to terminate in sinkholes, and to have a bed consisting of concreted limestone in some areas; and
2. More typical shaded rainforest streams.

In-situ measurements taken from the Juha area are shown in Table 3-1. The water chemistry is distinct between the two types of streams. JUH 3 and JUH 5 were observed to have higher pH, alkalinity and higher conductivities than other sites, associated with elevated levels of calcium and calcium carbonate (Figure 3-1). Limestone dominated the area, and the chemical signature in these waters indicated elevated levels of dissolved limestone (calcium carbonate). Waters with elevated levels of dissolved limestone are referred to as 'karstic' waters. These karstic waters may be groundwater derived, a result of surface water processes (or a mixture of both). Typical streams are circumneutral whereas the karstic streams are moderately alkaline. JUH9 did not have the visual appearance of a sinkhole creek, but recorded relatively high pH and conductivity, indicating a karstic water source.

Table 3-1 In-situ water quality measurements from Juha

Date	Location	Site	Stream Type	pH	Temp ¹ (°C)	Turb ² NTU ³	ORP ⁴ mV	SAL ⁵ ppt	DO ⁶ mg/L	Cond ⁷ mS/cm
19/02/2008	Juha Area	JUH2	Typical	6.85	20.62	0	332	0	76.1	0.0277
18/02/2008	Juha Area	JUH3	Sink hole	7.85	20.32	0	357	0.07	85.4	0.1592
18/02/2008	Juha Area	JUH5	Sink hole	7.98	20.39	0	345	0.05	89.7	0.1265
19/02/2008	Juha Area	JUH6	Typical	7.23	20.12	0	369	0	86.4	0.0227
20/02/2008	Juha Area	JUH8	Typical	6.8	20.14	0	371	0	80.8	0.0222
22/02/2008	Juha Area	JUH9	Typical	7.91	20.54	0	327	0.04	89.7	0.1085

NOTE: 1 Temperature;
 2. Turbidity;
 3. Nephelometric turbidity units (NTU);
 4. Oxidation-reduction potential,
 5. Salinity;
 6. Dissolved Oxygen;
 7. Conductivity.

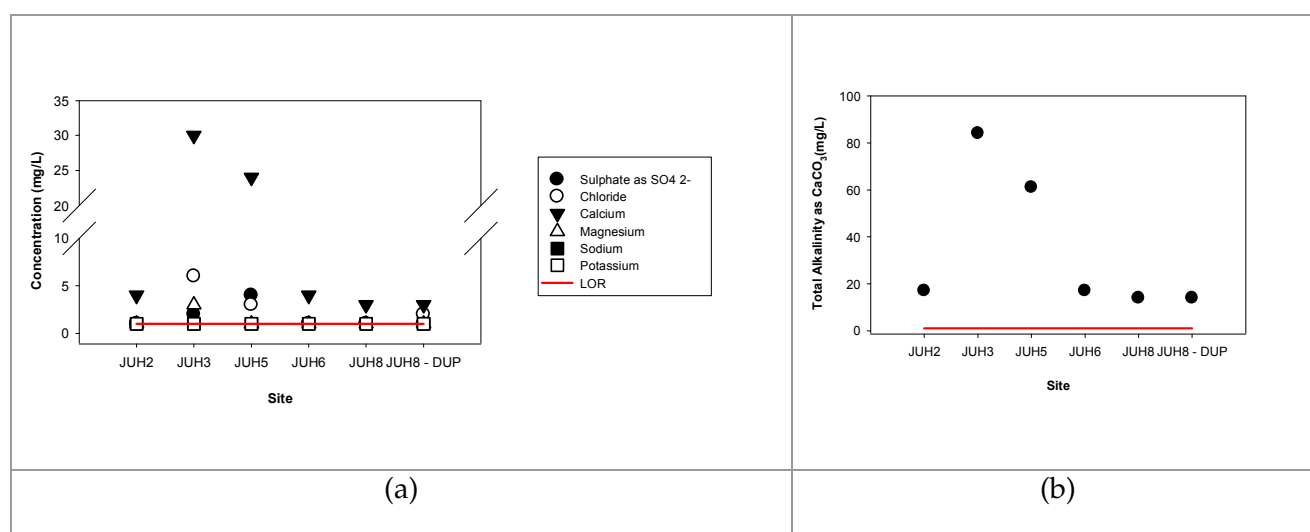


Figure 3-1 Major anions and cations (a) and total alkalinity (b) in the Juha area.

NOTE: Red line is limit of reporting

All dissolved metal concentrations from the Juha area were below the limit of reporting for all analytes, apart from manganese, iron and aluminium (water quality results are presented graphically in Appendix 3). Manganese concentrations ranged from below the limit of reporting (0.001 mg/L) at JUH5 to 0.011 mg/L at JUH3 (Figure 3-2). The PNG Environment Act stipulates a value of 0.5 mg/L of dissolved manganese for the protection of aquatic life, and ANZECC/ARMCANZ (2000) stipulates a value of 1.2 mg/L for the protection of 99% of aquatic species. Therefore, the concentrations present in the Juha area are considered to be low. Dissolved iron was slightly higher than the detection limit at JUH6 and JUH8 (60 mg/L), and was 100 mg/L at JUH2.

The PNG Environment Act does not stipulate a value for aluminium. The dissolved aluminium levels found at JUH 2 and JUH 5 are higher than the ANZECC/ARMCANZ (2000) 99% protection limit, and dissolved aluminium at JUH 6 is higher than the 95% protection limit for ANZECC/ARMCANZ (2000) (Figure 3-3). As the area is not impacted by human activities, these levels are natural baseline conditions reflecting background geology that the endemic flora and fauna are adapted to.

Total phosphorous was at or below the limit of reporting (0.01 mg/L) at all Juha sites. Nitrogenous compounds were detected at JUH2 and JUH6, mostly in the form of TKN (which consists of ammonia and TKN). These levels are not considered to be from an anthropogenic source as the area is not impacted by human activity. Total organic carbon (TOC) was fairly consistent between sites (2-3 mg/L), with only JUH5 having no detectable TOC.

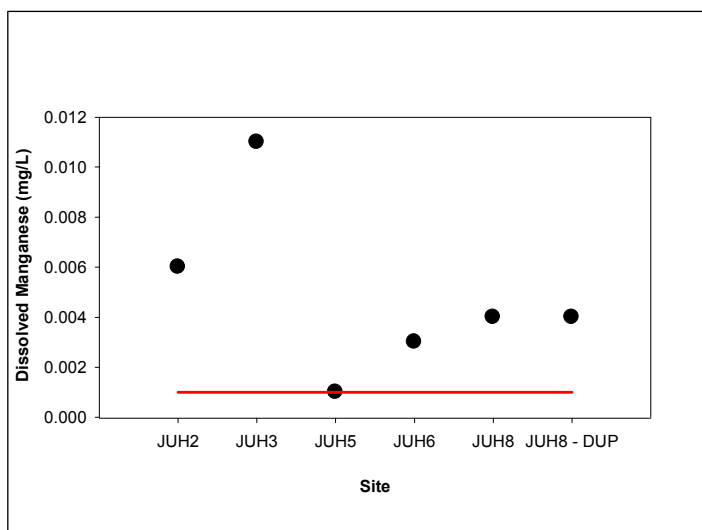


Figure 3-2 Dissolved manganese concentrations in the Juha Area

NOTE: Red line is limit of reporting

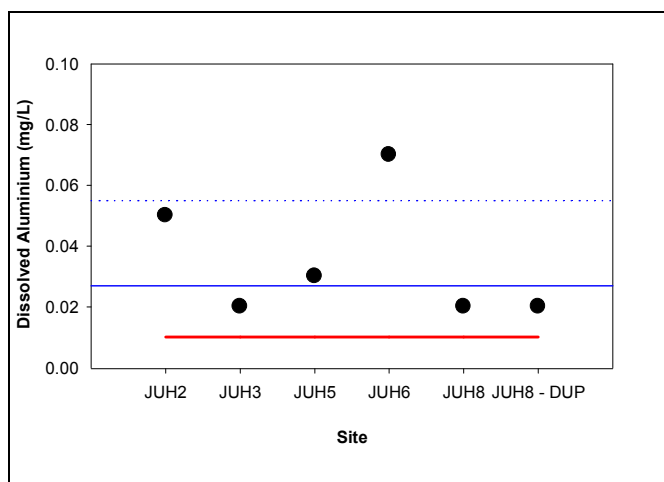


Figure 3-3 Dissolved aluminium concentrations in the Juha Area

NOTE: Red line is limit of reporting, blue line is ANZECC/ARMCANZ (2000) 99% of species protection limit, blue dotted line is ANZECC/ARMCANZ (2000) 95% species protection limit

3.1.2 Baia River and Karius Ridge Areas

In-situ measurements taken from the Baia River area (Camp 3) and the Karius Ridge area are shown in Table 3-2. The Baia River mainstream (BAI1) was measured on two occasions, once at a time of estimated moderate flow (12/2/08) and once after substantial rainfall (14/2/08). Turbidity at moderate flow was 81.3 NTU and that at high flow was 635 NTU, demonstrating the linkage between rainfall and sediment-input in this system.

Sites BAI5 and BAI6 were also in the Baia River mainstream, with BAI5 located upstream of the major tributary (Tikawe Ck) and BAI6 located at the furthest downstream extent of sampling. These sites also recorded relatively high turbidity. Site BAI4, located in Tikawe Ck, the major tributary upstream of the camp, was sampled on two occasions, again at moderate flows and after heavy rain, recording a marked increase in turbidity after rain.

Watercourses sampled in the Karius Ridge area (Camp 4) represent the headwaters of Baia River. In-situ measurements taken from the area are shown in Table 3-2. At this location, the Baia River is a colder, clearer watercourse and there were some differences in the physicochemical properties (eg. pH and conductivity) of the two watercourses sampled in this area, probably reflecting different geologies in the catchment headwaters.

Table 3-2 In-situ water quality measurements from Baia River and Karius Ridge areas

Date	Location	Site	Stream Type	pH	Temp ¹ (°C)	Turb ² NTU ³	ORP ⁴ mV	SAL ⁵ Ppt	DO ⁶ mg/L	Cond ⁷ mS/cm
14/02/2008	Baia River Area	BAI4	Large Tributary	8.05	21.6	156.9	315	0.03	98.4	0.0933
13/02/2008	Baia River Area	BAI4	Large Tributary	8.09	22.8	47.2	324	0.04	97.8	0.965
14/02/2008	Baia River Area	BAI5	Baia River	8.16	21.46	236.1	309	0.04	98.7	0.1031
12/02/2008	Baia River Area	BAI1	Baia River	8.09	21.8	81.3	337	0.09	98.7	0.1904
14/02/2008	Baia River Area	BAI1	Baia River	8.28	21.03	635	290	0.06	99.4	0.1325
14/02/2008	Baia River Area	BAI6	Baia River	8.24	22.02	362.3	313	0.07	99.8	0.1562
13/02/2008	Baia River Area	BAI2	Swamp	7.43	24.28	0	335	0.19	26.6	0.3864
14/02/2008	Baia River Area	BAI7	Rainforest stream	8.34	23.43	0	316	0.13	95.4	0.2674
14/02/2008	Baia River Area	BAI8	Rainforest stream	8.09	24.38	0	321	0.09	91.4	0.2045
21/02/2008	Karius Ridge Area	KAR1	Baia River headwaters	8.16	18.3	0	343	0.07	84.4	0.1636
21/02/2008	Karius Ridge Area	KAR2	Baia River headwaters	7.38	19.22	0	217	0.02	83.1	0.0745

NOTE: 1 Temperature;
 2. Turbidity;
 3. Nephelometric turbidity units (NTU);
 4. Oxidation-reduction potential,
 5. Salinity;
 6. Dissolved Oxygen;
 7. Conductivity.

Clearwater tributary streams (BAI7 and BAI8), the Karius Ridge sites (KAR1 and KAR2) and the swamp (BAI2) had turbidity readings of zero (Table 3-2). BAI2 recorded different in-situ water quality characteristics to the other sites, typical of more stagnant waters. Of particular note is the very low dissolved oxygen concentration recorded in the swamp (BAI2) and the lower pH at this site. The waters at KAR2 showed more reductive conditions than at other sites.

Waters in both the Baia River area and KAR1 sampling area appeared to be of karstic origin with high levels of calcium and alkalinity (Figure 3-4).

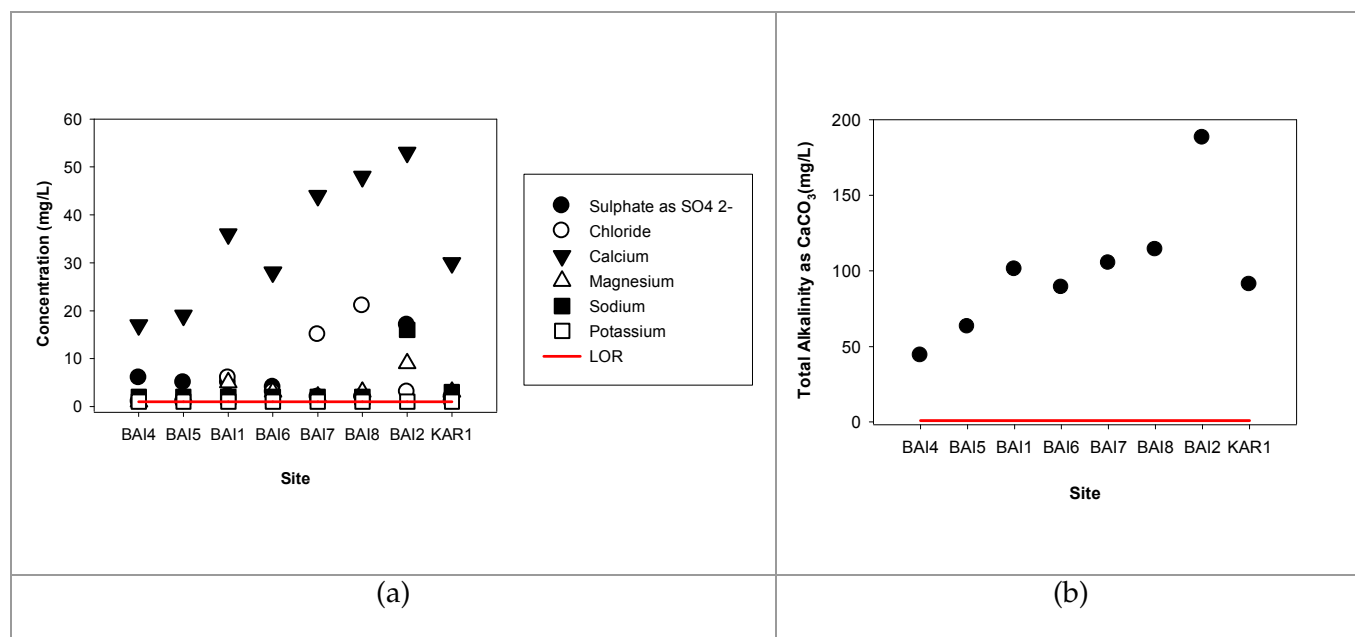


Figure 3-4 Major anions and cations (a) and total alkalinity (b) in the Baia River and Karius Ridge Areas

NOTE: Red line is limit of reporting

Dissolved metals were generally below the limit of reporting. Dissolved arsenic was detected at BAI2 and BAI6 (Appendix 3). Dissolved manganese was detected at all sites, with a maximum level of 0.16 mg/L being detected at BAI2. As noted in Section 3.1.1, these levels are considered relatively low. The low levels of oxygen and lower pH at BAI2 may be associated with the higher levels of manganese at this site.

Dissolved aluminium concentrations were higher than the limit of reporting at all sites in the Baia River area, other than BAI2. The dissolved aluminium concentrations at BAI4, BAI5, BAI6 and BAI7 were higher than the ANZECC/ARMCANZ (2000) 99% protection limit but lower than the 95 % protection limit at all sites.

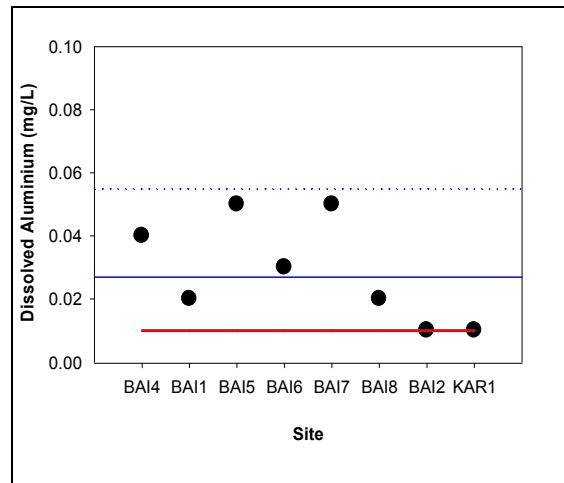


Figure 3-5 Dissolved Aluminium in the Baia River and Karius Ridge areas

NOTE: Red line is limit of reporting, blue line is ANZECC/ARMCANZ (2000) 99% of species protection limit, blue dotted line is ANZECC/ARMCANZ (2000) 95% species protection limit

Total suspended solids were highest at BAI5 and BAI6 (in the Baia River mainstream) and were slightly elevated at BAI4 and BAI1. At these sites, total metal concentrations that were elevated followed the same pattern as suspended solids (Figure 3-6), reflecting the predominant sediment chemistry of the area (Section 3.3) and indicating the relationship between total metals concentration and particulates. Total organic carbon was below the limit of reporting at BAI1, BAI2 (swamp) and KAR1. At all other sites TOC ranged from 2-3 mg/L.

Total phosphorous followed the same pattern (Figure 3-6) as the total metals concentrations, indicating that phosphorous concentrations were also linked to particulates in sediment loads. Nitrogen compounds were generally low across sites, and were not detected at BAI7 or BAI8. The highest concentrations were measured in the swamp (BAI2). The predominant form of nitrogen was TKN compounds (ammonia and organic nitrogen).

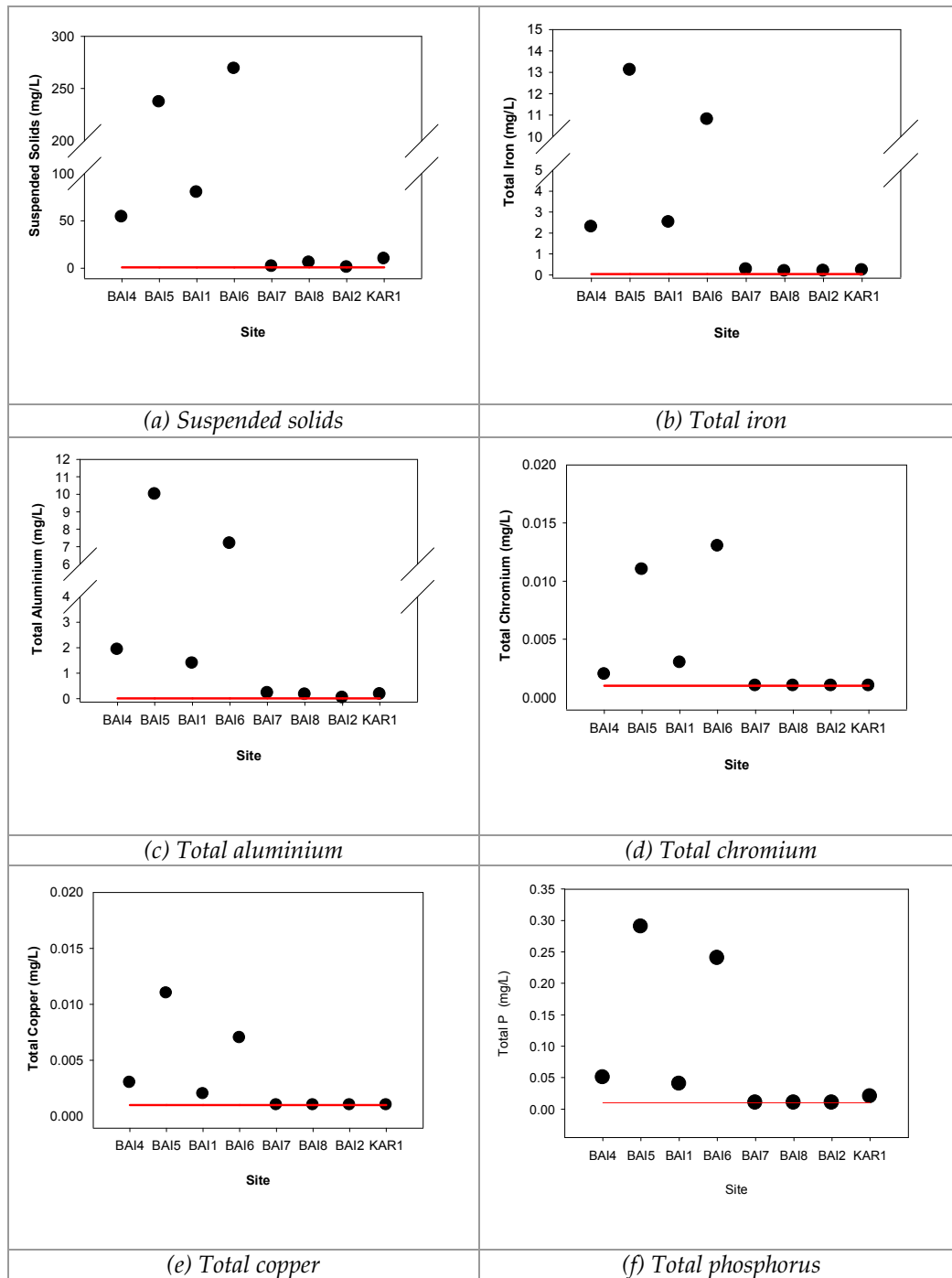


Figure 3-6 Suspended solids, total metals and total phosphorous concentrations in the Baia River and Karius Ridge Area

NOTE: Red line is limit of reporting

3.2 Tagari River Area

In-situ measurements taken from the Tagari River area are shown in Table 3-3. The mainstream Tagari River sites (TAG1 and TAG3), not surprisingly, are characterised by higher turbidity readings than the tributary streams. The site TAG7 is a control site, outside the direct area of the proposed HGCP and this creek is fed by groundwater. This stream was characterised by generally higher salinity and conductivity than the other tributary streams, with the exception of TAG4, indicating a higher proportion of karstic source waters at both sites (Figure 3-7). TAG4 is a stream draining the proposed HGCP area.

Table 3-3 In-situ water quality measurements from Tagari River area

Date	Location	Site	Type	pH	Temp ¹ (°C)	Turb ² NTU ³	ORP ⁴ mV	SAL ⁵ ppt	DO ⁶ mg/L	Cond ⁷ mS/cm
25/02/2008	Tagari River Area	TAG6	Major tributary	8.05	18.27	0	331	0.03	87.8	0.0928
25/02/2008	Tagari River Area	TAG5	Rainforest stream	7.31	20.53	0	272	0	86.5	0.0381
25/02/2008	Tagari River Area	TAG4	Rainforest stream	8.3	18.16	3.16	328	0.16	88	0.3295
26/02/2008	Tagari River Area	TAG7	Groundwater fed stream	8.19	23.3	9.4	328	0.12	90.4	0.2569
27/02/2008	Tagari River Area	TAG1	Tagari River	8.27	17.84	72	333	0.07	91.4	0.1635
28/02/2008	Tagari River Area	TAG3	Tagari River	8.14	18.34	238.3	324	0.07	90.5	0.1633

NOTE: 1 Temperature;

2. Turbidity;

3. Nephelometric turbidity units (NTU);

4. Oxidation-reduction potential,

5. Salinity;

6. Dissolved Oxygen;

7. Conductivity.

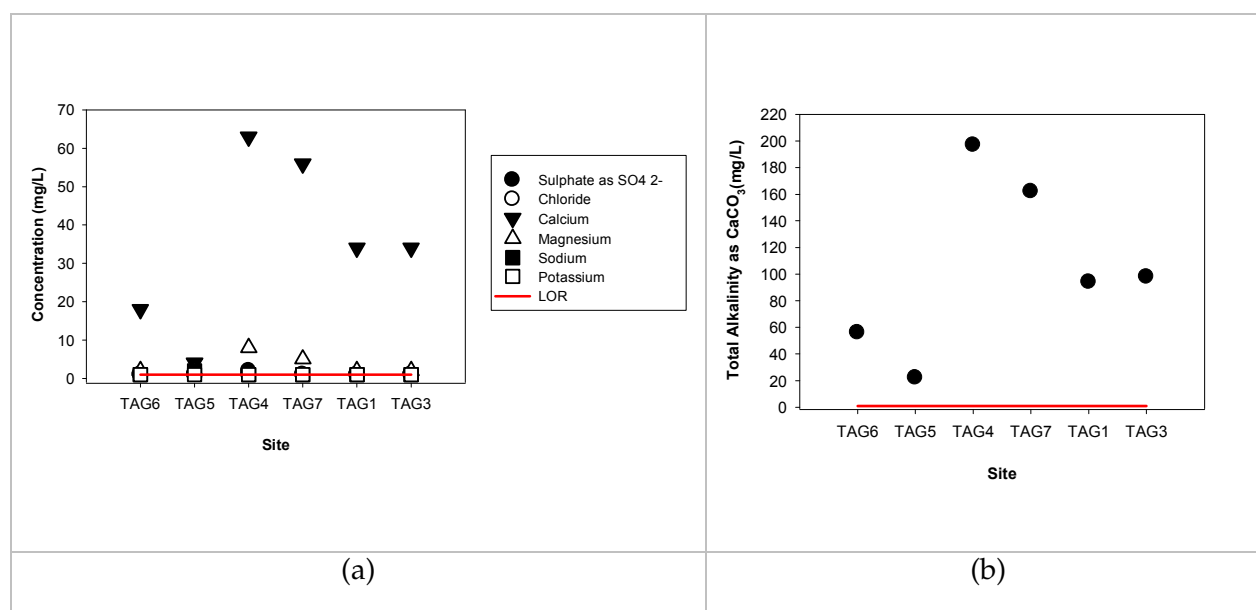


Figure 3-7 Major anions and cations (a) and total alkalinity (b) at Tagari River sites

Dissolved metal concentrations were generally just above or below the LOR. Dissolved metal data from TAG1 were considered to be of low quality and were not included in this analysis (Section 2.4.3). Low levels of dissolved manganese were detected at all sites. Iron and aluminium appear to be elevated at TAG3, TAG5 and TAG6 and chromium was slightly elevated at TAG4 and TAG6.

As with the Baia River area, higher turbidity readings were associated with higher total metal concentrations. Total metal concentrations for aluminium, iron, chromium, copper, manganese, arsenic and lead were elevated at TAG1 and TAG3 (Appendix 3), reflecting the extra sediment load at these sites and the sediment chemical signature in the area (Section 3.3.3).

Total phosphorous and total nitrogen (predominantly in the form of TKN) were higher at the river sites TAG1 and TAG3. Nitrogen and phosphorous concentrations at TAG5 and TAG6 were below detection limits. Total organic carbon was highest at TAG3 (6 mg/L) and may be associated with the high turbidity at this site.

3.2.1 Hegigio River Area

In-situ measurements taken from the Hegigio River area are shown in Table 3-4. These measurements clearly delineate the turbid Hegigio River mainstream (HEG1, HEG2) from the clearwater tributaries (H18, H17, and H16) (see Plate 3-1).

Table 3-4 In-situ water quality measurements from Hegigio River area

Date	Location	Site	Type	pH	Temp ¹ (°C)	Turb ² NTU ³	ORP ⁴ mV	SAL ⁵ ppt	DO ⁶ mg/L	Cond ⁷ mS/cm
29/02/2008	Hegigio River Area	H18	Upland stream	7.5	18.6	0	334	0	87.3	0.013
29/02/2008	Hegigio River Area	H17	Upland stream	7.5	19.84	0	296	0	86	0.0223
29/02/2008	Hegigio River Area	H16**	Upland stream	7.6	19.8	0	328	0	89.9	0.0365
29/02/2008	Hegigio River Area	HEG1	Hegigio River	8.2	20.13	125	330	0.05	94.1	0.1188
29/02/2008	Hegigio River Area	HEG2	Hegigio River	8.21	20.86	163.1	328	0.05	96.3	0.1207

NOTE: 1 Temperature;
 2. Turbidity;
 3. Nephelometric turbidity units (NTU);
 4. Oxidation-reduction potential,
 5. Salinity;
 6. Dissolved Oxygen;
 7. Conductivity.
 ** Sediment samples only taken



Plate 3-1 Confluence of Hegigio River with tributary (HEG2)

All dissolved metals were below the limit of reporting, apart from iron, aluminium and manganese (Appendix 3). Dissolved aluminium was higher than the 95% protection guidelines at all sites (Figure 3-8). Low concentrations of dissolved manganese were detected at all sites apart from H18.

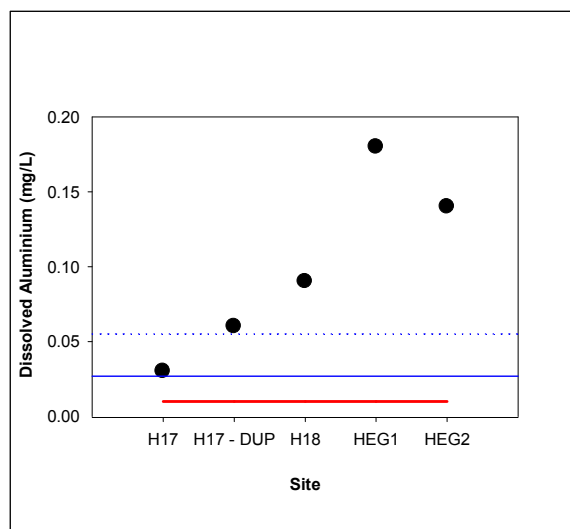


Figure 3-8 Dissolved aluminium at Hegigio River Area sites

NOTE: Red line is limit of reporting, blue line is ANZECC/ARMCANZ (2000) 99% of species protection limit, blue dotted line is ANZECC/ARMCANZ (2000) 95% species protection limit

The turbid river sites at HEG1 and HEG2 had elevated total metal concentrations. Total metal concentrations for aluminium, iron, chromium, copper, manganese, arsenic and lead were elevated (Appendix 3), again reflecting sediment chemical signature in the area (Section 3.3.4) and the linkage between total metals and particulate phases. Nitrogen (predominantly in the form of TKN) and phosphorus were detected at HEG1 and HEG2 only. Total organic carbon was highest (4 mg/L) at HEG1 and HEG3 and may be associated with elevated turbidity.

3.3 Sediment

3.3.1 Juha Area

Particle size distribution analyses indicated that the sediment in the Juha area was composed mainly of sand, with some silt and clay (Table 3-5). JUH3 and JUH6 sediment samples also contained a small amount of gravel (Appendix 5). Aluminium, chromium, copper, iron, lead, nickel and zinc were found in roughly the same proportions across all sites. Although found at all sites, arsenic and manganese were about double the concentrations at JUH3 than at other sites (Appendix 6).

Chromium and cadmium concentrations exceeded the ANZECC/ARMCANZ (2000) low level ISQGs at JUH 6, and cadmium concentrations were higher than the low level ISQG at JUH8 (in one duplicate). Nickel and arsenic concentrations at all sampled sites were

elevated above the ISQG's. As this is a baseline study in a pristine environment, these levels reflect the natural geology of a mineralised area.

Mercury concentrations were around an order of magnitude higher than the high level ISQG at JUH6 and JUH8 (Figure 3-9). As the mercury concentrations were surprisingly high, Hydrobiology requested that the samples be rerun. The results were of the same order of magnitude, although precision was poor for the JUH6 sample. As these levels are high, and disturbance of the sediment may mobilise the mercury, further investigations of the mercury concentrations may need to occur. It is worth noting that mercury was not detected in the waters of the Juha area.

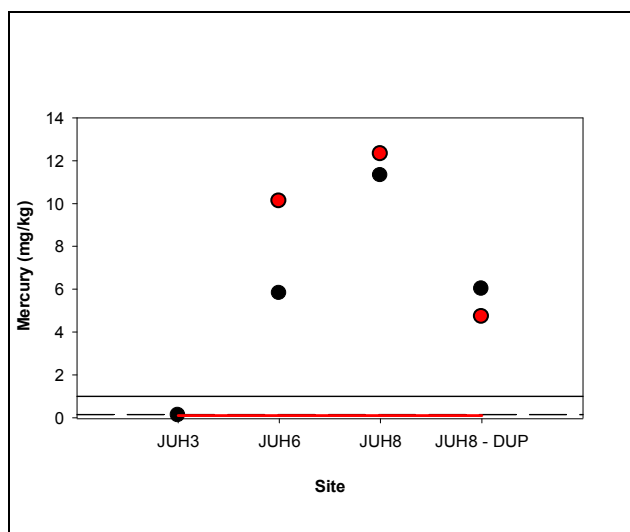


Figure 3-9 Mercury concentrations in sediment in the Juha area

Note: Red line is limit of reporting, black dashed line is low level interim sediment quality guideline (trigger value) – ANZECC/ARMCANZ (2000), black line is high level value. Red circles are laboratory repeats of results.

Table 3-5 Classification of particle size distributions

Size Class	Grain Size (µm)
Clay	< 2
Silt	2-60
Sand	60-2000
Gravel	> 2000

3.3.2 Baia River and Karius Ridge Areas

The sediment particle size distributions in the Baia River and Karius Ridge areas showed a large variation in the sediment size classes between sites. Higher bioavailable metal concentrations tend to be associated with clay and silt than with sand and larger particle sizes, and this pattern was evident in the Baia River and Karius Ridge areas.

BAI2 (perched swamp) was predominantly silt with some clay and a small amount of sand. BAI2 had almost double the level of arsenic, chromium, nickel, zinc and lead compared to the other sites, possibly related to the differences in particle sizes (Appendix 6). BAI1 (Baia River mainstream) was predominantly sand with some silt and clay, whereas BAI8 (clearwater tributary) contained around 50% sand and equal mixes of the other particle sizes (Appendix 5). KAR1 was mostly composed of sand, with a very small proportion of silt and gravel (Appendix 5). Baseline concentrations of aluminium, chromium, copper, iron, nickel and zinc likely reflect local catchment geology (Appendix 6). No arsenic or lead was detected in these sediments. No arsenic was detected at BAI1. Aluminium, iron and manganese were found in roughly the same proportions across all sites. Copper was highest in the sediment at BAI1 (Baia River mainstream), with the lowest concentration at BAI8.

3.3.3 Tagari River Area

Sediment particle size at the mainstream sites TAG1 and TAG3 indicated that sand dominated the sediment, with some silt and clay at both sites and gravel at TAG1. TAG4 sediment was composed of roughly equal amounts of silt and sand, with a smaller amount of clay. Sites TAG5 and TAG6 were dominated by gravel, with some sand fractions (Appendix 5).

Aluminium, chromium, copper, iron, manganese, nickel and zinc were recorded at all sites. Sediment at TAG4 was characterised as having the lowest concentrations of all these metals (Appendix 6).

Arsenic and lead were detected at TAG1, TAG3 and TAG7 with the highest concentration being at TAG3. Lead was also detected at TAG5.

Mercury was detected at all Tagari River sites, apart from TAG6. The concentrations of mercury at sites in the Tagari River area were an order of magnitude lower than that at the Juha area sites.

3.3.4 Hegigio River Area

Sediment samples from HEG1 and HEG2 were not analysed. Sand dominated the particles size distribution at sites H16 and H17, with some gravel and a small amount of silt and clay (Appendix 5).

Aluminium, chromium, copper, iron, manganese, nickel and zinc were recorded at all sites, again reflecting the local geology. No arsenic was detected at either site, and a low level of lead was detected at H16 (Appendix 6).

4 CONCLUSIONS

This study represents a single snap-shot assessment of water and sediment quality. In the absence of climatic or river discharge data, it is not possible to confidently determine if the conditions experienced at the time of sampling represented 'median' conditions or particularly dry or wet conditions. For the purposes of the aquatic fauna impact assessment, it has been assumed that the rivers were in approximately 'median' flow conditions.

The Baia River mainstream site was sampled at two times through the study; once at a time of what was considered to be median flow, and once after a night of rain, when the river had risen by approximately 1-2 m. Results from these two sampling events demonstrated the clear relationship between flow and TSS (and turbidity), with higher sediment loads being recorded at higher flow. Further, total metals concentrations were generally high at these high-flow times. This was not necessarily true for dissolved metals. The apparent relationship between rainfall, sediment loads and total metals concentrations has been identified and integrated into the aquatic fauna impact assessment (Hydrobiology 2008a). It is likely that in particularly high-rainfall periods, sediment loads in rivers of the project area will generally be higher than at drier times. The potential for total metals concentrations to also be higher at these times, related to particulate-phase metals, must be viewed with due consideration to the higher dilution factors (higher flow) at these times.

This baseline report of water and sediment quality has not identified any particular metals or other elements of concern with respect to potential impacts of the construction and operation of the project, with the possible exception of mercury at Juha. Metals detected in waters and sediments in the project area represent background geological concentrations and it is believed that earthworks related to the construction of the project, while potentially introducing sediment (and thus total metals) to the aquatic system, will not result in the significant elevation of bioavailable metals in waterways. High mercury concentrations were detected in stream sediments at Juha. Mercury was not elevated in stream waters. High mercury concentrations in stream sediments at Juha may indicate that the geology of the area contains naturally high mercury. If this is the case, earthworks and disturbance of sediment related to the construction of the pipeline and associated facilities may introduce additional sediment-associated mercury into drainages, which, under certain water chemistry conditions, may result in increased mercury concentrations in waters. Therefore, further definition of the mercury content of stream sediments and soils at Juha is recommended to further define the source and further inform the assessment of water quality risk.

The hydrology and geomorphology study (Hydrobiology 2008e) and the aquatic fauna study (Hydrobiology 2008a) have identified that potential impacts of sediment mobilisation into watercourses is the key water quality issue of concern. Specifically, sediment input is of most concern for water quality in clearwater tributaries of the project area. The large, turbid rivers of the project area have very high natural sediment loads and carrying capacity, while clearwater tributaries do not have this capacity and generally harbour species that are less tolerant of sediment. The baseline water quality data presented here (particularly sediment concentrations) should provide a benchmark against which future changes could be compared against, and, perhaps more importantly, provide a target for post-construction water quality that should aim to be achieved. The few data collected from areas of human habitation have indicated that there may be a casual relationship between nitrogenous

compounds in waterways and settlements/agriculture. The only areas of human habitation related specifically to the Hides-Juha component of the upstream project are the HGCP and JPF areas. Initially, construction camps at these locations will house work crews for construction of those facilities and construction of the ROW linking the JPF and HGCP. On-site sewage and best practice management of waste water should be implemented to protect water quality in watercourses draining these areas.

5 REFERENCES

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Hydrobiology (2008c). PNG LNG Project: Upstream. Water and Sediment Quality Baseline. A report to Coffey Natural Systems for the PNG LNG Project.

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Hydrobiology (2008e). PNG LNG Project: Upstream. Hydrology and Sediment Transport. A report to Coffey Natural Systems for the PNG LNG Project

Appendix 1 QA/QC Results for Water and Sediment

Water Quality Duplicates – Dissolved Metals

Site		Dissolved Boron		Dissolved Iron		Dissolved Selenium		Dissolved Aluminium		Dissolved Arsenic		Dissolved Cadmium		Dissolved Chromium		Dissolved Copper		Dissolved Lead
		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L		mg/L
JUH8	<	0.100		0.06	<	0.010		0.02	<	0.001		0.0002	<	0.001		0.001		0.001
JUH8 - DUP	<	0.100		0.06	<	0.010		0.02	<	0.001		0.000	<	0.001		0.001	<	0.001
%RSD		0.000		0.000		0.000		0.000		0.000		100.000		0.000		0.000		0.000
H17	<	0.100		0.07	<	0.010		0.03	<	0.001		0.000	<	0.001		0.001	<	0.001
H17 - DUP	<	0.100		0.07	<	0.010		0.06	<	0.001		0.0002	<	0.001		0.001		0.002
%RSD		0.000		0.000		0.000		66.667		0.000		-100.000		0.000		0.000		66.667

Site		Dissolved Manganese		Dissolved Nickel		Dissolved Silver		Dissolved Zinc		Dissolved Mercury
		mg/L		mg/L		mg/L		mg/L		mg/L
JUH8		0.004	<	0.001	<	0.001		0.185	<	0.0001
JUH8 - DUP		0.004	<	0.001	<	0.001		0.025	<	0.0001
%RSD		0.000		0.000		0.000		152.381		0.0000
H17		0.006	<	0.001	<	0.001		0.091	<	0.0001
H17 - DUP		0.006	<	0.001	<	0.001		0.159	<	0.0001
%RSD		0.000		0.000		0.000		-54.400		0.0000

Water Quality Duplicates – Total Metals

Site	Total Boron	Total Iron	Total Selenium	Total Aluminium	Total Arsenic	Total Cadmium	Total Chromium	Total Copper	Total Lead
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
JUH8	< 0.100	< 0.05	< 0.010	< 0.05	< 0.001	< 0.0003	< 0.001	< 0.001	< 0.001
JUH8 - DUP	< 0.100	< 0.05	< 0.010	< 0.05	< 0.001	< 0.000	< 0.001	< 0.001	< 0.001
%RSD	0.000	0.000	0.000	0.000	0.000	-100.000	0.000	0.000	0.000
H17	< 0.100	< 0.13	< 0.010	< 0.070	< 0.001	< 0.000	< 0.001	< 0.001	< 0.001
H17 - DUP	< 0.100	< 0.12	< 0.010	< 0.100	< 0.001	< 0.000	< 0.001	< 0.001	< 0.001
%RSD	0.000	-8.000	0.000	-35.294	0.000	0.000	0.000	0.000	0.000

Site	Total Manganese	Total Nickel	Total Silver	Total Zinc	Total Mercury
	mg/L	mg/L	mg/L	mg/L	mg/L
JUH8	0.006	< 0.001	< 0.001	0.026	< 0.000
JUH8 - DUP	0.006	< 0.001	< 0.001	0.076	< 0.000
%RSD	0.000	0.000	0.000	-98.039	0.000
H17	0.008	< 0.001	< 0.001	0.025	< 0.000
H17 - DUP	0.009	< 0.001	< 0.001	0.007	< 0.000
%RSD	11.765	0.000	0.000	112.500	0.000

Water Quality Duplicates – Physical, Major Anions and Cations and Nutrients

Site		Suspended Solids (SS)		Turbidity		Hydroxide Alkalinity as CaCO ₃		Carbonate Alkalinity as CaCO ₃		Bicarbonate Alkalinity as CaCO ₃		Total Alkalinity as CaCO ₃		Sulphate as SO ₄ 2-
		mg/L		NTU		mg/L		mg/L		mg/L		mg/L		mg/L
JUH8	<	1.00		0.2	<	1.00	<	1.00		14		14	<	1.00
JUH8 - DUP	<	1.00		0.2	<	1.00	<	1.00		14		14	<	1.00
%RSD		0.00		0.00		0.00		0.00		0.00		0.00		0.00
H17		1		0.9	<	1.00	<	1.00		14		14	<	1.00
H17 - DUP		3		0.8	<	1.00	<	1.00		16		16	<	1.00
%RSD		100.00		-11.76		0.00		0.00		13.33		13.33		0.00

Site		Chloride		Calcium		Magnesium		Sodium		Potassium
		mg/L		mg/L		mg/L		mg/L		mg/L
JUH8		1		3	<	1.00	<	1.00	<	1.00
JUH8 - DUP		2		3	<	1.00	<	1.00	<	1.00
%RSD		66.67		0.00		0.00		0.00		0.00
H17	<	1.00		3	<	1.00		1	<	1.00
H17 - DUP	<	1.00		3		1		1	<	1.00
%RSD		0.00		0.00		0.00		0.00		0.00

Site		Nitrite + Nitrate as N (NO _x)		Total Kjeldahl Nitrogen as N		Total Nitrogen as N (TKN + NO _x)		Total Phosphorus as P		Total Anions		Total Cations		Total Organic Carbon (TOC)
						mg/L		mg/L		meq/L		meq/L		mg/L
JUH8		0.02	<	0.10	<	0.10	<	0.01		0.30		0.16		2
JUH8 - DUP	<	0.01	<	0.10	<	0.10	<	0.01		0.34		0.16		2
%RSD		40.00		0.00		0.00		0.00		12.50		0.00		0.00
H17	<	0.01	<	0.10	<	0.10	<	0.01		0.28		0.18		2
H17 - DUP	<	0.01	<	0.10	<	0.10	<	0.01		0.33		0.26		1.00
%RSD		0.00		0.00		0.00		0.00		16.39		36.36		-66.67

Percentage of Dissolved to Total Metals

Site		Dissolved Boron		Total Boron	%RPD Dissolved:Total		Dissolved Iron		Total Iron	%RPD Dissolved:Total		Dissolved Selenium		Total Selenium	%RPD Dissolved:Total		Dissolved Aluminium		Total Aluminium	%RPD Dissolved:Total
BAI1	<	0.1	<	0.1	0.00	<	0.05		2.51	192.19	<	0.01	<	0.01	0.00		0.02		1.38	194.29
BAI2	<	0.1	<	0.1	0.00	<	0.05		0.19	116.67		0.01	<	0.01	0.00	<	0.01		0.03	100.00
BAI4	<	0.1	<	0.1	0.00	<	0.05		2.29	191.45		0.01	<	0.01	0.00		0.04		1.92	191.84
BAI5	<	0.1	<	0.1	0.00	<	0.05		13.1	198.48	<	0.01	<	0.01	0.00		0.05		10	198.01
BAI6	<	0.1	<	0.1	0.00	<	0.05		10.8	198.16	<	0.01	<	0.01	0.00		0.03		7.18	198.34
BAI7	<	0.1	<	0.1	0.00	<	0.05		0.26	135.48		0.02	<	0.01	-66.67		0.05		0.22	125.93
BAI8	<	0.1	<	0.1	0.00	<	0.05		0.18	113.04	<	0.01	<	0.01	0.00		0.02		0.16	155.56
JUH2	<	0.1	<	0.1	0.00		0.1		0.14	33.33	<	0.01	<	0.1	163.64		0.05		0.09	57.14
JUH3	<	0.1	<	0.1	0.00	<	0.05		0.06	18.18		0.01		0.01	0.00		0.02		0.02	0.00
JUH5	<	0.1	<	0.1	0.00	<	0.05		0.07	33.33	<	0.01	<	0.01	0.00		0.03		0.1	107.69
JUH6	<	0.1	<	0.1	0.00		0.06		0.16	90.91	<	0.01	<	0.01	0.00		0.07		0.12	52.63
JUH8	<	0.1	<	0.1	0.00		0.06		0.05	-18.18	<	0.01	<	0.01	0.00		0.02		0.05	85.71
JUH8 - DUP	<	0.1	<	0.1	0.00		0.06	<	0.05	-18.18	<	0.01	<	0.01	0.00		0.02		0.05	85.71
H17	<	0.1	<	0.1	0.00		0.07		0.13	60.00	<	0.01	<	0.01	0.00		0.03		0.07	80.00
H17 - DUP	<	0.1	<	0.1	0.00		0.07		0.12	52.63	<	0.01	<	0.01	0.00		0.06		0.1	50.00
H18	<	0.1	<	0.1	0.00	<	0.05		0.07	33.33	<	0.01	<	0.01	0.00		0.09		0.08	-11.76
HEG1	<	0.1	<	0.1	0.00		0.15		5.02	188.39	<	0.01	<	0.01	0.00		0.18		4.76	185.43
HEG2	<	0.1	<	0.1	0.00		0.13		6.18	191.76	<	0.01	<	0.01	0.00		0.14		6.28	191.28
TAG6	<	0.1	<	0.1	0.00		0.06		0.24	120.00	<	0.01	<	0.01	0.00		0.06		0.22	114.29
TAG5	<	0.1	<	0.1	0.00		0.06		0.74	170.00	<	0.01	<	0.01	0.00		0.07		0.58	156.92
TAG4	<	0.1	<	0.1	0.00	<	0.05		1.66	188.30	<	0.01	<	0.01	0.00		0.03		1.55	192.41
TAG7	<	0.1	<	0.1	0.00	<	0.05		0.29	141.18	<	0.01	<	0.01	0.00		0.01		0.28	186.21
TAG1		1.4	<	0.1	-173.33		0.14		2.85	181.27	<	0.01	<	0.01	0.00		4.96		2.38	-70.30
TAG3	<	0.1		0.8	155.56		0.06		8.66	197.25	<	0.01	<	0.01	0.00		0.36		10.6	186.86
Blank	<	0.1	<	0.1	0.00	<	0.05	<	0.05	0.00	<	0.01	<	0.01	0.00	<	0.01	<	0.01	0.00
Field Blank	<	0.1	<	0.1	0.00	<	0.05	<	0.05	0.00		0.01	<	0.01	0.00		0.01	<	0.01	0.00
Blank			<	0.1				<	0.05				<	0.01				<	0.01	

Site	Dissolved Arsenic	Total Arsenic	%RPD Dissolved:Total	Dissolved Cadmium	Total Cadmium	%RPD Dissolved:Total	Dissolved Chromium	Total Chromium	%RPD Dissolved:Total	Dissolved Copper	Total Copper	%RPD Dissolved:Total
BAI1	< 0.001	< 0.001	0.00	0.0003	< 0.0001	-100.00	< 0.001	0.003	100.00	< 0.001	0.002	66.67
BAI2	0.003	0.002	-40.00	< 0.0001	< 0.0001	0.00	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
BAI4	< 0.001	< 0.001	0.00	< 0.0001	< 0.0001	0.00	< 0.001	0.002	66.67	< 0.001	0.003	100.00
BAI5	< 0.001	0.003	100.00	0.0002	0.0003	40.00	< 0.001	0.011	166.67	< 0.001	0.011	166.67
BAI6	0.002	0.005	85.71	< 0.0001	< 0.0001	0.00	< 0.001	0.013	171.43	< 0.001	0.007	150.00
BAI7	< 0.001	< 0.001	0.00	< 0.0001	< 0.0001	0.00	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
BAI8	0.001	< 0.001	0.00	0.0049	0.0001	-192.00	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
JUH2	< 0.001	< 0.001	0.00	0.0002	< 0.0001	-66.67	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
JUH3	< 0.001	< 0.001	0.00	0.0001	< 0.0001	0.00	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
JUH5	< 0.001	< 0.001	0.00	< 0.0001	< 0.0001	0.00	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
JUH6	< 0.001	< 0.001	0.00	< 0.0001	< 0.0001	0.00	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
JUH8	< 0.001	< 0.001	0.00	0.0002	0.0003	40.00	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
JUH8 - DUP	< 0.001	< 0.001	0.00	< 0.0001	< 0.0001	0.00	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
H17	< 0.001	< 0.001	0.00	< 0.0001	< 0.0001	0.00	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
H17 - DUP	< 0.001	< 0.001	0.00	0.0002	< 0.0001	-66.67	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
H18	< 0.001	< 0.001	0.00	< 0.0001	< 0.0001	0.00	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
HEG1	0.001	0.003	100.00	< 0.0001	< 0.0001	0.00	< 0.001	0.005	133.33	< 0.001	0.007	150.00
HEG2	< 0.001	0.002	66.67	< 0.0001	< 0.0001	0.00	< 0.001	0.005	133.33	0.001	0.01	163.64
TAG6	< 0.001	< 0.001	0.00	< 0.0001	< 0.0001	0.00	0.002	< 0.001	-66.67	< 0.001	< 0.001	0.00
TAG5	< 0.001	< 0.001	0.00	< 0.0001	< 0.0001	0.00	< 0.001	< 0.001	0.00	0.002	0.002	0.00
TAG4	< 0.001	0.001	0.00	< 0.0001	0.0001	0.00	0.002	0.002	0.00	< 0.001	0.002	66.67
TAG7	< 0.001	< 0.001	0.00	< 0.0001	0.0001	0.00	0.001	0.001	0.00	< 0.001	< 0.001	0.00
TAG1	< 0.001	0.002	66.67	< 0.0001	0.0001	0.00	0.009	0.004	-76.92	0.002	0.003	40.00
TAG3	< 0.001	0.003	100.00	< 0.0001	0.0002	66.67	< 0.001	0.014	173.33	0.001	0.01	163.64
Blank	< 0.001	< 0.001	0.00	< 0.0001	0.0002	66.67	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
Field Blank	< 0.001	< 0.001	0.00	0.0016	< 0.0001	-176.47	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
Blank		< 0.001			0.0008			< 0.001			< 0.001	

Site	Dissolved Lead	Total Lead	%RPD Dissolved:Total	Dissolved Manganese	Total Manganese	%RPD Dissolved:Total	Dissolved Nickel	Total Nickel	%RPD Dissolved:Total	Dissolved Silver	Total Silver	%RPD Dissolved:Total
BAI1	< 0.001	< 0.001	0.00	0.002	0.05	184.62	< 0.001	0.004	120.00	< 0.001	< 0.001	0.00
BAI2	< 0.001	< 0.001	0.00	0.162	0.247	41.56	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
BAI4	< 0.001	< 0.001	0.00	0.007	0.057	156.25	< 0.001	0.002	66.67	< 0.001	< 0.001	0.00
BAI5	< 0.001	0.005	0.00	0.01	0.272	185.82	< 0.001	0.018	178.95	< 0.001	< 0.001	0.00
BAI6	< 0.001	0.004	0.00	0.005	0.241	191.87	< 0.001	0.016	176.47	< 0.001	< 0.001	0.00
BAI7	< 0.001	< 0.001	0.00	0.008	0.018	76.92	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
BAI8	< 0.001	< 0.001	0.00	0.002	0.01	133.33	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
JUH2	< 0.001	< 0.001	0.00	0.006	0.012	66.67	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
JUH3	< 0.001	< 0.001	0.00	0.011	0.012	8.70	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
JUH5	< 0.001	< 0.001	0.00	< 0.001	0.002	66.67	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
JUH6	< 0.001	< 0.001	0.00	0.003	0.006	66.67	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
JUH8	0.001	< 0.001	0.00	0.004	0.006	40.00	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
JUH8 - DUP	< 0.001	< 0.001	0.00	0.004	0.006	40.00	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
H17	< 0.001	< 0.001	0.00	0.006	0.008	28.57	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
H17 - DUP	0.002	< 0.001	0.00	0.006	0.009	40.00	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
H18	< 0.001	< 0.001	0.00	< 0.001	0.002	66.67	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
HEG1	< 0.001	0.003	0.00	0.004	0.102	184.91	< 0.001	0.003	100.00	< 0.001	< 0.001	0.00
HEG2	< 0.001	0.004	0.00	0.006	0.124	181.54	< 0.001	0.004	120.00	< 0.001	< 0.001	0.00
TAG6	< 0.001	< 0.001	0.00	0.002	0.005	85.71	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
TAG5	< 0.001	< 0.001	0.00	0.026	0.031	17.54	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
TAG4	< 0.001	< 0.001	0.00	0.006	0.047	154.72	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
TAG7	< 0.001	< 0.001	0.00	0.002	0.01	133.33	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
TAG1	0.003	0.003	0.00	0.007	0.064	160.56	< 0.001	0.002	66.67	< 0.001	< 0.001	0.00
TAG3	0.001	0.007	0.00	0.004	0.161	190.30	< 0.001	0.006	142.86	< 0.001	< 0.001	0.00
Blank	< 0.001	< 0.001	0.00	< 0.001	0.001	0.00	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
Field Blank	0.001	< 0.001	0.00	0.003	0.001	-100.00	< 0.001	< 0.001	0.00	< 0.001	< 0.001	0.00
Blank		< 0.001			0.001			< 0.001			< 0.001	

Site	Dissolved Zinc	Total Zinc	%RPD Dissolved:Total	Dissolved Mercury	Total Mercury	%RPD Dissolved:Total
BAI1	0.03	0.054	57.14	<	0.0001	0.00
BAI2	0.058	0.021	-93.67	<	0.0001	0.00
BAI4	0.096	0.078	-20.69	<	0.0001	0.00
BAI5	0.017	0.12	150.36	<	0.0001	0.00
BAI6	0.166	0.039	-123.90	<	0.0001	0.00
BAI7	0.005	<	0.005	<	0.0001	0.00
BAI8	0.016	0.007	-78.26	<	0.0001	0.00
JUH2	0.048	0.038	-23.26	<	0.0001	0.00
JUH3	0.057	<	0.005	<	0.0001	0.00
JUH5	0.056	0.041	-30.93	<	0.0001	0.00
JUH6	0.018	0.096	136.84	<	0.0001	0.00
JUH8	0.185	0.026	-150.71	<	0.0001	0.00
JUH8 - DUP	0.025	0.076	100.99	<	0.0001	0.00
H17	0.091	0.025	-113.79	<	0.0001	0.00
H17 - DUP	0.159	0.007	-183.13	<	0.0001	0.00
H18	0.021	0.014	-40.00	<	0.0001	0.00
HEG1	0.014	0.01	-33.33	<	0.0001	0.00
HEG2	0.049	0.103	71.05	<	0.0001	0.00
TAG6	0.15	0.044	-109.28	<	0.0001	0.00
TAG5	0.036	0.01	-113.04	<	0.0001	0.00
TAG4	0.058	0.031	-60.67	<	0.0001	0.00
TAG7	0.137	0.058	-81.03	<	0.0001	0.00
TAG1	0.037	0.085	78.69	<	0.0001	0.00
TAG3	0.104	0.133	24.47	<	0.0001	0.00
Blank	0.11	0.05	-75.00	<	0.0001	0.00
Field Blank	0.438	0.017	-185.05	<	0.0001	0.00
Blank		0.125			<	0.0001

Sediment Duplicates QA/QC

Site	Al	Al LOR	As	As LOR	B	B LOR	Cd	Cd LOR	Cr	Cr LOR	Cu	Cu LOR	Fe	Fe LOR	
JUH8	44700	50	35	5	<	50	50	1	1	48	2	22	5	77100	50
JUH8 - DUP	59600	50	25	5	<	50	50	2	1	68	2	20	5	94800	50
RPD	-28.57		33.33						-34.48		9.52		-20.59		

Site	Pb	Pb LOR	Mn	Mn LOR	Ni	Ni LOR	Se	Se LOR	Ag	Ag LOR	Zn	Zn LOR	Hg	Hg LOR		
JUH8	15	5	741	5	62	2	<	5	5	<	2	2	111	5	11.3	0.1
JUH8 - DUP	18	5	601	5	72	2	<	5	5	<	2	2	123	5	6	0.1
RPD	-18.18		20.86		-14.93		0.00		0.00		-10.26		61.27			

Site	% Gravel	% Sand	% Silt	% Clay
JUH8	0	81	12	7
JUH8 - DUP	0	73	15	12
RPD		10.39	-22.22	-52.63

Appendix 2 ALS Laboratory Reports

CHAIN OF CUSTODY DOCUMENTATION

CLIENT: HYDROBIOLOGY P/L	SAMPLER: ADRIAN FLYNN
ADDRESS / OFFICE: BRISBANE, 47 PARK RD, MILTON 4064	MOBILE: 0421 693 120
PROJECT MANAGER (PM): ADRIAN FLYNN	PHONE: 3369 1051
PROJECT ID: CNS0801	EMAIL REPORT TO: adrian.flynn@hydrobiology.biz
SITE: PNG	EMAIL INVOICE TO: (if different to report)
RESULTS REQUIRED (Date):	QUOTE NO.: BN/4008/07



Environmental Division
Brisbane

Work Order

EB0802329



Telephone : +61-7-3243 7222

FOR LABORATORY USE ONLY	COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:
COOLER SEAL (Circle appropriate)	
Intact: ☒ Yes ☐ No N/A	
SAMPLE TEMPERATURE 22.0	
CHILLED: ☒ Yes ☐ No	

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite)									
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	PHYS PARAMETERS	N & P	METALS (TOTAL)	METALS (DISSOLVED)	SEDIMENT	DISSOLVED METALS	DOC			
1	CNS0801-W-001	W	12/2/08		1L green		✓									
2	CNS0801-W-002	W			purple			✓								
3	" W-003	W			amber								✓			
4	" W-004	W			red				✓							
5	" W-005	W			red					✓						
6	" W-006	W			red											
7	" W-007	W			1L green		✓									
8	" W-008	W			purple			✓								
9	" W-009	W			amber								✓			
10	" W-010	W			red				✓							
11	" W-011	W			red					✓						
12	" W-012	W			1L green		✓									

Dissolved metals samples
field-filtered

Sediment in 2 samples
fraction

NOT SENT

RELINQUISHED BY:		RECEIVED BY:		METHOD OF SHIPMENT	
Name: ADRIAN FLYNN IN PNG	Date: 15/2/08	Name: J. FABRY	Date: 22/2/08	Con' Note No:	
Of: HYDROBIOLOGY	Time:	Of: ALS	Time: 08:35	CERPLABO 554 LNW	
Name:	Date:	Name:	Date:	Transport Co: TNT	
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.

ALS LABORATORY GROUP

CLIENT:	SAMPLER:	 ALS Laboratory Group
ADDRESS / OFFICE:	MOBILE:	
PROJECT MANAGER (PM):	PHONE:	
PROJECT ID:	EMAIL REPORT TO:	
SITE:	P.O. NO.:	
	EMAIL INVOICE TO: (if different to report)	



RESULTS REQUIRED (Date):		QUOTE NO.:	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)										
In tact:	(Yes) No N/A									
SAMPLE TEMPERATURE										
CHILLED:	Yes No									

[illegible]

RELINQUISHED BY:		RECEIVED BY:		METHOD OF SHIPMENT
Name: ADRIAN FRYAN in PNG	Date: 15/2/08	Name: J. FABRY	Date: 22/2/08	Con' Note No:
Of: HYDROBIOLOGY	Time:	Of: ALS	Time: 08-35	
Name:	Date:	Name:	Date:	Transport Co:
Of:	Time:	Of:	Time:	

ALS LABORATORY GROUP

CHAIN OF CUSTODY DOCUMENTATION



ALS Laboratory Group

CLIENT:	SAMPLER:
ADDRESS / OFFICE:	MOBILE:
PROJECT MANAGER (PM):	PHONE:
PROJECT ID:	EMAIL REPORT TO:
SITE:	EMAIL INVOICE TO: (if different to report)
P.O. NO.:	

RESULTS REQUIRED (Date): QUOTE NO.: 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: 22.0		
CHILLED: ☒ Yes ☐ No		

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION		PHYS	N	DO	MET	MET																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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RELINQUISHED BY:		RECEIVED BY:		METHOD OF SHIPMENT	
Name: AORIAN FCTNN in PNG	Date: 13/2/08	Name: J. FABRY	Date: 22/2/08	Con' Note No:	
Of: Hydrobiology	Time:	Of: ALS	Time: 08:35		
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.

ALS LABORATORY GROUP

COC Page 3 of 4



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: EB0802329	Page	: 1 of 16
Client	: HYDROBIOLOGY PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: MR ADRIAN FLYNN	Contact	: Tim Kilmister
Address	: P O BOX 2050 MILTON QLD, AUSTRALIA 4064	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: adrian.flynn@hydrobiology.biz	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 33682133	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 38763068	Facsimile	: +61-7-3243 7218
Project	: CNS0801	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 22-FEB-2008
C-O-C number	: ----	Issue Date	: 05-MAR-2008
Sampler	: ADRIAN FLYNN	No. of samples received	: 35
Site	: PNG	No. of samples analysed	: 35
Quote number	: ----		

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

This document is issued in accordance with NATA accreditation requirements.

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
Hoa Nguyen	Senior Inorganic Chemist	Inorganics
Kim McCabe	Senior Inorganic Chemist	Inorganics
Stephen Hislop		Inorganics

Environmental Division Brisbane

Part of the **ALS Laboratory Group**

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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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes.

Key : CAS Number = Chemistry Abstract Services number

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- **EG005T (Total Metals): LCS recovery for various inorganic analyses fall outside Dynamic Control Limits. They are however within ALS Static Control Limits and hence deemed acceptable.**



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-001	CNS0801-W-002	CNS0801-W-003	CNS0801-W-004	CNS0801-W-005
				12-FEB-2008 15:00	12-FEB-2008 15:00	12-FEB-2008 15:00	12-FEB-2008 15:00	12-FEB-2008 15:00
Compound	CAS Number	LOR	Unit	EB0802329-001	EB0802329-002	EB0802329-003	EB0802329-004	EB0802329-005
EA025: Suspended Solids								
^ Suspended Solids (SS)	----	1	mg/L	80	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	12.5	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	101	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	101	----	----	----	----
ED040F: Dissolved Major Anions								
Sulphate as SO4 2-	14808-79-8	1	mg/L	5	----	----	----	----
ED045P: Chloride by PC Titrator								
Chloride	16887-00-6	1	mg/L	6	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	36	----	----	----	----
Magnesium	7439-95-4	1	mg/L	5	----	----	----	----
Sodium	7440-23-5	1	mg/L	2	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG005F: Dissolved Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	----	<0.1
Iron	7439-89-6	0.05	mg/L	----	----	----	----	<0.05
Selenium	7782-49-2	0.01	mg/L	----	----	----	----	<0.01
EG005T: Total Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	<0.1	----
Iron	7439-89-6	0.05	mg/L	----	----	----	2.51	----
Selenium	7782-49-2	0.01	mg/L	----	----	----	<0.01	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	----	0.02
Arsenic	7440-38-2	0.001	mg/L	----	----	----	----	<0.001
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	----	0.0003
Chromium	7440-47-3	0.001	mg/L	----	----	----	----	<0.001
Copper	7440-50-8	0.001	mg/L	----	----	----	----	<0.001
Lead	7439-92-1	0.001	mg/L	----	----	----	----	<0.001
Manganese	7439-96-5	0.001	mg/L	----	----	----	----	0.002
Nickel	7440-02-0	0.001	mg/L	----	----	----	----	<0.001
Silver	7440-22-4	0.001	mg/L	----	----	----	----	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	----	----	0.030
EG020T: Total Metals by ICP-MS								



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-001	CNS0801-W-002	CNS0801-W-003	CNS0801-W-004	CNS0801-W-005
				12-FEB-2008 15:00	12-FEB-2008 15:00	12-FEB-2008 15:00	12-FEB-2008 15:00	12-FEB-2008 15:00
Compound	CAS Number	LOR	Unit	EB0802329-001	EB0802329-002	EB0802329-003	EB0802329-004	EB0802329-005
EG020T: Total Metals by ICP-MS - Continued								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	1.38	----
Arsenic	7440-38-2	0.001	mg/L	----	----	----	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	----	----	----	0.003	----
Copper	7440-50-8	0.001	mg/L	----	----	----	0.002	----
Lead	7439-92-1	0.001	mg/L	----	----	----	<0.001	----
Manganese	7439-96-5	0.001	mg/L	----	----	----	0.050	----
Nickel	7440-02-0	0.001	mg/L	----	----	----	0.004	----
Silver	7440-22-4	0.001	mg/L	----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L	----	----	----	0.054	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	----	<0.0001
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	<0.0001	----
EK057: Nitrite as N								
Nitrite as N	----	0.010	mg/L	<0.010	----	----	----	----
EK058: Nitrate as N								
^ Nitrate as N	14797-55-8	0.010	mg/L	0.079	----	----	----	----
EK059: Nitrite plus Nitrate as N (NOx)								
Nitrite + Nitrate as N	----	0.010	mg/L	0.079	0.116	----	----	----
EK061: Total Kjeldahl Nitrogen (TKN)								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	<0.1	----	----	----
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	0.1	mg/L	----	0.1	----	----	----
EK067: Total Phosphorus as P								
Total Phosphorus as P	----	0.01	mg/L	----	0.04	----	----	----
EK071: Reactive Phosphorus as P (Dissolved)								
Reactive Phosphorus - Filtered	----	0.010	mg/L	0.024	----	----	----	----
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	2.30	----	----	----	----
^ Total Cations	----	0.01	meq/L	2.30	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	----	----	1	----	----



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-007	CNS0801-W-008	CNS0801-W-009	CNS0801-W-010	CNS0801-W-011
				12-FEB-2008 15:00	12-FEB-2008 15:00	12-FEB-2008 15:00	12-FEB-2008 15:00	12-FEB-2008 15:00
Compound	CAS Number	LOR	Unit	EB0802329-006	EB0802329-007	EB0802329-008	EB0802329-009	EB0802329-010
EA025: Suspended Solids								
^ Suspended Solids (SS)	----	1	mg/L	<1	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	0.5	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	4	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	4	----	----	----	----
ED040F: Dissolved Major Anions								
Sulphate as SO4 2-	14808-79-8	1	mg/L	<1	----	----	----	----
ED045P: Chloride by PC Titrator								
Chloride	16887-00-6	1	mg/L	<1	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	<1	----	----	----	----
Magnesium	7439-95-4	1	mg/L	<1	----	----	----	----
Sodium	7440-23-5	1	mg/L	<1	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG005F: Dissolved Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	----	<0.1
Iron	7439-89-6	0.05	mg/L	----	----	----	----	<0.05
Selenium	7782-49-2	0.01	mg/L	----	----	----	----	<0.01
EG005T: Total Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	<0.1	----
Iron	7439-89-6	0.05	mg/L	----	----	----	<0.05	----
Selenium	7782-49-2	0.01	mg/L	----	----	----	<0.01	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	----	<0.01
Arsenic	7440-38-2	0.001	mg/L	----	----	----	----	<0.001
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	----	<0.0001
Chromium	7440-47-3	0.001	mg/L	----	----	----	----	<0.001
Copper	7440-50-8	0.001	mg/L	----	----	----	----	<0.001
Lead	7439-92-1	0.001	mg/L	----	----	----	----	<0.001
Manganese	7439-96-5	0.001	mg/L	----	----	----	----	<0.001
Nickel	7440-02-0	0.001	mg/L	----	----	----	----	<0.001
Silver	7440-22-4	0.001	mg/L	----	----	----	----	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	----	----	0.110
EG020T: Total Metals by ICP-MS								



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-007	CNS0801-W-008	CNS0801-W-009	CNS0801-W-010	CNS0801-W-011
				12-FEB-2008 15:00	12-FEB-2008 15:00	12-FEB-2008 15:00	12-FEB-2008 15:00	12-FEB-2008 15:00
Compound	CAS Number	LOR	Unit	EB0802329-006	EB0802329-007	EB0802329-008	EB0802329-009	EB0802329-010
EG020T: Total Metals by ICP-MS - Continued								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	<0.01	----
Arsenic	7440-38-2	0.001	mg/L	----	----	----	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	0.0002	----
Chromium	7440-47-3	0.001	mg/L	----	----	----	<0.001	----
Copper	7440-50-8	0.001	mg/L	----	----	----	<0.001	----
Lead	7439-92-1	0.001	mg/L	----	----	----	<0.001	----
Manganese	7439-96-5	0.001	mg/L	----	----	----	<0.001	----
Nickel	7440-02-0	0.001	mg/L	----	----	----	<0.001	----
Silver	7440-22-4	0.001	mg/L	----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L	----	----	----	0.050	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	----	<0.0001
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	<0.0001	----
EK057: Nitrite as N								
Nitrite as N	----	0.010	mg/L	<0.010	----	----	----	----
EK058: Nitrate as N								
^ Nitrate as N	14797-55-8	0.010	mg/L	<0.010	----	----	----	----
EK059: Nitrite plus Nitrate as N (NO_x)								
Nitrite + Nitrate as N	----	0.010	mg/L	<0.010	0.029	----	----	----
EK061: Total Kjeldahl Nitrogen (TKN)								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	<0.1	----	----	----
EK062: Total Nitrogen as N (TKN + NO_x)								
^ Total Nitrogen as N	----	0.1	mg/L	----	<0.1	----	----	----
EK067: Total Phosphorus as P								
Total Phosphorus as P	----	0.01	mg/L	----	<0.01	----	----	----
EK071: Reactive Phosphorus as P (Dissolved)								
Reactive Phosphorus - Filtered	----	0.010	mg/L	0.012	----	----	----	----
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	0.08	----	----	----	----
^ Total Cations	----	0.01	meq/L	<0.01	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	----	----	<1	----	----



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-012	CNS0801-W-013	CNS0801-W-014	CNS0801-W-015	CNS0801-W-016
				12-FEB-2008 15:00	12-FEB-2008 15:00	12-FEB-2008 15:00	12-FEB-2008 15:00	12-FEB-2008 15:00
Compound	CAS Number	LOR	Unit	EB0802329-011	EB0802329-012	EB0802329-013	EB0802329-014	EB0802329-015
EA025: Suspended Solids								
^ Suspended Solids (SS)	----	1	mg/L	<1	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	<0.1	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	4	----	----	----	----
Total Alkalinity as CaCO ₃	----	1	mg/L	4	----	----	----	----
ED040F: Dissolved Major Anions								
Sulphate as SO ₄ 2-	14808-79-8	1	mg/L	<1	----	----	----	----
ED045P: Chloride by PC Titrator								
Chloride	16887-00-6	1	mg/L	<1	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	<1	----	----	----	----
Magnesium	7439-95-4	1	mg/L	<1	----	----	----	----
Sodium	7440-23-5	1	mg/L	<1	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG005F: Dissolved Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	----	<0.1
Iron	7439-89-6	0.05	mg/L	----	----	----	----	0.36
Selenium	7782-49-2	0.01	mg/L	----	----	----	----	0.01
EG005T: Total Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	<0.1	----
Iron	7439-89-6	0.05	mg/L	----	----	----	<0.05	----
Selenium	7782-49-2	0.01	mg/L	----	----	----	<0.01	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	----	0.01
Arsenic	7440-38-2	0.001	mg/L	----	----	----	----	<0.001
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	----	0.0016
Chromium	7440-47-3	0.001	mg/L	----	----	----	----	<0.001
Copper	7440-50-8	0.001	mg/L	----	----	----	----	<0.001
Lead	7439-92-1	0.001	mg/L	----	----	----	----	0.001
Manganese	7439-96-5	0.001	mg/L	----	----	----	----	0.003
Nickel	7440-02-0	0.001	mg/L	----	----	----	----	<0.001
Silver	7440-22-4	0.001	mg/L	----	----	----	----	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	----	----	0.438
EG020T: Total Metals by ICP-MS								



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-012	CNS0801-W-013	CNS0801-W-014	CNS0801-W-015	CNS0801-W-016
				12-FEB-2008 15:00	12-FEB-2008 15:00	12-FEB-2008 15:00	12-FEB-2008 15:00	12-FEB-2008 15:00
Compound	CAS Number	LOR	Unit	EB0802329-011	EB0802329-012	EB0802329-013	EB0802329-014	EB0802329-015
EG020T: Total Metals by ICP-MS - Continued								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	<0.01	----
Arsenic	7440-38-2	0.001	mg/L	----	----	----	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	----	----	----	<0.001	----
Copper	7440-50-8	0.001	mg/L	----	----	----	<0.001	----
Lead	7439-92-1	0.001	mg/L	----	----	----	<0.001	----
Manganese	7439-96-5	0.001	mg/L	----	----	----	<0.001	----
Nickel	7440-02-0	0.001	mg/L	----	----	----	<0.001	----
Silver	7440-22-4	0.001	mg/L	----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L	----	----	----	0.017	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	----	<0.0001
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	<0.0001	----
EK057: Nitrite as N								
Nitrite as N	----	0.010	mg/L	<0.010	----	----	----	----
EK058: Nitrate as N								
^ Nitrate as N	14797-55-8	0.010	mg/L	<0.010	----	----	----	----
EK059: Nitrite plus Nitrate as N (NO_x)								
Nitrite + Nitrate as N	----	0.010	mg/L	<0.010	0.042	----	----	----
EK061: Total Kjeldahl Nitrogen (TKN)								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	<0.1	----	----	----
EK062: Total Nitrogen as N (TKN + NO_x)								
^ Total Nitrogen as N	----	0.1	mg/L	----	<0.1	----	----	----
EK067: Total Phosphorus as P								
Total Phosphorus as P	----	0.01	mg/L	----	<0.01	----	----	----
EK071: Reactive Phosphorus as P (Dissolved)								
Reactive Phosphorus - Filtered	----	0.010	mg/L	0.013	----	----	----	----
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	0.08	----	----	----	----
^ Total Cations	----	0.01	meq/L	<0.01	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	----	----	<1	----	----



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-017	CNS0801-W-018	CNS0801-W-019	CNS0801-W-020	CNS0801-W-021
				13-FEB-2008 15:00	13-FEB-2008 15:00	13-FEB-2008 15:00	13-FEB-2008 15:00	13-FEB-2008 15:00
Compound	CAS Number	LOR	Unit	EB0802329-016	EB0802329-017	EB0802329-018	EB0802329-019	EB0802329-020
EA025: Suspended Solids								
^ Suspended Solids (SS)	----	1	mg/L	1	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	0.5	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	188	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	188	----	----	----	----
ED040F: Dissolved Major Anions								
Sulphate as SO4 2-	14808-79-8	1	mg/L	17	----	----	----	----
ED045P: Chloride by PC Titrator								
Chloride	16887-00-6	1	mg/L	3	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	53	----	----	----	----
Magnesium	7439-95-4	1	mg/L	9	----	----	----	----
Sodium	7440-23-5	1	mg/L	16	----	----	----	----
Potassium	7440-09-7	1	mg/L	1	----	----	----	----
EG005F: Dissolved Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	----	<0.1
Iron	7439-89-6	0.05	mg/L	----	----	----	----	<0.05
Selenium	7782-49-2	0.01	mg/L	----	----	----	----	0.01
EG005T: Total Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	<0.1	----
Iron	7439-89-6	0.05	mg/L	----	----	----	0.19	----
Selenium	7782-49-2	0.01	mg/L	----	----	----	0.01	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	----	<0.01
Arsenic	7440-38-2	0.001	mg/L	----	----	----	----	0.003
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	----	<0.0001
Chromium	7440-47-3	0.001	mg/L	----	----	----	----	<0.001
Copper	7440-50-8	0.001	mg/L	----	----	----	----	<0.001
Lead	7439-92-1	0.001	mg/L	----	----	----	----	<0.001
Manganese	7439-96-5	0.001	mg/L	----	----	----	----	0.162
Nickel	7440-02-0	0.001	mg/L	----	----	----	----	<0.001
Silver	7440-22-4	0.001	mg/L	----	----	----	----	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	----	----	0.058
EG020T: Total Metals by ICP-MS								



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-017	CNS0801-W-018	CNS0801-W-019	CNS0801-W-020	CNS0801-W-021
				13-FEB-2008 15:00	13-FEB-2008 15:00	13-FEB-2008 15:00	13-FEB-2008 15:00	13-FEB-2008 15:00
Compound	CAS Number	LOR	Unit	EB0802329-016	EB0802329-017	EB0802329-018	EB0802329-019	EB0802329-020
EG020T: Total Metals by ICP-MS - Continued								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	0.03	----
Arsenic	7440-38-2	0.001	mg/L	----	----	----	0.002	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	----	----	----	<0.001	----
Copper	7440-50-8	0.001	mg/L	----	----	----	<0.001	----
Lead	7439-92-1	0.001	mg/L	----	----	----	<0.001	----
Manganese	7439-96-5	0.001	mg/L	----	----	----	0.247	----
Nickel	7440-02-0	0.001	mg/L	----	----	----	<0.001	----
Silver	7440-22-4	0.001	mg/L	----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L	----	----	----	0.021	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	----	<0.0001
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	<0.0001	----
EK057: Nitrite as N								
Nitrite as N	----	0.010	mg/L	<0.010	----	----	----	----
EK058: Nitrate as N								
^ Nitrate as N	14797-55-8	0.010	mg/L	0.013	----	----	----	----
EK059: Nitrite plus Nitrate as N (NOx)								
Nitrite + Nitrate as N	----	0.010	mg/L	0.013	0.052	----	----	----
EK061: Total Kjeldahl Nitrogen (TKN)								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	0.3	----	----	----
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	0.1	mg/L	----	0.4	----	----	----
EK067: Total Phosphorus as P								
Total Phosphorus as P	----	0.01	mg/L	----	0.01	----	----	----
EK071: Reactive Phosphorus as P (Dissolved)								
Reactive Phosphorus - Filtered	----	0.010	mg/L	0.024	----	----	----	----
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	4.19	----	----	----	----
^ Total Cations	----	0.01	meq/L	4.09	----	----	----	----
^ Ionic Balance	----	0.01	%	1.22	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	----	----	1	----	----



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-023	CNS0801-W-024	CNS0801-W-025	CNS0801-W-026	CNS0801-W-027
				13-FEB-2008 15:00	13-FEB-2008 15:00	13-FEB-2008 15:00	13-FEB-2008 15:00	13-FEB-2008 15:00
Compound	CAS Number	LOR	Unit	EB0802329-021	EB0802329-022	EB0802329-023	EB0802329-024	EB0802329-025
EA025: Suspended Solids								
^ Suspended Solids (SS)	----	1	mg/L	54	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	18.7	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	44	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	44	----	----	----	----
ED040F: Dissolved Major Anions								
Sulphate as SO4 2-	14808-79-8	1	mg/L	6	----	----	----	----
ED045P: Chloride by PC Titrator								
Chloride	16887-00-6	1	mg/L	<1	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	17	----	----	----	----
Magnesium	7439-95-4	1	mg/L	1	----	----	----	----
Sodium	7440-23-5	1	mg/L	2	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG005F: Dissolved Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	----	<0.1
Iron	7439-89-6	0.05	mg/L	----	----	----	----	<0.05
Selenium	7782-49-2	0.01	mg/L	----	----	----	----	0.01
EG005T: Total Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	<0.1	----
Iron	7439-89-6	0.05	mg/L	----	----	----	2.29	----
Selenium	7782-49-2	0.01	mg/L	----	----	----	<0.01	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	----	0.04
Arsenic	7440-38-2	0.001	mg/L	----	----	----	----	<0.001
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	----	<0.0001
Chromium	7440-47-3	0.001	mg/L	----	----	----	----	<0.001
Copper	7440-50-8	0.001	mg/L	----	----	----	----	<0.001
Lead	7439-92-1	0.001	mg/L	----	----	----	----	<0.001
Manganese	7439-96-5	0.001	mg/L	----	----	----	----	0.007
Nickel	7440-02-0	0.001	mg/L	----	----	----	----	<0.001
Silver	7440-22-4	0.001	mg/L	----	----	----	----	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	----	----	0.096
EG020T: Total Metals by ICP-MS								



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-023	CNS0801-W-024	CNS0801-W-025	CNS0801-W-026	CNS0801-W-027
				13-FEB-2008 15:00	13-FEB-2008 15:00	13-FEB-2008 15:00	13-FEB-2008 15:00	13-FEB-2008 15:00
Compound	CAS Number	LOR	Unit	EB0802329-021	EB0802329-022	EB0802329-023	EB0802329-024	EB0802329-025
EG020T: Total Metals by ICP-MS - Continued								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	1.92	----
Arsenic	7440-38-2	0.001	mg/L	----	----	----	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	----	----	----	0.002	----
Copper	7440-50-8	0.001	mg/L	----	----	----	0.003	----
Lead	7439-92-1	0.001	mg/L	----	----	----	<0.001	----
Manganese	7439-96-5	0.001	mg/L	----	----	----	0.057	----
Nickel	7440-02-0	0.001	mg/L	----	----	----	0.002	----
Silver	7440-22-4	0.001	mg/L	----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L	----	----	----	0.078	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	----	<0.0001
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	<0.0001	----
EK057: Nitrite as N								
Nitrite as N	----	0.010	mg/L	<0.010	----	----	----	----
EK058: Nitrate as N								
^ Nitrate as N	14797-55-8	0.010	mg/L	0.021	----	----	----	----
EK059: Nitrite plus Nitrate as N (NOx)								
Nitrite + Nitrate as N	----	0.010	mg/L	0.021	0.058	----	----	----
EK061: Total Kjeldahl Nitrogen (TKN)								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	0.1	----	----	----
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	0.1	mg/L	----	0.2	----	----	----
EK067: Total Phosphorus as P								
Total Phosphorus as P	----	0.01	mg/L	----	0.05	----	----	----
EK071: Reactive Phosphorus as P (Dissolved)								
Reactive Phosphorus - Filtered	----	0.010	mg/L	0.030	----	----	----	----
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	1.00	----	----	----	----
^ Total Cations	----	0.01	meq/L	1.10	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	----	----	2	----	----



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-029	CNS0801-W-030	CNS0801-W-031	CNS0801-W-032	CNS0801-W-033
				14-FEB-2008 15:00	14-FEB-2008 15:00	14-FEB-2008 15:00	14-FEB-2008 15:00	14-FEB-2008 15:00
Compound	CAS Number	LOR	Unit	EB0802329-026	EB0802329-027	EB0802329-028	EB0802329-029	EB0802329-030
EA025: Suspended Solids								
^ Suspended Solids (SS)	----	1	mg/L	237	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	16.4	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	63	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	63	----	----	----	----
ED040F: Dissolved Major Anions								
Sulphate as SO4 2-	14808-79-8	1	mg/L	5	----	----	----	----
ED045P: Chloride by PC Titrator								
Chloride	16887-00-6	1	mg/L	<1	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	19	----	----	----	----
Magnesium	7439-95-4	1	mg/L	2	----	----	----	----
Sodium	7440-23-5	1	mg/L	2	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG005F: Dissolved Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	----	<0.1
Iron	7439-89-6	0.05	mg/L	----	----	----	----	<0.05
Selenium	7782-49-2	0.01	mg/L	----	----	----	----	<0.01
EG005T: Total Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	<0.1	----
Iron	7439-89-6	0.05	mg/L	----	----	----	13.1	----
Selenium	7782-49-2	0.01	mg/L	----	----	----	<0.01	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	----	0.05
Arsenic	7440-38-2	0.001	mg/L	----	----	----	----	<0.001
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	----	0.0002
Chromium	7440-47-3	0.001	mg/L	----	----	----	----	<0.001
Copper	7440-50-8	0.001	mg/L	----	----	----	----	<0.001
Lead	7439-92-1	0.001	mg/L	----	----	----	----	<0.001
Manganese	7439-96-5	0.001	mg/L	----	----	----	----	0.010
Nickel	7440-02-0	0.001	mg/L	----	----	----	----	<0.001
Silver	7440-22-4	0.001	mg/L	----	----	----	----	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	----	----	0.017
EG020T: Total Metals by ICP-MS								



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-029	CNS0801-W-030	CNS0801-W-031	CNS0801-W-032	CNS0801-W-033
				14-FEB-2008 15:00	14-FEB-2008 15:00	14-FEB-2008 15:00	14-FEB-2008 15:00	14-FEB-2008 15:00
Compound	CAS Number	LOR	Unit	EB0802329-026	EB0802329-027	EB0802329-028	EB0802329-029	EB0802329-030
EG020T: Total Metals by ICP-MS - Continued								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	10.0	----
Arsenic	7440-38-2	0.001	mg/L	----	----	----	0.003	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	0.0003	----
Chromium	7440-47-3	0.001	mg/L	----	----	----	0.011	----
Copper	7440-50-8	0.001	mg/L	----	----	----	0.011	----
Lead	7439-92-1	0.001	mg/L	----	----	----	0.005	----
Manganese	7439-96-5	0.001	mg/L	----	----	----	0.272	----
Nickel	7440-02-0	0.001	mg/L	----	----	----	0.018	----
Silver	7440-22-4	0.001	mg/L	----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L	----	----	----	0.120	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	----	<0.0001
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	<0.0001	----
EK057: Nitrite as N								
Nitrite as N	----	0.010	mg/L	<0.010	----	----	----	----
EK058: Nitrate as N								
^ Nitrate as N	14797-55-8	0.010	mg/L	0.035	----	----	----	----
EK059: Nitrite plus Nitrate as N (NOx)								
Nitrite + Nitrate as N	----	0.010	mg/L	0.035	0.047	----	----	----
EK061: Total Kjeldahl Nitrogen (TKN)								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	0.1	----	----	----
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	0.1	mg/L	----	0.2	----	----	----
EK067: Total Phosphorus as P								
Total Phosphorus as P	----	0.01	mg/L	----	0.29	----	----	----
EK071: Reactive Phosphorus as P (Dissolved)								
Reactive Phosphorus - Filtered	----	0.010	mg/L	0.028	----	----	----	----
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	1.37	----	----	----	----
^ Total Cations	----	0.01	meq/L	1.18	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	----	----	2	----	----



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-039	CNS0801-W-040	CNS0801-W-041	CNS0801-W-042	CNS0801-W-043
				14-FEB-2008 15:00	14-FEB-2008 15:00	14-FEB-2008 15:00	14-FEB-2008 15:00	14-FEB-2008 15:00
Compound	CAS Number	LOR	Unit	EB0802329-031	EB0802329-032	EB0802329-033	EB0802329-034	EB0802329-035
EA025: Suspended Solids								
^ Suspended Solids (SS)	----	1	mg/L	269	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	127	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	89	----	----	----	----
Total Alkalinity as CaCO ₃	----	1	mg/L	89	----	----	----	----
ED040F: Dissolved Major Anions								
Sulphate as SO ₄ 2-	14808-79-8	1	mg/L	4	----	----	----	----
ED045P: Chloride by PC Titrator								
Chloride	16887-00-6	1	mg/L	3	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	28	----	----	----	----
Magnesium	7439-95-4	1	mg/L	3	----	----	----	----
Sodium	7440-23-5	1	mg/L	2	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG005F: Dissolved Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	----	<0.1
Iron	7439-89-6	0.05	mg/L	----	----	----	----	<0.05
Selenium	7782-49-2	0.01	mg/L	----	----	----	----	<0.01
EG005T: Total Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	<0.1	----
Iron	7439-89-6	0.05	mg/L	----	----	----	10.8	----
Selenium	7782-49-2	0.01	mg/L	----	----	----	<0.01	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	----	0.03
Arsenic	7440-38-2	0.001	mg/L	----	----	----	----	0.002
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	----	<0.0001
Chromium	7440-47-3	0.001	mg/L	----	----	----	----	<0.001
Copper	7440-50-8	0.001	mg/L	----	----	----	----	<0.001
Lead	7439-92-1	0.001	mg/L	----	----	----	----	<0.001
Manganese	7439-96-5	0.001	mg/L	----	----	----	----	0.005
Nickel	7440-02-0	0.001	mg/L	----	----	----	----	<0.001
Silver	7440-22-4	0.001	mg/L	----	----	----	----	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	----	----	0.166
EG020T: Total Metals by ICP-MS								



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-039	CNS0801-W-040	CNS0801-W-041	CNS0801-W-042	CNS0801-W-043
				14-FEB-2008 15:00	14-FEB-2008 15:00	14-FEB-2008 15:00	14-FEB-2008 15:00	14-FEB-2008 15:00
Compound	CAS Number	LOR	Unit	EB0802329-031	EB0802329-032	EB0802329-033	EB0802329-034	EB0802329-035
EG020T: Total Metals by ICP-MS - Continued								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	7.18	----
Arsenic	7440-38-2	0.001	mg/L	----	----	----	0.005	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	----	----	----	0.013	----
Copper	7440-50-8	0.001	mg/L	----	----	----	0.007	----
Lead	7439-92-1	0.001	mg/L	----	----	----	0.004	----
Manganese	7439-96-5	0.001	mg/L	----	----	----	0.241	----
Nickel	7440-02-0	0.001	mg/L	----	----	----	0.016	----
Silver	7440-22-4	0.001	mg/L	----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L	----	----	----	0.039	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	----	<0.0001
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	<0.0001	----
EK057: Nitrite as N								
Nitrite as N	----	0.010	mg/L	<0.010	----	----	----	----
EK058: Nitrate as N								
^ Nitrate as N	14797-55-8	0.010	mg/L	0.058	----	----	----	----
EK059: Nitrite plus Nitrate as N (NOx)								
Nitrite + Nitrate as N	----	0.010	mg/L	0.058	0.051	----	----	----
EK061: Total Kjeldahl Nitrogen (TKN)								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	0.2	----	----	----
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	0.1	mg/L	----	0.3	----	----	----
EK067: Total Phosphorus as P								
Total Phosphorus as P	----	0.01	mg/L	----	0.24	----	----	----
EK071: Reactive Phosphorus as P (Dissolved)								
Reactive Phosphorus - Filtered	----	0.010	mg/L	0.025	----	----	----	----
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	1.94	----	----	----	----
^ Total Cations	----	0.01	meq/L	1.76	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	----	----	2	----	----

CHAIN OF CUSTODY DOCUMENTATION



ALS Laboratory Group

CLIENT: HYDROBIOLOGY
 ADDRESS / OFFICE: 47 PARK RD, MILTON, QLD
 PROJECT MANAGER (PM): ADRIAN FLYNN
 PROJECT ID: CNS0801
 SITE: PNG P.O. NO.: BN/4006/07

SAMPLER:
 MOBILE:
 PHONE:
 EMAIL REPORT TO:
 EMAIL INVOICE TO: (if different to report)

RESULTS REQUIRED (Date):

QUOTE NO.:

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
	CNS0801-W-005					
1	CNS0801-S-006	Sed	✓		B	1
2	S-022	Sed	✓		B	1
3	S-035	Sed	x		JAR	1
4	S-036	Sed	✓		"	1
5	S-037	"	✓		"	1
6	S-038	"			"	1
7	S-044	"			B	1
8	S-045	"			JAR	1
9	W-046	Water			P	1
10	W-047	"			SP	1
11	W-048	"			SG	1

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	PHYS PARAMETERS	NAP	TOC/DOC	METALS (TOTAL)	METALS (DISSOLVED)	SEDIMENT PHYS	SEDIMENT METALS	HOLD - NO ANALYSE
1	CNS0801-S-006	Sed	✓		B	1						✓		
2	S-022	Sed	✓		B	1						✓		
3	S-035	Sed	x		JAR	1								X
4	S-036	Sed	✓		"	1						✓		
5	S-037	"	✓		"	1						✓		
6	S-038	"			"	1								X
7	S-044	"			B	1								X
8	S-045	"			JAR	1								X
9	W-046	Water			P	1	✓							
10	W-047	"			SP	1		✓						
11	W-048	"			SG	1			✓					

Environmental Division
 Brisbane
 Work Order
EB0802393



Telephone : +61-7-3243 7222

HOLD-NO ANALYSE

HOLD
 HOLD
 HOLD

RELINQUISHED BY:

Name: ADRIAN FLYNN Date: 19/2/08
 Of: HYDROBIOLOGY
 Name: Date:
 Of: Time:

RECEIVED BY

Name: [Signature] Date: 25/2/08
 Of: ALS Time: 1115
 Name: Date:
 Of: Time:

METHOD OF SHIPMENT

Con' Note No:
 Transport Co: FNT

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.

ALS LABORATORY GROUP

COC Page 1 of 184

CHAIN OF CUSTODY DOCUMENTATION										 ALS Laboratory Group	
CLIENT:					SAMPLER:						
ADDRESS / OFFICE:					MOBILE:						
PROJECT MANAGER (PM):					PHONE:						
PROJECT ID:					EMAIL REPORT TO:						
SITE:					P.O. NO.:					EMAIL INVOICE TO: (if different to report)	
RESULTS REQUIRED (Date):					QUOTE NO.:					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	PHYS	PARAM	TOC	NOV	
12	W-049	✓			N		✓				
13	W-050	"			N		✓				
14	S-051	S			B						
15	S-052	"			JAR						
16	W-053	W			P		✓				
17	W-054	"			SP						
18	W-055	"			SG						
19	W-056	"			N						
20	W-057	"			N						
21	S-058	S			B						
22	S-059	S			JAR						
23	W-060	W			P		✓				
RELINQUISHED BY:					RECEIVED BY:					METHOD OF SHIPMENT	
Name: ADAM FLINN			Date: 19/2/08		Name: [Signature]			Date: 25/2/08		Con' Note No:	
Of: HOROBIOLOG-1			Time:		Of: ALS			Time: 1115			
Name:			Date:		Name:			Date:		Transport Co: TAT	
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.											

CHAIN OF CUSTODY DOCUMENTATION



ALS Laboratory Group

CLIENT:	SAMPLER:
ADDRESS / OFFICE:	MOBILE:
PROJECT MANAGER (PM):	PHONE:
PROJECT ID:	EMAIL REPORT TO:
SITE:	P.O. NO.:
RESULTS REQUIRED (Date):	QUOTE NO.:
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: 	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												Extra Sample	
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	PHYS	TOC	MET	META	SED	SED						
24	" -W-061	W			SP			✓									S-028	
25	" W-062	"			SG			✓									S-034	
26	" W-063	"			NZ				✓									
27	" W-064	"			B					✓							field filled	
28	" S-065	S			JAR						✓							
29	" S-066	"										✓						
30	" W-067	W			P		✓											
31	" W-068	"			SP			✓										
32	" W-069	"			SG				✓									
33	" W-070	"			NZ					✓								
34	" W-071	"			NZ						✓						field filled	

Extra samples

S-028
S-034

field filled

field filled

RELINQUISHED BY:		RECEIVED BY:		METHOD OF SHIPMENT	
Name: ADRIAN FLYNN	Date: 19/2/08	Name:	Date: 25/2/08	Con' Note No:	
Of: HYDROBIOLOGY	Time:	Of: ALS	Time: 1115	Transport Co: TNT	
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.

ALS LABORATORY GROUP

CHAIN OF CUSTODY DOCUMENTATION																			
CLIENT:					SAMPLER:														
ADDRESS / OFFICE:					MOBILE:														
PROJECT MANAGER (PM):					PHONE:														
PROJECT ID:					EMAIL REPORT TO:														
SITE:					P.O. NO.:														
RESULTS REQUIRED (Date):					QUOTE NO.:														
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	PHYS PARAMETERS	N & P	To c/doc	METALS (TOTAL)	METALS (DISSOLVED)	SEDIMENT PHYS	SEDIMENT METALS	HOLD - NOT ANALYSE					
35	" - S-028	S			B										XX				
36	" - S-034	S		x	TBAG B										XX				
RELINQUISHED BY:							RECEIVED BY							METHOD OF SHIPMENT					
Name:			Date:		Of:		Name:			Date:		Of:		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.																			

**ALS Laboratory Group**

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

HOLD
HOLD

ALS LABORATORY GROUPCOC Page 4 of 4



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: EB0802393	Page	: 1 of 12
Client	: HYDROBIOLOGY PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: MR ADRIAN FLYNN	Contact	: Tim Kilmister
Address	: P O BOX 2050 MILTON QLD, AUSTRALIA 4064	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: adrian.flynn@hydrobiology.biz	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 33682133	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 38763068	Facsimile	: +61-7-3243 7218
Project	: CNS0801	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 25-FEB-2008
C-O-C number	: ----	Issue Date	: 06-MAR-2008
Sampler	: ----	No. of samples received	: 36
Site	: PNG	No. of samples analysed	: 24
Quote number	: BN/326/05		

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

This document is issued in
accordance with NATA
accreditation requirements.

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
Cass Sealby	Senior Chemist - Acid Sulphate Soils	Inorganics
Cass Sealby	Senior Chemist - Acid Sulphate Soils	Stafford Minerals
Herman Lin	Senior Inorganic Chemist	Inorganics
Kim McCabe	Senior Inorganic Chemist	Inorganics
Stephen Hislop	Senior Inorganic Chemist	Inorganics

Environmental Division Brisbane
Part of the **ALS Laboratory Group**

32 Shand Street Stafford QLD Australia 4053
Tel. +61-7-3243 7222 Fax. +61-7-3243 7218 www.alsglobal.com

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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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes.

Key : CAS Number = Chemistry Abstract Services number

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- **Ionic balances are within acceptable limits as detailed in the 20th Ed. APHA "Standard Methods for the Examination of Water and Wastewater".**



Analytical Results

Sub-Matrix: **SEDIMENT**

Client sample ID

Client sampling date / time

				CN50801-S-036	CN50801-S-037	CN50801-S-052	CN50801-S-066	----
				[19-FEB-2008]	[19-FEB-2008]	[19-FEB-2008]	[19-FEB-2008]	----
Compound	CAS Number	LOR	Unit	EB0802393-004	EB0802393-005	EB0802393-015	EB0802393-029	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103)	----	1.0	%	26.6	49.0	21.1	41.8	----
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	17900	20600	16200	55100	----
Arsenic	7440-38-2	5	mg/kg	<5	10	6	63	----
Boron	7440-42-8	50	mg/kg	<50	<50	<50	<50	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	<1	<1	----
Chromium	7440-47-3	2	mg/kg	27	46	26	74	----
Copper	7440-50-8	5	mg/kg	25	20	11	34	----
Iron	7439-89-6	50	mg/kg	32400	41100	36500	118000	----
Lead	7439-92-1	5	mg/kg	6	11	7	20	----
Manganese	7439-96-5	5	mg/kg	635	701	508	2180	----
Nickel	7440-02-0	2	mg/kg	38	69	38	113	----
Selenium	7782-49-2	5	mg/kg	<5	<5	<5	<5	----
Silver	7440-22-4	2	mg/kg	<2	<2	<2	<2	----
Zinc	7440-66-6	5	mg/kg	56	86	55	150	----
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	<0.1	<0.1	<0.1	<0.1	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	0.02	%	----	----	0.35	0.28	----



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CN50801-S-046	CN50801-S-047	CN50801-S-048	CN50801-W-049	CN50801-W-050
				[19-FEB-2008]	[19-FEB-2008]	[19-FEB-2008]	[19-FEB-2008]	[19-FEB-2008]
Compound	CAS Number	LOR	Unit	EB0802393-009	EB0802393-010	EB0802393-011	EB0802393-012	EB0802393-013
EA025: Suspended Solids								
^ Suspended Solids (SS)	----	1	mg/L	6	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	1.6	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	114	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	114	----	----	----	----
ED040F: Dissolved Major Anions								
Sulphate as SO4 2-	14808-79-8	1	mg/L	2	----	----	----	----
ED045P: Chloride by PC Titrator								
Chloride	16887-00-6	1	mg/L	21	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	48	----	----	----	----
Magnesium	7439-95-4	1	mg/L	3	----	----	----	----
Sodium	7440-23-5	1	mg/L	2	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG005F: Dissolved Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	----	<0.1
Iron	7439-89-6	0.05	mg/L	----	----	----	----	<0.05
Selenium	7782-49-2	0.01	mg/L	----	----	----	----	<0.01
EG005T: Total Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	<0.1	----
Iron	7439-89-6	0.05	mg/L	----	----	----	0.18	----
Selenium	7782-49-2	0.01	mg/L	----	----	----	<0.01	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	----	0.02
Arsenic	7440-38-2	0.001	mg/L	----	----	----	----	0.001
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	----	0.0049
Chromium	7440-47-3	0.001	mg/L	----	----	----	----	<0.001
Copper	7440-50-8	0.001	mg/L	----	----	----	----	<0.001
Lead	7439-92-1	0.001	mg/L	----	----	----	----	<0.001
Manganese	7439-96-5	0.001	mg/L	----	----	----	----	0.002
Nickel	7440-02-0	0.001	mg/L	----	----	----	----	<0.001
Silver	7440-22-4	0.001	mg/L	----	----	----	----	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	----	----	0.016
EG020T: Total Metals by ICP-MS								



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CN50801-S-046	CN50801-S-047	CN50801-S-048	CN50801-W-049	CN50801-W-050
				[19-FEB-2008]	[19-FEB-2008]	[19-FEB-2008]	[19-FEB-2008]	[19-FEB-2008]
Compound	CAS Number	LOR	Unit	EB0802393-009	EB0802393-010	EB0802393-011	EB0802393-012	EB0802393-013
EG020T: Total Metals by ICP-MS - Continued								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	0.16	----
Arsenic	7440-38-2	0.001	mg/L	----	----	----	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	0.0001	----
Chromium	7440-47-3	0.001	mg/L	----	----	----	<0.001	----
Copper	7440-50-8	0.001	mg/L	----	----	----	<0.001	----
Lead	7439-92-1	0.001	mg/L	----	----	----	<0.001	----
Manganese	7439-96-5	0.001	mg/L	----	----	----	0.010	----
Nickel	7440-02-0	0.001	mg/L	----	----	----	<0.001	----
Silver	7440-22-4	0.001	mg/L	----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L	----	----	----	0.007	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	----	<0.0001
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	<0.0001	----
EK057: Nitrite as N								
Nitrite as N	----	0.010	mg/L	<0.010	----	----	----	----
EK058: Nitrate as N								
^ Nitrate as N	14797-55-8	0.010	mg/L	<0.010	----	----	----	----
EK059: Nitrite plus Nitrate as N (NO_x)								
Nitrite + Nitrate as N	----	0.010	mg/L	<0.010	<0.010	----	----	----
EK061: Total Kjeldahl Nitrogen (TKN)								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	<0.1	----	----	----
EK062: Total Nitrogen as N (TKN + NO_x)								
^ Total Nitrogen as N	----	0.1	mg/L	----	<0.1	----	----	----
EK067: Total Phosphorus as P								
Total Phosphorus as P	----	0.01	mg/L	----	0.01	----	----	----
EK071: Reactive Phosphorus as P (Dissolved)								
Reactive Phosphorus - Filtered	----	0.010	mg/L	0.020	----	----	----	----
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	2.90	----	----	----	----
^ Total Cations	----	0.01	meq/L	2.73	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	----	----	3	----	----



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CN50801-W-053	CN50801-W-054	CN50801-W-055	CN50801-W-056	CN50801-W-057
				[19-FEB-2008]	[19-FEB-2008]	[19-FEB-2008]	[19-FEB-2008]	[19-FEB-2008]
Compound	CAS Number	LOR	Unit	EB0802393-016	EB0802393-017	EB0802393-018	EB0802393-019	EB0802393-020
EA025: Suspended Solids								
^ Suspended Solids (SS)	----	1	mg/L	2	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	0.4	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	105	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	105	----	----	----	----
ED040F: Dissolved Major Anions								
Sulphate as SO4 2-	14808-79-8	1	mg/L	2	----	----	----	----
ED045P: Chloride by PC Titrator								
Chloride	16887-00-6	1	mg/L	15	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	44	----	----	----	----
Magnesium	7439-95-4	1	mg/L	2	----	----	----	----
Sodium	7440-23-5	1	mg/L	2	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG005F: Dissolved Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	----	<0.1
Iron	7439-89-6	0.05	mg/L	----	----	----	----	<0.05
Selenium	7782-49-2	0.01	mg/L	----	----	----	----	0.02
EG005T: Total Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	<0.1	----
Iron	7439-89-6	0.05	mg/L	----	----	----	0.26	----
Selenium	7782-49-2	0.01	mg/L	----	----	----	<0.01	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	----	0.05
Arsenic	7440-38-2	0.001	mg/L	----	----	----	----	<0.001
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	----	<0.0001
Chromium	7440-47-3	0.001	mg/L	----	----	----	----	<0.001
Copper	7440-50-8	0.001	mg/L	----	----	----	----	<0.001
Lead	7439-92-1	0.001	mg/L	----	----	----	----	<0.001
Manganese	7439-96-5	0.001	mg/L	----	----	----	----	0.008
Nickel	7440-02-0	0.001	mg/L	----	----	----	----	<0.001
Silver	7440-22-4	0.001	mg/L	----	----	----	----	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	----	----	<0.005
EG020T: Total Metals by ICP-MS								



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CN50801-W-053	CN50801-W-054	CN50801-W-055	CN50801-W-056	CN50801-W-057
				[19-FEB-2008]	[19-FEB-2008]	[19-FEB-2008]	[19-FEB-2008]	[19-FEB-2008]
Compound	CAS Number	LOR	Unit	EB0802393-016	EB0802393-017	EB0802393-018	EB0802393-019	EB0802393-020
EG020T: Total Metals by ICP-MS - Continued								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	0.22	----
Arsenic	7440-38-2	0.001	mg/L	----	----	----	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	----	----	----	<0.001	----
Copper	7440-50-8	0.001	mg/L	----	----	----	<0.001	----
Lead	7439-92-1	0.001	mg/L	----	----	----	<0.001	----
Manganese	7439-96-5	0.001	mg/L	----	----	----	0.018	----
Nickel	7440-02-0	0.001	mg/L	----	----	----	<0.001	----
Silver	7440-22-4	0.001	mg/L	----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L	----	----	----	<0.005	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	----	<0.0001
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	<0.0001	----
EK057: Nitrite as N								
Nitrite as N	----	0.010	mg/L	<0.010	----	----	----	----
EK058: Nitrate as N								
^ Nitrate as N	14797-55-8	0.010	mg/L	<0.010	----	----	----	----
EK059: Nitrite plus Nitrate as N (NO_x)								
Nitrite + Nitrate as N	----	0.010	mg/L	<0.010	0.010	----	----	----
EK061: Total Kjeldahl Nitrogen (TKN)								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	<0.1	----	----	----
EK062: Total Nitrogen as N (TKN + NO_x)								
^ Total Nitrogen as N	----	0.1	mg/L	----	<0.1	----	----	----
EK067: Total Phosphorus as P								
Total Phosphorus as P	----	0.01	mg/L	----	0.01	----	----	----
EK071: Reactive Phosphorus as P (Dissolved)								
Reactive Phosphorus - Filtered	----	0.010	mg/L	0.020	----	----	----	----
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	2.55	----	----	----	----
^ Total Cations	----	0.01	meq/L	2.51	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	----	----	2	----	----



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CN50801-W-060	CN50801-W-061	CN50801-W-062	CN50801-W-063	CN50801-W-064
				[19-FEB-2008]	[19-FEB-2008]	[19-FEB-2008]	[19-FEB-2008]	[19-FEB-2008]
Compound	CAS Number	LOR	Unit	EB0802393-023	EB0802393-024	EB0802393-025	EB0802393-026	EB0802393-027
EA025: Suspended Solids								
^ Suspended Solids (SS)	----	1	mg/L	<1	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	0.5	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	84	----	----	----	----
Total Alkalinity as CaCO ₃	----	1	mg/L	84	----	----	----	----
ED040F: Dissolved Major Anions								
Sulphate as SO ₄ 2-	14808-79-8	1	mg/L	2	----	----	----	----
ED045P: Chloride by PC Titrator								
Chloride	16887-00-6	1	mg/L	6	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	30	----	----	----	----
Magnesium	7439-95-4	1	mg/L	3	----	----	----	----
Sodium	7440-23-5	1	mg/L	<1	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG005F: Dissolved Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	----	<0.1
Iron	7439-89-6	0.05	mg/L	----	----	----	----	<0.05
Selenium	7782-49-2	0.01	mg/L	----	----	----	----	0.01
EG005T: Total Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	<0.1	----
Iron	7439-89-6	0.05	mg/L	----	----	----	0.06	----
Selenium	7782-49-2	0.01	mg/L	----	----	----	0.01	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	----	0.02
Arsenic	7440-38-2	0.001	mg/L	----	----	----	----	<0.001
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	----	0.0001
Chromium	7440-47-3	0.001	mg/L	----	----	----	----	<0.001
Copper	7440-50-8	0.001	mg/L	----	----	----	----	<0.001
Lead	7439-92-1	0.001	mg/L	----	----	----	----	<0.001
Manganese	7439-96-5	0.001	mg/L	----	----	----	----	0.011
Nickel	7440-02-0	0.001	mg/L	----	----	----	----	<0.001
Silver	7440-22-4	0.001	mg/L	----	----	----	----	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	----	----	0.057
EG020T: Total Metals by ICP-MS								



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CN50801-W-060	CN50801-W-061	CN50801-W-062	CN50801-W-063	CN50801-W-064
				[19-FEB-2008]	[19-FEB-2008]	[19-FEB-2008]	[19-FEB-2008]	[19-FEB-2008]
Compound	CAS Number	LOR	Unit	EB0802393-023	EB0802393-024	EB0802393-025	EB0802393-026	EB0802393-027
EG020T: Total Metals by ICP-MS - Continued								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	0.02	----
Arsenic	7440-38-2	0.001	mg/L	----	----	----	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	----	----	----	<0.001	----
Copper	7440-50-8	0.001	mg/L	----	----	----	<0.001	----
Lead	7439-92-1	0.001	mg/L	----	----	----	<0.001	----
Manganese	7439-96-5	0.001	mg/L	----	----	----	0.012	----
Nickel	7440-02-0	0.001	mg/L	----	----	----	<0.001	----
Silver	7440-22-4	0.001	mg/L	----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L	----	----	----	<0.005	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	----	<0.0001
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	<0.0001	----
EK057: Nitrite as N								
Nitrite as N	----	0.010	mg/L	<0.010	----	----	----	----
EK058: Nitrate as N								
^ Nitrate as N	14797-55-8	0.010	mg/L	<0.010	----	----	----	----
EK059: Nitrite plus Nitrate as N (NO_x)								
Nitrite + Nitrate as N	----	0.010	mg/L	<0.010	0.022	----	----	----
EK061: Total Kjeldahl Nitrogen (TKN)								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	<0.1	----	----	----
EK062: Total Nitrogen as N (TKN + NO_x)								
^ Total Nitrogen as N	----	0.1	mg/L	----	<0.1	----	----	----
EK067: Total Phosphorus as P								
Total Phosphorus as P	----	0.01	mg/L	----	<0.01	----	----	----
EK071: Reactive Phosphorus as P (Dissolved)								
Reactive Phosphorus - Filtered	----	0.010	mg/L	0.017	----	----	----	----
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	1.89	----	----	----	----
^ Total Cations	----	0.01	meq/L	1.69	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	----	----	2	----	----



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CN50801-W-067	CN50801-W-068	CN50801-W-069	CN50801-W-070	CN50801-W-071
				[19-FEB-2008]	[19-FEB-2008]	[19-FEB-2008]	[19-FEB-2008]	[19-FEB-2008]
Compound	CAS Number	LOR	Unit	EB0802393-030	EB0802393-031	EB0802393-032	EB0802393-033	EB0802393-034
EA025: Suspended Solids								
^ Suspended Solids (SS)	----	1	mg/L	4	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	0.5	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	61	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	61	----	----	----	----
ED040F: Dissolved Major Anions								
Sulphate as SO4 2-	14808-79-8	1	mg/L	4	----	----	----	----
ED045P: Chloride by PC Titrator								
Chloride	16887-00-6	1	mg/L	3	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	24	----	----	----	----
Magnesium	7439-95-4	1	mg/L	1	----	----	----	----
Sodium	7440-23-5	1	mg/L	<1	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG005F: Dissolved Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	----	<0.1
Iron	7439-89-6	0.05	mg/L	----	----	----	----	<0.05
Selenium	7782-49-2	0.01	mg/L	----	----	----	----	<0.01
EG005T: Total Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	<0.1	----
Iron	7439-89-6	0.05	mg/L	----	----	----	0.07	----
Selenium	7782-49-2	0.01	mg/L	----	----	----	<0.01	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	----	0.03
Arsenic	7440-38-2	0.001	mg/L	----	----	----	----	<0.001
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	----	<0.0001
Chromium	7440-47-3	0.001	mg/L	----	----	----	----	<0.001
Copper	7440-50-8	0.001	mg/L	----	----	----	----	<0.001
Lead	7439-92-1	0.001	mg/L	----	----	----	----	<0.001
Manganese	7439-96-5	0.001	mg/L	----	----	----	----	<0.001
Nickel	7440-02-0	0.001	mg/L	----	----	----	----	<0.001
Silver	7440-22-4	0.001	mg/L	----	----	----	----	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	----	----	0.056
EG020T: Total Metals by ICP-MS								



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CN50801-W-067	CN50801-W-068	CN50801-W-069	CN50801-W-070	CN50801-W-071
				[19-FEB-2008]	[19-FEB-2008]	[19-FEB-2008]	[19-FEB-2008]	[19-FEB-2008]
Compound	CAS Number	LOR	Unit	EB0802393-030	EB0802393-031	EB0802393-032	EB0802393-033	EB0802393-034
EG020T: Total Metals by ICP-MS - Continued								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	0.10	----
Arsenic	7440-38-2	0.001	mg/L	----	----	----	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	0.0001	----
Chromium	7440-47-3	0.001	mg/L	----	----	----	<0.001	----
Copper	7440-50-8	0.001	mg/L	----	----	----	<0.001	----
Lead	7439-92-1	0.001	mg/L	----	----	----	<0.001	----
Manganese	7439-96-5	0.001	mg/L	----	----	----	0.002	----
Nickel	7440-02-0	0.001	mg/L	----	----	----	<0.001	----
Silver	7440-22-4	0.001	mg/L	----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L	----	----	----	0.041	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	----	<0.0001
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	<0.0001	----
EK057: Nitrite as N								
Nitrite as N	----	0.010	mg/L	<0.010	----	----	----	----
EK058: Nitrate as N								
^ Nitrate as N	14797-55-8	0.010	mg/L	<0.010	----	----	----	----
EK059: Nitrite plus Nitrate as N (NO_x)								
Nitrite + Nitrate as N	----	0.010	mg/L	<0.010	0.024	----	----	----
EK061: Total Kjeldahl Nitrogen (TKN)								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	<0.1	----	----	----
EK062: Total Nitrogen as N (TKN + NO_x)								
^ Total Nitrogen as N	----	0.1	mg/L	----	<0.1	----	----	----
EK067: Total Phosphorus as P								
Total Phosphorus as P	----	0.01	mg/L	----	<0.01	----	----	----
EK071: Reactive Phosphorus as P (Dissolved)								
Reactive Phosphorus - Filtered	----	0.010	mg/L	0.014	----	----	----	----
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	1.38	----	----	----	----
^ Total Cations	----	0.01	meq/L	1.34	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	----	----	1	----	----



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1/51 Secam Street, Mansfield QLD 4122
PO Box 2034 Mansfield DC QLD 4122
Phone:(07) 3343 3166 Fax:(07) 3849 4705
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TEST RESULTS

Client :	ALS Environmental Brisbane	Job No. :	087634002/8
Project :	Delivered Samples	Date Received :	28-Feb-08
Batch No. :	EB0802393	Sampled by :	Client

PARTICLE SIZE SUMMARY

Reg'n No.	Sample ID	Sample No.	Percent Gravel (+ 2 mm)	Percent Sand (2 mm - 0.060 mm)	Percent Silt (0.060 mm - 0.002 mm)	Percent Clay (-0.002 mm)
0831226	CNS0801-S-006	1	0	78	15	7
0831227	CNS0801-S-022	2	0	8	68	24
0831228	CNS0801-S-051	14	16	47	25	12
0831229	CNS0801-S-065	28	3	79	13	5

Remarks :

Test Procedure : AS 1289.3.6.3

Prepared by : *af*

Checked by : *JA*



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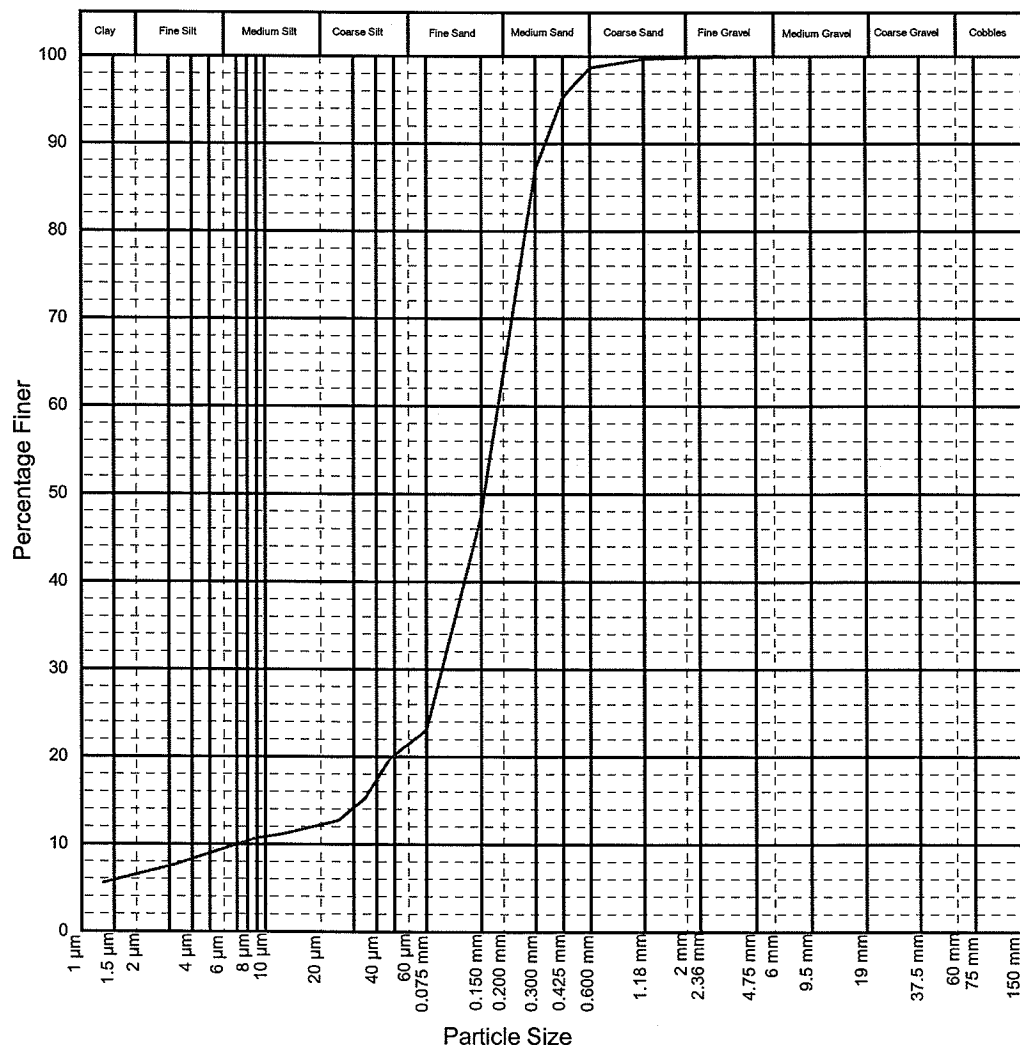
PARTICLE SIZE DISTRIBUTION BY HYDROMETER

Client : ALS Environmental Brisbane
Address : 32 Shand Street, Stafford
Project : Delivered Samples
Sample ID : CNS0801-S-006

Report No. : R6878
Job No. : 087634002/8
Reg'n No. : 0831226
Batch No. : EB0802393 - 1
Date Received : 28/02/2008
Sampled By : Client

SIZE FRACTIONS AS PER AUSTRALIAN STANDARDS AS 1726

Particle Size (mm)	Percent Passing
150	
75	
37.5	
19.0	
9.5	
4.75	100.0
2.36	99.9
1.18	99.7
0.600	98.7
0.425	95.3
0.300	86.9
0.150	47.5
0.075	23.0
Particle Size (Microns)	Percent Passing
47.6	19.8
34.5	15.2
24.8	12.7
12.4	11.2
8.8	10.7
6.3	9.6
4.5	8.6
3.2	7.6
1.3	5.6



Pretreatment	Tested as received	Soil Particle Density (assumed)	2.70
Loss in Pretreatment (%)	-	Type of Hydrometer	ASTM E100
Method of Dispersion	Mixer		
Remarks :			
Material Description :	(SC) Clayey SAND, pale grey		
Test Procedure :	AS 1289 3.6.2, 3.6.3 (up to 24 hours)		
Prepared by : <i>NR</i>	Checked by : <i>JA</i>		

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NR 7/3/08



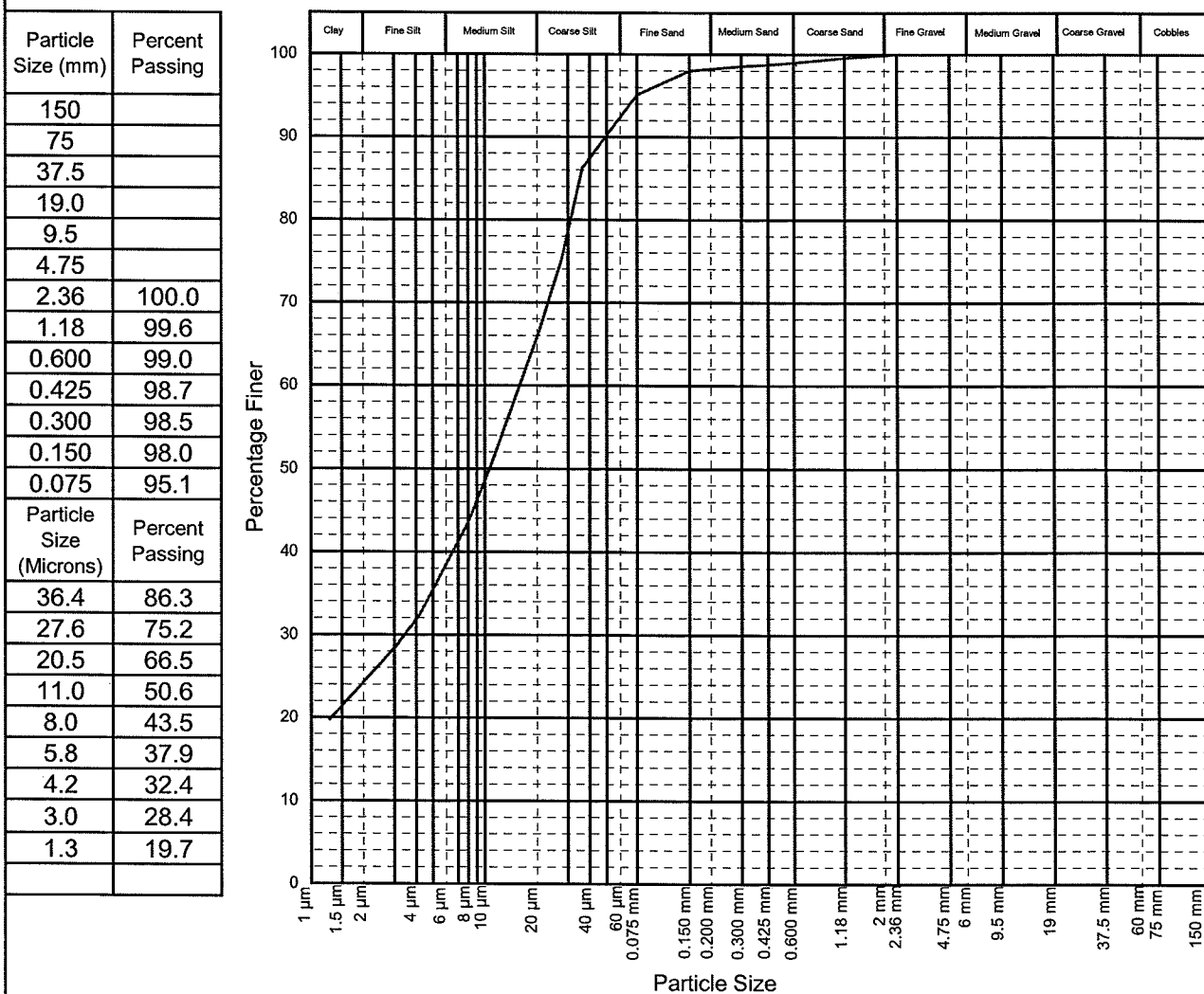
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PARTICLE SIZE DISTRIBUTION BY HYDROMETER

Client :	ALS Environmental Brisbane	Report No. :	R6878
Address :	32 Shand Street, Stafford	Job No. :	087634002/8
Project :	Delivered Samples	Reg'n No. :	0831227
Sample ID :	CNS0801-S-022	Batch No. :	EB0802393 - 2
		Date Received :	28/02/2008
		Sampled By :	Client

SIZE FRACTIONS AS PER AUSTRALIAN STANDARDS AS 1726



Pretreatment	Tested as received	Soil Particle Density (assumed)	2.70
Loss in Pretreatment (%)	-	Type of Hydrometer	ASTM E100
Method of Dispersion	Mixer		
Remarks :			
Material Description :	(CI) Silty CLAY, pale grey, with organics		
Test Procedure :	AS 1289 3.6.2, 3.6.3 (up to 24 hours)		
Prepared by : <i>NK</i>	Checked by : <i>JA</i>		

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N. Jones 7/3/8



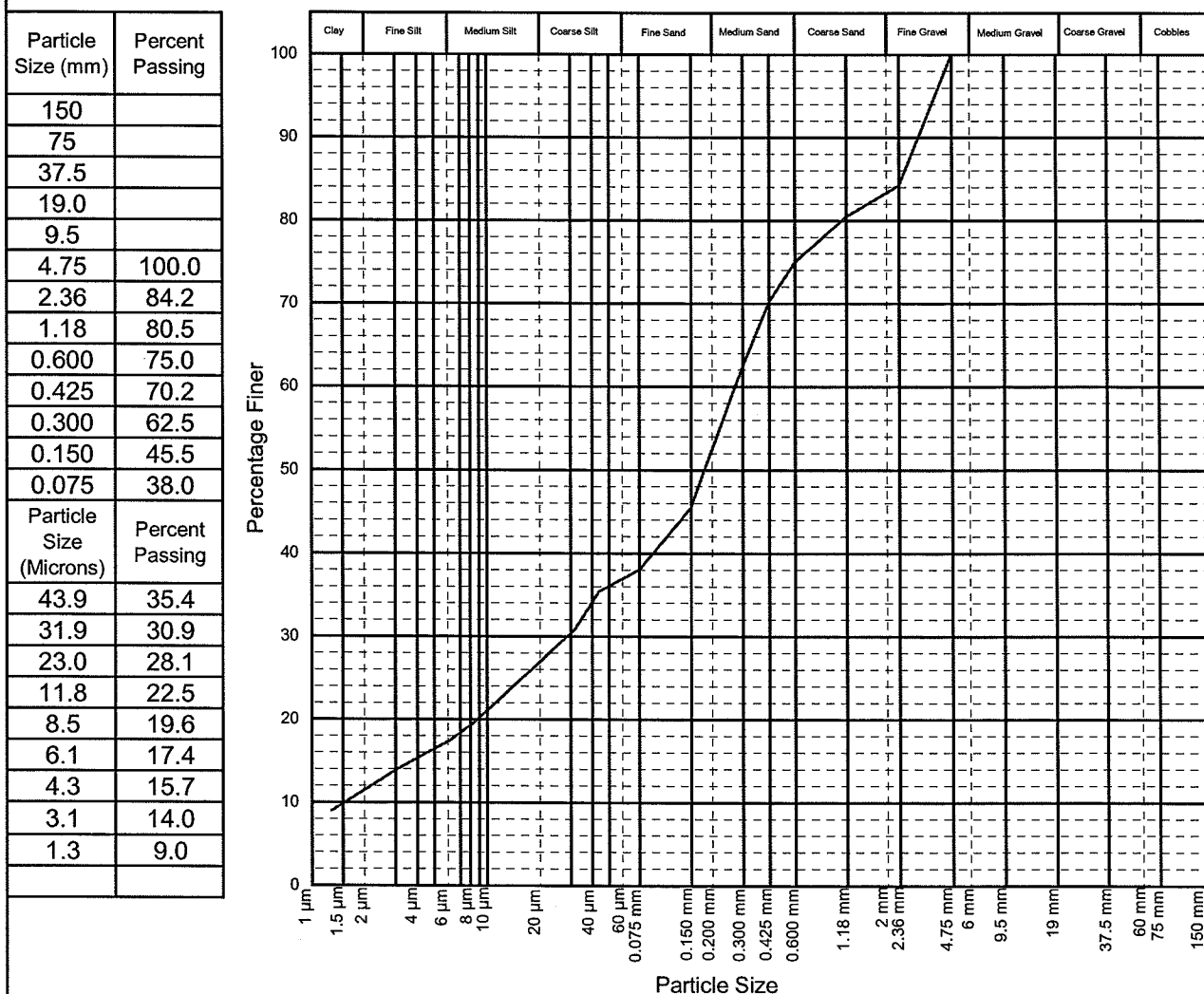
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PARTICLE SIZE DISTRIBUTION BY HYDROMETER

Client :	ALS Environmental Brisbane	Report No. :	R6878
Address :	32 Shand Street, Stafford	Job No. :	087634002/8
Project :	Delivered Samples	Reg'n No. :	0831228
Sample ID :	CNS0801-S-051	Batch No. :	EB0802393 - 14
		Date Received :	28/02/2008
		Sampled By :	Client

SIZE FRACTIONS AS PER AUSTRALIAN STANDARDS AS 1726



Pretreatment	Tested as received	Soil Particle Density (assumed)	2.70
Loss in Pretreatment (%)	-	Type of Hydrometer	ASTM E100
Method of Dispersion	Mixer		
Remarks :			
Material Description : (SC) Clayey SAND, pale grey, with some gravel			
Test Procedure : AS 1289 3.6.2, 3.6.3 (up to 24 hours)			
Prepared by : <i>ML</i>		Checked by : <i>JA</i>	

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ML 7/5/8



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Ph : (07) 3343 3166 Fax : (07) 3343 4705
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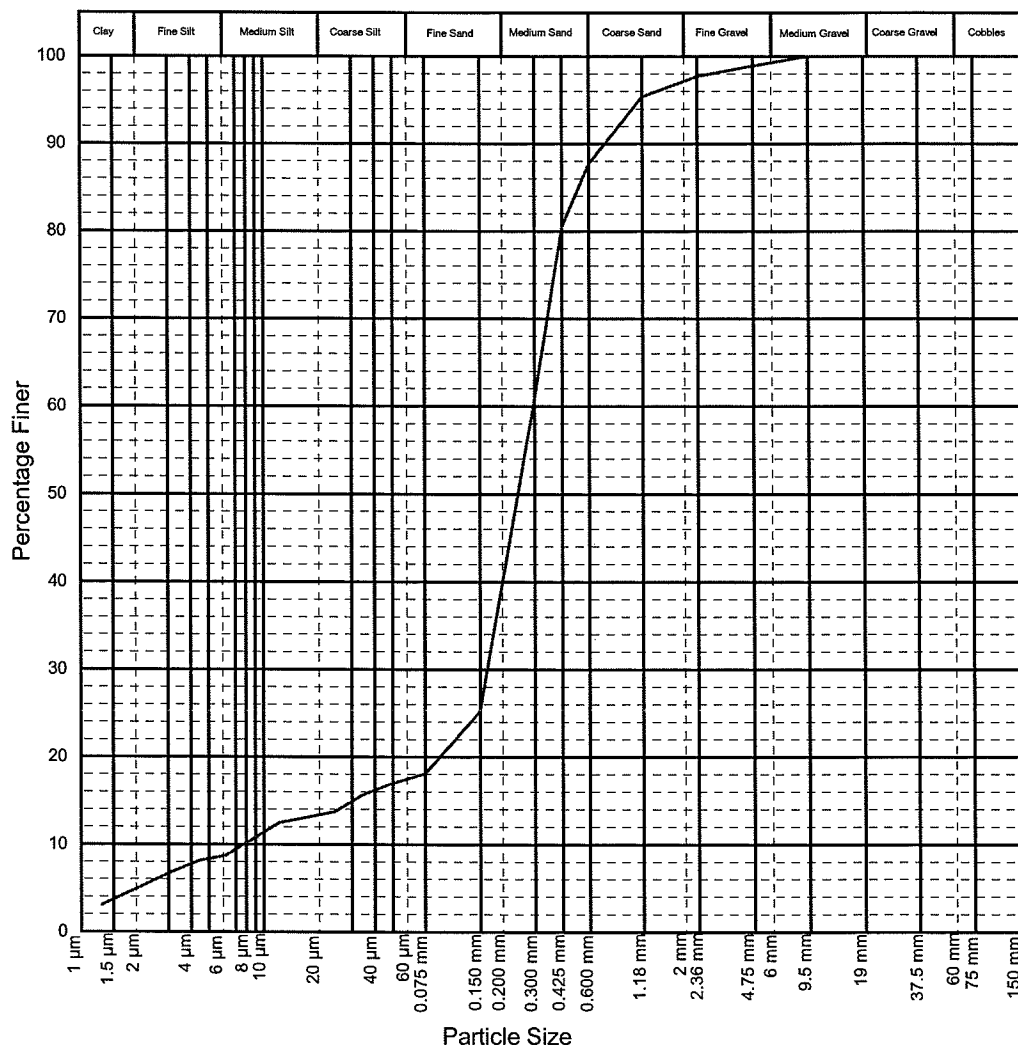
PARTICLE SIZE DISTRIBUTION BY HYDROMETER

Client : ALS Environmental Brisbane
Address : 32 Shand Street, Stafford
Project : Delivered Samples
Sample ID : CNS0801-S-065

Report No. : R6878
Job No. : 087634002/8
Reg'n No. : 0831229
Batch No. : EB0802393 - 28
Date Received : 28/02/2008
Sampled By : Client

SIZE FRACTIONS AS PER AUSTRALIAN STANDARDS AS 1726

Particle Size (mm)	Percent Passing
150	
75	
37.5	
19.0	
9.5	100.0
4.75	98.9
2.36	97.7
1.18	95.4
0.600	87.7
0.425	80.4
0.300	60.8
0.150	25.3
0.075	18.1
Particle Size (Microns)	Percent Passing
47.9	16.9
34.0	15.6
24.3	13.7
12.1	12.5
8.7	10.6
6.2	8.7
4.4	8.1
3.1	6.8
1.3	3.1



Pretreatment	Tested as received	Soil Particle Density (assumed)	2.70
Loss in Pretreatment (%)	-	Type of Hydrometer	ASTM E100
Method of Dispersion	Mixer		
Remarks :			
Material Description :	(SC) Clayey SAND, brown		
Test Procedure :	AS 1289 3.6.2, 3.6.3 (up to 24 hours)		
Prepared by : <i>NF</i>	Checked by : <i>JA</i>		

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Nathan 7/12/08

CHAIN OF CUSTODY DOCUMENTATION	
CLIENT: HYDROBIOLOGY	SAMPLER: ADRIAN FLYNN
ADDRESS / OFFICE: 47 PARK RD, MILTON 4064, BRISBANE, AUST.	MOBILE: 0421 693120
PROJECT MANAGER (PM): ADRIAN FLYNN	PHONE: (07) 3368 2133
PROJECT ID: CNS0801	EMAIL REPORT TO: adrian.flynn@hydrobiology.biz
SITE: PNG	EMAIL INVOICE TO: (if different to report)

PROJECT ID: CNS0801

SITE: PNG P.O. NO.:

EMAIL INVOICE TO: (if different to report)

QUOTE NO.: BN/400B/07

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

COMMENTS / SPECIAL HANDLING / STORAGE OR DISPOSAL:

KEEP CHILLED

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	CNS0801-W-072	W			P	
2	" W-073	W			SP	
3	" W-074	W			SG	
4	" W-075	W			N	
5	" W-076	W			N	
6	" S-077	S			B	
7	" S-078	S			JAR	
8	" W-079				P	
9	" W-080				SP	
10	" W-081				SG	
11	" W-082				N	
12	" W-083				N	

[illegible]

RELINQUISHED BY:

Name: ADRIAN FLYNN
Of: HYDROBIOLOGY

Date:	25-2-08
Time:	
Date:	
Time:	

RECEIVED BY

Name:	J. FABRY
Of:	ALS
Name:	
Of:	

Date:	5/3/08
Time:	14:27
Date:	
Time:	

METHOD OF SHIPMENT

Con' Note No:	
Transport Co:	

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.



Work Order

EB0802944



Telephone : + 61-7-3243 7222

CHAIN OF CUSTODY DOCUMENTATION										 ALS ALS Laboratory Group			
CLIENT: HYDROBIOLOGY					SAMPLER: ADRIAN FLYNN								
ADDRESS / OFFICE: 47 PARK RD, MILTON 4064, BRISBANE, AUSTRALIA					MOBILE: 0421 693120								
PROJECT MANAGER (PM): ADRIAN FLYNN					PHONE: (07) 3368 2133								
PROJECT ID: CNS 0801					EMAIL REPORT TO: adrian.flynn@hydrobiology.biz								
SITE: PNG					P.O. NO.: BN-400B-07					EMAIL INVOICE TO: (if different to report)			
RESULTS REQUIRED (Date):					QUOTE NO.: BN-400B-07					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: KEEP CHILLED			PHYS. PROPERTIES N & P TOC / DOC METALS (TOTALS) METALS (DISSOLVED) SEDIMENT PHYS. SEDIMENT METALS		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	CNS0801-S-084												
14	" - S-085												
15	" - W-086												
16	" - W-087												
17	" - W-088												
18	" - W-089												
19	" - W-090												
20	" - S-091												
21	" - S-092												
22	" - W-093												
23	" - W-094												
24	" - W-095												
RELINQUISHED BY:						RECEIVED BY						METHOD OF SHIPMENT	
Name: ADRIAN FLYNN			Date: 25-2-08			Name: J. FARR			Date: 5/3/08			Con' Note No:	
Of: HYDROBIOLOGY			Time:			Of: ALS			Time: 14-27			Transport Co:	
Name:			Date:			Name:			Date:			Transport Co:	
Of:			Time:			Of:			Time:			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.													

CHAIN OF CUSTODY DOCUMENTATION



ALS Laboratory Group

CLIENT: HYDROBIOLOGY
 ADDRESS / OFFICE: 47 PARK RD, MILTON 4064, BRISBANE, AUST.
 PROJECT MANAGER (PM): ADRIAN FLYNN
 PROJECT ID: CNS0801
 SITE: PNG P.O. NO.: BN/4008/07
 SAMPLER: ADRIAN FLYNN
 MOBILE: 0421 693120
 PHONE: (07) 3368 2133
 EMAIL REPORT TO: adrian.flynn@hydrobiology.biz
 EMAIL INVOICE TO: (if different to report)

RESULTS REQUIRED (Date):

QUOTE NO.:

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:

KEEP CHILLED

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

PHYS. PROPERTIES
 N & P
 TOC / DOC
 METALS (TOTALS)
 METALS (DISSOLVED)
 SEDIMENT (PHYS)
 SEDIMENT METALS

SAMPLE INFORMATION (note: S = Soil, W=Water)					CONTAINER INFORMATION	
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles
25	CNS0801-W-096					
26	CNS0801-W-097					
27	" - S-098					
28	" - S-099					
29	" - W-100					
30	" - W-101					
31	" - W-102					
32	" - W-103					
33	" - W-104					
34	" - S-105					
35	" - S-106					
36	"					

HOLD - DO NOT ANALYSE
 HOLD - DO NOT ANALYSE
 HOLD - DO NOT ANALYSE
 HOLD - DO NOT ANALYSE
 HOLD - DO NOT ANALYSE
 HOLD - DO NOT ANALYSE
 HOLD - DO NOT ANALYSE
 HOLD - DO NOT ANALYSE

RELINQUISHED BY:

Name: ADRIAN FLYNN
 Of: HYDROBIOLOGY
 Name:
 Of:

Date: 25-2-08
 Time:
 Date:
 Time:

RECEIVED BY:

Name: J. FARR
 Of: ALS
 Name:
 Of:

Date: 5/3/08
 Time: 14:27
 Date:
 Time:

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.

ALS LABORATORY GROUP

COC Page 3 of 3



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: EB0802944	Page	: 1 of 12
Client	: HYDROBIOLOGY PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: MR ADRIAN FLYNN	Contact	: Tim Kilmister
Address	: P O BOX 2050 MILTON QLD, AUSTRALIA 4064	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: adrian.flynn@hydrobiology.biz	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 33682133	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 38763068	Facsimile	: +61-7-3243 7218
Project	: CNS 0801	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 05-MAR-2008
C-O-C number	: ----	Issue Date	: 19-MAR-2008
Sampler	: ADRIAN FLYNN	No. of samples received	: 38
Site	: DNG	No. of samples analysed	: 26
Quote number	: BN/326/05		

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

This document is issued in
accordance with NATA
accreditation requirements.

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
Ankit Joshi	Inorganic Chemist	Inorganics
Kim McCabe	Senior Inorganic Chemist	Inorganics

Environmental Division Brisbane
Part of the ALS Laboratory Group

32 Shand Street Stafford QLD Australia 4053
Tel. +61-7-3243 7222 Fax. +61-7-3243 7218 www.alsglobal.com

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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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes. If the sampling time is 0:00 the information was not supplied by client.

Key : CAS Number = Chemistry Abstract Services number

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- **EG005T (Total Metals): EB0802944-037 (CNS0801-S-092) matrix spike failed due to sample matrix interference.**
- **Ionic balances are within acceptable limits as detailed in the 20th Ed. APHA "Standard Methods for the Examination of Water and Wastewater".**



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

				CNS0801-S-078	CNS0801-S-092	CNS0801-S-099	CNS0801-S-078 <2mm	CNS0801-S-092 <2mm
				[25-FEB-2008]	[25-FEB-2008]	[25-FEB-2008]	[25-FEB-2008]	[25-FEB-2008]
Compound	CAS Number	LOR	Unit	EB0802944-007	EB0802944-021	EB0802944-028	EB0802944-036	EB0802944-037
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	64.0	71.0	40.3	----	----
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	----	----	----	61400	44700
Arsenic	7440-38-2	5	mg/kg	----	----	----	28	35
Boron	7440-42-8	50	mg/kg	----	----	----	<50	<50
Cadmium	7440-43-9	1	mg/kg	----	----	----	2	1
Chromium	7440-47-3	2	mg/kg	----	----	----	133	48
Copper	7440-50-8	5	mg/kg	----	----	----	24	22
Iron	7439-89-6	50	mg/kg	----	----	----	119000	77100
Lead	7439-92-1	5	mg/kg	----	----	----	16	15
Manganese	7439-96-5	5	mg/kg	----	----	----	913	741
Nickel	7440-02-0	2	mg/kg	----	----	----	87	62
Selenium	7782-49-2	5	mg/kg	----	----	----	<5	<5
Silver	7440-22-4	2	mg/kg	----	----	----	<2	<2
Zinc	7440-66-6	5	mg/kg	----	----	----	138	111
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	----	----	5.8	11.3



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

				CNS0801-S-099	----	----	----	----
				<2mm				
Client sampling date / time				[25-FEB-2008]	----	----	----	----
Compound	CAS Number	LOR	Unit	EB0802944-038	----	----	----	----
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	59600	----	----	----	----
Arsenic	7440-38-2	5	mg/kg	25	----	----	----	----
Boron	7440-42-8	50	mg/kg	<50	----	----	----	----
Cadmium	7440-43-9	1	mg/kg	2	----	----	----	----
Chromium	7440-47-3	2	mg/kg	68	----	----	----	----
Copper	7440-50-8	5	mg/kg	20	----	----	----	----
Iron	7439-89-6	50	mg/kg	94800	----	----	----	----
Lead	7439-92-1	5	mg/kg	18	----	----	----	----
Manganese	7439-96-5	5	mg/kg	601	----	----	----	----
Nickel	7440-02-0	2	mg/kg	72	----	----	----	----
Selenium	7782-49-2	5	mg/kg	<5	----	----	----	----
Silver	7440-22-4	2	mg/kg	<2	----	----	----	----
Zinc	7440-66-6	5	mg/kg	123	----	----	----	----
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	6.0	----	----	----	----



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-072	CNS0801-W-073	CNS0801-W-074	CNS0801-W-075	CNS0801-W-076
				[25-FEB-2008]	[25-FEB-2008]	[25-FEB-2008]	[25-FEB-2008]	[25-FEB-2008]
Compound	CAS Number	LOR	Unit	EB0802944-001	EB0802944-002	EB0802944-003	EB0802944-004	EB0802944-005
EA025: Suspended Solids								
^ Suspended Solids (SS)	----	1	mg/L	2	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	0.5	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	17	----	----	----	----
Total Alkalinity as CaCO ₃	----	1	mg/L	17	----	----	----	----
ED040F: Dissolved Major Anions								
Sulphate as SO ₄ 2-	14808-79-8	1	mg/L	<1	----	----	----	----
ED045P: Chloride by PC Titrator								
Chloride	16887-00-6	1	mg/L	1	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	4	----	----	----	----
Magnesium	7439-95-4	1	mg/L	1	----	----	----	----
Sodium	7440-23-5	1	mg/L	<1	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG005F: Dissolved Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	----	<0.1
Iron	7439-89-6	0.05	mg/L	----	----	----	----	0.06
Selenium	7782-49-2	0.01	mg/L	----	----	----	----	<0.01
EG005T: Total Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	<0.1	----
Iron	7439-89-6	0.05	mg/L	----	----	----	0.16	----
Selenium	7782-49-2	0.01	mg/L	----	----	----	<0.01	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	----	0.07
Arsenic	7440-38-2	0.001	mg/L	----	----	----	----	<0.001
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	----	<0.0001
Chromium	7440-47-3	0.001	mg/L	----	----	----	----	<0.001
Copper	7440-50-8	0.001	mg/L	----	----	----	----	<0.001
Lead	7439-92-1	0.001	mg/L	----	----	----	----	<0.001
Manganese	7439-96-5	0.001	mg/L	----	----	----	----	0.003
Nickel	7440-02-0	0.001	mg/L	----	----	----	----	<0.001
Silver	7440-22-4	0.001	mg/L	----	----	----	----	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	----	----	0.018
EG020T: Total Metals by ICP-MS								



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-072	CNS0801-W-073	CNS0801-W-074	CNS0801-W-075	CNS0801-W-076
				[25-FEB-2008]	[25-FEB-2008]	[25-FEB-2008]	[25-FEB-2008]	[25-FEB-2008]
Compound	CAS Number	LOR	Unit	EB0802944-001	EB0802944-002	EB0802944-003	EB0802944-004	EB0802944-005
EG020T: Total Metals by ICP-MS - Continued								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	0.12	----
Arsenic	7440-38-2	0.001	mg/L	----	----	----	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	----	----	----	<0.001	----
Copper	7440-50-8	0.001	mg/L	----	----	----	0.001	----
Lead	7439-92-1	0.001	mg/L	----	----	----	<0.001	----
Manganese	7439-96-5	0.001	mg/L	----	----	----	0.006	----
Nickel	7440-02-0	0.001	mg/L	----	----	----	<0.001	----
Silver	7440-22-4	0.001	mg/L	----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L	----	----	----	0.096	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	----	<0.0001
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	<0.0001	----
EK057: Nitrite as N								
Nitrite as N	----	0.010	mg/L	<0.010	----	----	----	----
EK058: Nitrate as N								
^ Nitrate as N	14797-55-8	0.010	mg/L	<0.010	----	----	----	----
EK059: Nitrite plus Nitrate as N (NO_x)								
Nitrite + Nitrate as N	----	0.010	mg/L	<0.010	0.016	----	----	----
EK061: Total Kjeldahl Nitrogen (TKN)								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	0.2	----	----	----
EK062: Total Nitrogen as N (TKN + NO_x)								
^ Total Nitrogen as N	----	0.1	mg/L	----	0.2	----	----	----
EK067: Total Phosphorus as P								
Total Phosphorus as P	----	0.01	mg/L	----	<0.01	----	----	----
EK071: Reactive Phosphorus as P (Dissolved)								
Reactive Phosphorus - Filtered	----	0.010	mg/L	<0.010	----	----	----	----
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	0.37	----	----	----	----
^ Total Cations	----	0.01	meq/L	0.27	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	----	----	3	----	----



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-079	CNS0801-W-080	CNS0801-W-081	CNS0801-W-082	CNS0801-W-083
				[25-FEB-2008]	[25-FEB-2008]	[25-FEB-2008]	[25-FEB-2008]	[25-FEB-2008]
Compound	CAS Number	LOR	Unit	EB0802944-008	EB0802944-009	EB0802944-010	EB0802944-011	EB0802944-012
EA025: Suspended Solids								
^ Suspended Solids (SS)	----	1	mg/L	<1	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	0.4	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	17	----	----	----	----
Total Alkalinity as CaCO ₃	----	1	mg/L	17	----	----	----	----
ED040F: Dissolved Major Anions								
Sulphate as SO ₄ 2-	14808-79-8	1	mg/L	<1	----	----	----	----
ED045P: Chloride by PC Titrator								
Chloride	16887-00-6	1	mg/L	1	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	4	----	----	----	----
Magnesium	7439-95-4	1	mg/L	1	----	----	----	----
Sodium	7440-23-5	1	mg/L	<1	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG005F: Dissolved Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	----	<0.1
Iron	7439-89-6	0.05	mg/L	----	----	----	----	0.10
Selenium	7782-49-2	0.01	mg/L	----	----	----	----	<0.01
EG005T: Total Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	<0.1	----
Iron	7439-89-6	0.05	mg/L	----	----	----	0.14	----
Selenium	7782-49-2	0.01	mg/L	----	----	----	<0.01	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	----	0.05
Arsenic	7440-38-2	0.001	mg/L	----	----	----	----	<0.001
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	----	0.0002
Chromium	7440-47-3	0.001	mg/L	----	----	----	----	<0.001
Copper	7440-50-8	0.001	mg/L	----	----	----	----	<0.001
Lead	7439-92-1	0.001	mg/L	----	----	----	----	<0.001
Manganese	7439-96-5	0.001	mg/L	----	----	----	----	0.006
Nickel	7440-02-0	0.001	mg/L	----	----	----	----	<0.001
Silver	7440-22-4	0.001	mg/L	----	----	----	----	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	----	----	0.048
EG020T: Total Metals by ICP-MS								



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-079	CNS0801-W-080	CNS0801-W-081	CNS0801-W-082	CNS0801-W-083
				[25-FEB-2008]	[25-FEB-2008]	[25-FEB-2008]	[25-FEB-2008]	[25-FEB-2008]
Compound	CAS Number	LOR	Unit	EB0802944-008	EB0802944-009	EB0802944-010	EB0802944-011	EB0802944-012
EG020T: Total Metals by ICP-MS - Continued								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	0.09	----
Arsenic	7440-38-2	0.001	mg/L	----	----	----	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	----	----	----	<0.001	----
Copper	7440-50-8	0.001	mg/L	----	----	----	<0.001	----
Lead	7439-92-1	0.001	mg/L	----	----	----	<0.001	----
Manganese	7439-96-5	0.001	mg/L	----	----	----	0.012	----
Nickel	7440-02-0	0.001	mg/L	----	----	----	<0.001	----
Silver	7440-22-4	0.001	mg/L	----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L	----	----	----	0.038	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	----	<0.0001
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	<0.0001	----
EK057: Nitrite as N								
Nitrite as N	----	0.010	mg/L	<0.010	----	----	----	----
EK058: Nitrate as N								
^ Nitrate as N	14797-55-8	0.010	mg/L	<0.010	----	----	----	----
EK059: Nitrite plus Nitrate as N (NO_x)								
Nitrite + Nitrate as N	----	0.010	mg/L	<0.010	0.015	----	----	----
EK061: Total Kjeldahl Nitrogen (TKN)								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	0.3	----	----	----
EK062: Total Nitrogen as N (TKN + NO_x)								
^ Total Nitrogen as N	----	0.1	mg/L	----	0.3	----	----	----
EK067: Total Phosphorus as P								
Total Phosphorus as P	----	0.01	mg/L	----	<0.01	----	----	----
EK071: Reactive Phosphorus as P (Dissolved)								
Reactive Phosphorus - Filtered	----	0.010	mg/L	<0.010	----	----	----	----
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	0.37	----	----	----	----
^ Total Cations	----	0.01	meq/L	0.28	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	----	----	2	----	----



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-086	CNS0801-W-087	CNS0801-W-088	CNS0801-W-089	CNS0801-W-090
				[25-FEB-2008]	[25-FEB-2008]	[25-FEB-2008]	[25-FEB-2008]	[25-FEB-2008]
Compound	CAS Number	LOR	Unit	EB0802944-015	EB0802944-016	EB0802944-017	EB0802944-018	EB0802944-019
EA025: Suspended Solids								
^ Suspended Solids (SS)	----	1	mg/L	<1	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	0.2	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	14	----	----	----	----
Total Alkalinity as CaCO ₃	----	1	mg/L	14	----	----	----	----
ED040F: Dissolved Major Anions								
Sulphate as SO ₄ 2-	14808-79-8	1	mg/L	<1	----	----	----	----
ED045P: Chloride by PC Titrator								
Chloride	16887-00-6	1	mg/L	1	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	3	----	----	----	----
Magnesium	7439-95-4	1	mg/L	<1	----	----	----	----
Sodium	7440-23-5	1	mg/L	<1	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG005F: Dissolved Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	----	<0.1
Iron	7439-89-6	0.05	mg/L	----	----	----	----	0.06
Selenium	7782-49-2	0.01	mg/L	----	----	----	----	<0.01
EG005T: Total Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	<0.1	----
Iron	7439-89-6	0.05	mg/L	----	----	----	0.05	----
Selenium	7782-49-2	0.01	mg/L	----	----	----	<0.01	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	----	0.02
Arsenic	7440-38-2	0.001	mg/L	----	----	----	----	<0.001
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	----	0.0002
Chromium	7440-47-3	0.001	mg/L	----	----	----	----	<0.001
Copper	7440-50-8	0.001	mg/L	----	----	----	----	<0.001
Lead	7439-92-1	0.001	mg/L	----	----	----	----	0.001
Manganese	7439-96-5	0.001	mg/L	----	----	----	----	0.004
Nickel	7440-02-0	0.001	mg/L	----	----	----	----	<0.001
Silver	7440-22-4	0.001	mg/L	----	----	----	----	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	----	----	0.185
EG020T: Total Metals by ICP-MS								



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-086	CNS0801-W-087	CNS0801-W-088	CNS0801-W-089	CNS0801-W-090
				[25-FEB-2008]	[25-FEB-2008]	[25-FEB-2008]	[25-FEB-2008]	[25-FEB-2008]
Compound	CAS Number	LOR	Unit	EB0802944-015	EB0802944-016	EB0802944-017	EB0802944-018	EB0802944-019
EG020T: Total Metals by ICP-MS - Continued								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	0.05	----
Arsenic	7440-38-2	0.001	mg/L	----	----	----	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	0.0003	----
Chromium	7440-47-3	0.001	mg/L	----	----	----	<0.001	----
Copper	7440-50-8	0.001	mg/L	----	----	----	<0.001	----
Lead	7439-92-1	0.001	mg/L	----	----	----	<0.001	----
Manganese	7439-96-5	0.001	mg/L	----	----	----	0.006	----
Nickel	7440-02-0	0.001	mg/L	----	----	----	<0.001	----
Silver	7440-22-4	0.001	mg/L	----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L	----	----	----	0.026	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	----	<0.0001
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	<0.0001	----
EK057: Nitrite as N								
Nitrite as N	----	0.010	mg/L	<0.010	----	----	----	----
EK058: Nitrate as N								
^ Nitrate as N	14797-55-8	0.010	mg/L	<0.010	----	----	----	----
EK059: Nitrite plus Nitrate as N (NOx)								
Nitrite + Nitrate as N	----	0.010	mg/L	<0.010	0.015	----	----	----
EK061: Total Kjeldahl Nitrogen (TKN)								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	<0.1	----	----	----
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	0.1	mg/L	----	<0.1	----	----	----
EK067: Total Phosphorus as P								
Total Phosphorus as P	----	0.01	mg/L	----	<0.01	----	----	----
EK071: Reactive Phosphorus as P (Dissolved)								
Reactive Phosphorus - Filtered	----	0.010	mg/L	<0.010	----	----	----	----
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	0.30	----	----	----	----
^ Total Cations	----	0.01	meq/L	0.16	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	----	----	2	----	----



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-093	CNS0801-W-094	CNS0801-W-095	CNS0801-W-096	CNS0801-W-097
				[25-FEB-2008]	[25-FEB-2008]	[25-FEB-2008]	[25-FEB-2008]	[25-FEB-2008]
Compound	CAS Number	LOR	Unit	EB0802944-022	EB0802944-023	EB0802944-024	EB0802944-025	EB0802944-026
EA025: Suspended Solids								
^ Suspended Solids (SS)	----	1	mg/L	<1	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	0.2	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	14	----	----	----	----
Total Alkalinity as CaCO ₃	----	1	mg/L	14	----	----	----	----
ED040F: Dissolved Major Anions								
Sulphate as SO ₄ 2-	14808-79-8	1	mg/L	<1	----	----	----	----
ED045P: Chloride by PC Titrator								
Chloride	16887-00-6	1	mg/L	2	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	3	----	----	----	----
Magnesium	7439-95-4	1	mg/L	<1	----	----	----	----
Sodium	7440-23-5	1	mg/L	<1	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG005F: Dissolved Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	----	<0.1
Iron	7439-89-6	0.05	mg/L	----	----	----	----	0.06
Selenium	7782-49-2	0.01	mg/L	----	----	----	----	<0.01
EG005T: Total Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	<0.1	----
Iron	7439-89-6	0.05	mg/L	----	----	----	<0.05	----
Selenium	7782-49-2	0.01	mg/L	----	----	----	<0.01	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	----	0.02
Arsenic	7440-38-2	0.001	mg/L	----	----	----	----	<0.001
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	----	<0.0001
Chromium	7440-47-3	0.001	mg/L	----	----	----	----	<0.001
Copper	7440-50-8	0.001	mg/L	----	----	----	----	<0.001
Lead	7439-92-1	0.001	mg/L	----	----	----	----	<0.001
Manganese	7439-96-5	0.001	mg/L	----	----	----	----	0.004
Nickel	7440-02-0	0.001	mg/L	----	----	----	----	<0.001
Silver	7440-22-4	0.001	mg/L	----	----	----	----	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	----	----	0.025
EG020T: Total Metals by ICP-MS								



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-093	CNS0801-W-094	CNS0801-W-095	CNS0801-W-096	CNS0801-W-097
				[25-FEB-2008]	[25-FEB-2008]	[25-FEB-2008]	[25-FEB-2008]	[25-FEB-2008]
Compound	CAS Number	LOR	Unit	EB0802944-022	EB0802944-023	EB0802944-024	EB0802944-025	EB0802944-026
EG020T: Total Metals by ICP-MS - Continued								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	0.05	----
Arsenic	7440-38-2	0.001	mg/L	----	----	----	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	----	----	----	<0.001	----
Copper	7440-50-8	0.001	mg/L	----	----	----	<0.001	----
Lead	7439-92-1	0.001	mg/L	----	----	----	<0.001	----
Manganese	7439-96-5	0.001	mg/L	----	----	----	0.006	----
Nickel	7440-02-0	0.001	mg/L	----	----	----	<0.001	----
Silver	7440-22-4	0.001	mg/L	----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L	----	----	----	0.076	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	----	<0.0001
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	<0.0001	----
EK057: Nitrite as N								
Nitrite as N	----	0.010	mg/L	<0.010	----	----	----	----
EK058: Nitrate as N								
^ Nitrate as N	14797-55-8	0.010	mg/L	<0.010	----	----	----	----
EK059: Nitrite plus Nitrate as N (NOx)								
Nitrite + Nitrate as N	----	0.010	mg/L	<0.010	<0.010	----	----	----
EK061: Total Kjeldahl Nitrogen (TKN)								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	<0.1	----	----	----
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	0.1	mg/L	----	<0.1	----	----	----
EK067: Total Phosphorus as P								
Total Phosphorus as P	----	0.01	mg/L	----	<0.01	----	----	----
EK071: Reactive Phosphorus as P (Dissolved)								
Reactive Phosphorus - Filtered	----	0.010	mg/L	<0.010	----	----	----	----
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	0.34	----	----	----	----
^ Total Cations	----	0.01	meq/L	0.16	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	----	----	2	----	----



**MANSFIELD
LABORATORY**

1/51 Secam Street, Mansfield QLD 4122
PO Box 2034 Mansfield DC QLD 4122
Phone:(07) 3343 3166 Fax:(07) 3849 4705
www.golder.com.au

TEST RESULTS

Client :	ALS Environmental Brisbane	Job No. :	087634002/8
Project :	Delivered Samples	Date Received :	07-Mar-08
Batch No. :	EB0802944	Sampled by :	Client

PARTICLE SIZE SUMMARY

Reg'n No.	Sample ID	Sample No.	Percent Gravel (+ 2 mm)	Percent Sand (2 mm - 0.060 mm)	Percent Silt (0.060 mm - 0.002 mm)	Percent Clay (-0.002 mm)
0831422	CNS0801-S-77	6	8	71	18	3
0831423	CNS0801-S-91	20	0	81	12	7
0831424	CNS0801-S-98	27	0	73	15	12

Remarks :

Test Procedure : AS 1289.3.6.3

Prepared by : *NF*

Checked by *JA*



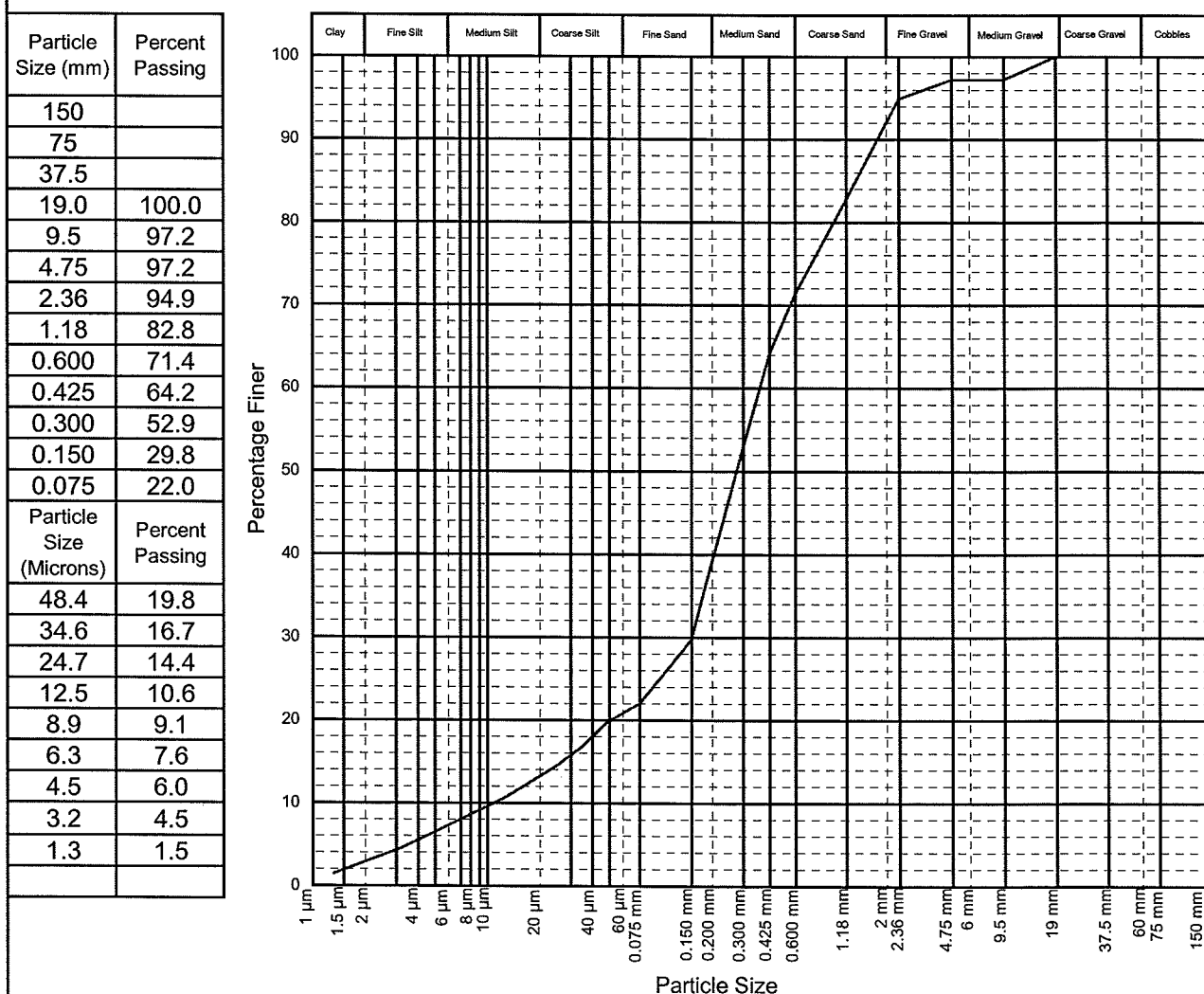
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PARTICLE SIZE DISTRIBUTION BY HYDROMETER

Client :	ALS Environmental Brisbane	Report No. :	R6895
Address :	32 Shand Street, Stafford	Job No. :	087634002/8
Project :	Delivered Samples	Reg'n No. :	0831422
Sample ID :	CNS0801-S-77	Batch No. :	EB0802944 - 6
		Date Received :	7/03/2008
		Sampled By :	Client

SIZE FRACTIONS AS PER AUSTRALIAN STANDARDS AS 1726



Pretreatment	Tested as received	Soil Particle Density (assumed)	2.70
Loss in Pretreatment (%)	-	Type of Hydrometer	ASTM E100
Method of Dispersion	Mixer		
Remarks :			
Material Description :	(SM) Silty SAND, dark brown		
Test Procedure :	AS 1289 3.6.2, 3.6.3 (up to 24 hours)		
Prepared by : <i>NR</i>	Checked by : <i>SA</i>		

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..... *NR* *26/3/08*
Authorised Signatory



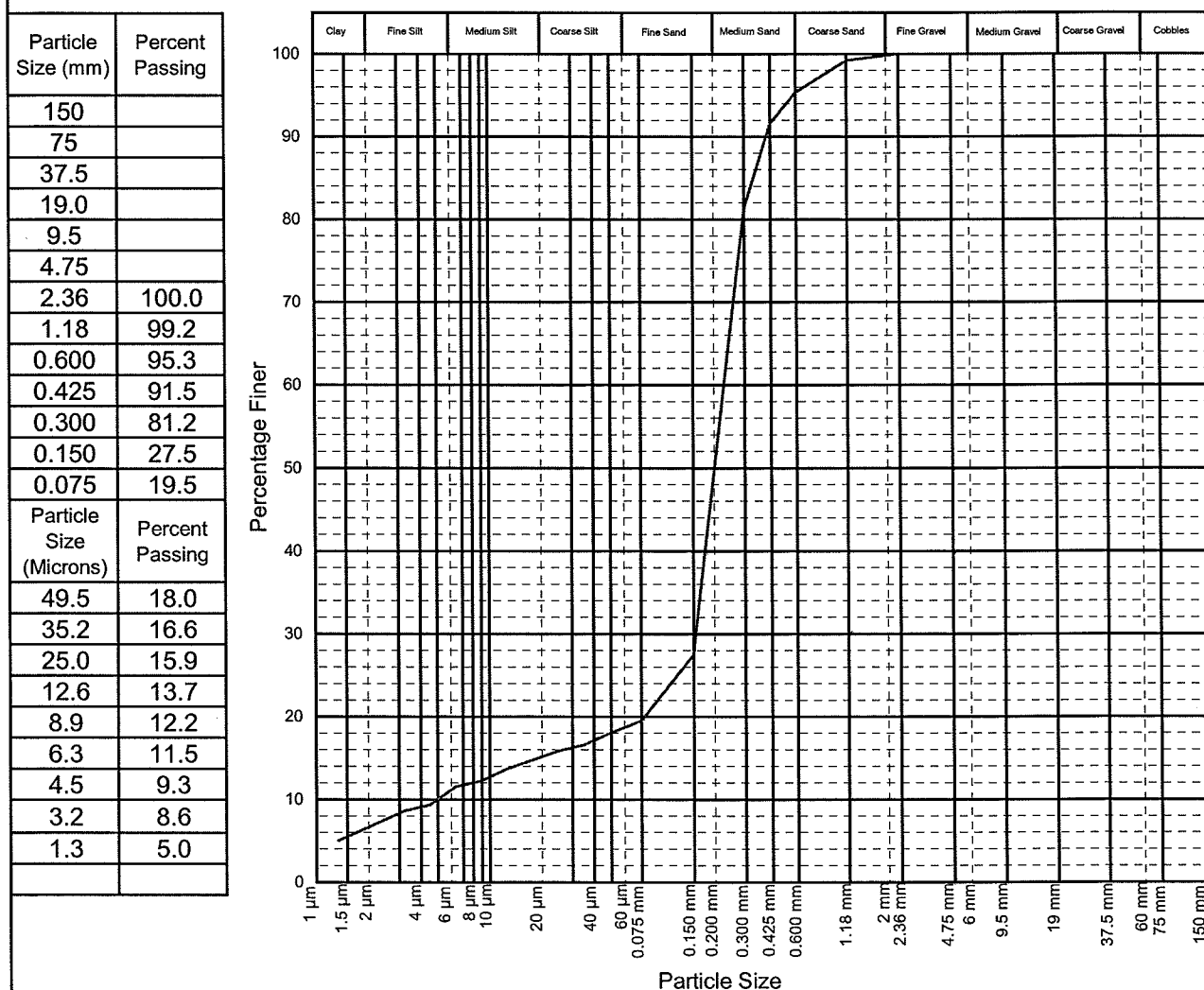
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PARTICLE SIZE DISTRIBUTION BY HYDROMETER

Client :	ALS Environmental Brisbane	Report No. :	R6895
Address :	32 Shand Street, Stafford	Job No. :	087634002/8
Project :	Delivered Samples	Reg'n No. :	0831423
Sample ID :	CNS0801-S-91	Batch No. :	EB0802944 - 20
		Date Received :	7/03/2008
		Sampled By :	Client

SIZE FRACTIONS AS PER AUSTRALIAN STANDARDS AS 1726



Pretreatment	Tested as received	Soil Particle Density (assumed)	2.70
Loss in Pretreatment (%)	-	Type of Hydrometer	ASTM E100
Method of Dispersion	Mixer		
Remarks :			
Material Description : (SM) Silty SAND, dark brown, organics throughout			
Test Procedure : AS 1289 3.6.2, 3.6.3 (up to 24 hours)			
Prepared by : <i>nr</i>		Checked by : <i>SA</i>	

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N. J. J. 26/3/8



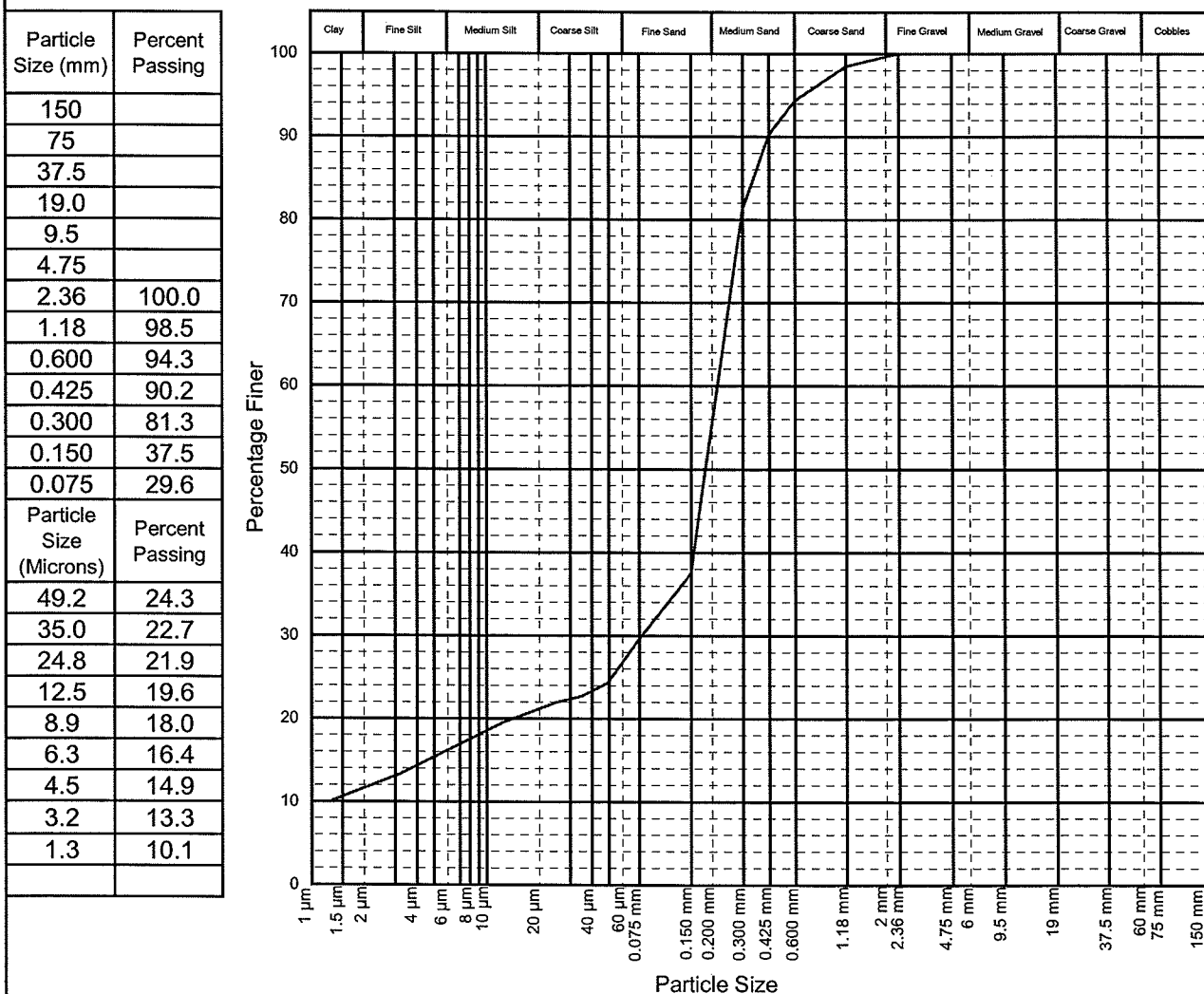
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PO Box 2034 Mansfield DC Qld 4122
Ph : (07) 3343 3166 Fax : (07) 3343 4705
www.golder.com.au

PARTICLE SIZE DISTRIBUTION BY HYDROMETER

Client :	ALS Environmental Brisbane	Report No. :	R6895
Address :	32 Shand Street, Stafford	Job No. :	087634002/8
Project :	Delivered Samples	Reg'n No. :	0831424
Sample ID :	CNS0801-S-98	Batch No. :	EB0802944 - 27
		Date Received :	7/03/2008
		Sampled By :	Client

SIZE FRACTIONS AS PER AUSTRALIAN STANDARDS AS 1726



Pretreatment	Tested as received	Soil Particle Density (assumed)	2.70
Loss in Pretreatment (%)	-	Type of Hydrometer	ASTM E100
Method of Dispersion	Mixer		
Remarks :			
Material Description :	(SM) Silty SAND, dark brown, organics throughout		
Test Procedure :	AS 1289 3.6.2, 3.6.3 (up to 24 hours)		
Prepared by : <i>NT</i>	Checked by : <i>JA</i>		

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NT 26/2/8

CHAIN OF CUSTODY DOCUMENTATION



ALS Laboratory Group

CLIENT: HYDROBIOLOGY
 ADDRESS / OFFICE: 47 PARK RD, MILTON 4064
 PROJECT MANAGER (PM): ADRIAN FLYNN
 PROJECT ID: CNS0801
 SITE: PNG P.O. NO.:
 RESULTS REQUIRED (Date): QUOTE NO.: BN/400B/07

SAMPLER:
 MOBILE:
 PHONE:
 EMAIL REPORT TO:
 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 2

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	CNS0801-W-254	W			SP	
2	W-255				SG	
3	W-256				N	
4	W-257				N	
5	S-258	S			B	
6	S-259	S			JAR	
7	W-261	W			SP	
8	W-262				SG	
9	W-263				N	
10	W-264				N	

NAP	TOC	Metals (Total)	Metals (Dissolved)	SED PSD	SED METALS
✓	✓	✓	✓	✓	✓

Environmental Division
 Brisbane

Work Order

EB0803133



Telephone : +61-7-3243 7222

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

RELINQUISHED BY:
 Name: ADRIAN FLYNN
 Of: HYDROBIOLOGY - FROM PNG
 Name:
 Of:

Date: 3/3/08
 Time:
 Date:
 Time:

RECEIVED BY:
 Name: Wong; Lee
 Of: ALS
 Name:
 Of:

Date: 10.3.08
 Time: 9.15
 Date:
 Time:

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.

ALS LABORATORY GROUP

COC Page 1 of 3

CHAIN OF CUSTODY DOCUMENTATION



ALS Laboratory Group

CLIENT: _____

ADDRESS / OFFICE: _____

PROJECT MANAGER (PM): _____

PROJECT ID: _____

SITE: _____ P.O. NO.: _____

RESULTS REQUIRED (Date): _____ QUOTE NO.: _____

SAMPLER: _____

MOBILE: _____

PHONE: _____

EMAIL REPORT TO: _____

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:

ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles	N+P	TOC	METALS (TOTAL)	METALS (DISSOLVABLE)	SED. PSD	SED. METALS								
--------	-----------	--------	------	------	-------------	---------------	-----	-----	----------------	----------------------	----------	-------------	--	--	--	--	--	--	--	--

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
11	W-268	W			SP	
12	W-269				SG	
13	W-270				N	
14	W-271				N	
15	W-275				SP	
16	W-276				SG	
17	W-277				N	
18	W-278				N	
19	S-279	S			B	
20	S-280	S			SEP	

HOLD

HOLD

HOLD

HOLD

HOLD

HOLD

RELINQUISHED BY:

Name: _____ Date: _____

Of: _____ Time: _____

Name: _____ Date: _____

Of: _____ Time: _____

RECEIVED BY:

Name: Wanki Lee Date: 10.3.08

Of: ALS Time: 9.15

Name: _____ Date: _____

Of: _____ Time: _____

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.

ALS LABORATORY GROUP

COC Page 2 of 3

CLIENT:

SAMPLER:

ADDRESS / OFFICE:

MOBILE:

PROJECT MANAGER (PM):

PHONE:

PROJECT ID:

EMAIL REPORT TO:

SITE:

P.O. NO.:

EMAIL INVOICE TO: (if different to report)

RESULTS REQUIRED (Date):

QUOTE NO.:

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

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

CONTAINER INFORMATION

[illegible]

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

NAP
TOC
METALS (TOTAL)
METALS (DISSOLVED)
SED. PHYS
SED. METALS

RECEIVED BY

METHOD OF SHIPMENT

RELINQUISHED BY:

Name:

Date:

Name:

Date: 10.3.08

Con' Note No:

Of:

Time:

Of:

Time: 9.15

Transport Co:

Name:

Date:

Name: _____

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; HCl = Hydrochloric Acid Preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Plastic

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide So. Preserved; 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.

COC Page 3 of 3



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: EB0803133	Page	: 1 of 11
Client	: HYDROBIOLOGY PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: MR ADRIAN FLYNN	Contact	: Tim Kilmister
Address	: P O BOX 2050 MILTON QLD, AUSTRALIA 4064	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: adrian.flynn@hydrobiology.biz	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 33682133	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 38763068	Facsimile	: +61-7-3243 7218
Project	: CN50801	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 10-MAR-2008
C-O-C number	: ----	Issue Date	: 26-MAR-2008
Sampler	: ----	No. of samples received	: 28
Site	: PNG	No. of samples analysed	: 21
Quote number	: ----		

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

This document is issued in accordance with NATA accreditation requirements.

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
Ankit Joshi	Inorganic Chemist	Inorganics
Hoa Nguyen		Inorganics
Kim McCabe	Senior Inorganic Chemist	Inorganics
Phillip Kennedy	2IC Environmental Laboratory	Inorganics

Environmental Division Brisbane

Part of the **ALS Laboratory Group**

32 Shand Street Stafford QLD Australia 4053
Tel. +61-7-3243 7222 Fax. +61-7-3243 7218 www.alsglobal.com

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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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes. If the sampling time is 0:00 the information was not supplied by client.

Key : CAS Number = Chemistry Abstract Services number

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- **EG005T (Total Metals): EB0803218-049 shows poor duplicate results due to sample heterogeneity. Confirmed by visual inspection.**
- **EG005T (Total Metals): Poor matrix spike recovery on EB0803215-002 due to sample heterogeneity. Confirmed by visual inspection.**



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

				CNS0801-S-259	CNS0801-S-259 <2mm	----	----	----
Client sampling date / time				[03-MAR-2008]	[03-MAR-2008]	----	----	----
Compound	CAS Number	LOR	Unit	EB0803133-006	EB0803133-028	----	----	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	30.9	----	----	----	----
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	----	13600	----	----	----
Arsenic	7440-38-2	5	mg/kg	----	<5	----	----	----
Boron	7440-42-8	50	mg/kg	----	<50	----	----	----
Cadmium	7440-43-9	1	mg/kg	----	<1	----	----	----
Chromium	7440-47-3	2	mg/kg	----	30	----	----	----
Copper	7440-50-8	5	mg/kg	----	9	----	----	----
Iron	7439-89-6	50	mg/kg	----	38000	----	----	----
Lead	7439-92-1	5	mg/kg	----	<5	----	----	----
Manganese	7439-96-5	5	mg/kg	----	551	----	----	----
Nickel	7440-02-0	2	mg/kg	----	7	----	----	----
Selenium	7782-49-2	5	mg/kg	----	<5	----	----	----
Silver	7440-22-4	2	mg/kg	----	<2	----	----	----
Zinc	7440-66-6	5	mg/kg	----	37	----	----	----
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	<0.1	----	----	----



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-254	CNS0801-W-255	CNS0801-W-256	CNS0801-W-257	CNS0801-W-261
				[03-MAR-2008]	[03-MAR-2008]	[03-MAR-2008]	[03-MAR-2008]	[03-MAR-2008]
Compound	CAS Number	LOR	Unit	EB0803133-001	EB0803133-002	EB0803133-003	EB0803133-004	EB0803133-007
EG005F: Dissolved Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	<0.1	----
Iron	7439-89-6	0.05	mg/L	----	----	----	0.07	----
Selenium	7782-49-2	0.01	mg/L	----	----	----	<0.01	----
EG005T: Total Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	<0.1	----	----
Iron	7439-89-6	0.05	mg/L	----	----	0.13	----	----
Selenium	7782-49-2	0.01	mg/L	----	----	<0.01	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	0.03	----
Arsenic	7440-38-2	0.001	mg/L	----	----	----	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	----	----	----	<0.001	----
Copper	7440-50-8	0.001	mg/L	----	----	----	<0.001	----
Lead	7439-92-1	0.001	mg/L	----	----	----	<0.001	----
Manganese	7439-96-5	0.001	mg/L	----	----	----	0.006	----
Nickel	7440-02-0	0.001	mg/L	----	----	----	<0.001	----
Silver	7440-22-4	0.001	mg/L	----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L	----	----	----	0.091	----
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	0.07	----	----
Arsenic	7440-38-2	0.001	mg/L	----	----	<0.001	----	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	<0.0001	----	----
Chromium	7440-47-3	0.001	mg/L	----	----	<0.001	----	----
Copper	7440-50-8	0.001	mg/L	----	----	<0.001	----	----
Lead	7439-92-1	0.001	mg/L	----	----	<0.001	----	----
Manganese	7439-96-5	0.001	mg/L	----	----	0.008	----	----
Nickel	7440-02-0	0.001	mg/L	----	----	<0.001	----	----
Silver	7440-22-4	0.001	mg/L	----	----	<0.001	----	----
Zinc	7440-66-6	0.005	mg/L	----	----	0.025	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	<0.0001	----
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	<0.0001	----	----
EK059: Nitrite plus Nitrate as N (NO_x)								
Nitrite + Nitrate as N	----	0.010	mg/L	0.015	----	----	----	0.017
EK061: Total Kjeldahl Nitrogen (TKN)								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	----	----	----	<0.1



Analytical Results

Sub-Matrix: WATER

				Client sample ID	CNS0801-W-254	CNS0801-W-255	CNS0801-W-256	CNS0801-W-257	CNS0801-W-261
				Client sampling date / time	[03-MAR-2008]	[03-MAR-2008]	[03-MAR-2008]	[03-MAR-2008]	[03-MAR-2008]
Compound	CAS Number	LOR	Unit		EB0803133-001	EB0803133-002	EB0803133-003	EB0803133-004	EB0803133-007
EK062: Total Nitrogen as N (TKN + NOx)									
^ Total Nitrogen as N	----	0.1	mg/L		<0.1	----	----	----	<0.1
EK067: Total Phosphorus as P									
Total Phosphorus as P	----	0.01	mg/L		<0.01	----	----	----	<0.01
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		----	2	----	----	----



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-262	CNS0801-W-263	CNS0801-W-264	CNS0801-W-268	CNS0801-W-269
				[03-MAR-2008]	[03-MAR-2008]	[03-MAR-2008]	[03-MAR-2008]	[03-MAR-2008]
Compound	CAS Number	LOR	Unit	EB0803133-008	EB0803133-009	EB0803133-010	EB0803133-011	EB0803133-012
EG005F: Dissolved Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	<0.1	----	----
Iron	7439-89-6	0.05	mg/L	----	----	0.07	----	----
Selenium	7782-49-2	0.01	mg/L	----	----	<0.01	----	----
EG005T: Total Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	<0.1	----	----	----
Iron	7439-89-6	0.05	mg/L	----	0.12	----	----	----
Selenium	7782-49-2	0.01	mg/L	----	<0.01	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	0.06	----	----
Arsenic	7440-38-2	0.001	mg/L	----	----	<0.001	----	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	0.0002	----	----
Chromium	7440-47-3	0.001	mg/L	----	----	<0.001	----	----
Copper	7440-50-8	0.001	mg/L	----	----	<0.001	----	----
Lead	7439-92-1	0.001	mg/L	----	----	0.002	----	----
Manganese	7439-96-5	0.001	mg/L	----	----	0.006	----	----
Nickel	7440-02-0	0.001	mg/L	----	----	<0.001	----	----
Silver	7440-22-4	0.001	mg/L	----	----	<0.001	----	----
Zinc	7440-66-6	0.005	mg/L	----	----	0.159	----	----
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	0.10	----	----	----
Arsenic	7440-38-2	0.001	mg/L	----	<0.001	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	----	<0.0001	----	----	----
Chromium	7440-47-3	0.001	mg/L	----	<0.001	----	----	----
Copper	7440-50-8	0.001	mg/L	----	<0.001	----	----	----
Lead	7439-92-1	0.001	mg/L	----	<0.001	----	----	----
Manganese	7439-96-5	0.001	mg/L	----	0.009	----	----	----
Nickel	7440-02-0	0.001	mg/L	----	<0.001	----	----	----
Silver	7440-22-4	0.001	mg/L	----	<0.001	----	----	----
Zinc	7440-66-6	0.005	mg/L	----	0.007	----	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	<0.0001	----	----
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	<0.0001	----	----	----
EK059: Nitrite plus Nitrate as N (NO_x)								
Nitrite + Nitrate as N	----	0.010	mg/L	----	----	----	0.111	----
EK061: Total Kjeldahl Nitrogen (TKN)								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	----	----	0.4	----



Analytical Results

Sub-Matrix: WATER

				Client sample ID	CNS0801-W-262	CNS0801-W-263	CNS0801-W-264	CNS0801-W-268	CNS0801-W-269
				Client sampling date / time	[03-MAR-2008]	[03-MAR-2008]	[03-MAR-2008]	[03-MAR-2008]	[03-MAR-2008]
Compound	CAS Number	LOR	Unit		EB0803133-008	EB0803133-009	EB0803133-010	EB0803133-011	EB0803133-012
EK062: Total Nitrogen as N (TKN + NOx)									
^ Total Nitrogen as N	----	0.1	mg/L		----	----	----	0.6	----
EK067: Total Phosphorus as P									
Total Phosphorus as P	----	0.01	mg/L		----	----	----	0.14	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		1	----	----	----	4



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-270	CNS0801-W-271	CNS0801-W-282	CNS0801-W-283	CNS0801-W-284
				[03-MAR-2008]	[03-MAR-2008]	[03-MAR-2008]	[03-MAR-2008]	[03-MAR-2008]
Compound	CAS Number	LOR	Unit	EB0803133-013	EB0803133-014	EB0803133-021	EB0803133-022	EB0803133-023
EG005F: Dissolved Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	<0.1	----	----	----
Iron	7439-89-6	0.05	mg/L	----	0.15	----	----	----
Selenium	7782-49-2	0.01	mg/L	----	<0.01	----	----	----
EG005T: Total Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	<0.1	----	----	----	<0.1
Iron	7439-89-6	0.05	mg/L	5.02	----	----	----	6.18
Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	<0.01
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	0.18	----	----	----
Arsenic	7440-38-2	0.001	mg/L	----	0.001	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	----	<0.0001	----	----	----
Chromium	7440-47-3	0.001	mg/L	----	<0.001	----	----	----
Copper	7440-50-8	0.001	mg/L	----	<0.001	----	----	----
Lead	7439-92-1	0.001	mg/L	----	<0.001	----	----	----
Manganese	7439-96-5	0.001	mg/L	----	0.004	----	----	----
Nickel	7440-02-0	0.001	mg/L	----	<0.001	----	----	----
Silver	7440-22-4	0.001	mg/L	----	<0.001	----	----	----
Zinc	7440-66-6	0.005	mg/L	----	0.014	----	----	----
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	4.76	----	----	----	6.28
Arsenic	7440-38-2	0.001	mg/L	0.003	----	----	----	0.002
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	<0.0001
Chromium	7440-47-3	0.001	mg/L	0.005	----	----	----	0.005
Copper	7440-50-8	0.001	mg/L	0.007	----	----	----	0.010
Lead	7439-92-1	0.001	mg/L	0.003	----	----	----	0.004
Manganese	7439-96-5	0.001	mg/L	0.102	----	----	----	0.124
Nickel	7440-02-0	0.001	mg/L	0.003	----	----	----	0.004
Silver	7440-22-4	0.001	mg/L	<0.001	----	----	----	<0.001
Zinc	7440-66-6	0.005	mg/L	0.010	----	----	----	0.103
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	<0.0001	----	----	----
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	<0.0001	----	----	----	<0.0001
EK059: Nitrite plus Nitrate as N (NO_x)								
Nitrite + Nitrate as N	----	0.010	mg/L	----	----	0.107	----	----
EK061: Total Kjeldahl Nitrogen (TKN)								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	----	0.4	----	----



Analytical Results

Sub-Matrix: WATER				Client sample ID	CNS0801-W-270	CNS0801-W-271	CNS0801-W-282	CNS0801-W-283	CNS0801-W-284
				Client sampling date / time	[03-MAR-2008]	[03-MAR-2008]	[03-MAR-2008]	[03-MAR-2008]	[03-MAR-2008]
Compound	CAS Number	LOR	Unit		EB0803133-013	EB0803133-014	EB0803133-021	EB0803133-022	EB0803133-023
EK062: Total Nitrogen as N (TKN + NOx)									
^ Total Nitrogen as N	----	0.1	mg/L		----	----	0.5	----	----
EK067: Total Phosphorus as P									
Total Phosphorus as P	----	0.01	mg/L		----	----	0.32	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		----	----	----	4	----



Analytical Results

Sub-Matrix: **WATER**

				Client sample ID	CNS0801-W-285	CNS0801-W-301	CNS0801-W-302	CNS0801-W-303	----
				Client sampling date / time	[03-MAR-2008]	[03-MAR-2008]	[03-MAR-2008]	[03-MAR-2008]	----
Compound	CAS Number	LOR	Unit		EB0803133-024	EB0803133-025	EB0803133-026	EB0803133-027	----
EG005F: Dissolved Metals by ICP-AES									
Boron	7440-42-8	0.1	mg/L		<0.1	----	----	----	----
Iron	7439-89-6	0.05	mg/L		0.13	----	----	----	----
Selenium	7782-49-2	0.01	mg/L		<0.01	----	----	----	----
EG005T: Total Metals by ICP-AES									
Boron	7440-42-8	0.1	mg/L		----	----	----	<0.1	----
Iron	7439-89-6	0.05	mg/L		----	----	----	<0.05	----
Selenium	7782-49-2	0.01	mg/L		----	----	----	<0.01	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		0.14	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L		<0.001	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L		<0.0001	----	----	----	----
Chromium	7440-47-3	0.001	mg/L		<0.001	----	----	----	----
Copper	7440-50-8	0.001	mg/L		0.001	----	----	----	----
Lead	7439-92-1	0.001	mg/L		<0.001	----	----	----	----
Manganese	7439-96-5	0.001	mg/L		0.006	----	----	----	----
Nickel	7440-02-0	0.001	mg/L		<0.001	----	----	----	----
Silver	7440-22-4	0.001	mg/L		<0.001	----	----	----	----
Zinc	7440-66-6	0.005	mg/L		0.049	----	----	----	----
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L		----	----	----	<0.01	----
Arsenic	7440-38-2	0.001	mg/L		----	----	----	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L		----	----	----	0.0008	----
Chromium	7440-47-3	0.001	mg/L		----	----	----	<0.001	----
Copper	7440-50-8	0.001	mg/L		----	----	----	<0.001	----
Lead	7439-92-1	0.001	mg/L		----	----	----	<0.001	----
Manganese	7439-96-5	0.001	mg/L		----	----	----	<0.001	----
Nickel	7440-02-0	0.001	mg/L		----	----	----	<0.001	----
Silver	7440-22-4	0.001	mg/L		----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L		----	----	----	0.125	----
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		<0.0001	----	----	----	----
EG035T: Total Mercury by FIMS									
Mercury	7439-97-6	0.0001	mg/L		----	----	----	<0.0001	----
EK059: Nitrite plus Nitrate as N (NO_x)									
Nitrite + Nitrate as N	----	0.010	mg/L		----	0.025	----	----	----
EK061: Total Kjeldahl Nitrogen (TKN)									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		----	<0.1	----	----	----



Analytical Results

Sub-Matrix: WATER				Client sample ID	CNS0801-W-285	CNS0801-W-301	CNS0801-W-302	CNS0801-W-303	----
				Client sampling date / time	[03-MAR-2008]	[03-MAR-2008]	[03-MAR-2008]	[03-MAR-2008]	----
Compound	CAS Number	LOR	Unit		EB0803133-024	EB0803133-025	EB0803133-026	EB0803133-027	----
EK062: Total Nitrogen as N (TKN + NOx)									
^ Total Nitrogen as N	----	0.1	mg/L		----	<0.1	----	----	----
EK067: Total Phosphorus as P									
Total Phosphorus as P	----	0.01	mg/L		----	<0.01	----	----	----
EP005: Total Organic Carbon (TOC)									
Total Organic Carbon	----	1	mg/L		----	----	<1	----	----



**MANSFIELD
LABORATORY**

1/51 Secam Street, Mansfield QLD 4122
PO Box 2034 Mansfield DC QLD 4122
Phone:(07) 3343 3166 Fax:(07) 3849 4705
www.golder.com.au

TEST RESULTS

Client :	ALS Environmental Brisbane	Job No. :	087634002/8
Project :	Delivered Samples	Date Received :	11-Mar-08
Batch No. :	EB0803133	Sampled by :	Client

PARTICLE SIZE SUMMARY

Reg'n No.	Sample ID	Sample No.	Percent Gravel (+ 2 mm)	Percent Sand (2 mm - 0.060 mm)	Percent Silt (0.060 mm - 0.002 mm)	Percent Clay (-0.002 mm)
0831580	CNS0801-S-258	5	21	72	5	2

Remarks :

Test Procedure : AS 1289.3.6.3

Prepared by : *JK*

Checked by *JA*



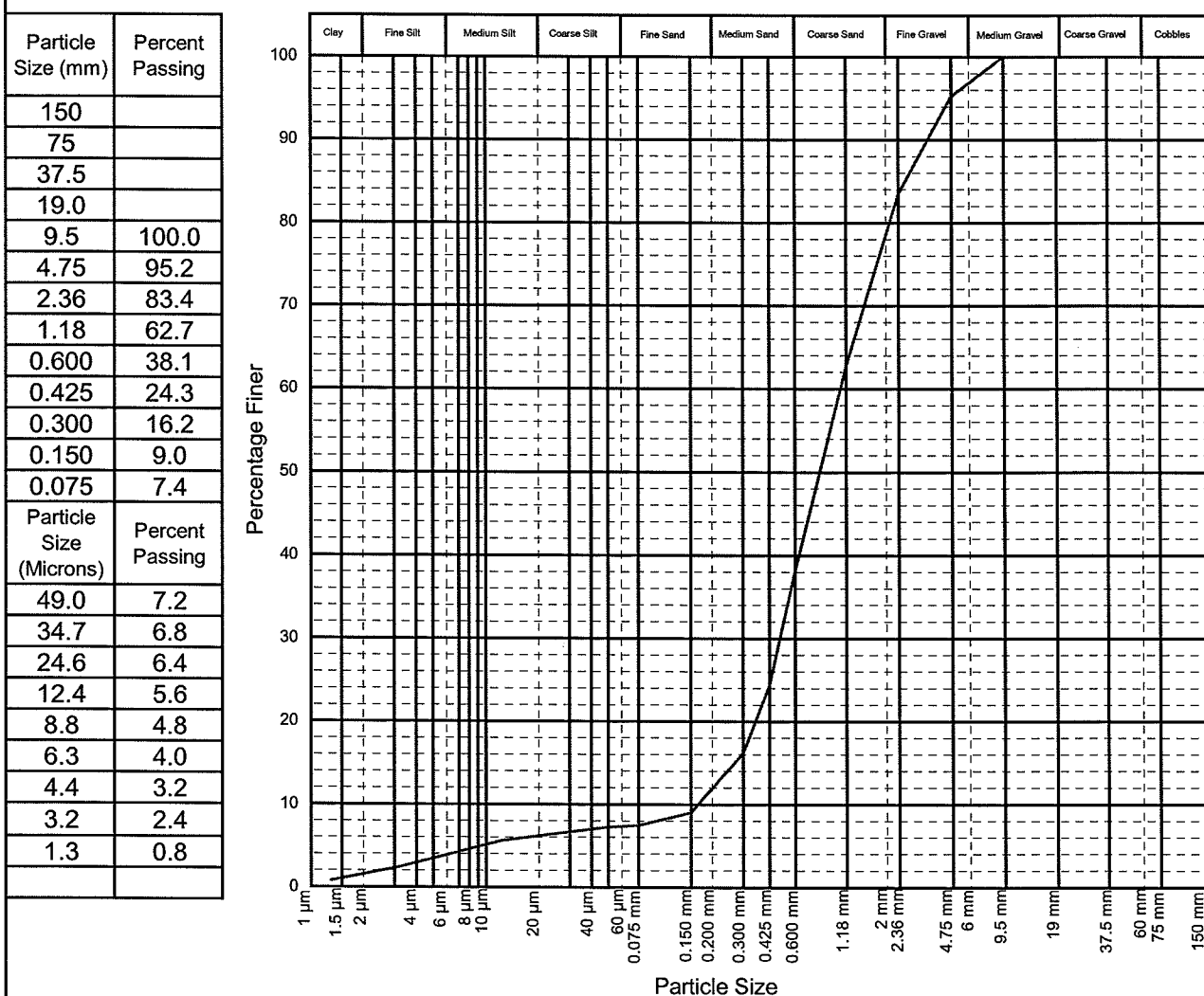
**MANSFIELD
LABORATORY**

1/51 Secam Street Mansfield Qld 4122
PO Box 2034 Mansfield DC Qld 4122
Ph : (07) 3343 3166 Fax : (07) 3343 4705
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PARTICLE SIZE DISTRIBUTION BY HYDROMETER

Client :	ALS Environmental Brisbane	Report No. :	R6909
Address :	32 Shand Street, Stafford	Job No. :	087634002/8
Project :	Delivered Samples	Reg'n No. :	0831580
Sample ID :	CNS0801-S-258	Batch No. :	EB0803133 - 5
		Date Received :	11/03/2008
		Sampled By :	Client

SIZE FRACTIONS AS PER AUSTRALIAN STANDARDS AS 1726



Pretreatment	Tested as received	Soil Particle Density (assumed)	2.80
Loss in Pretreatment (%)	-	Type of Hydrometer	ASTM E100
Method of Dispersion	Mixer		
Remarks :			
Material Description : (SM/SP) Silty SAND/SAND, brown, with some gravel			
Test Procedure : AS 1289 3.6.2, 3.6.3 (up to 24 hours)			
Prepared by : <i>NT</i>		Checked by : <i>SA</i>	

This Laboratory is accredited by the National Association of Testing Authorities, Australia. The test(s) reported herein have been performed in accordance with its scope of accreditation.
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1446

..... *N. J. J. 28/3/8*
Authorised Signatory

CLIENT: Hydrobiolog-y
ADDRESS / OFFICE: 47 PARK Rd, MILTON
PROJECT MANAGER (PM): ADRIAN FLINN
PROJECT ID: CNS0801
SITE: PNG P.O. NO.: 1

SAMPLER:
MOBILE:
PHONE:
EMAIL REPORT TO:
EMAIL INVOICE TO: (if different to report)

RESULTS REQUIRED (Date): QUOTE NO.: BN/400B/07

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 bottle
1	CNS0801-W-200	✓			P	
2	W-201	↓			SP	
3	W-202	↓			SG	
4	W-203	↓			N	
5	W-204	↓			N	
6	S-205	S			B	
7	S-206	S			JAR	
8	W-207	W			P	
9	W-208	↓			SP	
10	W-209	↓			SG	
11	W-210	↓			N	
12	W-211	↓			N	

[illegible]

Environmental Division
Brisbane
Work Order
EB0803157



Telephone : +61-7-3243 7222

RELINQUISHED BY:	
Name: ADRIAN FLYNN	Date: 3/3/08.
Of: HYDROBIOLOGIST - FROM PNG.	Time:
Name:	Date:
Of:	Time:

RECEIVED BY	
Name: Wanki Lee	Date: 10.3.08
Of: ALS	Time: 9.15
Name:	Date:
Of:	Time:

	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.

ALS LABORATORY GROUP

COC Page 1 of 5

CHAIN OF CUSTODY DOCUMENTATION



ALS Laboratory Group

CLIENT:		SAMPLER:	
ADDRESS / OFFICE:		MOBILE:	
PROJECT MANAGER (PM):		PHONE:	
PROJECT ID:		EMAIL REPORT TO:	
SITE:		P.O. NO.:	
RESULTS REQUIRED (Date):		QUOTE NO.:	
FOR LABORATORY USE ONLY		ANALYSIS REQUIRED including SUITES (note - suite codes must be listed to attract suite prices)	

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		WAT	N	P	ME	ME	SE	SE						
ALS ID	SAMPLE ID	MATRIX	DATE	Time	Type / Code	Total bottles													
13	S-212	S			B							✓							
14	S-213	S			JAR								✓						
15	W-214	W			P		✓												
16	W-215	↓			SP			✓											
17	W-216	↓			SG				✓										
18	W-217	↓			N					✓									
19	W-218	↓			N						✓								
20	S-219	S			B							✓							
21	S-220	S			JAR								✓						
22	W-225	✓			P		✓												
23	W-226	W			SP			✓											
24	W-227	W			SG				✓										

RELINQUISHED BY:		RECEIVED BY:		METHOD OF SHIPMENT	
Name:	Date:	Name: Wonki Lee	Date: 10.3.08	Con' Note No:	
Of:	Time:	Of: ALS	Time: 9.15		
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.

ALS LABORATORY GROUP

COC Page 2 of 5

CHAIN OF CUSTODY DOCUMENTATION



ALS Laboratory Group

CLIENT: _____
 ADDRESS / OFFICE: _____
 PROJECT MANAGER (PM): _____
 PROJECT ID: _____
 SITE: _____ P.O. NO.: _____
 RESULTS REQUIRED (Date): _____ QUOTE NO.: _____

SAMPLER: _____
 MOBILE: _____
 PHONE: _____
 EMAIL REPORT TO: _____
 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:

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
25	W-228	W			N	
26	W-229	W			N	
27	S-230	S			BAG	
28	S-231	S			JAR	
29	W-232	W			P	
30	W-233	I			SP	
31	W-234	I			SG	
32	W-235	I			N	
33	W-236	I			N	
34	S-237	S			B	
35	S-238	S			SP	

Water	PHYS	NAP	TOC	METALS (TOTAL)	METALS (DISSOLVED)	SED. PSD	SED. METALS												
				✓															
					✓														
						✓													
							✓												
✓																			
	✓																		
			✓																
				✓															
					✓														
						✓													
							✓												
								✓											
									✓										

RELINQUISHED BY:				RECEIVED BY				METHOD OF SHIPMENT
Name:	Date:	Name:	Date:	Name:	Date:	Name:	Date:	Con' Note No:
Of:	Time:	Of:	Time:	Of:	Time:	Of:	Time:	
Name:	Date:	Name:	Date:	Name:	Date:	Name:	Date:	Transport Co:
Of:	Time:	Of:	Time:	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.

ALS LABORATORY GROUP

COC Page 3 of 5

CHAIN OF CUSTODY DOCUMENTATION



ALS Laboratory Group

CLIENT:		SAMPLER:	
ADDRESS / OFFICE:		MOBILE:	
PROJECT MANAGER (PM):		PHONE:	
PROJECT ID:		EMAIL REPORT TO:	
SITE:		EMAIL INVOICE TO: (if different to report)	
RESULTS REQUIRED (Date):		QUOTE NO.:	
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	Water	Plastics	NAP	TOC	Metals (Total)	Metals (Dissolved)	SED. PSD	SED. METALS				
36	W-239	W			P		✓											
37	W-240				SP			✓										
38	W-241				SG				✓									
39	W-242				N					✓								
40	W-243	↓			N						✓							
41	S-244	S			B								✓					
42	S-245	S			JAP									✓				
43	W-246	W			P		✓											
44	W-247				SP			✓										
45	W-248				SG				✓									
46	W-249				N					✓								
47	W-250	↓			N						✓							

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:	Date:	Name: Wanki Lee	Date: 10.3.08	Con' Note No:	
Of:	Time:	Of: ALS	Time: 9.15		
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.

ALS LABORATORY GROUP

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[illegible]



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: EB0803157	Page	: 1 of 20
Client	: HYDROBIOLOGY PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: MR ADRIAN FLYNN	Contact	: Tim Kilmister
Address	: P O BOX 2050 MILTON QLD, AUSTRALIA 4064	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: adrian.flynn@hydrobiology.biz	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 33682133	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 38763068	Facsimile	: +61-7-3243 7218
Project	: CNS0801	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 10-MAR-2008
C-O-C number	: ----	Issue Date	: 26-MAR-2008
Sampler	: ----	No. of samples received	: 59
Site	: PNG	No. of samples analysed	: 52
Quote number	: ----		

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

This document is issued in accordance with NATA accreditation requirements.

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
Hoa Nguyen	Senior Inorganic Chemist	Inorganics
Kim McCabe	2IC Environmental Laboratory	Inorganics
Phillip Kennedy	Senior Inorganic Chemist	Inorganics
Stephen Hislop		Inorganics

Environmental Division Brisbane

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A Campbell Brothers Limited Company



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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes. If the sampling time is 0:00 the information was not supplied by client.

Key : CAS Number = Chemistry Abstract Services number

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- **EG005T (Total metals): EB0803157-055 (CNS0801-S-213 <2mm) shows poor duplicate results due to sample heterogeneity.**
- **Ionic balances are within acceptable limits as detailed in the 20th Ed. APHA "Standard Methods for the Examination of Water and Wastewater".**



Analytical Results

Sub-Matrix: SOIL				Client sample ID	CNS0801-S-206	CNS0801-S-213	CNS0801-S-220	CNS0801-S-231	CNS0801-S-238
				Client sampling date / time	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00
Compound	CAS Number	LOR	Unit		EB0803157-007	EB0803157-014	EB0803157-021	EB0803157-028	EB0803157-035
EA055: Moisture Content									
^ Moisture Content (dried @ 103°C)		----	1.0	%	20.1	37.5	25.4	23.2	26.9



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

				CNS0801-S-245	CNS0801-S-206 <2mm	CNS0801-S-213 <2mm	CNS0801-S-220 <2mm	CNS0801-S-231 <2mm
				03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00
Compound	CAS Number	LOR	Unit	EB0803157-042	EB0803157-054	EB0803157-055	EB0803157-056	EB0803157-057
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	25.9	----	----	----	----
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	----	20900	18000	5950	13100
Arsenic	7440-38-2	5	mg/kg	----	<5	<5	<5	7
Boron	7440-42-8	50	mg/kg	----	<50	<50	<50	<50
Cadmium	7440-43-9	1	mg/kg	----	<1	<1	<1	<1
Chromium	7440-47-3	2	mg/kg	----	15	32	13	30
Copper	7440-50-8	5	mg/kg	----	19	47	10	15
Iron	7439-89-6	50	mg/kg	----	32900	45200	15400	35800
Lead	7439-92-1	5	mg/kg	----	5	9	<5	7
Manganese	7439-96-5	5	mg/kg	----	539	954	269	678
Nickel	7440-02-0	2	mg/kg	----	10	9	3	8
Selenium	7782-49-2	5	mg/kg	----	<5	<5	<5	<5
Silver	7440-22-4	2	mg/kg	----	<2	<2	<2	<2
Zinc	7440-66-6	5	mg/kg	----	41	55	17	36
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	0.1	0.5	0.2	0.2



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

				CNS0801-S-238 <2mm	CNS0801-S-245 <2mm	----	----	----
				03-MAR-2008 15:00	03-MAR-2008 15:00	----	----	----
Compound	CAS Number	LOR	Unit	EB0803157-058	EB0803157-059	----	----	----
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	20400	14600	----	----	----
Arsenic	7440-38-2	5	mg/kg	10	18	----	----	----
Boron	7440-42-8	50	mg/kg	<50	<50	----	----	----
Cadmium	7440-43-9	1	mg/kg	<1	<1	----	----	----
Chromium	7440-47-3	2	mg/kg	27	24	----	----	----
Copper	7440-50-8	5	mg/kg	21	20	----	----	----
Iron	7439-89-6	50	mg/kg	34500	31300	----	----	----
Lead	7439-92-1	5	mg/kg	8	16	----	----	----
Manganese	7439-96-5	5	mg/kg	627	443	----	----	----
Nickel	7440-02-0	2	mg/kg	11	13	----	----	----
Selenium	7782-49-2	5	mg/kg	<5	<5	----	----	----
Silver	7440-22-4	2	mg/kg	<2	<2	----	----	----
Zinc	7440-66-6	5	mg/kg	43	62	----	----	----
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	0.2	0.2	----	----	----



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-200	CNS0801-W-201	CNS0801-W-202	CNS0801-W-203	CNS0801-W-204
				03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00
Compound	CAS Number	LOR	Unit	EB0803157-001	EB0803157-002	EB0803157-003	EB0803157-004	EB0803157-005
EA025: Suspended Solids								
^ Suspended Solids (SS)	----	1	mg/L	4	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	2.0	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	56	----	----	----	----
Total Alkalinity as CaCO ₃	----	1	mg/L	56	----	----	----	----
ED040F: Dissolved Major Anions								
Sulphate as SO ₄ 2-	14808-79-8	1	mg/L	<1	----	----	----	----
ED045P: Chloride by PC Titrator								
Chloride	16887-00-6	1	mg/L	<1	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	18	----	----	----	----
Magnesium	7439-95-4	1	mg/L	2	----	----	----	----
Sodium	7440-23-5	1	mg/L	<1	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG005F: Dissolved Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	----	<0.1
Iron	7439-89-6	0.05	mg/L	----	----	----	----	0.06
Selenium	7782-49-2	0.01	mg/L	----	----	----	----	<0.01
EG005T: Total Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	<0.1	----
Iron	7439-89-6	0.05	mg/L	----	----	----	0.24	----
Selenium	7782-49-2	0.01	mg/L	----	----	----	<0.01	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	----	0.06
Arsenic	7440-38-2	0.001	mg/L	----	----	----	----	<0.001
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	----	<0.0001
Chromium	7440-47-3	0.001	mg/L	----	----	----	----	0.002
Copper	7440-50-8	0.001	mg/L	----	----	----	----	<0.001
Lead	7439-92-1	0.001	mg/L	----	----	----	----	<0.001
Manganese	7439-96-5	0.001	mg/L	----	----	----	----	0.002
Nickel	7440-02-0	0.001	mg/L	----	----	----	----	<0.001
Silver	7440-22-4	0.001	mg/L	----	----	----	----	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	----	----	0.150
EG020T: Total Metals by ICP-MS								



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-200	CNS0801-W-201	CNS0801-W-202	CNS0801-W-203	CNS0801-W-204
				03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00
Compound	CAS Number	LOR	Unit	EB0803157-001	EB0803157-002	EB0803157-003	EB0803157-004	EB0803157-005
EG020T: Total Metals by ICP-MS - Continued								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	0.22	----
Arsenic	7440-38-2	0.001	mg/L	----	----	----	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	----	----	----	<0.001	----
Copper	7440-50-8	0.001	mg/L	----	----	----	<0.001	----
Lead	7439-92-1	0.001	mg/L	----	----	----	<0.001	----
Manganese	7439-96-5	0.001	mg/L	----	----	----	0.005	----
Nickel	7440-02-0	0.001	mg/L	----	----	----	<0.001	----
Silver	7440-22-4	0.001	mg/L	----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L	----	----	----	0.044	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	----	<0.0001
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	<0.0001	----
EK057: Nitrite as N								
Nitrite as N	----	0.010	mg/L	<0.010	----	----	----	----
EK058: Nitrate as N								
^ Nitrate as N	14797-55-8	0.010	mg/L	<0.010	----	----	----	----
EK059: Nitrite plus Nitrate as N (NO_x)								
Nitrite + Nitrate as N	----	0.010	mg/L	<0.010	0.017	----	----	----
EK061: Total Kjeldahl Nitrogen (TKN)								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	<0.1	----	----	----
EK062: Total Nitrogen as N (TKN + NO_x)								
^ Total Nitrogen as N	----	0.1	mg/L	----	<0.1	----	----	----
EK067: Total Phosphorus as P								
Total Phosphorus as P	----	0.01	mg/L	----	<0.01	----	----	----
EK071: Reactive Phosphorus as P (Dissolved)								
Reactive Phosphorus - Filtered	----	0.010	mg/L	<0.010	----	----	----	----
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	1.11	----	----	----	----
^ Total Cations	----	0.01	meq/L	1.03	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	----	----	3	----	----



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-207	CNS0801-W-208	CNS0801-W-209	CNS0801-W-210	CNS0801-W-211
				03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00
Compound	CAS Number	LOR	Unit	EB0803157-008	EB0803157-009	EB0803157-010	EB0803157-011	EB0803157-012
EA025: Suspended Solids								
^ Suspended Solids (SS)	----	1	mg/L	4	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	8.4	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	22	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	22	----	----	----	----
ED040F: Dissolved Major Anions								
Sulphate as SO4 2-	14808-79-8	1	mg/L	<1	----	----	----	----
ED045P: Chloride by PC Titrator								
Chloride	16887-00-6	1	mg/L	<1	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	4	----	----	----	----
Magnesium	7439-95-4	1	mg/L	2	----	----	----	----
Sodium	7440-23-5	1	mg/L	2	----	----	----	----
Potassium	7440-09-7	1	mg/L	1	----	----	----	----
EG005F: Dissolved Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	----	<0.1
Iron	7439-89-6	0.05	mg/L	----	----	----	----	0.28
Selenium	7782-49-2	0.01	mg/L	----	----	----	----	<0.01
EG005T: Total Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	<0.1	----
Iron	7439-89-6	0.05	mg/L	----	----	----	0.74	----
Selenium	7782-49-2	0.01	mg/L	----	----	----	<0.01	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	----	0.07
Arsenic	7440-38-2	0.001	mg/L	----	----	----	----	<0.001
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	----	<0.0001
Chromium	7440-47-3	0.001	mg/L	----	----	----	----	<0.001
Copper	7440-50-8	0.001	mg/L	----	----	----	----	0.002
Lead	7439-92-1	0.001	mg/L	----	----	----	----	<0.001
Manganese	7439-96-5	0.001	mg/L	----	----	----	----	0.026
Nickel	7440-02-0	0.001	mg/L	----	----	----	----	<0.001
Silver	7440-22-4	0.001	mg/L	----	----	----	----	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	----	----	0.036
EG020T: Total Metals by ICP-MS								



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-207	CNS0801-W-208	CNS0801-W-209	CNS0801-W-210	CNS0801-W-211
				03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00
Compound	CAS Number	LOR	Unit	EB0803157-008	EB0803157-009	EB0803157-010	EB0803157-011	EB0803157-012
EG020T: Total Metals by ICP-MS - Continued								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	0.58	----
Arsenic	7440-38-2	0.001	mg/L	----	----	----	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	----	----	----	<0.001	----
Copper	7440-50-8	0.001	mg/L	----	----	----	0.002	----
Lead	7439-92-1	0.001	mg/L	----	----	----	<0.001	----
Manganese	7439-96-5	0.001	mg/L	----	----	----	0.031	----
Nickel	7440-02-0	0.001	mg/L	----	----	----	<0.001	----
Silver	7440-22-4	0.001	mg/L	----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L	----	----	----	0.010	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	----	<0.0001
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	<0.0001	----
EK057: Nitrite as N								
Nitrite as N	----	0.010	mg/L	<0.010	----	----	----	----
EK058: Nitrate as N								
^ Nitrate as N	14797-55-8	0.010	mg/L	<0.010	----	----	----	----
EK059: Nitrite plus Nitrate as N (NO_x)								
Nitrite + Nitrate as N	----	0.010	mg/L	<0.010	<0.010	----	----	----
EK061: Total Kjeldahl Nitrogen (TKN)								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	<0.1	----	----	----
EK062: Total Nitrogen as N (TKN + NO_x)								
^ Total Nitrogen as N	----	0.1	mg/L	----	<0.1	----	----	----
EK067: Total Phosphorus as P								
Total Phosphorus as P	----	0.01	mg/L	----	<0.01	----	----	----
EK071: Reactive Phosphorus as P (Dissolved)								
Reactive Phosphorus - Filtered	----	0.010	mg/L	<0.010	----	----	----	----
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	0.44	----	----	----	----
^ Total Cations	----	0.01	meq/L	0.42	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	----	----	2	----	----



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-214	CNS0801-W-215	CNS0801-W-216	CNS0801-W-217	CNS0801-W-218
				03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00
Compound	CAS Number	LOR	Unit	EB0803157-015	EB0803157-016	EB0803157-017	EB0803157-018	EB0803157-019
EA025: Suspended Solids								
^ Suspended Solids (SS)	----	1	mg/L	46	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	5.3	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	197	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	197	----	----	----	----
ED040F: Dissolved Major Anions								
Sulphate as SO4 2-	14808-79-8	1	mg/L	2	----	----	----	----
ED045P: Chloride by PC Titrator								
Chloride	16887-00-6	1	mg/L	<1	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	63	----	----	----	----
Magnesium	7439-95-4	1	mg/L	8	----	----	----	----
Sodium	7440-23-5	1	mg/L	1	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG005F: Dissolved Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	----	<0.1
Iron	7439-89-6	0.05	mg/L	----	----	----	----	<0.05
Selenium	7782-49-2	0.01	mg/L	----	----	----	----	<0.01
EG005T: Total Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	<0.1	----
Iron	7439-89-6	0.05	mg/L	----	----	----	1.66	----
Selenium	7782-49-2	0.01	mg/L	----	----	----	<0.01	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	----	0.03
Arsenic	7440-38-2	0.001	mg/L	----	----	----	----	<0.001
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	----	<0.0001
Chromium	7440-47-3	0.001	mg/L	----	----	----	----	0.002
Copper	7440-50-8	0.001	mg/L	----	----	----	----	<0.001
Lead	7439-92-1	0.001	mg/L	----	----	----	----	<0.001
Manganese	7439-96-5	0.001	mg/L	----	----	----	----	0.006
Nickel	7440-02-0	0.001	mg/L	----	----	----	----	<0.001
Silver	7440-22-4	0.001	mg/L	----	----	----	----	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	----	----	0.058
EG020T: Total Metals by ICP-MS								



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-214	CNS0801-W-215	CNS0801-W-216	CNS0801-W-217	CNS0801-W-218
				03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00
Compound	CAS Number	LOR	Unit	EB0803157-015	EB0803157-016	EB0803157-017	EB0803157-018	EB0803157-019
EG020T: Total Metals by ICP-MS - Continued								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	1.55	----
Arsenic	7440-38-2	0.001	mg/L	----	----	----	0.001	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	0.0001	----
Chromium	7440-47-3	0.001	mg/L	----	----	----	0.002	----
Copper	7440-50-8	0.001	mg/L	----	----	----	0.002	----
Lead	7439-92-1	0.001	mg/L	----	----	----	<0.001	----
Manganese	7439-96-5	0.001	mg/L	----	----	----	0.047	----
Nickel	7440-02-0	0.001	mg/L	----	----	----	<0.001	----
Silver	7440-22-4	0.001	mg/L	----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L	----	----	----	0.031	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	----	<0.0001
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	<0.0001	----
EK057: Nitrite as N								
Nitrite as N	----	0.010	mg/L	<0.010	----	----	----	----
EK058: Nitrate as N								
^ Nitrate as N	14797-55-8	0.010	mg/L	0.106	----	----	----	----
EK059: Nitrite plus Nitrate as N (NOx)								
Nitrite + Nitrate as N	----	0.010	mg/L	0.106	0.164	----	----	----
EK061: Total Kjeldahl Nitrogen (TKN)								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	<0.1	----	----	----
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	0.1	mg/L	----	0.2	----	----	----
EK067: Total Phosphorus as P								
Total Phosphorus as P	----	0.01	mg/L	----	0.03	----	----	----
EK071: Reactive Phosphorus as P (Dissolved)								
Reactive Phosphorus - Filtered	----	0.010	mg/L	0.010	----	----	----	----
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	3.98	----	----	----	----
^ Total Cations	----	0.01	meq/L	3.89	----	----	----	----
^ Ionic Balance	----	0.01	%	1.18	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	----	----	1	----	----



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-225	CNS0801-W-226	CNS0801-W-227	CNS0801-W-228	CNS0801-W-229
				03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00
Compound	CAS Number	LOR	Unit	EB0803157-022	EB0803157-023	EB0803157-024	EB0803157-025	EB0803157-026
EA025: Suspended Solids								
^ Suspended Solids (SS)	----	1	mg/L	7	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	1.0	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	162	----	----	----	----
Total Alkalinity as CaCO ₃	----	1	mg/L	162	----	----	----	----
ED040F: Dissolved Major Anions								
Sulphate as SO ₄ 2-	14808-79-8	1	mg/L	<1	----	----	----	----
ED045P: Chloride by PC Titrator								
Chloride	16887-00-6	1	mg/L	<1	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	56	----	----	----	----
Magnesium	7439-95-4	1	mg/L	5	----	----	----	----
Sodium	7440-23-5	1	mg/L	<1	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG005F: Dissolved Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	----	<0.1
Iron	7439-89-6	0.05	mg/L	----	----	----	----	<0.05
Selenium	7782-49-2	0.01	mg/L	----	----	----	----	<0.01
EG005T: Total Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	<0.1	----
Iron	7439-89-6	0.05	mg/L	----	----	----	0.29	----
Selenium	7782-49-2	0.01	mg/L	----	----	----	<0.01	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	----	0.01
Arsenic	7440-38-2	0.001	mg/L	----	----	----	----	<0.001
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	----	<0.0001
Chromium	7440-47-3	0.001	mg/L	----	----	----	----	0.001
Copper	7440-50-8	0.001	mg/L	----	----	----	----	<0.001
Lead	7439-92-1	0.001	mg/L	----	----	----	----	<0.001
Manganese	7439-96-5	0.001	mg/L	----	----	----	----	0.002
Nickel	7440-02-0	0.001	mg/L	----	----	----	----	<0.001
Silver	7440-22-4	0.001	mg/L	----	----	----	----	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	----	----	0.137
EG020T: Total Metals by ICP-MS								



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-225	CNS0801-W-226	CNS0801-W-227	CNS0801-W-228	CNS0801-W-229
				03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00
Compound	CAS Number	LOR	Unit	EB0803157-022	EB0803157-023	EB0803157-024	EB0803157-025	EB0803157-026
EG020T: Total Metals by ICP-MS - Continued								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	0.28	----
Arsenic	7440-38-2	0.001	mg/L	----	----	----	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	0.0001	----
Chromium	7440-47-3	0.001	mg/L	----	----	----	0.001	----
Copper	7440-50-8	0.001	mg/L	----	----	----	<0.001	----
Lead	7439-92-1	0.001	mg/L	----	----	----	<0.001	----
Manganese	7439-96-5	0.001	mg/L	----	----	----	0.010	----
Nickel	7440-02-0	0.001	mg/L	----	----	----	<0.001	----
Silver	7440-22-4	0.001	mg/L	----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L	----	----	----	0.058	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	----	<0.0001
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	<0.0001	----
EK057: Nitrite as N								
Nitrite as N	----	0.010	mg/L	<0.010	----	----	----	----
EK058: Nitrate as N								
^ Nitrate as N	14797-55-8	0.010	mg/L	0.147	----	----	----	----
EK059: Nitrite plus Nitrate as N (NOx)								
Nitrite + Nitrate as N	----	0.010	mg/L	0.147	0.174	----	----	----
EK061: Total Kjeldahl Nitrogen (TKN)								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	<0.1	----	----	----
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	0.1	mg/L	----	0.2	----	----	----
EK067: Total Phosphorus as P								
Total Phosphorus as P	----	0.01	mg/L	----	<0.01	----	----	----
EK071: Reactive Phosphorus as P (Dissolved)								
Reactive Phosphorus - Filtered	----	0.010	mg/L	<0.010	----	----	----	----
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	3.23	----	----	----	----
^ Total Cations	----	0.01	meq/L	3.21	----	----	----	----
^ Ionic Balance	----	0.01	%	0.23	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	----	----	<1	----	----



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-232	CNS0801-W-233	CNS0801-W-234	CNS0801-W-235	CNS0801-W-236
				03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00
Compound	CAS Number	LOR	Unit	EB0803157-029	EB0803157-030	EB0803157-031	EB0803157-032	EB0803157-033
EA025: Suspended Solids								
^ Suspended Solids (SS)	----	1	mg/L	66	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	18.0	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	94	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	94	----	----	----	----
ED040F: Dissolved Major Anions								
Sulphate as SO4 2-	14808-79-8	1	mg/L	<1	----	----	----	----
ED045P: Chloride by PC Titrator								
Chloride	16887-00-6	1	mg/L	<1	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	34	----	----	----	----
Magnesium	7439-95-4	1	mg/L	2	----	----	----	----
Sodium	7440-23-5	1	mg/L	<1	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG005F: Dissolved Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	----	1.4
Iron	7439-89-6	0.05	mg/L	----	----	----	----	0.14
Selenium	7782-49-2	0.01	mg/L	----	----	----	----	<0.01
EG005T: Total Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	<0.1	----
Iron	7439-89-6	0.05	mg/L	----	----	----	2.85	----
Selenium	7782-49-2	0.01	mg/L	----	----	----	<0.01	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	----	4.96
Arsenic	7440-38-2	0.001	mg/L	----	----	----	----	<0.001
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	----	<0.0001
Chromium	7440-47-3	0.001	mg/L	----	----	----	----	0.009
Copper	7440-50-8	0.001	mg/L	----	----	----	----	0.002
Lead	7439-92-1	0.001	mg/L	----	----	----	----	0.003
Manganese	7439-96-5	0.001	mg/L	----	----	----	----	0.007
Nickel	7440-02-0	0.001	mg/L	----	----	----	----	<0.001
Silver	7440-22-4	0.001	mg/L	----	----	----	----	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	----	----	0.037
EG020T: Total Metals by ICP-MS								



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-232	CNS0801-W-233	CNS0801-W-234	CNS0801-W-235	CNS0801-W-236
				03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00
Compound	CAS Number	LOR	Unit	EB0803157-029	EB0803157-030	EB0803157-031	EB0803157-032	EB0803157-033
EG020T: Total Metals by ICP-MS - Continued								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	2.38	----
Arsenic	7440-38-2	0.001	mg/L	----	----	----	0.002	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	0.0001	----
Chromium	7440-47-3	0.001	mg/L	----	----	----	0.004	----
Copper	7440-50-8	0.001	mg/L	----	----	----	0.003	----
Lead	7439-92-1	0.001	mg/L	----	----	----	0.003	----
Manganese	7439-96-5	0.001	mg/L	----	----	----	0.064	----
Nickel	7440-02-0	0.001	mg/L	----	----	----	0.002	----
Silver	7440-22-4	0.001	mg/L	----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L	----	----	----	0.085	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	----	<0.0001
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	<0.0001	----
EK057: Nitrite as N								
Nitrite as N	----	0.010	mg/L	<0.010	----	----	----	----
EK058: Nitrate as N								
^ Nitrate as N	14797-55-8	0.010	mg/L	0.100	----	----	----	----
EK059: Nitrite plus Nitrate as N (NOx)								
Nitrite + Nitrate as N	----	0.010	mg/L	0.100	0.087	----	----	----
EK061: Total Kjeldahl Nitrogen (TKN)								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	0.3	----	----	----
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	0.1	mg/L	----	0.4	----	----	----
EK067: Total Phosphorus as P								
Total Phosphorus as P	----	0.01	mg/L	----	0.06	----	----	----
EK071: Reactive Phosphorus as P (Dissolved)								
Reactive Phosphorus - Filtered	----	0.010	mg/L	<0.010	----	----	----	----
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	1.88	----	----	----	----
^ Total Cations	----	0.01	meq/L	1.83	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	----	----	4	----	----



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-239	CNS0801-W-240	CNS0801-W-241	CNS0801-W-242	CNS0801-W-243
				03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00
Compound	CAS Number	LOR	Unit	EB0803157-036	EB0803157-037	EB0803157-038	EB0803157-039	EB0803157-040
EA025: Suspended Solids								
^ Suspended Solids (SS)	----	1	mg/L	241	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	85.0	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	98	----	----	----	----
Total Alkalinity as CaCO ₃	----	1	mg/L	98	----	----	----	----
ED040F: Dissolved Major Anions								
Sulphate as SO ₄ 2-	14808-79-8	1	mg/L	<1	----	----	----	----
ED045P: Chloride by PC Titrator								
Chloride	16887-00-6	1	mg/L	<1	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	34	----	----	----	----
Magnesium	7439-95-4	1	mg/L	2	----	----	----	----
Sodium	7440-23-5	1	mg/L	<1	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG005F: Dissolved Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	----	<0.1
Iron	7439-89-6	0.05	mg/L	----	----	----	----	0.06
Selenium	7782-49-2	0.01	mg/L	----	----	----	----	<0.01
EG005T: Total Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	0.8	----
Iron	7439-89-6	0.05	mg/L	----	----	----	8.66	----
Selenium	7782-49-2	0.01	mg/L	----	----	----	<0.01	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	----	0.36
Arsenic	7440-38-2	0.001	mg/L	----	----	----	----	<0.001
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	----	<0.0001
Chromium	7440-47-3	0.001	mg/L	----	----	----	----	<0.001
Copper	7440-50-8	0.001	mg/L	----	----	----	----	0.001
Lead	7439-92-1	0.001	mg/L	----	----	----	----	0.001
Manganese	7439-96-5	0.001	mg/L	----	----	----	----	0.004
Nickel	7440-02-0	0.001	mg/L	----	----	----	----	<0.001
Silver	7440-22-4	0.001	mg/L	----	----	----	----	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	----	----	0.104
EG020T: Total Metals by ICP-MS								



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-239	CNS0801-W-240	CNS0801-W-241	CNS0801-W-242	CNS0801-W-243
				03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00	03-MAR-2008 15:00
Compound	CAS Number	LOR	Unit	EB0803157-036	EB0803157-037	EB0803157-038	EB0803157-039	EB0803157-040
EG020T: Total Metals by ICP-MS - Continued								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	10.6	----
Arsenic	7440-38-2	0.001	mg/L	----	----	----	0.003	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	0.0002	----
Chromium	7440-47-3	0.001	mg/L	----	----	----	0.014	----
Copper	7440-50-8	0.001	mg/L	----	----	----	0.010	----
Lead	7439-92-1	0.001	mg/L	----	----	----	0.007	----
Manganese	7439-96-5	0.001	mg/L	----	----	----	0.161	----
Nickel	7440-02-0	0.001	mg/L	----	----	----	0.006	----
Silver	7440-22-4	0.001	mg/L	----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L	----	----	----	0.133	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	----	<0.0001
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	<0.0001	----
EK057: Nitrite as N								
Nitrite as N	----	0.010	mg/L	<0.010	----	----	----	----
EK058: Nitrate as N								
^ Nitrate as N	14797-55-8	0.010	mg/L	0.112	----	----	----	----
EK059: Nitrite plus Nitrate as N (NOx)								
Nitrite + Nitrate as N	----	0.010	mg/L	0.112	0.136	----	----	----
EK061: Total Kjeldahl Nitrogen (TKN)								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	0.8	----	----	----
EK062: Total Nitrogen as N (TKN + NOx)								
^ Total Nitrogen as N	----	0.1	mg/L	----	0.9	----	----	----
EK067: Total Phosphorus as P								
Total Phosphorus as P	----	0.01	mg/L	----	0.29	----	----	----
EK071: Reactive Phosphorus as P (Dissolved)								
Reactive Phosphorus - Filtered	----	0.010	mg/L	<0.010	----	----	----	----
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	1.95	----	----	----	----
^ Total Cations	----	0.01	meq/L	1.86	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	----	----	5	----	----



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-246	CNS0801-W-247	CNS0801-W-248	CNS0801-W-249	CNS0801-W-250
				03-MAR-2008 15:00	10-MAR-2008 15:00	10-MAR-2008 15:00	10-MAR-2008 15:00	10-MAR-2008 15:00
Compound	CAS Number	LOR	Unit	EB0803157-043	EB0803157-044	EB0803157-045	EB0803157-046	EB0803157-047
EA025: Suspended Solids								
^ Suspended Solids (SS)	----	1	mg/L	2	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	1.2	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	8	----	----	----	----
Total Alkalinity as CaCO ₃	----	1	mg/L	8	----	----	----	----
ED040F: Dissolved Major Anions								
Sulphate as SO ₄ 2-	14808-79-8	1	mg/L	<1	----	----	----	----
ED045P: Chloride by PC Titrator								
Chloride	16887-00-6	1	mg/L	<1	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	1	----	----	----	----
Magnesium	7439-95-4	1	mg/L	<1	----	----	----	----
Sodium	7440-23-5	1	mg/L	<1	----	----	----	----
Potassium	7440-09-7	1	mg/L	<1	----	----	----	----
EG005F: Dissolved Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	----	<0.1
Iron	7439-89-6	0.05	mg/L	----	----	----	----	<0.05
Selenium	7782-49-2	0.01	mg/L	----	----	----	----	<0.01
EG005T: Total Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	<0.1	----
Iron	7439-89-6	0.05	mg/L	----	----	----	0.07	----
Selenium	7782-49-2	0.01	mg/L	----	----	----	<0.01	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	----	0.09
Arsenic	7440-38-2	0.001	mg/L	----	----	----	----	<0.001
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	----	<0.0001
Chromium	7440-47-3	0.001	mg/L	----	----	----	----	<0.001
Copper	7440-50-8	0.001	mg/L	----	----	----	----	<0.001
Lead	7439-92-1	0.001	mg/L	----	----	----	----	<0.001
Manganese	7439-96-5	0.001	mg/L	----	----	----	----	<0.001
Nickel	7440-02-0	0.001	mg/L	----	----	----	----	<0.001
Silver	7440-22-4	0.001	mg/L	----	----	----	----	<0.001
Zinc	7440-66-6	0.005	mg/L	----	----	----	----	0.021
EG020T: Total Metals by ICP-MS								



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-246	CNS0801-W-247	CNS0801-W-248	CNS0801-W-249	CNS0801-W-250
				03-MAR-2008 15:00	10-MAR-2008 15:00	10-MAR-2008 15:00	10-MAR-2008 15:00	10-MAR-2008 15:00
Compound	CAS Number	LOR	Unit	EB0803157-043	EB0803157-044	EB0803157-045	EB0803157-046	EB0803157-047
EG020T: Total Metals by ICP-MS - Continued								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	0.08	----
Arsenic	7440-38-2	0.001	mg/L	----	----	----	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	----	----	----	<0.001	----
Copper	7440-50-8	0.001	mg/L	----	----	----	<0.001	----
Lead	7439-92-1	0.001	mg/L	----	----	----	<0.001	----
Manganese	7439-96-5	0.001	mg/L	----	----	----	0.002	----
Nickel	7440-02-0	0.001	mg/L	----	----	----	<0.001	----
Silver	7440-22-4	0.001	mg/L	----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L	----	----	----	0.014	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	----	<0.0001
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	<0.0001	----
EK057: Nitrite as N								
Nitrite as N	----	0.010	mg/L	<0.010	----	----	----	----
EK058: Nitrate as N								
^ Nitrate as N	14797-55-8	0.010	mg/L	<0.010	----	----	----	----
EK059: Nitrite plus Nitrate as N (NO_x)								
Nitrite + Nitrate as N	----	0.010	mg/L	<0.010	<0.010	----	----	----
EK061: Total Kjeldahl Nitrogen (TKN)								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	<0.1	----	----	----
EK062: Total Nitrogen as N (TKN + NO_x)								
^ Total Nitrogen as N	----	0.1	mg/L	----	<0.1	----	----	----
EK067: Total Phosphorus as P								
Total Phosphorus as P	----	0.01	mg/L	----	<0.01	----	----	----
EK071: Reactive Phosphorus as P (Dissolved)								
Reactive Phosphorus - Filtered	----	0.010	mg/L	<0.010	----	----	----	----
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	0.16	----	----	----	----
^ Total Cations	----	0.01	meq/L	0.06	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	----	----	3	----	----



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-253	CNS0801-W-260	CNS0801-W-267	CNS0801-W-281	CNS0801-W-300
				10-MAR-2008 15:00	10-MAR-2008 15:00	10-MAR-2008 15:00	10-MAR-2008 15:00	10-MAR-2008 15:00
Compound	CAS Number	LOR	Unit	EB0803157-048	EB0803157-049	EB0803157-050	EB0803157-052	EB0803157-053
EA025: Suspended Solids								
^ Suspended Solids (SS)	----	1	mg/L	1	3	122	143	<1
EA045: Turbidity								
Turbidity	----	0.1	NTU	0.9	0.8	55.0	75.0	<0.1
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	14	16	69	75	3
Total Alkalinity as CaCO ₃	----	1	mg/L	14	16	69	75	3
ED040F: Dissolved Major Anions								
Sulphate as SO ₄ 2-	14808-79-8	1	mg/L	<1	<1	<1	<1	<1
ED045P: Chloride by PC Titrator								
Chloride	16887-00-6	1	mg/L	<1	<1	<1	<1	<1
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	3	3	23	23	<1
Magnesium	7439-95-4	1	mg/L	<1	1	2	2	<1
Sodium	7440-23-5	1	mg/L	1	1	<1	1	<1
Potassium	7440-09-7	1	mg/L	<1	<1	<1	<1	<1
EK057: Nitrite as N								
Nitrite as N	----	0.010	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010
EK058: Nitrate as N								
^ Nitrate as N	14797-55-8	0.010	mg/L	<0.010	<0.010	0.072	0.074	<0.010
EK059: Nitrite plus Nitrate as N (NO_x)								
Nitrite + Nitrate as N	----	0.010	mg/L	<0.010	<0.010	0.072	0.074	<0.010
EK071: Reactive Phosphorus as P (Dissolved)								
Reactive Phosphorus - Filtered	----	0.010	mg/L	<0.010	<0.010	<0.010	0.010	<0.010
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	0.28	0.33	1.39	1.49	0.05
^ Total Cations	----	0.01	meq/L	0.18	0.26	1.29	1.38	<0.01



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TEST RESULTS

Client :	ALS Environmental Brisbane	Job No. :	087634002/8
Project :	Delivered Samples	Date Received :	11-Mar-08
Batch No. :	EB0803157	Sampled by :	Client

PARTICLE SIZE SUMMARY

Reg'n No.	Sample ID	Sample No.	Percent Gravel (+ 2 mm)	Percent Sand (2 mm - 0.060 mm)	Percent Silt (0.060 mm - 0.002 mm)	Percent Clay (-0.002 mm)
0831581	CNS0801-S-205	6	61	33	4	2
0831582	CNS0801-S-212	13	62	28	5	5
0831583	CNS0801-S-219	20	0	40	45	15
0831584	CNS0801-S-230	27	4	72	12	12
0831585	CNS0801-S-237	34	8	78	8	6
0831586	CNS0801-S-244	41	0	69	16	15

Remarks :

Test Procedure : AS 1289.3.6.3

Prepared by : *NF*

Checked by *SA*



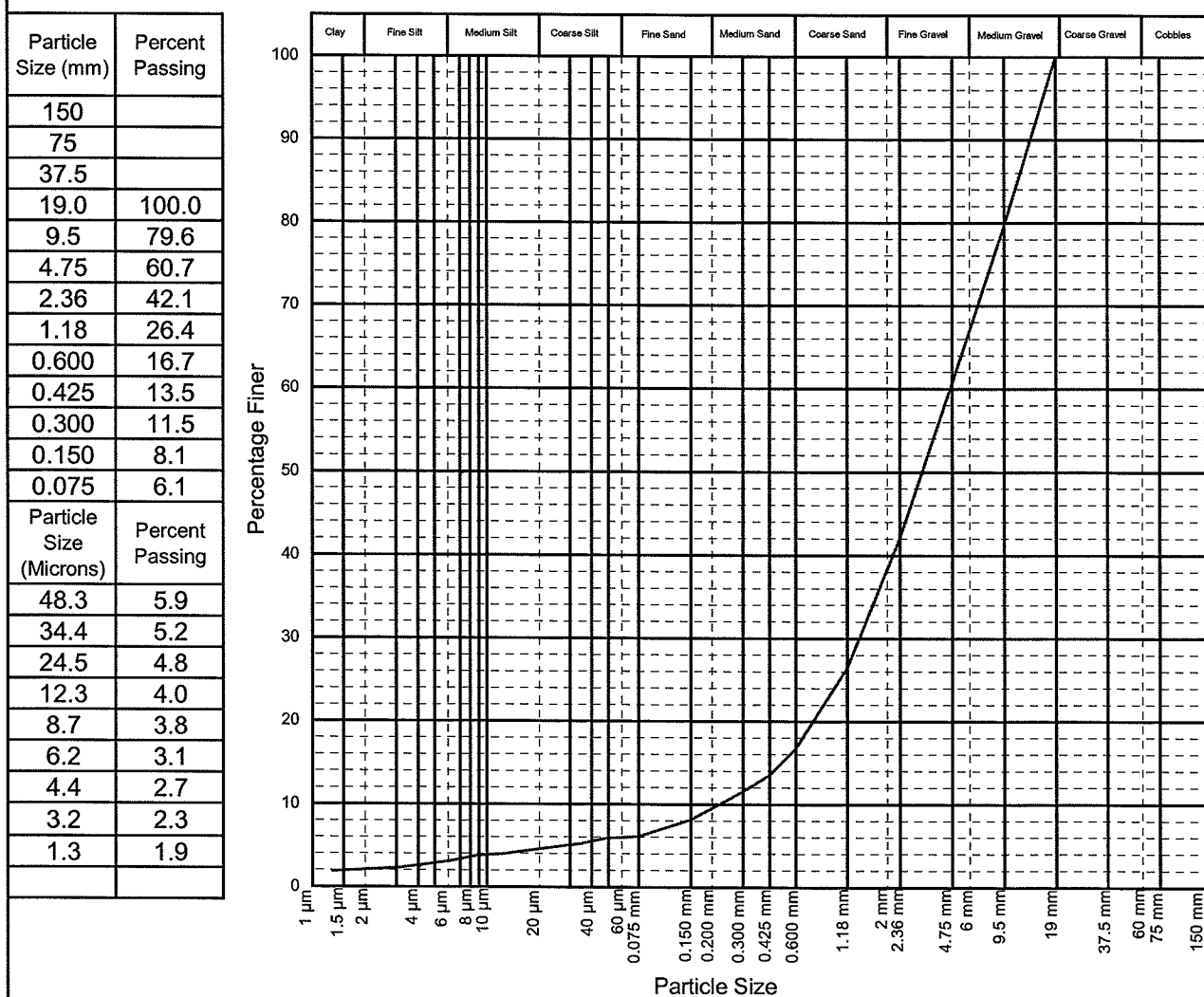
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PARTICLE SIZE DISTRIBUTION BY HYDROMETER

Client :	ALS Environmental Brisbane	Report No. :	R6915
Address :	32 Shand Street, Stafford	Job No. :	087634002/8
Project :	Delivered Samples	Reg'n No. :	0831581
Sample ID :	CNS0801-S-205	Batch No. :	EB0803157 - 6
		Date Received :	11/03/2008
		Sampled By :	Client

SIZE FRACTIONS AS PER AUSTRALIAN STANDARDS AS 1726



Pretreatment	Tested as received	Soil Particle Density (assumed)	2.70
Loss in Pretreatment (%)	-	Type of Hydrometer	ASTM E100
Method of Dispersion	Mixer		
Remarks :	Sample mass as received does not meet the requirements of the test method.		
Material Description :	(GP/GM) GRAVEL/Silty GRAVEL, brown, with some sand		
Test Procedure :	AS 1289 3.6.2, 3.6.3 (up to 24 hours)		
Prepared by : <i>AK</i>	Checked by : <i>JA</i>		

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Authorised Signatory

AK 28/3/8



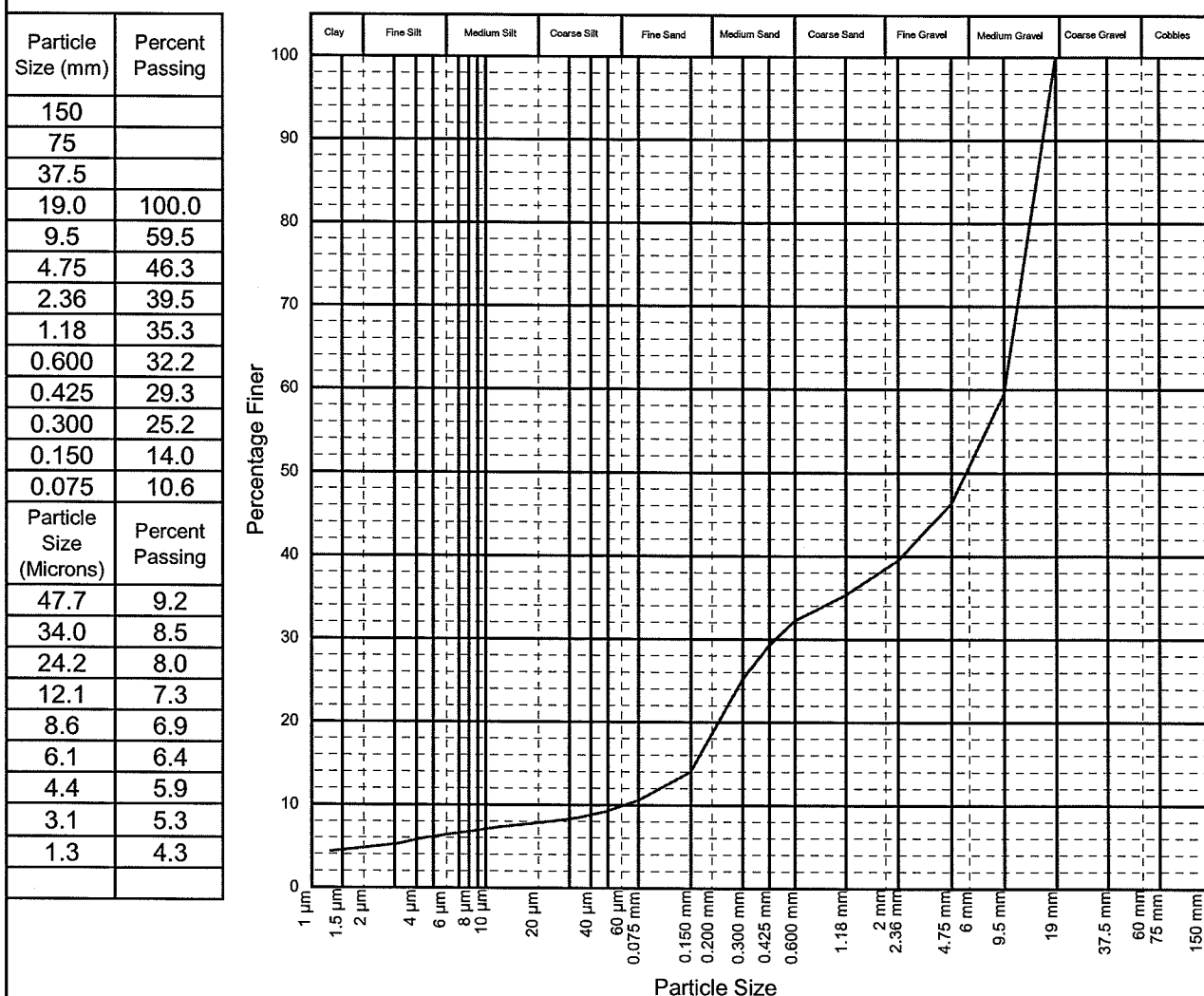
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PARTICLE SIZE DISTRIBUTION BY HYDROMETER

Client :	ALS Environmental Brisbane	Report No. :	R6915
Address :	32 Shand Street, Stafford	Job No. :	087634002/8
Project :	Delivered Samples	Reg'n No. :	0831582
Sample ID :	CNS0801-S-212	Batch No. :	EB0803157 - 13
		Date Received :	11/03/2008
		Sampled By :	Client

SIZE FRACTIONS AS PER AUSTRALIAN STANDARDS AS 1726



Pretreatment	Tested as received	Soil Particle Density (assumed)	2.70
Loss in Pretreatment (%)	-	Type of Hydrometer	ASTM E100
Method of Dispersion	Mixer		
Remarks :	Sample mass as received does not meet the requirements of the test method.		
Material Description :	(GP/GM) GRAVEL/Silty GRAVEL, brown, with some sand		
Test Procedure :	AS 1289 3.6.2, 3.6.3 (up to 24 hours)		
Prepared by : <i>mk</i>	Checked by : <i>JA</i>		

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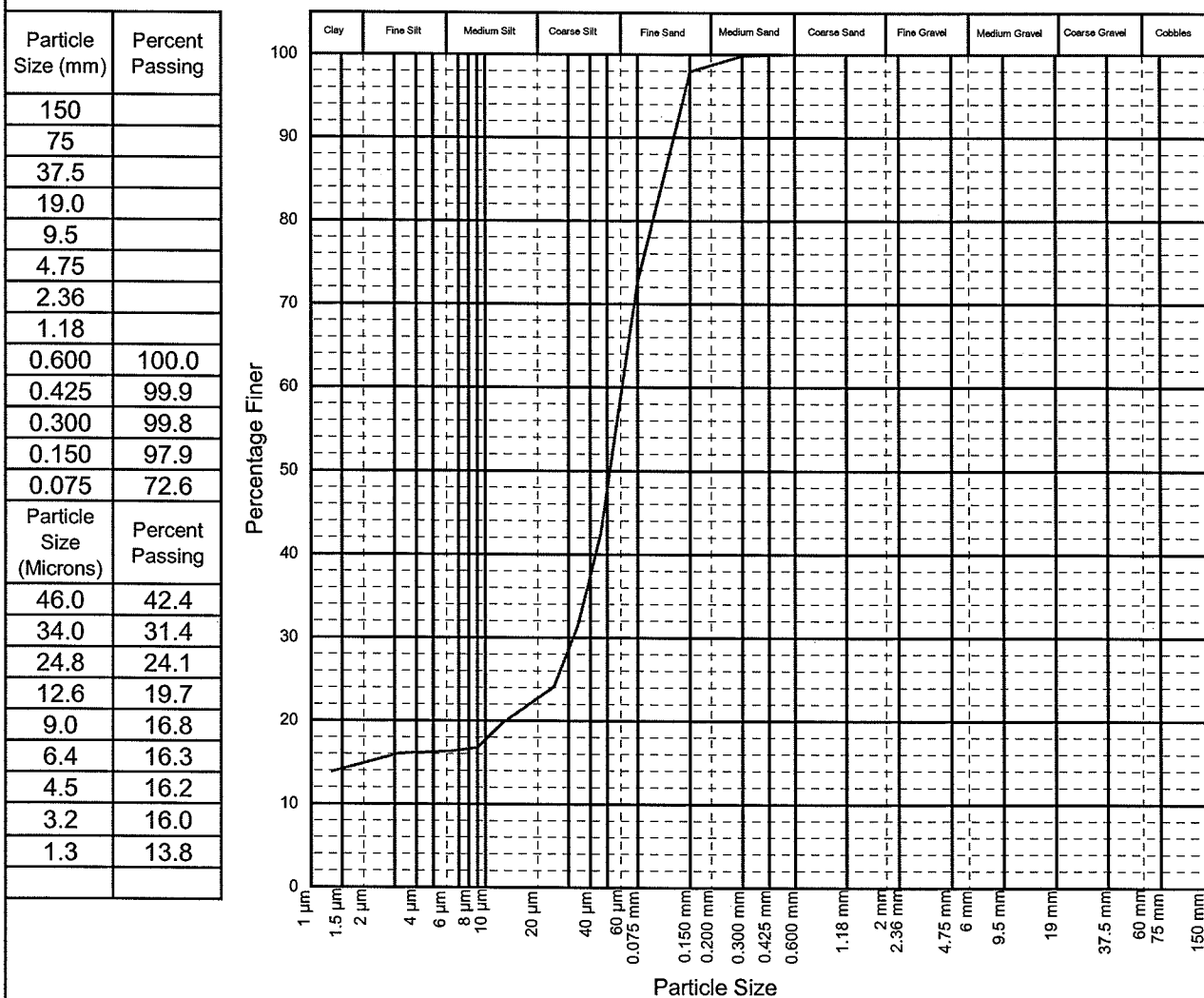
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PARTICLE SIZE DISTRIBUTION BY HYDROMETER

Client :	ALS Environmental Brisbane	Report No. :	R6915
Address :	32 Shand Street, Stafford	Job No. :	087634002/8
Project :	Delivered Samples	Reg'n No. :	0831583
Sample ID :	CNS0801-S-219	Batch No. :	EB0803157 - 20
		Date Received :	11/03/2008
		Sampled By :	Client

SIZE FRACTIONS AS PER AUSTRALIAN STANDARDS AS 1726



Pretreatment	Tested as received	Soil Particle Density (assumed)	2.70
Loss in Pretreatment (%)	-	Type of Hydrometer	ASTM E100
Method of Dispersion	Mixer		
Remarks :			
Material Description :	(CI) Sandy CLAY, pale brown		
Test Procedure :	AS 1289 3.6.2, 3.6.3 (up to 24 hours)		
Prepared by : <i>mf</i>	Checked by : <i>JA</i>		

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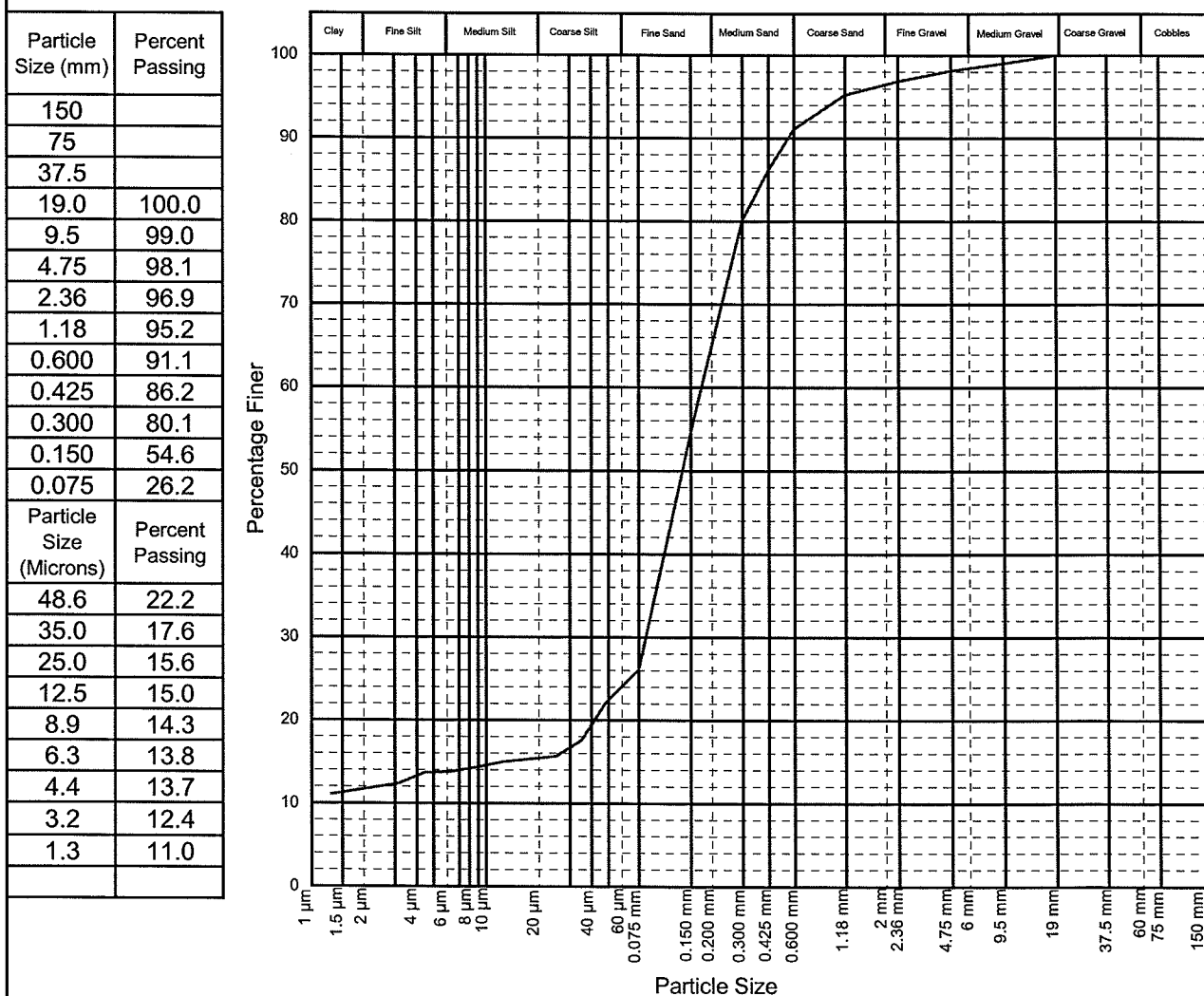
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PARTICLE SIZE DISTRIBUTION BY HYDROMETER

Client :	ALS Environmental Brisbane	Report No. :	R6915
Address :	32 Shand Street, Stafford	Job No. :	087634002/8
Project :	Delivered Samples	Reg'n No. :	0831584
Sample ID :	CNS0801-S-230	Batch No. :	EB0803157 - 27
		Date Received :	11/03/2008
		Sampled By :	Client

SIZE FRACTIONS AS PER AUSTRALIAN STANDARDS AS 1726



Pretreatment	Tested as received	Soil Particle Density (assumed)	2.70
Loss in Pretreatment (%)	-	Type of Hydrometer	ASTM E100
Method of Dispersion	Mixer		
Remarks :			
Material Description :	(SC) Clayey SAND, brown		
Test Procedure :	AS 1289 3.6.2, 3.6.3 (up to 24 hours)		
Prepared by : <i>mf</i>	Checked by : <i>JA</i>		

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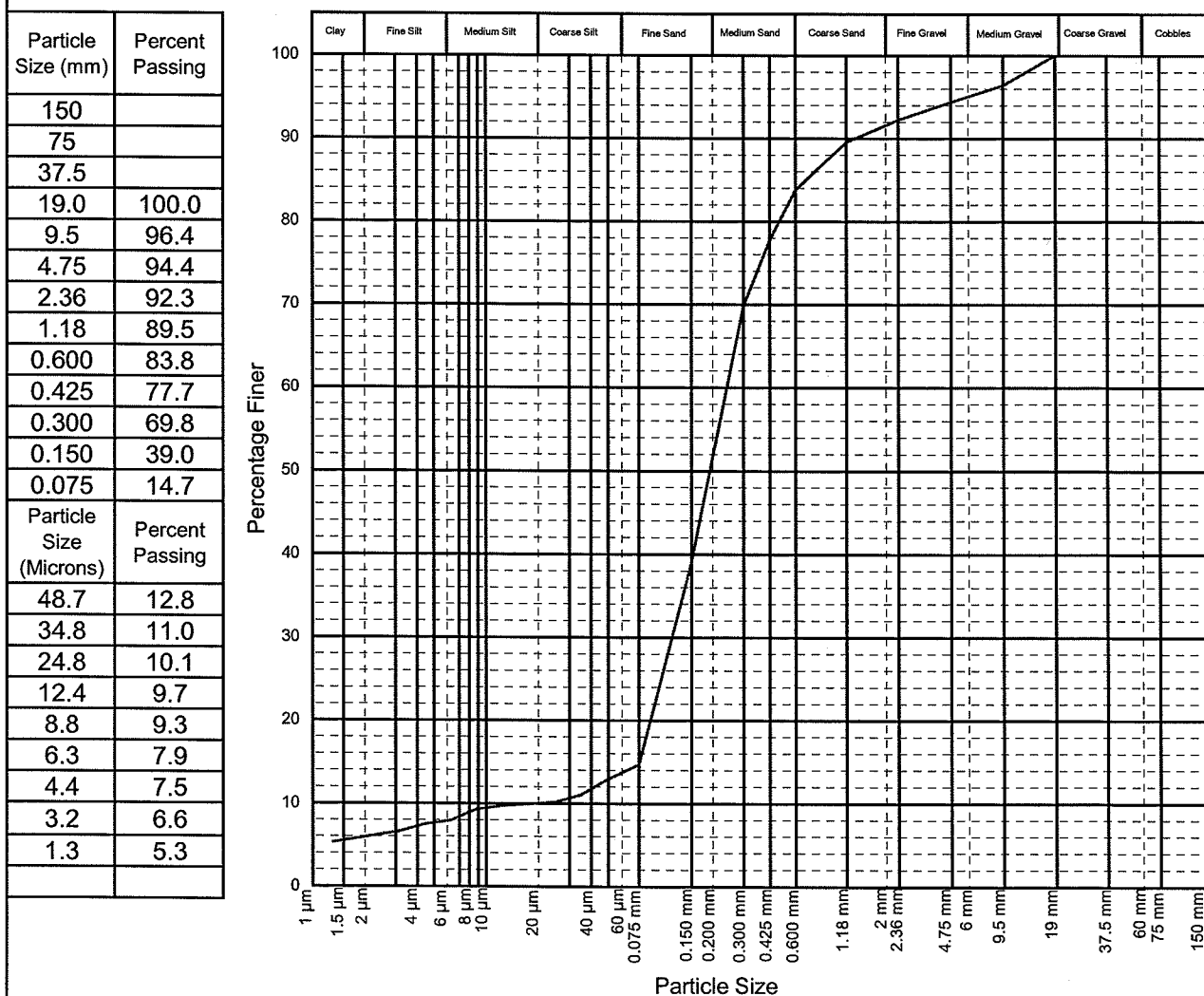
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PARTICLE SIZE DISTRIBUTION BY HYDROMETER

Client :	ALS Environmental Brisbane	Report No. :	R6915
Address :	32 Shand Street, Stafford	Job No. :	087634002/8
Project :	Delivered Samples	Reg'n No. :	0831585
Sample ID :	CNS0801-S-237	Batch No. :	EB0803157 - 34
		Date Received :	11/03/2008
		Sampled By :	Client

SIZE FRACTIONS AS PER AUSTRALIAN STANDARDS AS 1726



Pretreatment	Tested as received	Soil Particle Density (assumed)	2.70
Loss in Pretreatment (%)	-	Type of Hydrometer	ASTM E100
Method of Dispersion	Mixer		
Remarks :			
Material Description :	(SC) Clayey SAND, brown		
Test Procedure :	AS 1289 3.6.2, 3.6.3 (up to 24 hours)		
Prepared by : <i>NT</i>	Checked by : <i>JA</i>		

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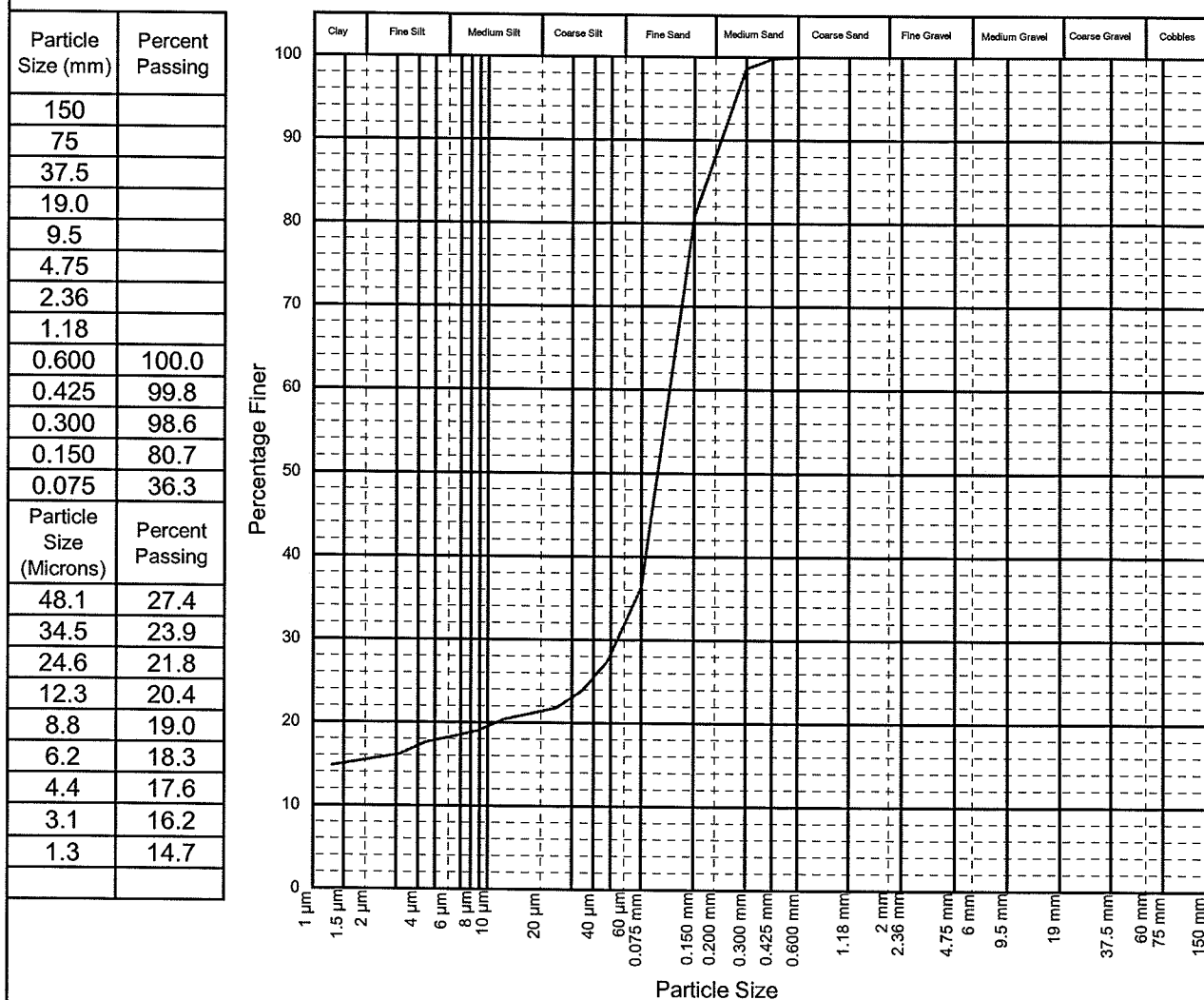
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PARTICLE SIZE DISTRIBUTION BY HYDROMETER

Client :	ALS Environmental Brisbane	Report No. :	R6915
Address :	32 Shand Street, Stafford	Job No. :	087634002/8
Project :	Delivered Samples	Reg'n No. :	0831586
Sample ID :	CNS0801-S-244	Batch No. :	EB0803157 - 41
		Date Received :	11/03/2008
		Sampled By :	Client

SIZE FRACTIONS AS PER AUSTRALIAN STANDARDS AS 1726



Pretreatment	Tested as received	Soil Particle Density (assumed)	2.70
Loss in Pretreatment (%)	-	Type of Hydrometer	ASTM E100
Method of Dispersion	Mixer		
Remarks :			
Material Description :	(SC) Clayey SAND, brown		
Test Procedure :	AS 1289 3.6.2, 3.6.3 (up to 24 hours)		
Prepared by : <i>NK</i>	Checked by : <i>SA</i>		

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N. Mann 28/3/08

To: Jodie Hancock; Phillip Kennedy
Cc: James Shelley
Subject: Hydrobiology - PNG Project - HOLD samples

Alex, Can you please find these +
 give them to Sample
 Receipt

Dear Jodi/Phillip,

As you will have noticed, a number of samples that came in from PNG were listed on the COCs as HOLD – DO NOT ANALYSE. This was because we needed to re-check budget and sample number allocations, which I have now done. We can now go ahead and ANALYSE some of those samples that were marked HOLD as follows:

Sample Number	Analyte	Instruction
CNS0801-W-100 <i>29</i>	Water - physical parameters	ANALYSE <i>1</i>
CNS0801-W-101 <i>30</i>	Water – N&P compounds	ANALYSE <i>2</i>
CNS0801-W-102 <i>31</i>	Water – TOC	ANALYSE <i>3</i>
CNS0801-W-103 <i>32</i>	Water – Total metals	ANALYSE <i>34</i>
CNS0801-W-104 <i>33</i>	Water – Dissolved metals	ANALYSE <i>45</i>
CNS0801-S-105 <i>34</i>	Sediment PSD	ANALYSE <i>56</i>
CNS0801-S-106 <i>35</i>	Sediment metals	ANALYSE <i>67</i>
CNS0801-S-279 <i>19</i>	Sediment PSD	ANALYSE <i>7</i>
CNS0801-S-280 <i>20</i>	Sediment metals	ANALYSE <i>8</i>

Thanks and regards,
 Adrian

Adrian Flynn
 Manager - Ecology and Impact Assessment
 Hydrobiology Pty Ltd
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 Milton 4064 QUEENSLAND AUSTRALIA
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Environmental Division
 Brisbane
 Work Order

EB0804628



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BN/4008/07

7/04/2008



Environmental Division

CERTIFICATE OF ANALYSIS

Work Order	: EB0804628	Page	: 1 of 5
Client	: HYDROBIOLOGY PTY LTD	Laboratory	: Environmental Division Brisbane
Contact	: MR ADRIAN FLYNN	Contact	: Tim Kilmister
Address	: P O BOX 2050 MILTON QLD, AUSTRALIA 4064	Address	: 32 Shand Street Stafford QLD Australia 4053
E-mail	: adrian.flynn@hydrobiology.biz	E-mail	: Services.Brisbane@alsenviro.com
Telephone	: +61 07 33682133	Telephone	: +61-7-3243 7222
Facsimile	: +61 07 38763068	Facsimile	: +61-7-3243 7218
Project	: CNS 0801	QC Level	: NEPM 1999 Schedule B(3) and ALS QCS3 requirement
Order number	: ----	Date Samples Received	: 07-APR-2008
C-O-C number	: ----	Issue Date	: 18-APR-2008
Sampler	: Adrian Flynn	No. of samples received	: 10
Site	: PNG	No. of samples analysed	: 8
Quote number	: ----		

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

This document is issued in accordance with NATA accreditation requirements.

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
Hoa Nguyen	Senior Inorganic Chemist	Inorganics
Kim McCabe	Senior Inorganic Chemist	Inorganics
Stephen Hislop		Inorganics

Environmental Division Brisbane

Part of the **ALS Laboratory Group**

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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 date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for processing purposes. If the sampling time is displayed as 0:00 the information was not provided by client.

Key : CAS Number = Chemistry Abstract Services number

LOR = Limit of reporting

^ = This result is computed from individual analyte detections at or above the level of reporting

- **EG005T (Total metals):EB0804628-009 (CNS0801-S-106 <2mm) & EB0804476-001 shows poor duplicate results due to sample heterogeneity. Confirmed by Visual Inspection**
- **Ionic balances are within acceptable limits as detailed in the 20th Ed. APHA "Standard Methods for the Examination of Water and Wastewater".**



Analytical Results

Sub-Matrix: **SOIL**

Client sample ID

Client sampling date / time

				CNS0801-S-106	CNS0801-S-280	CNS0801-S-106 <2mm	CNS0801-S-280 <2mm	----
				06-MAR-2008 15:00	06-MAR-2008 15:00	06-MAR-2008 15:00	06-MAR-2008 15:00	----
Compound	CAS Number	LOR	Unit	EB0804628-006	EB0804628-008	EB0804628-009	EB0804628-010	----
EA055: Moisture Content								
^ Moisture Content (dried @ 103°C)	----	1.0	%	21.2	34.3	----	----	----
EG005T: Total Metals by ICP-AES								
Aluminium	7429-90-5	50	mg/kg	----	----	<50	<50	----
Arsenic	7440-38-2	5	mg/kg	----	----	<5	<5	----
Boron	7440-42-8	50	mg/kg	----	----	<50	<50	----
Cadmium	7440-43-9	1	mg/kg	----	----	<1	<1	----
Chromium	7440-47-3	2	mg/kg	----	----	<2	<2	----
Copper	7440-50-8	5	mg/kg	----	----	<5	<5	----
Iron	7439-89-6	50	mg/kg	----	----	<50	<50	----
Lead	7439-92-1	5	mg/kg	----	----	<5	<5	----
Manganese	7439-96-5	5	mg/kg	----	----	<5	<5	----
Nickel	7440-02-0	2	mg/kg	----	----	<2	<2	----
Selenium	7782-49-2	5	mg/kg	----	----	<5	<5	----
Silver	7440-22-4	2	mg/kg	----	----	<2	<2	----
Zinc	7440-66-6	5	mg/kg	----	----	<5	<5	----
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.1	mg/kg	----	----	<0.1	<0.1	----



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-100	CNS0801-W-101	CNS0801-W-103	CNS0801-W-104	----
				06-MAR-2008 15:00	06-MAR-2008 15:00	06-MAR-2008 15:00	06-MAR-2008 15:00	----
Compound	CAS Number	LOR	Unit	EB0804628-001	EB0804628-002	EB0804628-003	EB0804628-004	----
EA025: Suspended Solids								
^ Suspended Solids (SS)	----	1	mg/L	10	----	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	0.6	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO ₃	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO ₃	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO ₃	71-52-3	1	mg/L	91	----	----	----	----
Total Alkalinity as CaCO ₃	----	1	mg/L	91	----	----	----	----
ED040F: Dissolved Major Anions								
Sulphate as SO ₄ 2-	14808-79-8	1	mg/L	2	----	----	----	----
ED045P: Chloride by PC Titrator								
Chloride	16887-00-6	1	mg/L	<1	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	30	----	----	----	----
Magnesium	7439-95-4	1	mg/L	3	----	----	----	----
Sodium	7440-23-5	1	mg/L	3	----	----	----	----
Potassium	7440-09-7	1	mg/L	1	----	----	----	----
EG005F: Dissolved Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	----	0.1	----
Iron	7439-89-6	0.05	mg/L	----	----	----	<0.05	----
Selenium	7782-49-2	0.01	mg/L	----	----	----	<0.01	----
EG005T: Total Metals by ICP-AES								
Boron	7440-42-8	0.1	mg/L	----	----	<0.1	----	----
Iron	7439-89-6	0.05	mg/L	----	----	0.22	----	----
Selenium	7782-49-2	0.01	mg/L	----	----	<0.01	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	----	----	----	0.01	----
Arsenic	7440-38-2	0.001	mg/L	----	----	----	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	0.0001	----
Chromium	7440-47-3	0.001	mg/L	----	----	----	<0.001	----
Copper	7440-50-8	0.001	mg/L	----	----	----	<0.001	----
Lead	7439-92-1	0.001	mg/L	----	----	----	<0.001	----
Manganese	7439-96-5	0.001	mg/L	----	----	----	0.010	----
Nickel	7440-02-0	0.001	mg/L	----	----	----	<0.001	----
Silver	7440-22-4	0.001	mg/L	----	----	----	<0.001	----
Zinc	7440-66-6	0.005	mg/L	----	----	----	0.166	----
EG020T: Total Metals by ICP-MS								



Analytical Results

Sub-Matrix: **WATER**

Client sample ID

Client sampling date / time

				CNS0801-W-100	CNS0801-W-101	CNS0801-W-103	CNS0801-W-104	----
				06-MAR-2008 15:00	06-MAR-2008 15:00	06-MAR-2008 15:00	06-MAR-2008 15:00	----
Compound	CAS Number	LOR	Unit	EB0804628-001	EB0804628-002	EB0804628-003	EB0804628-004	----
EG020T: Total Metals by ICP-MS - Continued								
Aluminium	7429-90-5	0.01	mg/L	----	----	0.17	----	----
Arsenic	7440-38-2	0.001	mg/L	----	----	<0.001	----	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	<0.0001	----	----
Chromium	7440-47-3	0.001	mg/L	----	----	<0.001	----	----
Copper	7440-50-8	0.001	mg/L	----	----	<0.001	----	----
Lead	7439-92-1	0.001	mg/L	----	----	<0.001	----	----
Manganese	7439-96-5	0.001	mg/L	----	----	0.015	----	----
Nickel	7440-02-0	0.001	mg/L	----	----	<0.001	----	----
Silver	7440-22-4	0.001	mg/L	----	----	<0.001	----	----
Zinc	7440-66-6	0.005	mg/L	----	----	0.090	----	----
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	----	<0.0001	----
EG035T: Total Mercury by FIMS								
Mercury	7439-97-6	0.0001	mg/L	----	----	<0.0001	----	----
EK057: Nitrite as N								
Nitrite as N	----	0.010	mg/L	<0.010	----	----	----	----
EK058: Nitrate as N								
^ Nitrate as N	14797-55-8	0.010	mg/L	<0.010	----	----	----	----
EK059: Nitrite plus Nitrate as N (NO_x)								
Nitrite + Nitrate as N	----	0.010	mg/L	<0.010	0.027	----	----	----
EK061: Total Kjeldahl Nitrogen (TKN)								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	0.2	----	----	----
EK062: Total Nitrogen as N (TKN + NO_x)								
^ Total Nitrogen as N	----	0.1	mg/L	----	0.2	----	----	----
EK067: Total Phosphorus as P								
Total Phosphorus as P	----	0.01	mg/L	----	0.02	----	----	----
EK071: Reactive Phosphorus as P (Dissolved)								
Reactive Phosphorus - Filtered	----	0.010	mg/L	0.045	----	----	----	----
EN055: Ionic Balance								
^ Total Anions	----	0.01	meq/L	1.86	----	----	----	----
^ Total Cations	----	0.01	meq/L	1.90	----	----	----	----
EP005: Total Organic Carbon (TOC)								
Total Organic Carbon	----	1	mg/L	----	1	----	----	----



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TEST RESULTS

Client :	ALS Environmental Brisbane	Job No. :	087634002/8
Project :	Delivered Samples	Date Received :	14-Apr-08
Batch No. :	EB0804628	Sampled by :	Client

PARTICLE SIZE SUMMARY

Reg'n No.	Sample ID	Sample No.	Percent Gravel (+ 2 mm)	Percent Sand (2 mm - 0.060 mm)	Percent Silt (0.060 mm - 0.002 mm)	Percent Clay (-0.002 mm)
0832483	CNS0801-S-105	5	3	95	2	
0832484	CNS0801-S-279	7	17	73	8	2

Remarks :

Test Procedures : AS 1289.3.6.1 & 3.6.3

Prepared by : *mk*

Checked by : *JA*

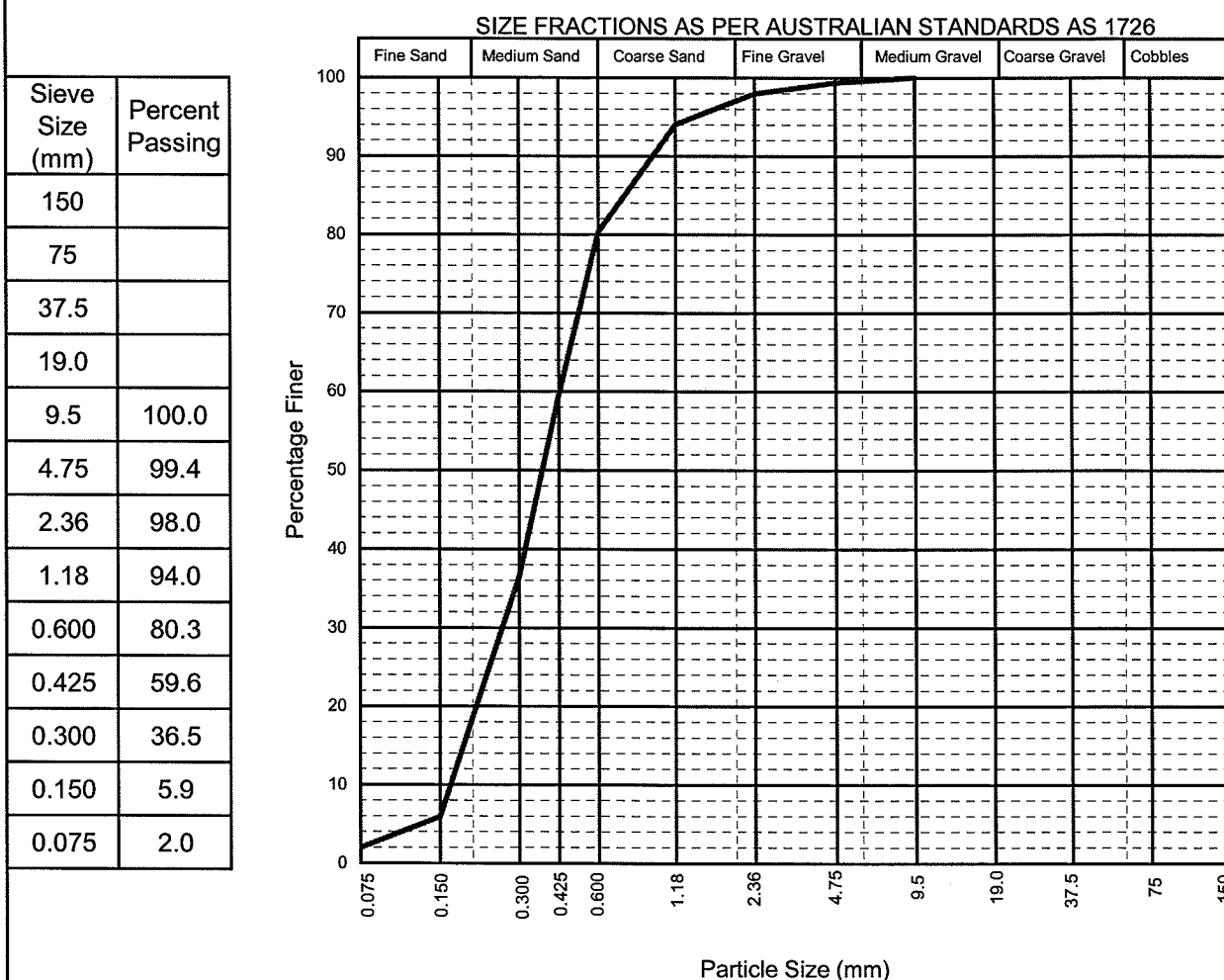


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PARTICLE SIZE DISTRIBUTION

Client :	ALS Environmental Brisbane	Report No. :	R6949
Address :	32 Shand Street, Stafford	Job No. :	087634002/8
Project :	Delivered Samples	Reg'n No. :	0832483
Sample ID :	CNS0801-S-105	Batch No. :	EB0804628 - 5
		Date Received :	14/04/08
		Sampled By :	Client



Remarks :

Material Description : (SP) SAND, dark grey

Test Procedure : AS 1289 3.6.1

Prepared by : *NT*

Checked by : *SA*

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1446

Authorised Signatory

N. J. 18/4/8



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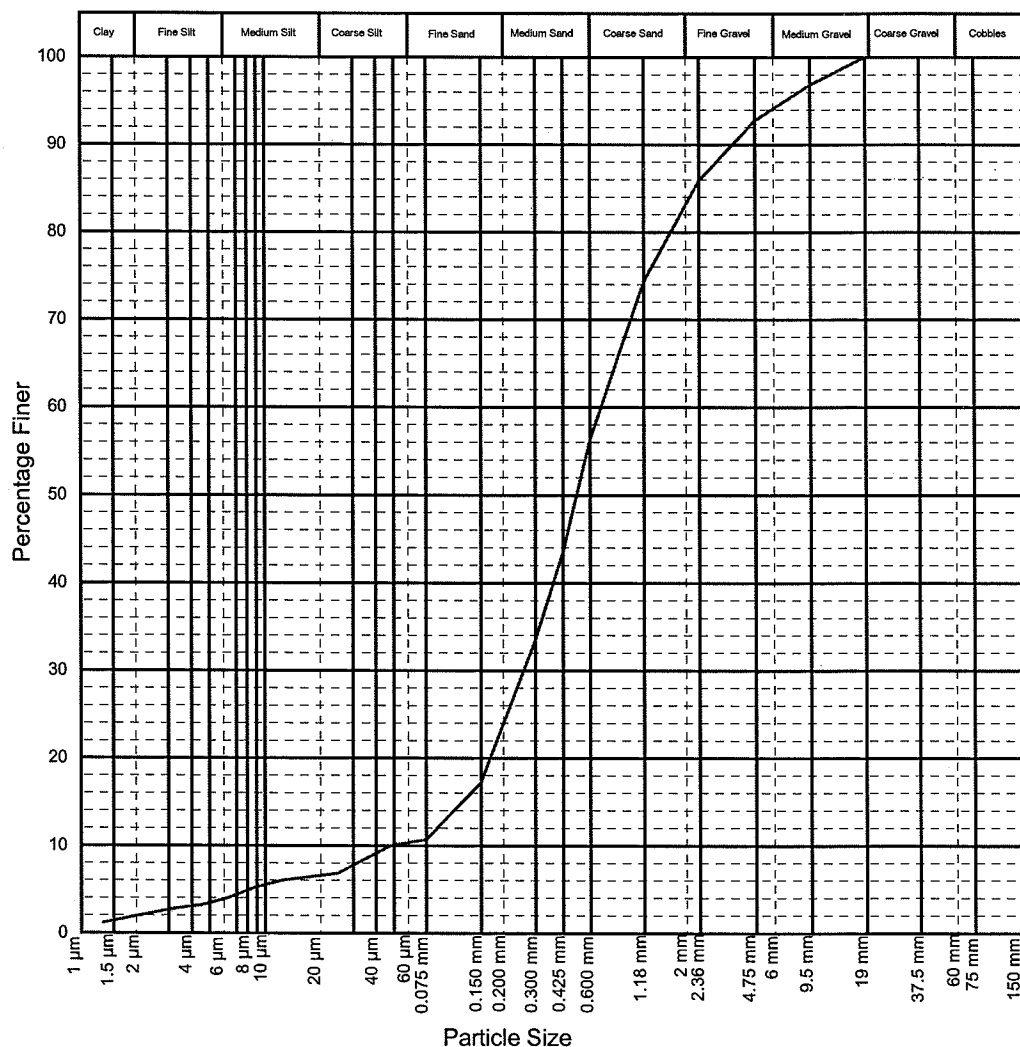
PARTICLE SIZE DISTRIBUTION BY HYDROMETER

Client : ALS Environmental Brisbane
Address : 32 Shand Street, Stafford
Project : Delivered Samples
Sample ID : CNS0801-S-279

Report No. : R6949
Job No. : 087634002/8
Reg'n No. : 0832484
Batch No. : EB0804628 - 7
Date Received : 14/04/2008
Sampled By : Client

SIZE FRACTIONS AS PER AUSTRALIAN STANDARDS AS 1726

Particle Size (mm)	Percent Passing
150	
75	
37.5	
19.0	100.0
9.5	96.8
4.75	92.8
2.36	85.9
1.18	74.3
0.600	56.3
0.425	43.5
0.300	33.5
0.150	17.2
0.075	10.7
Particle Size (Microns)	Percent Passing
48.4	10.0
34.6	8.4
24.8	6.8
12.4	6.0
8.8	5.2
6.3	4.0
4.5	3.2
3.2	2.8
1.3	1.2



Pretreatment	Tested as received	Soil Particle Density (assumed)	2.70
Loss in Pretreatment (%)	-	Type of Hydrometer	ASTM E100
Method of Dispersion	Mixer		
Remarks :			
Material Description :	(SM/SP) Silty SAND/SAND, grey & brown, with some gravel		
Test Procedure :	AS 1289 3.6.2, 3.6.3 (up to 24 hours)		
Prepared by : <i>NF</i>	Checked by : <i>DA</i>		

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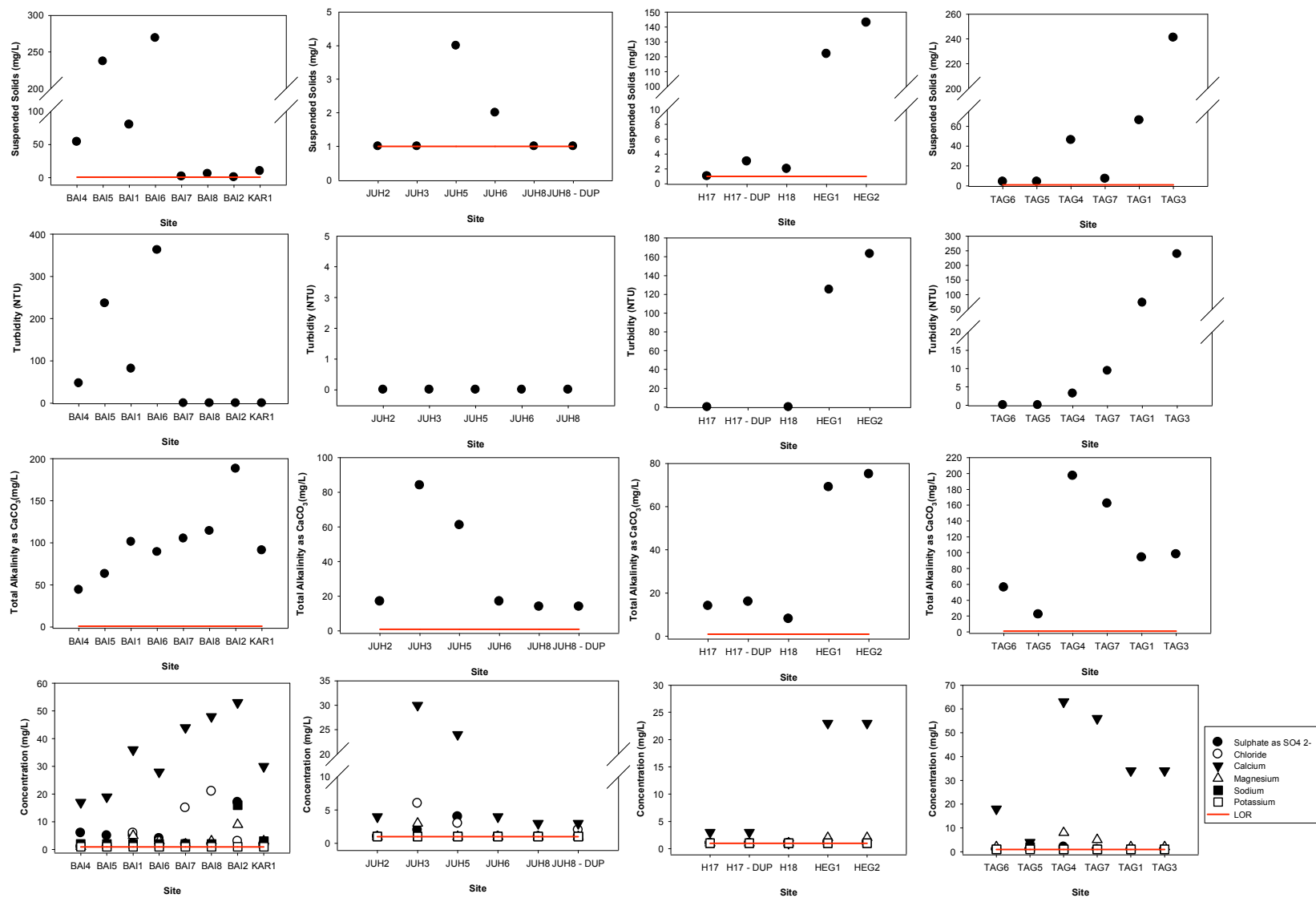


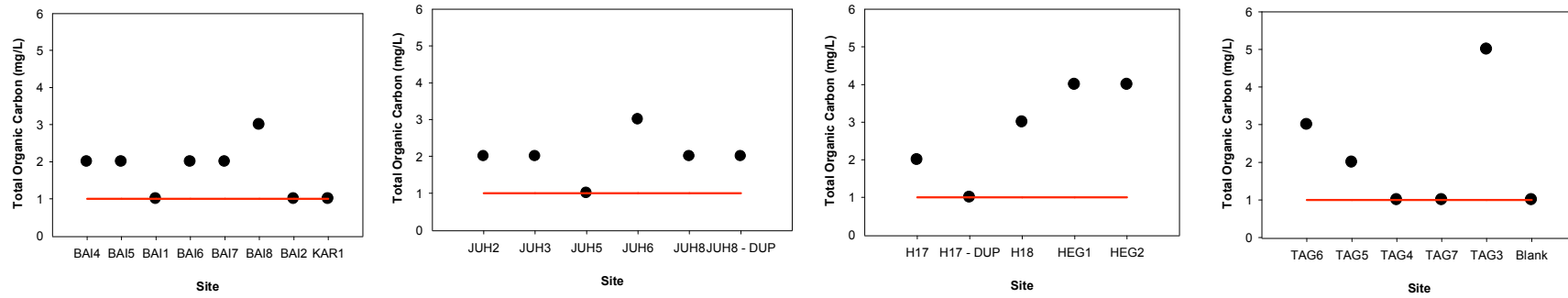
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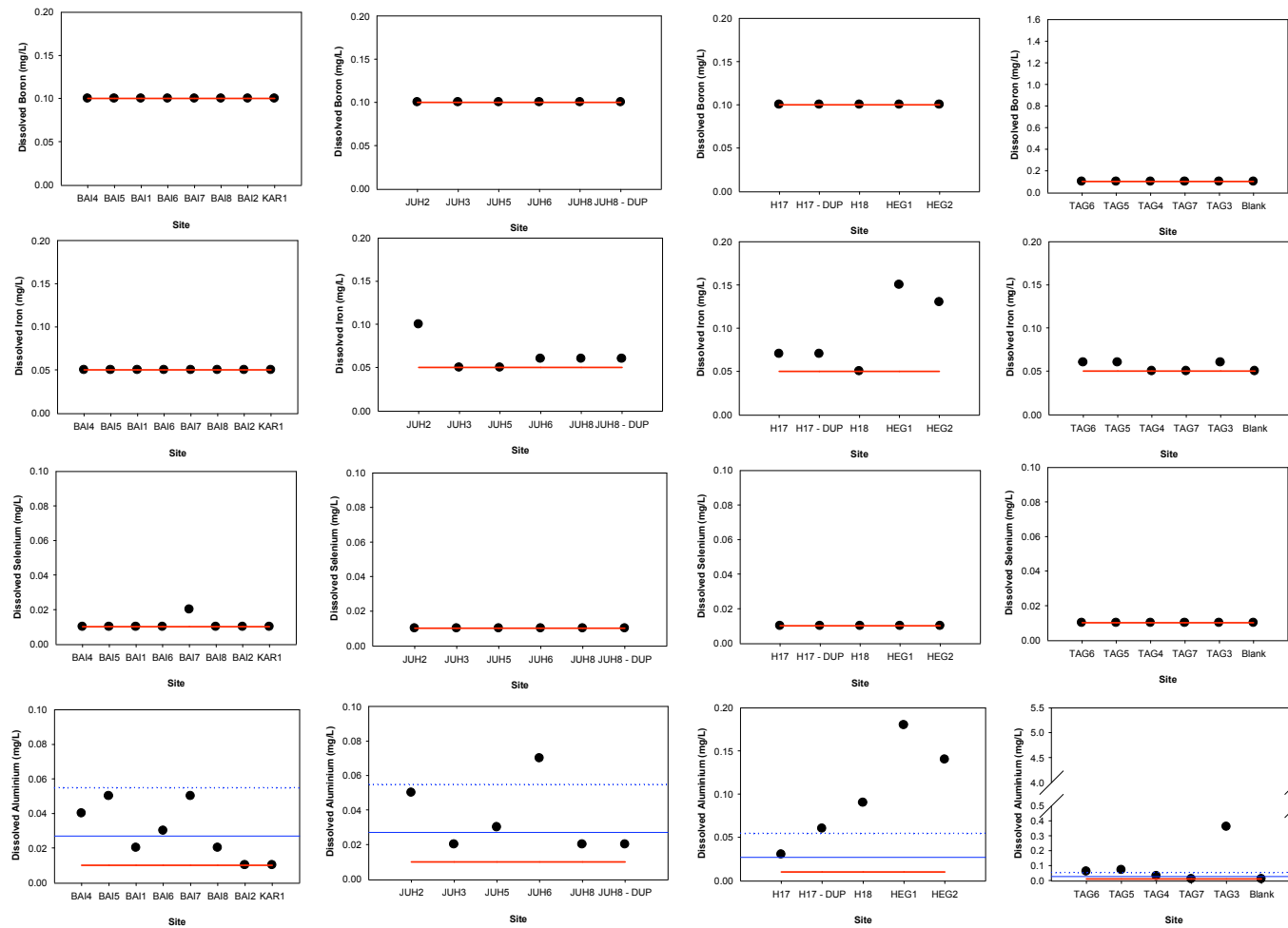
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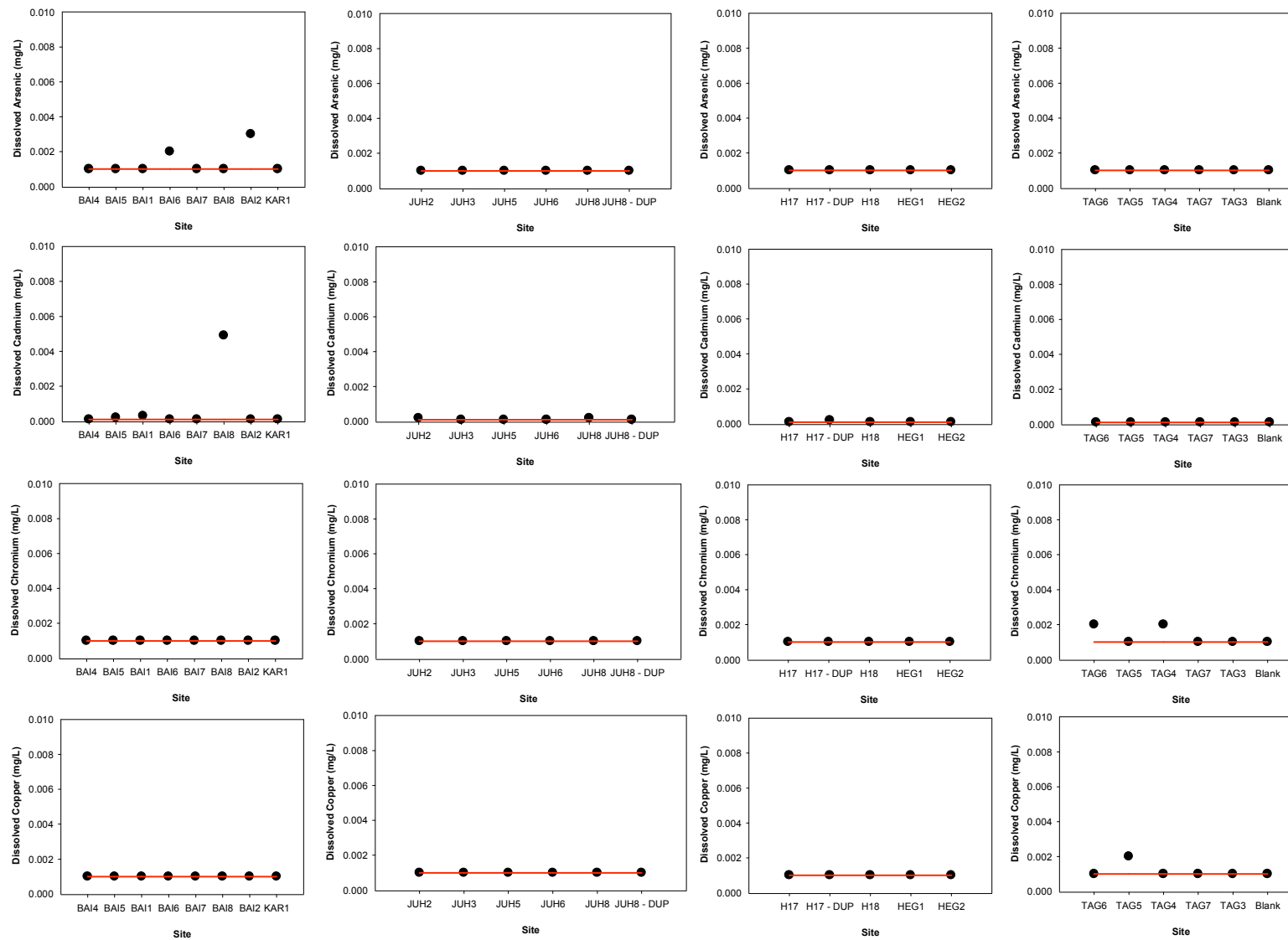
Appendix 3 Water Quality Results – Graphs

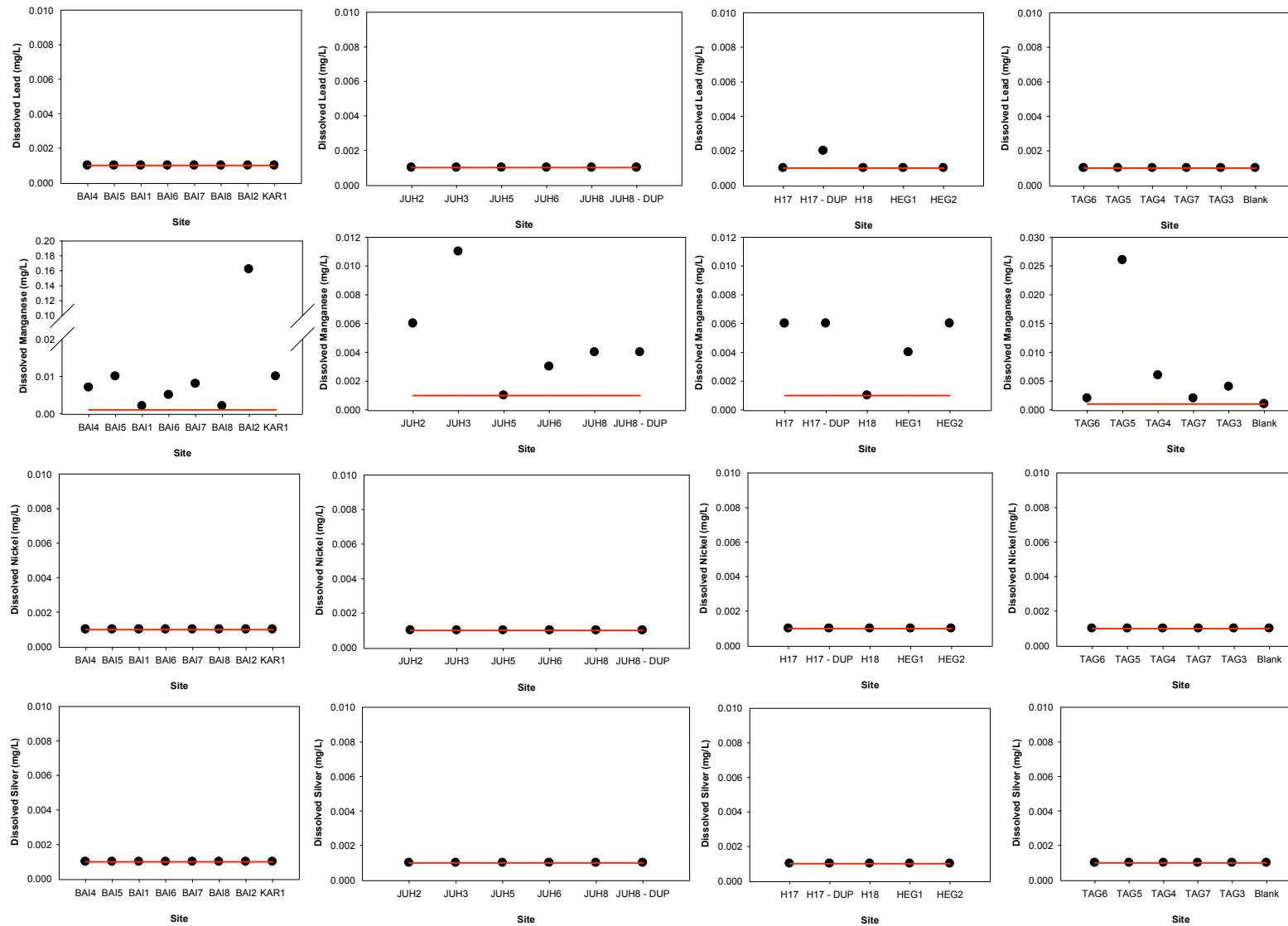


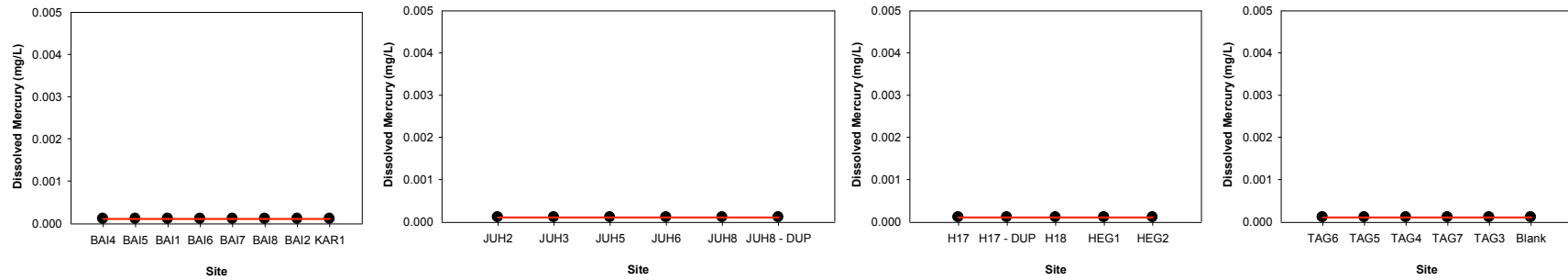


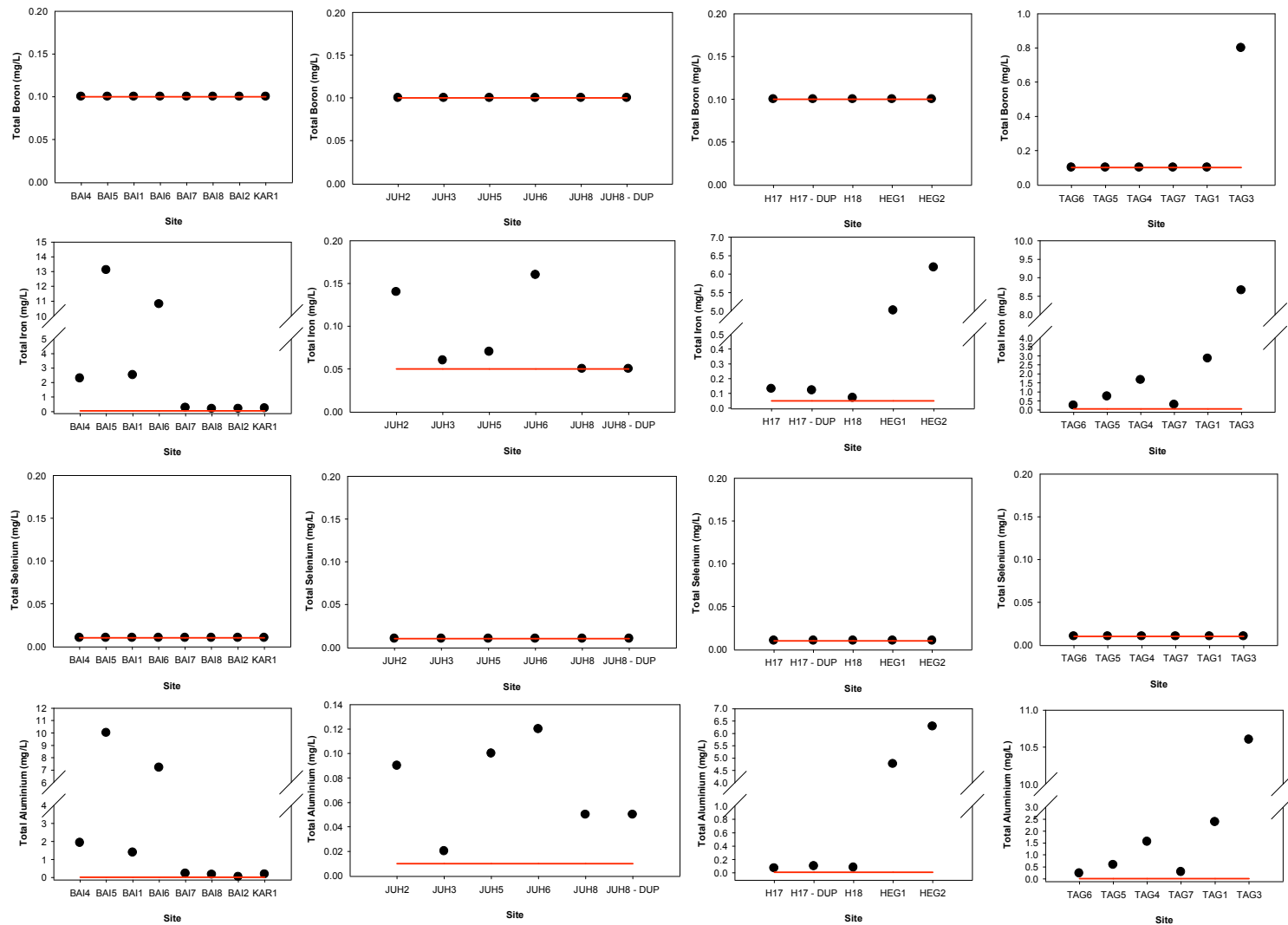


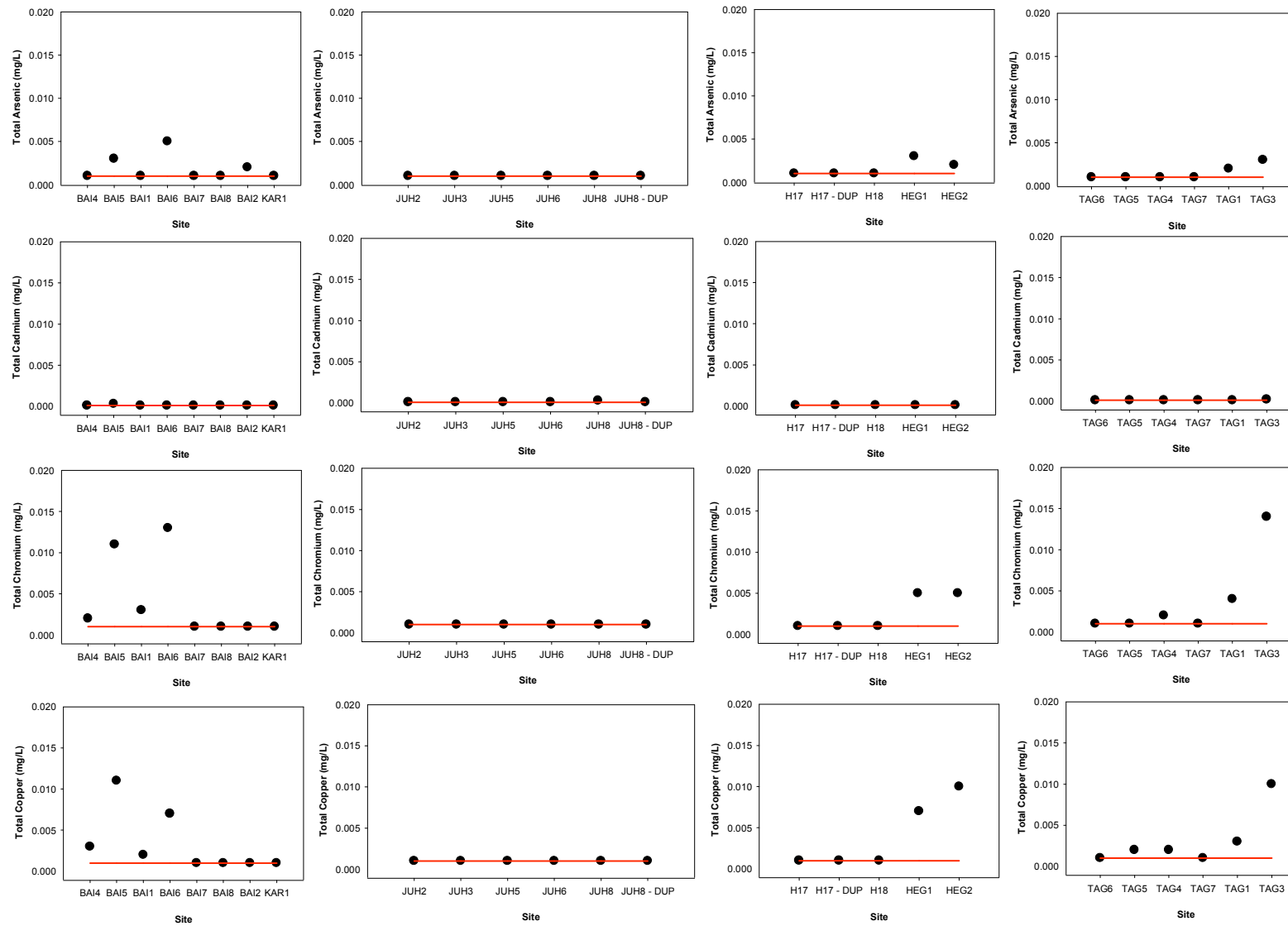
NOTE: Red line is limit of reporting, blue line is ANZECC/ARMCANZ (2000) 99% of species protection limit, blue dotted line is ANZECC/ARMCANZ (2000) 95% species protection limit

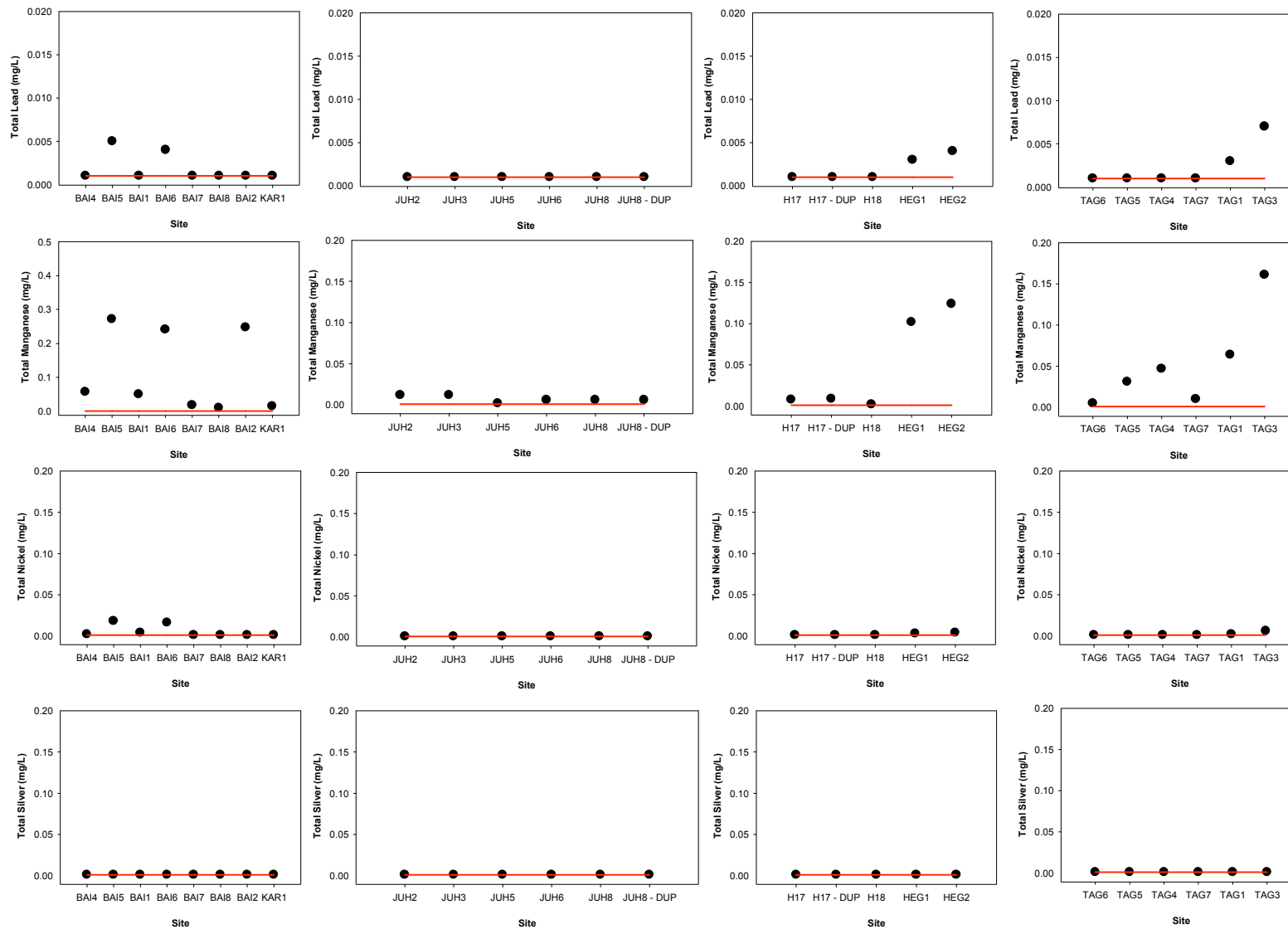


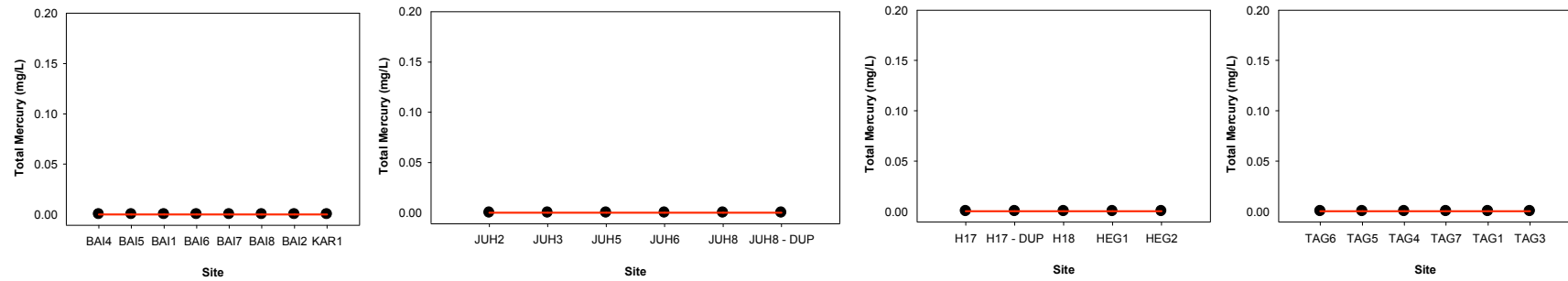


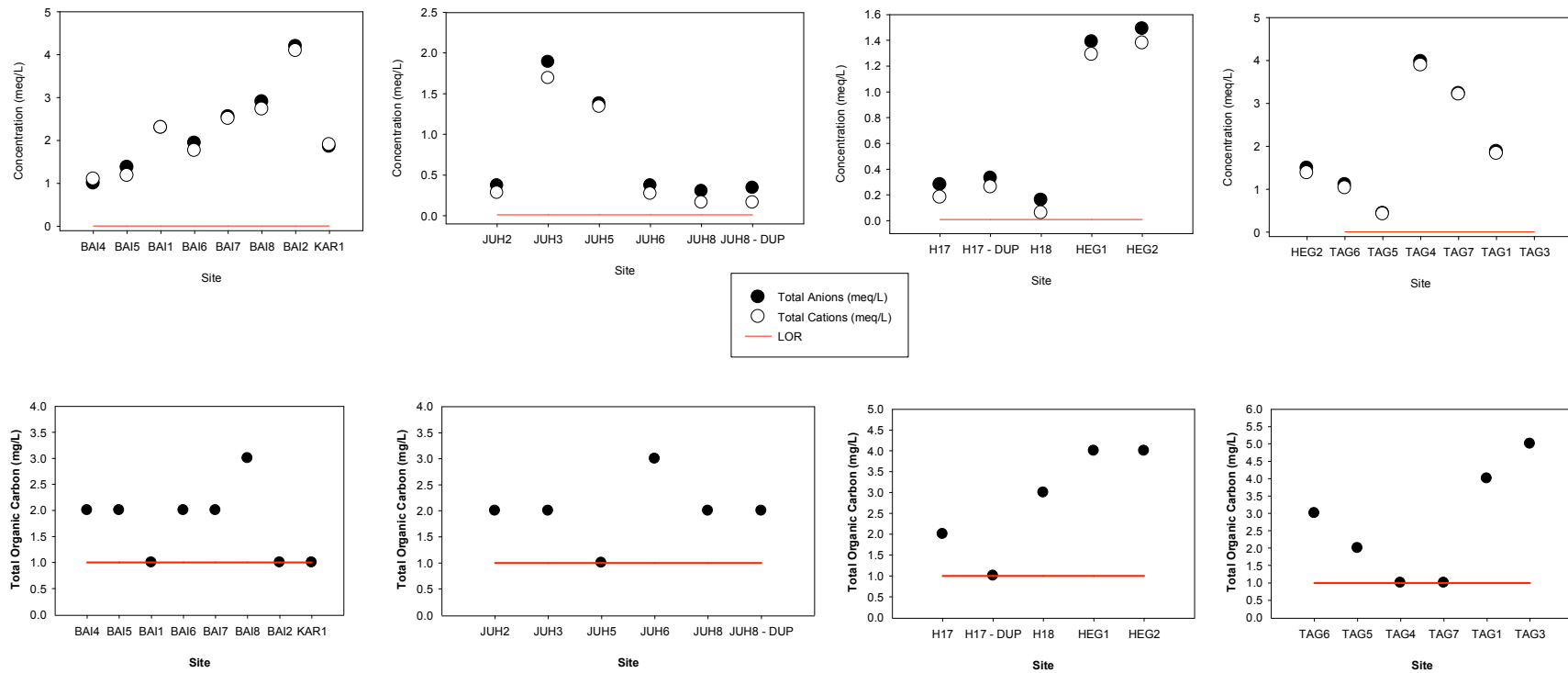


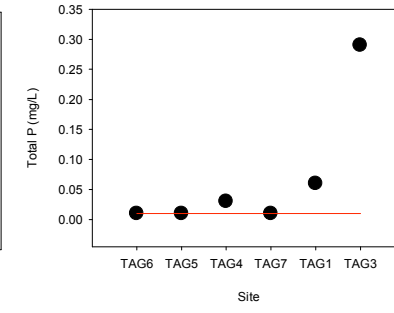
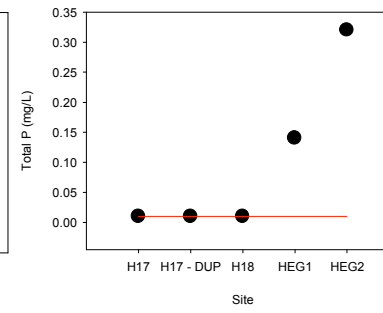
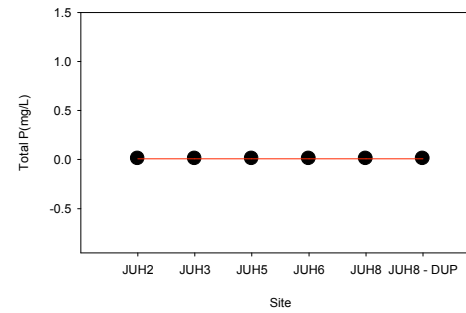
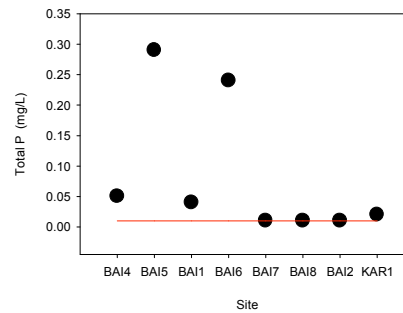
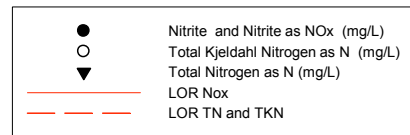
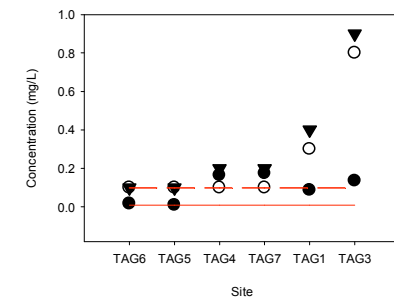
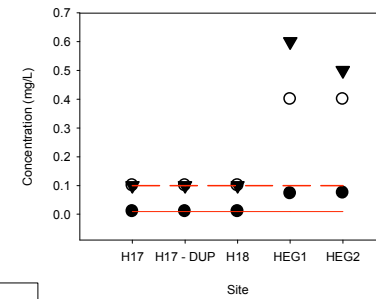
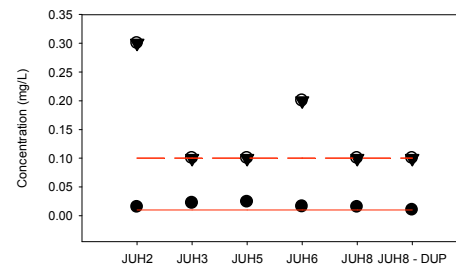
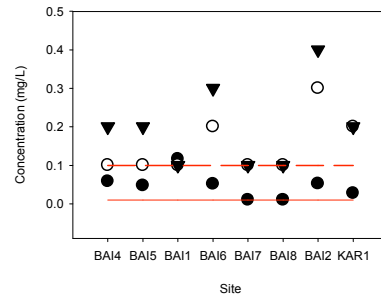












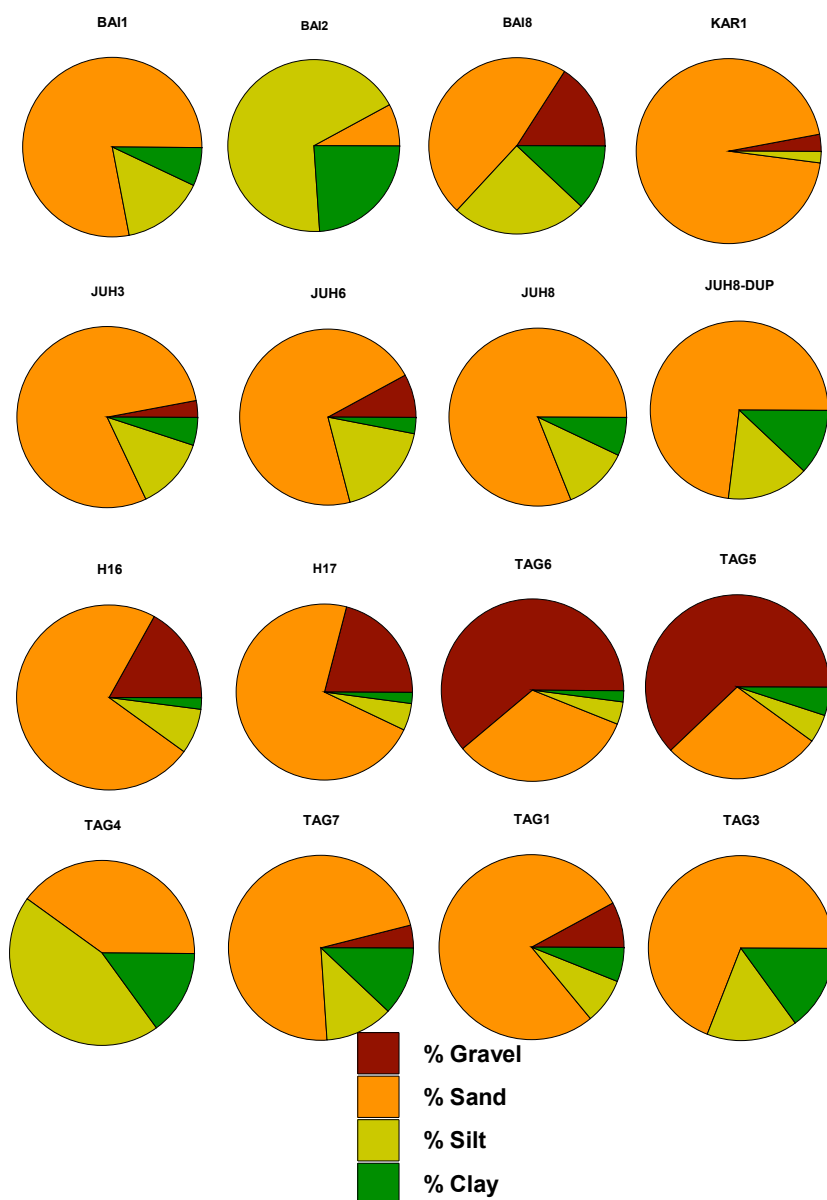
Appendix 4 Water Quality Results – Tables

Site	Suspended Solids (SS)	Turbidity	Hydroxide Alkalinity as CaCO3	Carbonate Alkalinity as CaCO3	Bicarbonate Alkalinity as CaCO3	Total Alkalinity as CaCO3	Sulphate as SO4 2-	Chloride	Calcium	Magnesium	Water Hardness (CaCO3 conc)	Sodium	Potassium	Nitrite as N	Nitrate as N	Nitrite + Nitrate as N (NOx)	Total Kjeldahl Nitrogen as N	Total Nitrogen as N (TKN + NOx)	Total Phosphorus	Reactive Phosphorus as P - Filtered (dissolved)	Total Anions	Total Cations	Ionic Balance	Total Organic Carbon (TOC)
BAI1	80	12.5	< 1	< 1	101	101	5	6	36	5	110.5	2	< 1	< 0.01	0.079	0.116	< 0.1	0.1	0.04	0.024	2.3	2.3		1
BAI2	1	0.5	< 1	< 1	188	188	17	3	53	9	169.4	16	< 1	< 0.01	0.013	0.052	0.3	0.4	0.01	0.024	4.19	4.09	1.22	1
BAI4	54	18.7	< 1	< 1	44	44	6	<1	17	1	46.6	2	< 1	< 0.01	0.021	0.058	0.1	0.2	0.05	0.03	1	1.1		2
BAI5	237	16.4	< 1	< 1	63	63	5	<1	19	2	55.7	2	< 1	< 0.01	0.035	0.047	0.1	0.2	0.29	0.028	1.37	1.18		2
BAI6	269	127	< 1	< 1	89	89	4	3	28	3	82.3	2	< 1	< 0.01	0.058	0.051	0.2	0.3	0.24	0.025	1.94	1.76		2
BAI7	2	0.4	< 1	< 1	105	105	2	15	44	2	118.2	2	< 1	< 0.01	< 0.01	< 0.01	< 0.1	< 0.1	0.01	0.02	2.55	2.51		2
BAI8	6	1.6	< 1	< 1	114	114	2	21	48	3	132.3	2	< 1	< 0.01	< 0.01	< 0.01	< 0.1	< 0.1	0.01	0.02	2.9	2.73		3
JUH2	< 1	0.4	< 1	< 1	17	17	< 1	1	4	1	14.1	< 1	< 1	< 0.01	< 0.01	0.015	0.3	0.3	< 0.01	< 0.01	0.37	0.28		2
JUH3	< 1	0.5	< 1	< 1	84	84	2	6	30	3	87.3	< 1	< 1	< 0.01	< 0.01	0.022	< 0.1	< 0.1	< 0.01	0.017	1.89	1.69		2
JUH5	4	0.5	< 1	< 1	61	61	4	3	24	1	64.1	< 1	< 1	< 0.01	< 0.01	0.024	< 0.1	< 0.1	< 0.01	0.014	1.38	1.34		1
JUH6	2	0.5	< 1	< 1	17	17	< 1	1	4	1	14.1	< 1	< 1	< 0.01	< 0.01	0.018	0.2	0.2	< 0.01	< 0.01	0.37	0.27		3
JUH8	< 1	0.2	< 1	< 1	14	14	< 1	1	3	< 1	11.6	< 1	< 1	< 0.01	< 0.01	0.015	< 0.1	< 0.1	< 0.01	< 0.01	0.30	0.16		2
JUH8 - DUP	< 1	0.2	< 1	< 1	14	14	< 1	2	3	< 1	11.6	< 1	< 1	< 0.01	< 0.01	< 0.01	< 0.1	< 0.1	< 0.01	< 0.01	0.34	0.16		2
H17	1	0.9	< 1	< 1	14	14	< 1	< 1	3	< 1	11.6	< 1	< 1	< 0.01	< 0.01	< 0.01	< 0.1	< 0.1	< 0.01	< 0.01	0.28	0.18		2
H17 - DUP	3	0.8	< 1	< 1	16	16	< 1	< 1	3	< 1	11.6	< 1	< 1	< 0.01	< 0.01	< 0.01	< 0.1	< 0.1	< 0.01	< 0.01	0.33	0.26		1
H18	2	1.2	< 1	< 1	8	8	< 1	< 1	1	< 1	6.6	< 1	< 1	< 0.01	< 0.01	< 0.01	< 0.1	< 0.1	< 0.01	< 0.01	0.16	0.06		3
HEG1	122	55.0	< 1	< 1	69	69	< 1	< 1	23	2	65.7	< 1	< 1	< 0.01	0.072	0.072	0.4	0.6	0.14	< 0.01	1.39	1.29		4
HEG2	143	75.0	< 1	< 1	75	75	< 1	< 1	23	2	65.7	< 1	< 1	< 0.01	0.074	0.074	0.4	0.6	0.32	0.010	1.49	1.38		4
TAG6	4	2.0	< 1	< 1	56	56	< 1	< 1	18	2	53.2	< 1	< 1	< 0.01	< 0.01	0.017	< 0.1	< 0.1	< 0.01	< 0.01	1.11	1.03		3
TAG5	4	8.4	< 1	< 1	22	22	< 1	< 1	4	2	18.2	< 1	< 1	< 0.01	< 0.01	< 0.01	< 0.1	< 0.1	< 0.01	< 0.01	0.44	0.42		2
TAG4	46	5.3	< 1	< 1	197	197	2	< 1	63	8	190.3	< 1	< 1	< 0.01	0.106	0.164	< 0.1	0.2	0.03	0.010	3.98	3.89	1.18	1
TAG7	7	1.0	< 1	< 1	162	162	< 1	< 1	56	5	160.5	< 1	< 1	< 0.01	0.147	0.174	< 0.1	0.2	< 0.01	< 0.01	3.23	3.21	0.23	< 1
TAG1	66	18.0	< 1	< 1	94	94	< 1	< 1	34	2	93.2	< 1	< 1	< 0.01	0.100	0.087	0.3	0.4	0.06	< 0.01	1.88	1.83		4
TAG3	241	85.0	< 1	< 1	98	98	< 1	< 1	34	2	93.2	< 1	< 1	< 0.01	0.112	0.130	0.6	0.9	0.29	< 0.01	1.95	1.86		5
Blank	< 1	0.5	< 1	< 1	4	4	< 1	< 1	< 1	< 1	6.6	< 1	< 1	< 0.01	< 0.01	0.029	< 0.1	< 0.1	< 0.01	0.012	0.08	< 0.01	< 1	
Field Blank	< 1	< 0.1	< 1	< 1	4	4	< 1	< 1	< 1	< 1	6.6	< 1	< 1	< 0.01	< 0.01	0.042	< 0.1	< 0.1	< 0.01	0.013	0.08	< 0.01	< 1	
Blank	< 1	< 0.1	< 1	< 1	3	3	< 1	< 1	< 1	< 1	6.6	< 1	< 1	< 0.01	< 0.01				< 0.01	0.05	< 0.01	< 1		
KAR1	10	0.6	< 1	< 1	91	91	2	< 1	30	3		3	< 1	< 0.01	< 0.01	0.027	0.2	0.2	0.02	0.045	1.86	1.90		1

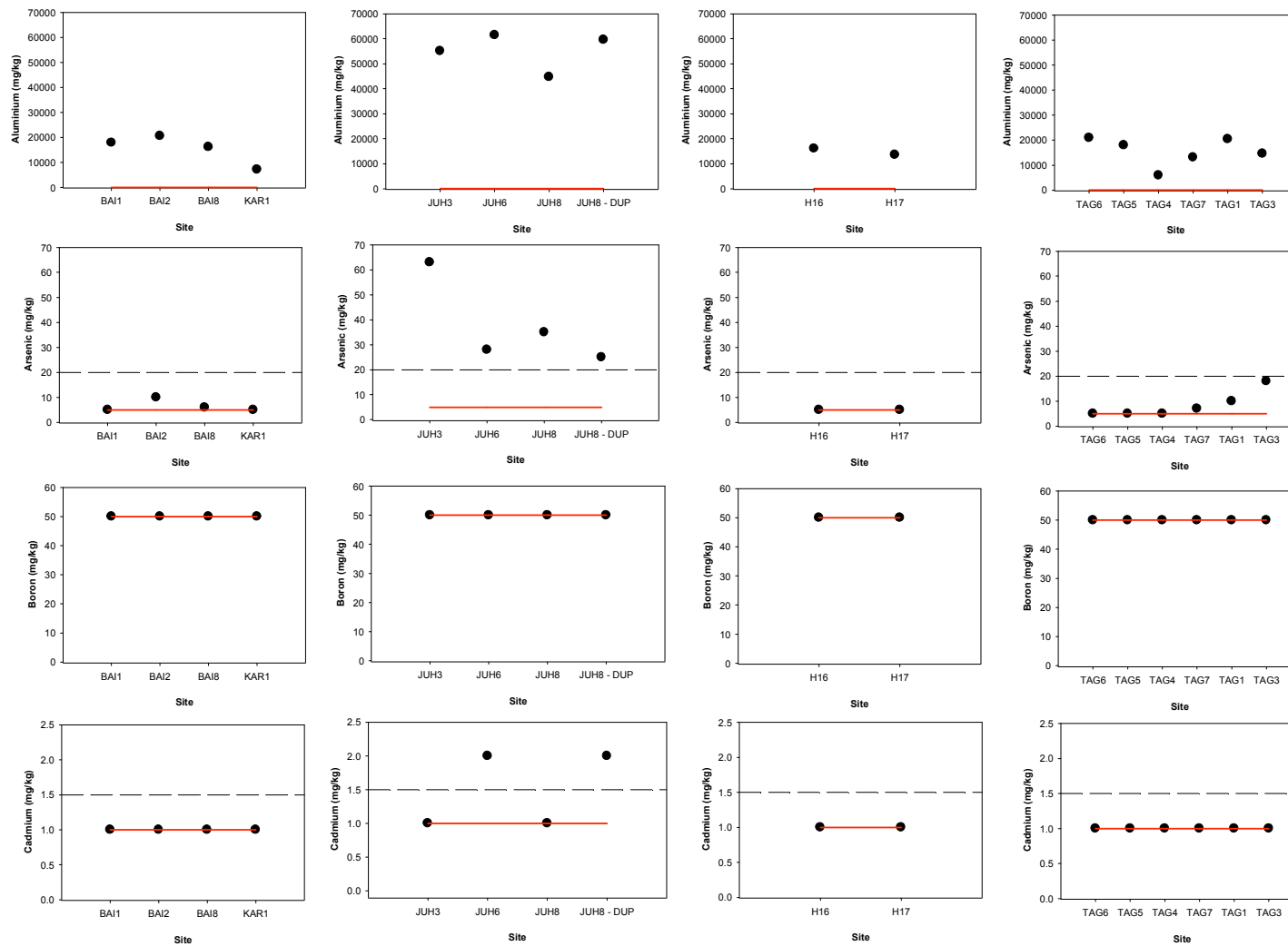
Site	Dissolved Boron	Dissolved Iron	Dissolved Selenium	Dissolved Aluminium	Dissolved Arsenic	Dissolved Cadmium	Dissolved Chromium	Dissolved Copper	Dissolved Lead	Dissolved Manganese	Dissolved Nickel	Dissolved Silver	Dissolved Zinc	Dissolved Mercury
BAI1	< 0.1	< 0.05	< 0.01	0.02	< 0.001	0.0003	< 0.001	< 0.001	< 0.001	0.002	< 0.001	< 0.001	0.03	< 0.0001
BAI2	< 0.1	< 0.05	0.01	< 0.01	0.003	< 0.0001	< 0.001	< 0.001	< 0.001	0.162	< 0.001	< 0.001	0.058	< 0.0001
BAI4	< 0.1	< 0.05	0.01	0.04	< 0.001	< 0.0001	< 0.001	< 0.001	< 0.001	0.007	< 0.001	< 0.001	0.096	< 0.0001
BAI5	< 0.1	< 0.05	< 0.01	0.05	< 0.001	0.0002	< 0.001	< 0.001	< 0.001	0.01	< 0.001	< 0.001	0.017	< 0.0001
BAI6	< 0.1	< 0.05	< 0.01	0.03	0.002	< 0.0001	< 0.001	< 0.001	< 0.001	0.005	< 0.001	< 0.001	0.166	< 0.0001
BAI7	< 0.1	< 0.05	0.02	0.05	< 0.001	< 0.0001	< 0.001	< 0.001	< 0.001	0.008	< 0.001	< 0.001	0.005	< 0.0001
BAI8	< 0.1	< 0.05	< 0.01	0.02	0.001	0.0049	< 0.001	< 0.001	< 0.001	0.002	< 0.001	< 0.001	0.016	< 0.0001
JUH2	< 0.1	0.10	< 0.01	0.05	< 0.001	0.0002	< 0.001	< 0.001	< 0.001	0.006	< 0.001	< 0.001	0.048	< 0.0001
JUH3	< 0.1	< 0.05	0.01	0.02	< 0.001	0.0001	< 0.001	< 0.001	< 0.001	0.011	< 0.001	< 0.001	0.057	< 0.0001
JUH5	< 0.1	< 0.05	< 0.01	0.03	< 0.001	< 0.0001	< 0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	0.056	< 0.0001
JUH6	< 0.1	0.06	< 0.01	0.07	< 0.001	< 0.0001	< 0.001	< 0.001	< 0.001	0.003	< 0.001	< 0.001	0.018	< 0.0001
JUH8	< 0.1	0.06	< 0.01	0.02	< 0.001	0.0002	< 0.001	< 0.001	0.001	0.004	< 0.001	< 0.001	0.185	< 0.0001
JUH8 - DUP	< 0.1	0.06	< 0.01	0.02	< 0.001	< 0.0001	< 0.001	< 0.001	< 0.001	0.004	< 0.001	< 0.001	0.025	< 0.0001
H17	< 0.1	0.07	< 0.01	0.03	< 0.001	< 0.0001	< 0.001	< 0.001	< 0.001	0.006	< 0.001	< 0.001	0.091	< 0.0001
H17 - DUP	< 0.1	0.07	< 0.01	0.06	< 0.001	0.0002	< 0.001	< 0.001	0.002	0.006	< 0.001	< 0.001	0.159	< 0.0001
H18	< 0.1	< 0.05	< 0.01	0.09	< 0.001	< 0.0001	< 0.001	< 0.001	< 0.001	0.001	< 0.001	< 0.001	0.021	< 0.0001
HEG1	< 0.1	0.15	< 0.01	0.18	0.001	< 0.0001	< 0.001	< 0.001	< 0.001	0.004	< 0.001	< 0.001	0.014	< 0.0001
HEG2	< 0.1	0.13	< 0.01	0.14	< 0.001	< 0.0001	< 0.001	< 0.001	< 0.001	0.006	< 0.001	< 0.001	0.049	< 0.0001
TAG6	< 0.1	0.06	< 0.01	0.06	< 0.001	< 0.0001	0.002	< 0.001	< 0.001	0.002	< 0.001	< 0.001	0.150	< 0.0001
TAG5	< 0.1	0.06	< 0.01	0.07	< 0.001	< 0.0001	< 0.001	0.002	< 0.001	0.026	< 0.001	< 0.001	0.036	< 0.0001
TAG4	< 0.1	< 0.05	< 0.01	0.03	< 0.001	< 0.0001	0.002	< 0.001	< 0.001	0.006	< 0.001	< 0.001	0.058	< 0.0001
TAG7	< 0.1	< 0.05	< 0.01	0.01	< 0.001	< 0.0001	0.001	< 0.001	< 0.001	0.002	< 0.001	< 0.001	0.137	< 0.0001
TAG1	1.4	0.14	< 0.01	4.96	< 0.001	< 0.0001	0.009	0.002	0.003	0.007	< 0.001	< 0.001	0.037	< 0.0001
TAG3	< 0.1	0.06	< 0.01	0.36	< 0.001	< 0.0001	< 0.001	0.001	0.001	0.004	< 0.001	< 0.001	0.104	< 0.0001
Blank	< 0.1	< 0.05	< 0.01	< 0.01	< 0.001	< 0.0001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.11	< 0.0001
Field Blank	< 0.1	< 0.05	0.01	0.01	< 0.001	0.0016	< 0.001	< 0.001	0.001	0.003	< 0.001	< 0.001	0.438	< 0.0001
Blank														
KAR1	0.1	< 0.05	< 0.01	0.01	< 0.001	0.0001	< 0.001	< 0.001	< 0.001	0.010	< 0.001	< 0.001	0.166	< 0.0001

Site	Total Boron	Total Iron	Total Selenium	Total Aluminium	Total Arsenic	Total Cadmium	Total Chromium	Total Copper	Total Lead	Total Manganese	Total Nickel	Total Silver	Total Zinc	Total Mercury
BAI1	< 0.1	2.51	< 0.01	1.38	< 0.001	< 0.0001	0.003	0.002	< 0.001	0.05	0.004	< 0.001	0.054	< 0.0001
BAI2	< 0.1	0.19	< 0.01	0.03	0.002	< 0.0001	< 0.001	< 0.001	< 0.001	0.247	< 0.001	< 0.001	0.021	< 0.0001
BAI4	< 0.1	2.29	< 0.01	1.92	< 0.001	< 0.0001	0.002	0.003	< 0.001	0.057	0.002	< 0.001	0.078	< 0.0001
BAI5	< 0.1	13.1	< 0.01	10	0.003	0.0003	0.011	0.011	0.005	0.272	0.018	< 0.001	0.12	< 0.0001
BAI6	< 0.1	10.8	< 0.01	7.18	0.005	< 0.0001	0.013	0.007	0.004	0.241	0.016	< 0.001	0.039	< 0.0001
BAI7	< 0.1	0.26	< 0.01	0.22	< 0.001	< 0.0001	< 0.001	< 0.001	< 0.001	0.018	< 0.001	< 0.001	0.005	< 0.0001
BAI8	< 0.1	0.18	< 0.01	0.16	< 0.001	0.0001	< 0.001	< 0.001	< 0.001	0.01	< 0.001	< 0.001	0.007	< 0.0001
JUH2	< 0.1	0.14	< 0.1	0.09	< 0.001	< 0.0001	< 0.001	< 0.001	< 0.001	0.012	< 0.001	< 0.001	0.038	< 0.0001
JUH3	< 0.1	0.06	0.01	0.02	< 0.001	< 0.0001	< 0.001	< 0.001	< 0.001	0.012	< 0.001	< 0.001	0.005	< 0.0001
JUH5	< 0.1	0.07	< 0.01	0.1	< 0.001	0.0001	< 0.001	< 0.001	< 0.001	0.002	< 0.001	< 0.001	0.041	< 0.0001
JUH6	< 0.1	0.16	< 0.01	0.12	< 0.001	0.0001	< 0.001	0.001	< 0.001	0.006	< 0.001	< 0.001	0.096	< 0.0001
JUH8	< 0.1	0.05	< 0.01	0.05	< 0.001	0.0003	< 0.001	< 0.001	< 0.001	0.006	< 0.001	< 0.001	0.026	< 0.0001
JUH8 - DUP	< 0.1	< 0.05	< 0.01	0.05	< 0.001	< 0.0001	< 0.001	< 0.001	< 0.001	0.006	< 0.001	< 0.001	0.076	< 0.0001
H17	< 0.1	0.13	< 0.01	0.07	< 0.001	< 0.0001	< 0.001	< 0.001	< 0.001	0.008	< 0.001	< 0.001	0.025	< 0.0001
H17 - DUP	< 0.1	0.12	< 0.01	0.10	< 0.001	< 0.0001	< 0.001	< 0.001	< 0.001	0.009	< 0.001	< 0.001	0.007	< 0.0001
H18	< 0.1	0.07	< 0.01	0.08	< 0.001	0.0001	< 0.001	< 0.001	< 0.001	0.002	< 0.001	< 0.001	0.014	< 0.0001
HEG1	< 0.1	5.02	< 0.01	4.76	0.003	< 0.0001	0.005	0.007	0.003	0.102	0.003	< 0.001	0.010	< 0.0001
HEG2	< 0.1	6.18	< 0.01	6.28	0.002	< 0.0001	0.005	0.010	0.004	0.124	0.004	< 0.001	0.103	< 0.0001
TAG6	< 0.1	0.24	< 0.01	0.22	< 0.001	< 0.0001	< 0.001	< 0.001	< 0.001	0.005	< 0.001	< 0.001	0.044	< 0.0001
TAG5	< 0.1	0.74	< 0.01	0.58	< 0.001	< 0.0001	< 0.001	0.002	< 0.001	0.031	< 0.001	< 0.001	0.010	< 0.0001
TAG4	< 0.1	1.66	< 0.01	1.55	0.001	0.0001	0.002	0.002	< 0.001	0.047	< 0.001	< 0.001	0.031	< 0.0001
TAG7	< 0.1	0.29	< 0.01	0.28	< 0.001	0.0001	0.001	< 0.001	< 0.001	0.010	< 0.001	< 0.001	0.058	< 0.0001
TAG1	< 0.1	2.85	< 0.01	2.38	0.002	0.0001	0.004	0.003	0.003	0.064	0.002	< 0.001	0.085	< 0.0001
TAG3	0.8	8.66	< 0.01	10.6	0.003	0.0002	0.014	0.010	0.007	0.161	0.006	< 0.001	0.133	< 0.0001
Blank	< 0.1	<0.05	< 0.01	< 0.01	< 0.001	0.0002	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.05	< 0.0001
Field Blank	< 0.1	<0.05	< 0.01	< 0.01	< 0.001	< 0.0001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.017	< 0.0001
Blank	< 0.1	< 0.05	< 0.01	< 0.01	< 0.001	0.0008	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.125	< 0.0001
KAR1	< 0.1	0.22	< 0.01	0.17	< 0.001	< 0.0001	< 0.001	< 0.001	< 0.001	0.015	< 0.001	< 0.001	0.090	< 0.0001

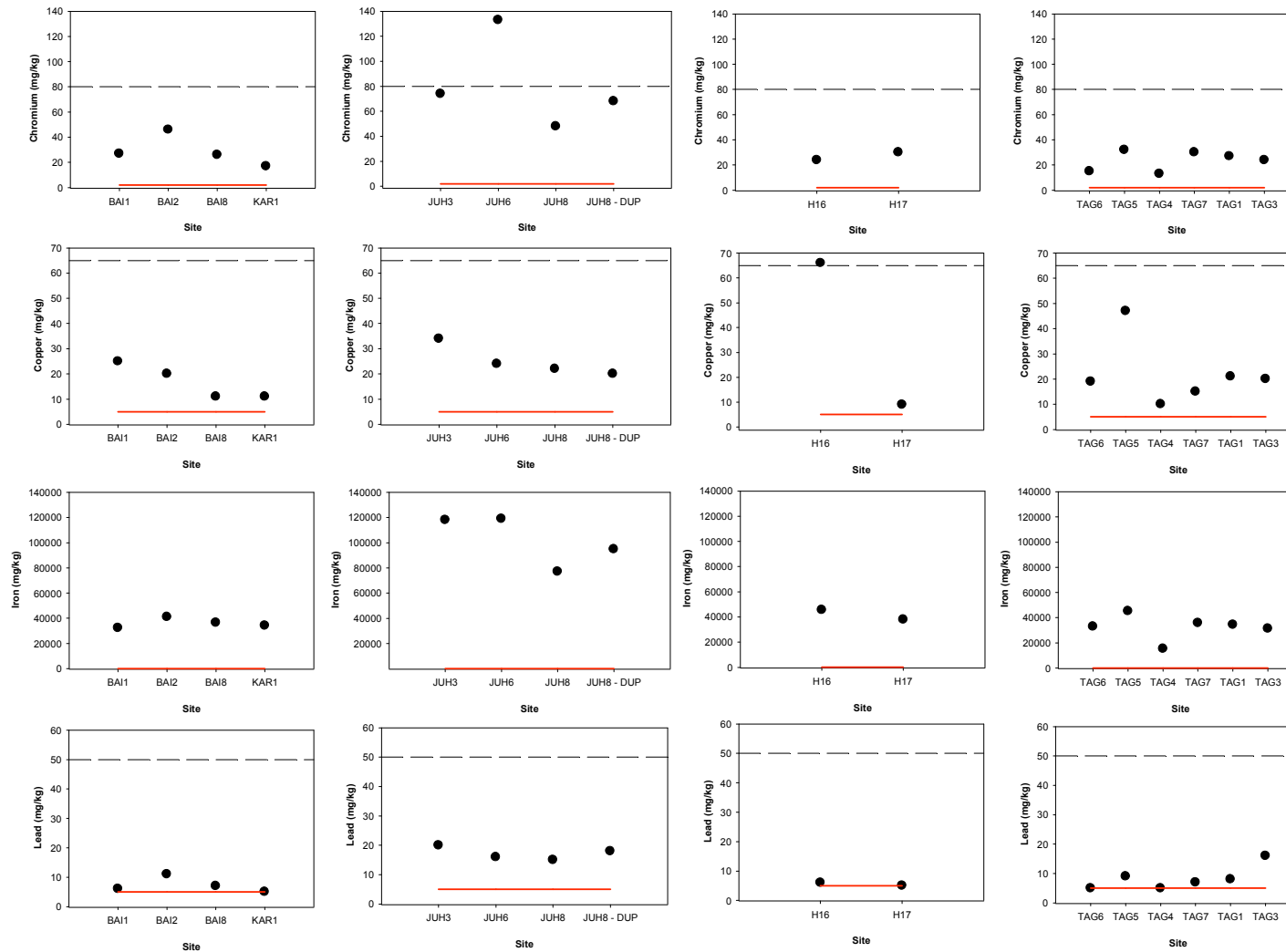
Appendix 5 Particle Size Distribution Results



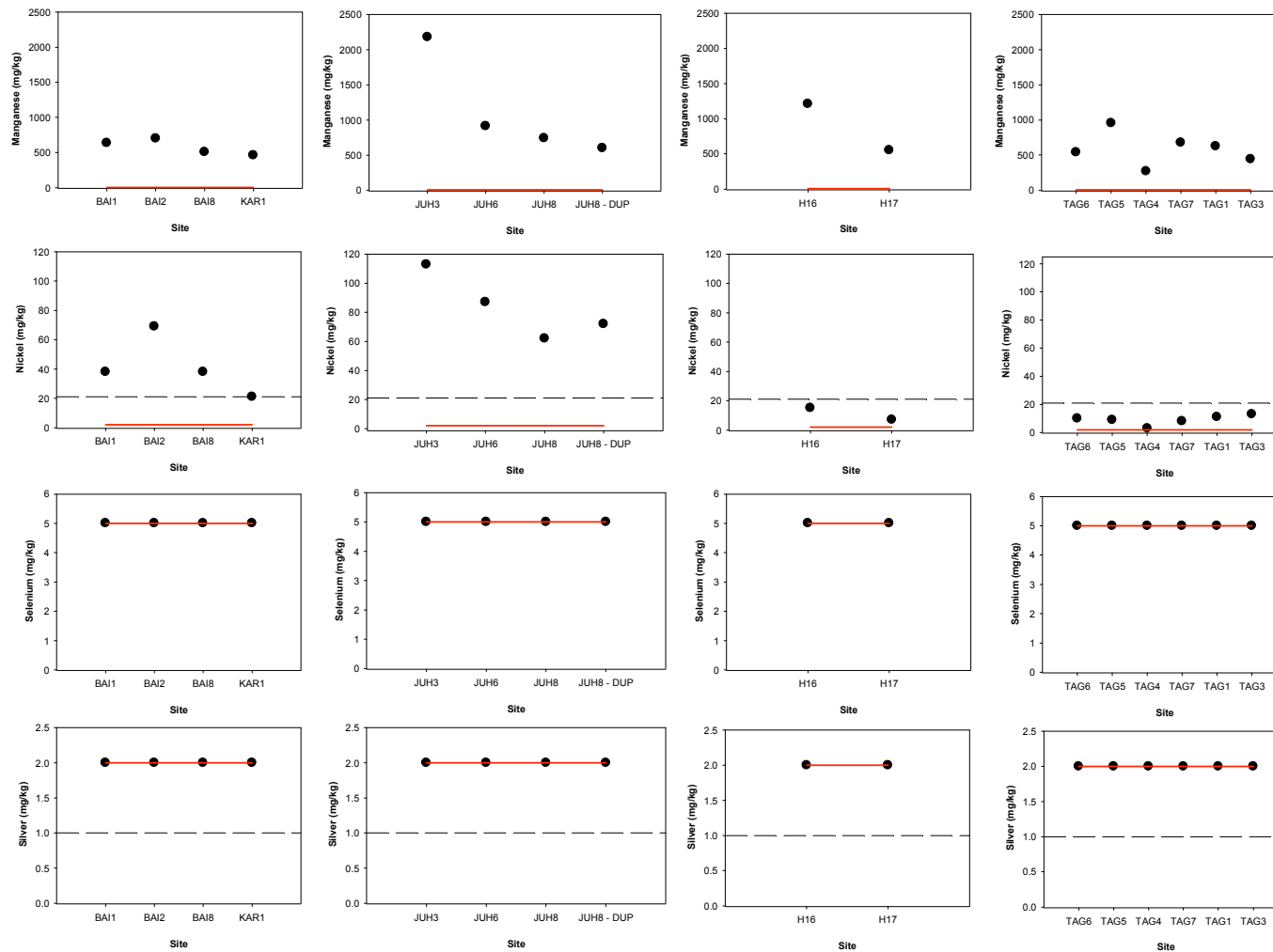
Appendix 6 Sediment Quality Results - Graphs



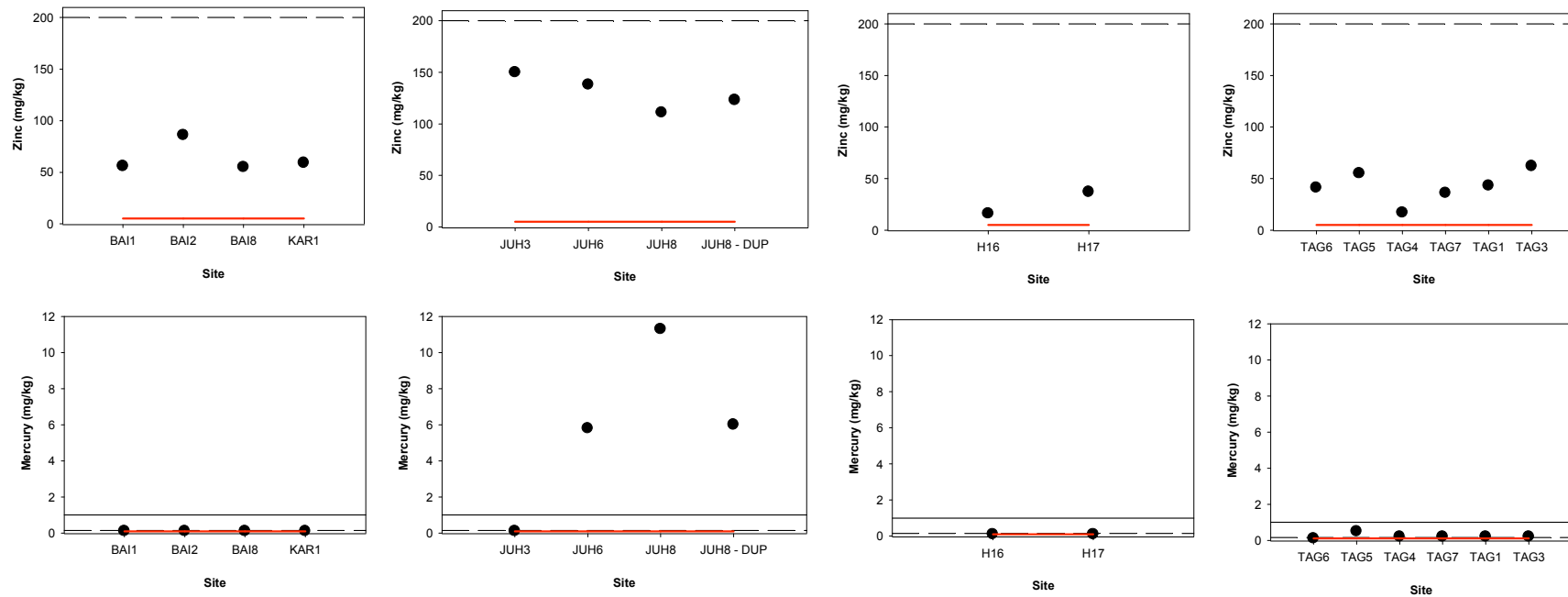
Note: Black dashed line is low level interim sediment quality guideline (trigger value) – ANZECC/ARMC ANZ (2000).



Note: Black dashed line is low level interim sediment quality guideline (trigger value) – ANZECC/ARMC ANZ (2000).



Note: Black dashed line is low level interim sediment quality guideline (trigger value) – ANZECC/ARMC ANZ (2000).



Note: Black dashed line is low level interim sediment quality guideline (trigger value) – ANZECC/ARMC ANZ (2000), black line is high level value. .

Appendix 7 Sediment Quality Results – Tables

Site	Al	Al LOR	As	As LOR	B	B LOR	Cd	Cd LOR	Cr	Cr LOR	Cu	Cu LOR	Fe	Fe LOR	Pb	Pb LOR
BAI1	17900	50	< 5	5	< 50	50	< 1	1	27	2	25	5	32400	50	6	5
BAI2	20600	50	< 10	5	< 50	50	< 1	1	46	2	20	5	41100	50	11	5
BAI8	16200	50	< 6	5	< 50	50	< 1	1	26	2	11	5	36500	50	7	5
JUH3	55100	50	< 63	5	< 50	50	< 1	1	74	2	34	5	118000	50	20	5
JUH6	61400	50	< 28	5	< 50	50	< 2	1	133	2	24	5	119000	50	16	5
JUH8	44700	50	< 35	5	< 50	50	< 1	1	48	2	22	5	77100	50	15	5
JUH8 - DUP	59600	50	< 25	5	< 50	50	< 2	1	68	2	20	5	94800	50	18	5
H16	16100	50	< 5	5	< 50	50	< 1	1	24	2	66	5	45500	50	6	5
H17	13600	50	< 5	5	< 50	50	< 1	1	30	2	9	5	38000	50	< 5	5
TAG6	20900	50	< 5	5	< 50	50	< 1	1	15	2	19	5	32900	50	5	5
TAG5	18000	50	< 5	5	< 50	50	< 1	1	32	2	47	5	45200	50	9	5
TAG4	5950	50	< 5	5	< 50	50	< 1	1	13	2	10	5	15400	50	< 5	5
TAG7	13100	50	< 7	5	< 50	50	< 1	1	30	2	15	5	35800	50	7	5
TAG1	20400	50	< 10	5	< 50	50	< 1	1	27	2	21	5	34500	50	8	5
TAG3	14600	50	< 18	5	< 50	50	< 1	1	24	2	20	5	31300	50	16	5
KAR1	7160	50	< 5	5	< 50	50	< 1	1	17	2	11	5	34200	50	< 5	5

Site	Mn	Mn LOR	Ni	Ni LOR	Se	Se LOR	Ag	Ag LOR	Zn	Zn LOR	Hg	Hg LOR	TOC	% Gravel	% Sand	% Silt	% Clay
BAI1	635	5	38	2	< 5	5	< 2	2	56	5	< 0.1	0.1	---	0	78	15	7
BAI2	701	5	69	2	< 5	5	< 2	2	86	5	< 0.1	0.1	---	0	8	68	24
BAI8	508	5	38	2	< 5	5	< 2	2	55	5	< 0.1	0.1	0.35	16	47	25	12
JUH3	2180	5	113	2	< 5	5	< 2	2	150	5	< 0.1	0.1	0.28	3	79	13	5
JUH6	913	5	87	2	< 5	5	< 2	2	138	5	< 5.8	0.1		8	71	18	3
JUH8	741	5	62	2	< 5	5	< 2	2	111	5	< 11.3	0.1		0	81	12	7
JUH8 - DUP	601	5	72	2	< 5	5	< 2	2	123	5	< 6.0	0.1		0	73	15	12
H16	1210	5	15	2	< 5	5	< 2	2	61	5	< 0.1	0.1		17	73	8	2
H17	551	5	7	2	< 5	5	< 2	2	37	5	< 0.1	0.1		21	72	5	2
TAG6	539	5	10	2	< 5	5	< 2	2	41	5	< 0.1	0.1		61	33	4	2
TAG5	954	5	9	2	< 5	5	< 2	2	55	5	< 0.5	0.1		62	28	5	5
TAG4	269	5	3	2	< 5	5	< 2	2	17	5	< 0.2	0.1		0	40	45	15
TAG7	678	5	8	2	< 5	5	< 2	2	36	5	< 0.2	0.1		4	72	12	12
TAG1	627	5	11	2	< 5	5	< 2	2	43	5	< 0.2	0.1		8	78	8	6
TAG3	443	5	13	2	< 5	5	< 2	2	62	5	< 0.2	0.1		0	69	16	15
KAR1	461	5	21	2	< 5	5	< 2	2	59	5	< 0.1	0.1		3	95	2	0