coffey environments
SPECIALISTS IN LIVING AND WORKING PLACES

24 October 2007

Tattersall Surveyors Pty Ltd
PO Box 54
RAYMOND TERRACE NSW 2324

Attention: Bob Lander

Dear Bob

RE: Myall Quays Detention Lake Sediment Sampling and Analysis

1 INTRODUCTION

1.1 General

The is letter presents the results of sediment sampling and analysis carried out by Coffey Environments Pty Ltd (Coffey Environments) from Myall Quays, Tea Garden as shown in **Figure 1**.

The work was commissioned by Mr Bob Lander of Tattersall Surveyors Pty Ltd to measure the levels of potential contaminants present in the Myall Quays.

1.2 Objectives and Scope of Work

The objectives of this investigation were to assess the lake sediments with regards to the potential for the lake to become a 'pollutant sink' resulting in the build up of nutrients and persistent chemical pollutants.

The scope of work included:

- Fieldwork including sediment sampling at selected locations on the lake floor;
- Laboratory analysis of a selected number of samples for heavy metals (Sb, As, Cd, Cr, Cu, Pb, Ni, Ag, Sn, Zn, Hg), total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene and xylenes (BTEX), Polynuclear aromatic hydrocarbons (PAH), organochlorine pesticides (OCP), polychlorinated biphenyls (PCB), total phosphorous, total oxidised nitrogen (NOx) and total kjeldahl nitrogen (TKN);
- Data assessment and reporting.

1.3 Regulatory Background and Applicable Guidelines

Sediments are important as both a source and as a sink of dissolved contaminants. As well as influencing surface water quality, sediments represent a source of bioavailable contaminants to benthic biota and hence potentially to the aquatic food chain.

For assessing contamination levels in the sediment the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000), Chapter 3.5 Sediment Quality Guidelines (the guidelines) were used.[1] The recommended guideline values are tabulated as interim sediment quality guideline (ISQG) values and are presented in **Tables LR1-LR4**. The ISQG are presented in a range. The low range trigger values have been adopted as warning levels and the high range trigger values have been adopted as the investigation levels (ILs). Due to the trace level detection limits required for silver, chlordane, dieldrin, endrin and lindane the warning levels were below the reporting limits of the laboratories.

2 FIELD WORK

2.1 Field Investigations

Field work was carried out on 5 October 2007. Twenty one sediment samples were collected at locations shown in **Figure 2**. Sediment sampling was conducted using Coffey's shallow bottom boat manned by a Coffey Environmental Scientist and a technician. Sixteen sediment samples were collected using a core sampler and disposable gloves. Sediment samples were placed into glass jars with Teflon lined lids as supplied by the laboratory and given a unique sample identification number.

2.2 Field Quality Assurance/Quality Control

Environmental sampling activities were generally based on procedures and protocols outlined in Coffey's Environmental standard operating procedures which is based on industry accepted standard practice.

The sampling equipment was decontaminated between sample locations to avoid cross contamination. A clean pair of disposable gloves was used when handling each sample.

One duplicate sample, identified as D1 (duplicate of S1) was tested by the primary laboratory as part of this investigation to assess whether the field sampling procedures provided adequately reproducible results. One triplicate sample, identified as TRIP1 (triplicate of S1) was tested by the secondary laboratory as part of this investigation to assess whether the primary laboratory procedures provided adequately reproducible results.

In addition to field quality control, the laboratory conducted internal quality control using laboratory duplicates, spikes and method blanks. The results are shown with laboratory report sheets in Appendix B. Analytical methods used for the laboratory testing are also indicated on the laboratory report sheets.

2.3 Laboratory Testing

Primary and duplicate sediment samples were dispatched to SGS Australia Pty Ltd (SGS). SGS forwarded sub samples to the National Measurement Institute for ultra trace level OCP/PCB analysis and the triplicate sediment sample was dispatched to Australian Laboratory Services Environmental (ALSE), both of which are a NATA registered laboratory for the analysis undertaken, under chain of custody conditions.

Selected soil samples collected from near the lake inlets were subjected to laboratory analysis, while other samples were held in the laboratory for further analysis, if required.

The analytical suite was selected based on the analytes tabulated in Chapter 3 of the guidelines.

2.4 Contamination Assessment Results

2.4.1 Quality Assurance/Quality Control

Samples were received by SGS, NM1 and ALSE within the recommended holding times and they were chilled when received. Copies of the Chain of Custody documentation are included in **Appendix A.** The samples were extracted within the required holding time. The percentage recovery results of laboratory control sample were acceptable for the analyses requested. The laboratory blank results were below the practical quantitation limit (PQL) for the analyses requested.

A field duplicate (D1) was also submitted for analysis. The relative percentage difference (RPD) of the results between the primary sample (S1) and field duplicate can give an indication of the robustness of the sampling technique and heterogeneity of contamination. RPD are presented in **Tables LR1-LR4** for analytical results greater than 5 times the level of reporting. There were no RPDs <50% which indicates that the contamination is homogeneous and sampling techniques were robust. Triplicate sample, TRIP1, had a concentration of 0.2 mg/kg where as the primary and duplicate sample were below the laboratory reporting limit. Based on the primary and secondary results the triplicate result has been rejected from the data set and judged to be a QA/QC failure on the secondary laboratory's behalf.

The analytical laboratories also conducted internal QA/QC sample analysis including method blanks, laboratory control samples and duplicates. A review of the internal laboratories QA/QC data were within each laboratories acceptance criteria.

Based on the above information the primary laboratory data is judged to be representative and usable for this investigation.

2.4.2 Comparison of Results with Investigation Levels

A summary of the laboratory results is presented in **Tables LR1-LR4**. The laboratory results and chain of custody documentation is presented in **Appendix A**.

Comparison of the laboratory results to the sediment investigation levels (IL) revealed TPH, BTEX, OCP and PCB were not detected above the laboratory reporting limit and thus the adopted ILs.

Heavy metals were not detected above the warning levels in the primary and duplicate samples analysed. .

There are no ILs established for total phosphorous or total nitrogen for this investigation. These results were compared to Sediment Properties of Urban Lakes and Ponds.[2] The total kjeldahl nitrogen concentrations were in the range of 36-690 mg/kg in the samples analysed. These are below typical range of 1,000-3,000 mg/kg. Total phosphorous concentrations were in the range 23-150 mg/kg in the samples analysed. These are below the typical range of 300-900mg/kg.

2.5 Summary and Conclusions

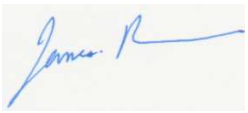
The sediment samples analysed from Myall Quay's Detention Lake show low heavy metals (Cr, Cu, Pb, Hg, Ni and Zn) concentrations which are below the adopted warning levels and may possibly be at background levels.

OCP and PCB were not detected above the laboratory reporting limits. PAH were detected in sample D1 (duplicate of S1) at concentrations below the warning levels for this investigation.

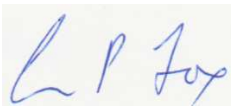
Nutrient concentrations (total nitrogen and total phosphorous) indicate they have not accumulated to levels typical of urban ponds and lakes.

Based on the above investigation it appears that the Myall Quays Detention Lake is not a “pollutant sink” to date. This report has established baseline comparison data for future development and monitoring of the sediments of the detention lake.

For and on behalf of Coffey Environments Pty Ltd



James McMahon
Group Leader Newcastle



Laurie Fox
Associate

Attachments: Import Information Regarding Your Coffey Environments Report
Figure 1
Figure 2
Table LR1
Table LR2
Table LR3
Table LR4
Laboratory Certificates

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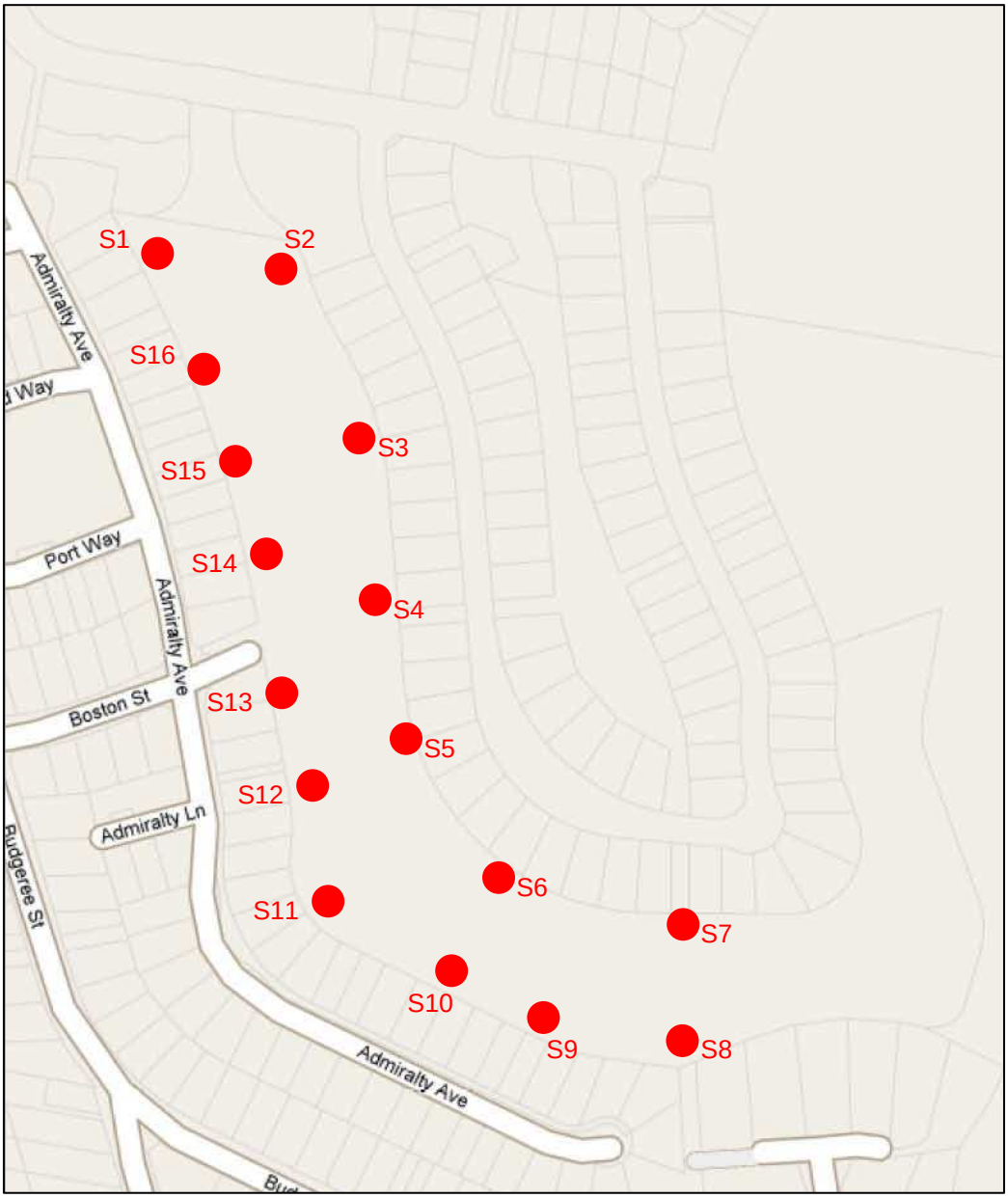
1 ‘Australian and New Zealand Guidelines for Fresh and Marine Water Quality’, Australian and New Zealand Environment and Conservation Council, 2000.

2 ‘Pond and Wetland Models, Description and Quality Assurances Report’, CRC for Freshwater Ecology, May 2001.

drawn	**NLS**	coffey environments SPECIALISTS IN LIVING AND WORKING PLACES	client:	**TATERSALL SURVEYORS PTY LTD**
approved	JAM		project:	**MYALL QUAYS DETENTION LAKE TEA GARDENS SEDIMENT SAMPLING AND ANALYSIS**
date	**25-10-07**		title:	**SITE LOCALITY PLAN**
scale	**NTS**		project no: **ENVIWARA00137AA**	figure no: **FIGURE 1**
original size	**A4**			



LEGEND

APPROXIMATE SAMPLING LOCATIONS

drawn	**NLS**	coffey environments SPECIALISTS IN LIVING AND WORKING PLACES	client:	**TATERSALL SURVEYORS PTY LTD**
approved	JAM		project:	**MYALL QUAYS DETENTION LAKE TEA GARDENS SEDIMENT SAMPLING AND ANALYSIS**
date	**25-10-07**		title:	**SAMPLING LOCATION PLAN**
scale	**NTS**		project no: **ENVIWARA00137AA**	figure no: **FIGURE 2**
original size	**A4**			

TABLE LR2- RESULTS OF CHEMICAL ANALYSES, SEDIMENT ASSESSMENT

Client:	**Tatersall Surveyors Pty Ltd**											
Project:	**Myall Quays**											
Location:	**Tea Gardens**											
		Polynuclear Aromatic Hydrocarbons µg/kg										
		Naphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Low Molecular Weight PAHs	Fluoranthene	Pyrene	Benz(a)anthracene	Chrysene
ISQG-Low		160	44	16	19	240	85	552	600	665	261	384
ISQG-High		2100	640	500	540	1500	1100	3160	5100	2600	1600	2800
SAMPLE IDENTIFICATION	DEPTH (m)											
S1	0.0-0.05	<10	<10	<10	<10	<10	<10	<50	<10	<10	<10	<10
S7	0.0-0.05	<10	<10	<10	<10	<10	<10	<50	<10	<10	<10	<10
S9	0.0-0.05	<10	<10	<10	<10	<10	<10	<50	<10	<10	<10	<10
S13	0.0-0.05	<10	<10	<10	<10	<10	<10	<50	<10	<10	<10	<10
D1	0.0-0.05	<10	<10	<10	<10	30	<10	<50	80	70	30	30
TRIP1	0.0-0.05	<500	<500	<500	<500	<500	<500	<500	<500	<500	<500	<500

<PQL	Results Below Practical Quantifiable Limit
--	Not Analysed
YELLOW SHADED	Results exceeds ISQG- Low Trigger Value
RED SHADED	Results exceeds ISQG- HighTrigger Value
BLUE SHADED	Laboratory LOR is greater than ISQG-Low trigger value and less than ISQG-High trigger Value
PURPLE SHADED	Laboratory LOR is greater than ISQG-High and results are not able to be interpretted

Criteria from the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000), Chapter 3.5 Sediment Quality Guidelines.

Benzo[a]pyrene	Dibenz[a.h]anthracene	High Molecular Weight PAHs
430	63	1700
1600	260	9600
<10	<10	<1000
<10	<10	<1000
<10	<10	<1000
<10	<10	<1000
80	30	<1000
<500	<500	<500

TABLE LR1- RESULTS OF CHEMICAL ANALYSES, SEDIMENT ASSESSMENT

Client:	**Tatersall Surveyors Pty Ltd**								
Project:	**Myall Quays**								
Location:	**Tea Gardens**								
		TPH				BTEX			
		C_6-C_9	C_{10}-C_{14}	C_{15}-C_{28}	C_{29}-C_{36}	Benzene	Toluene	Ethylbenzene	Xylenes
ISQG-Low		NE	NE	NE	NE	NE	NE	NE	NE
ISQG-High		NE	NE	NE	NE	NE	NE	NE	NE
SAMPLE IDENTIFICATION	DEPTH (m)								
S1	0.0-0.05	<20	<20	<50	<50	<0.5	<0.5	<0.5	<0.5
S7	0.0-0.05	<20	<20	<50	<50	<0.5	<0.5	<0.5	<0.5
S9	0.0-0.05	<20	<20	<50	<50	<0.5	<0.5	<0.5	<0.5
S13	0.0-0.05	<20	<20	<50	<50	<0.5	<0.5	<0.5	<0.5
D1	0.0-0.05	<20	<20	<50	<50	<0.5	<0.5	<0.5	<1.5
TRIP1	0.0-0.05	<50	<50	<100	<100	<0.2	<0.5	<0.5	<1.0

<PQL	Results Below Practical Quantifiable Limit
--	Not Analysed
YELLOW SHADED	Results exceeds ISQG- Low Trigger Value
RED SHADED	Results exceeds ISQG- HighTrigger Value
BLUE SHADED	Laboratory LOR is greater than ISQG-Low trigger value and less than ISQG-High trigger Value
PURPLE SHADED	Laboratory LOR is greater than ISQG-High and results are not able to be interpretted

Criteria from the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000), Chapter 3.5 Sediment Quality Guidelines.

TABLE LR3- RESULTS OF CHEMICAL ANALYSES, SEDIMENT ASSESSMENT

(concentrations in mg/kg for soil tests and mg/L for TCLP tests)

Client:	**Tatersall Surveyors Pty Ltd**								
Project:	**Myall Quays**								
Location:	**Tea Gardens**								
		Orgonochlorine pesticides/PCBs µg/kg							
		Total DDT	p,p'-DDE	o,p'-+p,p'-DDD	Chlordane	Dieldrin	Endrin	Lindane	Total PCBs
ISQG-Low		1.6	2.2	2	0.5	0.02	0.02	0.32	23
ISQG-High		46	70	20	6	8	8	1	-
SAMPLE IDENTIFICATION	DEPTH (m)								
S1	0.0-0.05	<1	<1	<2	<2	<1	<1	<1	<10
S7	0.0-0.05	<1	<1	<2	<2	<1	<1	<1	<10
S9	0.0-0.05	<1	<1	<2	<2	<1	<1	<1	<10
S13	0.0-0.05	<1	<1	<2	<2	<1	<1	<1	<10
D1	0.0-0.05	<1	<1	<2	<2	<1	<1	<1	<10
TRIP1	0.0-0.05	<50	<50	<50	<50	<50	<50	<50	<100

NOTES:

<PQL	Results Below Practical Quantifiable Limit
--	Not Analysed
YELLOW SHADED	Results exceeds ISQG- Low Trigger Value
RED SHADED	Results exceeds ISQG- HighTrigger Value
BLUE SHADED	Laboratory LOR is greater than ISQG-Low trigger value and less than ISQG-High trigger Value
PURPLE SHADED	Laboratory LOR is greater than ISQG-High and results are not able to be interpretted

CRITERIA:

Criteria from the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000), Chapter 3.5 Sediment Quality Guidelines.

TABLE LR4- RESULTS OF CHEMICAL ANALYSES, SEDIMENT ASSESSMENT

Client:	**Tatersall Surveyors Pty Ltd**
Project:	**Myall Quays**
Location:	**Tea Gardens**

		HEAVY METALS/Inorganics mg/kg											Inorganics mg/kg		
		Sb	As	Cd	Cr	Cu	Pb	Hg	Ni	Ag	Sn	Zn	TP	Nox	TKN
ISQG-Low		2	20	1.5	80	65	50	0.15	21	1	0.005	200	NE	NE	NE
ISQG-High		25	70	10	370	270	220	1	52	3.7	0.07	410	NE	NE	NE
SAMPLE IDENTIFICATION	DEPTH (m)														
S1	0.0-0.05	<3	<3	<0.1	4	1.3	4	<0.05	1.3	<2	<2	14	110	<1.25	320
S2	0.0-0.05	NT	NT	NT	NT	NT	NT	<0.05	NT	NT	NT	NT	NT	NT	NT
S3	0.0-0.05	NT	NT	NT	NT	NT	NT	<0.05	NT	NT	NT	NT	NT	NT	NT
S4	0.0-0.05	NT	NT	NT	NT	NT	NT	<0.05	NT	NT	NT	NT	NT	NT	NT
S5	0.0-0.05	NT	NT	NT	NT	NT	NT	<0.05	NT	NT	NT	NT	NT	NT	NT
S6	0.0-0.05	NT	NT	NT	NT	NT	NT	<0.05	NT	NT	NT	NT	NT	NT	NT
S7	0.0-0.05	<3	3	<0.1	8.4	2.5	4	<0.05	2.7	<2	<2	16	150	<1.25	140
S8	0.0-0.05	NT	NT	NT	NT	NT	NT	<0.05	NT	NT	NT	NT	NT	NT	NT
S9	0.0-0.05	<3	<3	<0.1	3.4	<0.5	2	0.11	1	<2	<2	3.1	23	<1.25	36
S10	0.0-0.05	NT	NT	NT	NT	NT	NT	<0.05	NT	NT	NT	NT	NT	NT	NT
S11	0.0-0.05	NT	NT	NT	NT	NT	NT	<0.05	NT	NT	NT	NT	NT	NT	NT
S12	0.0-0.05	NT	NT	NT	NT	NT	NT	<0.05	NT	NT	NT	NT	NT	NT	NT
S13	0.0-0.05	<3	<3	<0.1	2.4	0.7	2	<0.05	0.91	<2	<2	10	53	<1.25	77
S14	0.0-0.05	NT	NT	NT	NT	NT	NT	<0.05	NT	NT	NT	NT	NT	NT	NT
S15	0.0-0.05	NT	NT	NT	NT	NT	NT	<0.05	NT	NT	NT	NT	NT	NT	NT
S16	0.0-0.05	NT	NT	NT	NT	NT	NT	<0.05	NT	NT	NT	NT	NT	NT	NT
D1	0.0-0.05	<3	<3	<0.1	3.3	1.4	5	<0.05	1.1	<2	<2	15	77	<1.25	230
TRIP1	0.0-0.05	<5	<5	<1	5	<5	5	0.2	<2	<2	<2	20	76	<0.10	690
%RPD duplicate		NA	NA	NA	19%	7%	22%	NA	17%	NA	NA	7%	35%	NA	33%
%RPD triplicate		NA	NA	NA	22%	NA	22%	NA	NA	NA	NA	35%	37%	NA	73%

<PQL	Results Below Practical Quantifiable Limit
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PURPLE SHADED	Laboratory LOR is greater than ISQG-High and results are not able to be interpretted

Criteria from the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000), Chapter 3.5 Sediment Quality Guidelines.

24 October 2007 **TEST REPORT**

Coffey Environments Pty Ltd
Lot 101, 19 Warabrook Blvd
Warabrook
NSW 2304

Your Reference: ENVIWARA00137AA, (COC#11113)
Report Number: 55703

Attention: James McMahon

Dear James
The following samples were received from you on the date indicated.

Samples: Qty.	21 Soils, 2 Waters
Date of Receipt of Samples:	09/10/07
Date of Receipt of Instructions:	09/10/07
Date Preliminary Report Emailed:	17/10/07

These samples were analysed in accordance with your written instructions.
A copy of the instructions is attached with the analytical report.

The results and associated quality control are contained in the following pages of this report. Unless otherwise stated, solid samples are expressed on a dry weight basis (moisture has been supplied for your information only), air and liquid samples as received.

Should you have any queries regarding this report please contact the undersigned.

Yours faithfully
SGS ENVIRONMENTAL SERVICES

Ly Kim Ha
Senior Organic Chemist

Edward Ibrahim
Laboratory Services Manager

Alexandra Stenta
Key Account Representative

SGS Australia Pty Ltd
ABN 44 000 964 278
Environmental Services Unit 16, 33 Maddox Street, Alexandria Australia
t (02) 8594 0400 f (02) 8594 0499
www.au.sgs.com
Member of the SGS Group

BTEX in Soil Our Reference: Your Reference Sample Type Date Sampled	UNITS ---------- ----------	55703-1 S1 Soil 05/10/07	55703-7 S7 Soil 05/10/07	55703-9 S9 Soil 05/10/07	55703-13 S13 Soil 05/10/07	55703-17 D1 Soil 05/10/07
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
m-Xylene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
p- Xylene	mg/kg	<0.50	<0.50	<1.0	<0.50	<0.50
o- Xylene	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Total Xylenes	mg/kg	<1.5	<1.5	<1.5	<1.5	<1.5
BTEX Surrogate (%)	%	98	76	76	91	83

BTEX in Soil Our Reference: Your Reference Sample Type Date Sampled	UNITS ---------- ----------	55703-21 TRIPBLANK Soil 05/10/07	55703-22 TRIPSPIKE Soil 05/10/07
Benzene	mg/kg	<0.5	94%
Toluene	mg/kg	<0.5	98%
Ethylbenzene	mg/kg	<0.5	96%
m-Xylene	mg/kg	<0.5	96%
p- Xylene	mg/kg	<1.0	96%
o- Xylene	mg/kg	<0.50	97%
Total Xylenes	mg/kg	<1.5	97%
BTEX Surrogate (%)	%	122	105%

TRH in soil with..C6-C9 by P/T Our Reference: Your Reference Sample Type Date Sampled	UNITS ---------- ----------	55703-1 S1 Soil 05/10/07	55703-7 S7 Soil 05/10/07	55703-9 S9 Soil 05/10/07	55703-13 S13 Soil 05/10/07	55703-17 D1 Soil 05/10/07
TRH C_6 - C_9 P&T	mg/kg	<20	<20	<20	<20	<20
TRH C_{10} - C_{14}	mg/kg	<20	<20	<20	<20	<20
TRH C_{15} - C_{28}	mg/kg	<50	<50	<50	<50	<50
TRH C_{29} - C_{36}	mg/kg	<50	<50	<50	<50	<50

TRH in soil with..C6-C9 by P/T Our Reference: Your Reference Sample Type Date Sampled	UNITS ---------- ----------	55703-21 TRIPBLANK Soil 05/10/07
TRH C_6 - C_9 P&T	mg/kg	<20
TRH C_{10} - C_{14}	mg/kg	<20
TRH C_{15} - C_{28}	mg/kg	<50
TRH C_{29} - C_{36}	mg/kg	<50

PAHs in Soil Our Reference: Your Reference Sample Type Date Sampled	UNITS ---------- ----------	55703-1 S1 Soil 05/10/07	55703-7 S7 Soil 05/10/07	55703-9 S9 Soil 05/10/07	55703-13 S13 Soil 05/10/07	55703-17 D1 Soil 05/10/07
Acenaphthene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Acenaphthylene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
2-Methylnaphthanlene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Anthracene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Fluorene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Naphthalene	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Phenanthrene	mg/kg	<0.01	<0.01	<0.01	<0.01	0.03
Benzo[*b*,*k*]fluoranthene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo[*a*]anthracene	mg/kg	<0.01	<0.01	<0.01	<0.01	0.03
Benzo[*a*]pyrene	mg/kg	<0.01	<0.01	<0.01	<0.01	0.08
Dibenzo[*ah*]anthracene	mg/kg	<0.01	<0.01	<0.01	<0.01	0.01
Chrysene	mg/kg	<0.01	<0.01	<0.01	<0.01	0.03
Fluoranthene	mg/kg	<0.01	<0.01	<0.01	<0.01	0.08
Pyrene	mg/kg	0.01	0.01	<0.01	0.01	0.07
Benzo[*ghi*]perylene	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0
p -Terphenyl-*d14*	%	102	102	98	106	106

OC Pesticides in Soil Our Reference: Your Reference Sample Type Date Sampled	UNITS ---------- ----------	55703-1 S1 Soil 05/10/07	55703-7 S7 Soil 05/10/07	55703-9 S9 Soil 05/10/07	55703-13 S13 Soil 05/10/07	55703-17 D1 Soil 05/10/07
HCB	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
Heptachlor	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
Heptachlor Epoxide	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
Aldrin	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
gamma-BHC (Lindane)	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
alpha-BHC	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
beta-BHC	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
delta-BHC	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
trans-Chlordane	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
cis-Chlordane	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
Oxychlordane	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
Dieldrin	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
p,p-DDE	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
p,p-DDD	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
p,p-DDT	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
Endrin	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
Endrin Aldehyde	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
Endrin Ketone	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
alpha-Endosulfan	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
beta-Endosulfan	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
Endosulfan Sulphate	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
Methoxychlor	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001
Surrogate	%	78	67	81	82	87

PCBs in Soil Our Reference: Your Reference Sample Type Date Sampled	UNITS ---------- ----------	55703-1 S1 Soil 05/10/07	55703-7 S7 Soil 05/10/07	55703-9 S9 Soil 05/10/07	55703-13 S13 Soil 05/10/07	55703-17 D1 Soil 05/10/07
Arochlor 1016	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Arochlor 1221	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Arochlor 1232	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Arochlor 1242	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Arochlor 1248	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Arochlor 1254	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01
Arochlor 1260	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01

Metals in Soil by ICP-OES Our Reference: Your Reference Sample Type Date Sampled	UNITS ---------- ----------	55703-1 S1 Soil 05/10/07	55703-7 S7 Soil 05/10/07	55703-9 S9 Soil 05/10/07	55703-13 S13 Soil 05/10/07	55703-17 D1 Soil 05/10/07
Antimony	mg/kg	<3	<3	<3	<3	<3
Arsenic	mg/kg	<3	3	<3	<3	<3
Cadmium	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chromium	mg/kg	4.0	8.4	3.4	2.4	3.3
Copper	mg/kg	1.3	2.5	<0.5	0.7	1.4
Lead	mg/kg	4	4	2	2	5
Nickel	mg/kg	1.3	2.7	1.0	0.91	1.1
Silver	mg/kg	<2	<2	<2	<2	<2
Tin	mg/kg	<2	<2	<2	<2	<2
Zinc	mg/kg	14	16	3.1	10	15
Phosphorus (Total)	mg/kg	110	150	23	53	77

Mercury Cold Vapor/Hg Analyser Our Reference: Your Reference Sample Type Date Sampled	UNITS ---------- ----------	55703-1 S1 Soil 05/10/07	55703-7 S7 Soil 05/10/07	55703-9 S9 Soil 05/10/07	55703-13 S13 Soil 05/10/07	55703-17 D1 Soil 05/10/07
Mercury	mg/kg	<0.05	<0.05	0.11	<0.05	<0.05

Anions in soil Our Reference: Your Reference Sample Type Date Sampled	UNITS ---------- ----------	55703-1 S1 Soil 05/10/07	55703-7 S7 Soil 05/10/07	55703-9 S9 Soil 05/10/07	55703-13 S13 Soil 05/10/07	55703-17 D1 Soil 05/10/07
Nitrite as N 1:5 soil:water	mg/kg	<1	<1	<1	<1	<1
Nitrate as N 1:5 soil:water	mg/kg	<0.25	<0.25	<0.25	<0.25	<0.25

Inorganics Our Reference: Your Reference Sample Type Date Sampled	UNITS ---------- ----------	55703-1 S1 Soil 05/10/07	55703-7 S7 Soil 05/10/07	55703-9 S9 Soil 05/10/07	55703-13 S13 Soil 05/10/07	55703-17 D1 Soil 05/10/07
Total Kjeldahl Nitrogen *	mg/kg	320	140	36	77	230

Trace HM (ICP-MS)-Dissolved Our Reference: Your Reference Sample Type Date Sampled	UNITS ---------- ----------	55703-19 BACKGRO UND Water 05/10/07	55703-20 RINSATE Water 05/10/07
Antimony	µg/L	<1.0	1.8
Arsenic	µg/L	2.0	2.5
Cadmium	µg/L	<0.10	<0.10
Chromium	µg/L	1.3	1.4
Copper	µg/L	3.7	4.7
Lead	µg/L	<1.0	<1.0
Nickel	µg/L	<1.0	<1.0
Silver	µg/L	4.6	1.9
Zinc	µg/L	11	1.9

Metals in water by ICP-OES			
Our Reference:	UNITS	55703-19	55703-20
Your Reference	----------	BACKGROUND	RINSATE
Sample Type	----------	Water	Water
Date Sampled		05/10/07	05/10/07
Tin (Dissolved)	mg/L	<0.03	<0.03

Mercury Cold Vapor/Hg Analyser Our Reference: Your Reference Sample Type Date Sampled	UNITS ---------- ----------	55703-19 BACKGRO UND Water 05/10/07	55703-20 RINSATE Water 05/10/07
Mercury (Dissolved)	mg/L	<0.0005	<0.0005

Moisture Our Reference: Your Reference Sample Type Date Sampled	UNITS ---------- ----------	55703-1 S1 Soil 05/10/07	55703-7 S7 Soil 05/10/07	55703-9 S9 Soil 05/10/07	55703-13 S13 Soil 05/10/07	55703-17 D1 Soil 05/10/07
Moisture	%	26	41	24	25	28

Moisture Our Reference: Your Reference Sample Type Date Sampled	UNITS ---------- ----------	55703-21 TRIPBLANK Soil 05/10/07
Moisture	%	<1

Method ID	Methodology Summary
SEO-018	BTEX - Determination by purge and trap/ Gas Chromatography with MS Detection.
SEO-017	BTEX/TRH C6-C9 - Determination by Purge and Trap Gas Chromatography with Flame Ionisation Detection (FID) and Photo Ionisation Detection (PID). The surrogate spike used is aaa-trifluorotoluene.
SEO-020	TRH - Determination of Total Recoverable Hydrocarbons by gas chromatography following extraction with DCM/Acetone for solids and DCM for liquids.
Ext-003	Analysis subcontracted to SGS Environmental Perth.
SEO-030	PAHs by GC/MS - Determination of Polynuclear Aromatic Hydrocarbons (PAH's) by Gas Chromatography / Mass Spectrometry following extraction with dichloromethane or dichloromethane/acetone. The surrogate spike used is p-Terphenyl-d14.
Ext-048	Subcontracted analysis to Analytical National Measurement Institute, NSW.
SEO-005	OC/OP/PCB - Determination of a suite of Organchlorine Pesticides, Chlorinated Organo-phosphorus Pesticides and Polychlorinated Biphenyls (PCB's) by sonication extraction using dichloromethane for waters or acetone / hexane for soils followed by Gas Chromatographic separation with Electron Capture Detection (GC/ECD). The surrogate spike used is 2,4,5,6-Tetrachloro-m-xylene.
SEM-010	Metals - Determination of various metals by ICP-AES following aqua regia digest.
SEM-005	Mercury - Determination of Mercury by Cold Vapour Generation Atomic Absorption Spectroscopy.
SEI-038	Anions - a range of Anions are determined by Ion Chromatography, in accordance with APHA 20th ED, 4110-B.
Ext-043	Subcontracted to LabPoint. Nata Accreditation No: 11111
AN318	Determination of elements at trace levels in waters by ICP-MS. Method based on USEPA 6020A
AN320	Metals - Determination of various metals by ICP-OES at trace levels following aqua regia digest.
AN002	Preparation of soils, sediments and sludges undergo analysis by either air drying, compositing, subsampling and 1:5 soil water extraction where required. Moisture content is determined by drying the sample at 105 ± 5°C.

QUALITY CONTROL BTEX in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
Benzene	mg/kg	0.5	SEO-018	<0.5	[NT]	[NT]	LCS	87 || [N/T]
Toluene	mg/kg	0.5	SEO-018	<0.5	[NT]	[NT]	LCS	89 || [N/T]
Ethylbenzene	mg/kg	0.5	SEO-018	<0.5	[NT]	[NT]	LCS	88 || [N/T]
m-Xylene	mg/kg	0.5	SEO-018	<0.5	[NT]	[NT]	LCS	90 || [N/T]
p- Xylene	mg/kg	0.5	SEO-018	<0.50	[NT]	[NT]	LCS	90 || [N/T]
o- Xylene	mg/kg	0.5	SEO-018	<0.50	[NT]	[NT]	LCS	92 || [N/T]
Total Xylenes	mg/kg	1.5	SEO-018	<1.5	[NT]	[NT]	LCS	91 || [N/T]
BTEX Surrogate (%)	%	0	SEO-018	105	[NT]	[NT]	LCS	112 || [N/T]
QUALITY CONTROL TRH in soil with..C6-C9 by P/T	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
TRH C_6 - C_9 P&T	mg/kg	20	SEO-017	<20	[NT]	[NT]	LCS	98 || [N/T]
TRH C_{10} - C_{14}	mg/kg	20	SEO-020	<20	[NT]	[NT]	LCS	100 || [N/T]
TRH C_{15} - C_{28}	mg/kg	50	SEO-020	<50	[NT]	[NT]	LCS	95 || [N/T]
TRH C_{29} - C_{36}	mg/kg	50	SEO-020	<50	[NT]	[NT]	LCS	106 || [N/T]
QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
Acenaphthene	mg/kg	0.01	Ext-003	<0.01	55703-1	<0.01 || <0.01	[NR]	[NR]
Acenaphthylene	mg/kg	0.01	SEO-030	<0.01	55703-1	<0.01 || <0.01	[NR]	[NR]
2-Methylnaphthanlene	mg/kg	0.01	SEO-030	<0.01	55703-1	<0.01 || <0.01	[NR]	[NR]
Anthracene	mg/kg	0.01	SEO-030	<0.01	55703-1	<0.01 || <0.01	[NR]	[NR]
Fluorene	mg/kg	0.01	SEO-030	<0.01	55703-1	<0.01 || <0.01	55703-1	101 || 91 || RPD: 10
Naphthalene	mg/kg	0.01	SEO-030	<0.01	55703-1	<0.01 || <0.01	55703-1	90 || 80 || RPD: 12
Phenanthrene	mg/kg	0.01	SEO-030	<0.01	55703-1	<0.01 || <0.01	55703-1	97 || 104 || RPD: 7
Benzo[*b,k*]fluoranthene	mg/kg	0.5	Ext-003	[NT]	55703-1	<0.5 || <0.5	[NR]	[NR]
Benzo[*a*]anthracene	mg/kg	0.01	SEO-030	<0.01	55703-1	<0.01 || 0.01	55703-1	93 || 109 || RPD: 16
Benzo[*a*]pyrene	mg/kg	0.01	SEO-030	<0.01	55703-1	<0.01 || 0.02	55703-1	113 || 132 || RPD: 16
Dibenzo[*ah*]anthracene	mg/kg	0.01	SEO-030	<0.01	55703-1	<0.01 || <0.01	55703-1	111 || 106 || RPD: 5
Chrysene	mg/kg	0.01	SEO-030	<0.01	55703-1	<0.01 || <0.01	[NR]	[NR]
Fluoranthene	mg/kg	0.01	SEO-030	<0.01	55703-1	<0.01 || 0.02	[NR]	[NR]
Pyrene	mg/kg	0.01	SEO-030	<0.01	55703-1	0.01 || 0.02 || RPD: 67	55703-1	102 || 126 || RPD: 21
Benzo[*ghi*]perylene	mg/kg	1	Ext-003	[NT]	55703-1	<1.0 || <1.0	[NR]	[NR]
p -Terphenyl-*d* 14	%	0	SEO-030	108	55703-1	102 || 102 || RPD: 0	55703-1	108 || 106 || RPD: 2

QUALITY CONTROL OC Pesticides in Soil	UNITS	PQL	METHOD	Blank
HCB	mg/kg	0.001	Ext-048	<0.001
Heptachlor	mg/kg	0.001	SEO-005	<0.001
Heptachlor Epoxide	mg/kg	0.001	SEO-005	<0.001
Aldrin	mg/kg	0.001	SEO-005	<0.001
gamma-BHC (Lindane)	mg/kg	0.001	SEO-005	<0.001
alpha-BHC	mg/kg	0.001	SEO-005	<0.001
beta-BHC	mg/kg	0.001	SEO-005	<0.001
delta-BHC	mg/kg	0.001	SEO-005	<0.001
trans-Chlordane	mg/kg	0.001	SEO-005	<0.001
cis-Chlordane	mg/kg	0.001	SEO-005	<0.001
Oxychlordane	mg/kg	0.001	SEO-005	<0.001
Dieldrin	mg/kg	0.001	SEO-005	<0.001
p,p-DDE	mg/kg	0.001	SEO-005	<0.001
p,p-DDD	mg/kg	0.001	SEO-005	<0.001
p,p-DDT	mg/kg	0.001	SEO-005	<0.001
Endrin	mg/kg	0.001	SEO-005	<0.001
Endrin Aldehyde	mg/kg	0.001	SEO-005	<0.001
Endrin Ketone	mg/kg	0.001	SEO-005	<0.001
alpha-Endosulfan	mg/kg	0.001	SEO-005	<0.001
beta-Endosulfan	mg/kg	0.001	SEO-005	<0.001
Endosulfan Sulphate	mg/kg	0.001	SEO-005	<0.001
Methoxychlor	mg/kg	0.001	SEO-005	<0.001
Surrogate	%	0	SEO-005	[NT]

QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank
Arochlor 1016	mg/kg	0.01	SEO-005	<0.01
Arochlor 1221	mg/kg	0.01	SEO-005	<0.01
Arochlor 1232	mg/kg	0.01	SEO-005	<0.01
Arochlor 1242	mg/kg	0.01	SEO-005	<0.01
Arochlor 1248	mg/kg	0.01	SEO-005	<0.01
Arochlor 1254	mg/kg	0.01	SEO-005	<0.01
Arochlor 1260	mg/kg	0.01	SEO-005	<0.01

QUALITY CONTROL Metals in Soil by ICP-OES	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
Antimony	mg/kg	3	SEM-010	<3	[NT]	[NT]	LCS	109 || [N/T]
Arsenic	mg/kg	3	SEM-010	<3	[NT]	[NT]	LCS	104 || [N/T]
Cadmium	mg/kg	0.1	SEM-010	<0.1	[NT]	[NT]	LCS	109 || [N/T]
Chromium	mg/kg	0.3	SEM-010	<0.3	[NT]	[NT]	LCS	103 || [N/T]
Copper	mg/kg	0.5	SEM-010	<0.5	[NT]	[NT]	LCS	107 || [N/T]
Lead	mg/kg	1	SEM-010	<1	[NT]	[NT]	LCS	106 || [N/T]
Nickel	mg/kg	0.5	SEM-010	<0.5	[NT]	[NT]	LCS	107 || [N/T]
Silver	mg/kg	2	SEM-010	<2	[NT]	[NT]	LCS	118 || [N/T]
Tin	mg/kg	2	SEM-010	<2	[NT]	[NT]	LCS	103 || [N/T]
Zinc	mg/kg	0.3	SEM-010	<0.3	[NT]	[NT]	LCS	107 || [N/T]
Phosphorus (Total)	mg/kg	0.1	SEM-010	<0.10	[NT]	[NT]	LCS	100 || [N/T]

QUALITY CONTROL Mercury Cold Vapor/Hg Analyser	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
Mercury	mg/kg	0.05	SEM-005	<0.05	[NT]	[NT]	LCS	77 || [N/T]

QUALITY CONTROL Anions in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
Nitrite as N 1:5 soil:water	mg/kg	1	SEI-038	<1	55703-1	<1 || <1	LCS	102 || [N/T]
Nitrate as N 1:5 soil:water	mg/kg	0.25	SEI-038	<0.25	55703-1	<0.25 || <0.25	LCS	104 || [N/T]

QUALITY CONTROL Inorganics	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
Total Kjeldahl Nitrogen *	mg/kg	1.0	Ext-043	<1.0	55703-1	320 || [N/T]	55703-1	90 || [N/T]

QUALITY CONTROL Trace HM (ICP-MS)-Dissolved	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
Antimony	µg/L	1	AN318	<1.0	[NT]	[NT]	LCS	125 || [N/T]
Arsenic	µg/L	1	AN318	<1.0	[NT]	[NT]	LCS	100 || [N/T]

QUALITY CONTROL **Trace HM (ICP-MS)-Dissolved**	**UNITS**	**PQL**	**METHOD**	**Blank**	**Duplicate Sm#**	**Duplicate** **Base + Duplicate + %RPD**	**Spike Sm#**	**Matrix Spike % Recovery** **Duplicate + %RPD**
Cadmium	µg/L	0.1	AN318	<0.10	[NT]	[NT]	LCS	101 || [N/T]
Chromium	µg/L	1	AN318	<1.0	[NT]	[NT]	LCS	102 || [N/T]
Copper	µg/L	1	AN318	<1.0	[NT]	[NT]	LCS	106 || [N/T]
Lead	µg/L	1	AN318	<1.0	[NT]	[NT]	LCS	99 || [N/T]
Nickel	µg/L	1	AN318	<1.0	[NT]	[NT]	LCS	96 || [N/T]
Silver	µg/L	1	AN320	<1.0	[NT]	[NT]	LCS	90 || [N/T]
Zinc	µg/L	1	AN318	<1.0	[NT]	[NT]	LCS	102 || [N/T]
QUALITY CONTROL Metals in water by ICP-OES	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
Tin (Dissolved)	mg/L	0.03	SEM-010	<0.03	[NT]	[NT]	LCS	97 || [N/T]
QUALITY CONTROL Mercury Cold Vapor/Hg Analyser	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
Mercury (Dissolved)	mg/L	0.0005	SEM-005	<0.0005	[NT]	[NT]	LCS	97 || [N/T]

QUALITY CONTROL Hold sample-**NO test** required	UNITS	PQL	METHOD	Blank
Sample on HOLD				[NT]
QUALITY CONTROL Moisture	UNITS	PQL	METHOD	Blank
Moisture	%	1	AN002	<1

QUALITY CONTROL Inorganics	UNITS	Dup. Sm#	Duplicate Base + Duplicate + %RPD
Total Kjeldahl Nitrogen *	mg/kg	55703-17	230 || 220 || RPD: 4

Result Codes

[INS]	:	Insufficient Sample for this test	[HBG]	:	Results not Reported due to High Background Interference
[NR]	:	Not Requested	*	:	Not part of NATA Accreditation
[NT]	:	Not tested	[N/A]	:	Not Applicable

Result Comments

PAH in Soil was analysed by SGS Perth with Report No 13739.

OC/ PCB in Soil were analysed by NMI with Report No SGSA01/071010.

Date Organics extraction commenced: 10/10/07
NATA Corporate Accreditation No. 2562, Site No 4354
Note: Test results are not corrected for recovery (excluding Dioxins/Furans* and PAH in XAD and PUF).

Quality Control Protocol

Reagent Blank: Sample free reagents carried through the preparation/extraction/digestion procedure and analysed at the beginning of every sample batch analysis. For larger projects, a reagent blank is prepared and analysed with every 20 samples.
Duplicate: A separate portion of a sample being analysed which is treated the same as the other samples in the batch. A duplicate is prepared at least every 10 samples.
Matrix Spike Duplicates: Sample replicates spiked with identical concentrations of target analyte(s). The spiking occurs during the sample preparation and prior to the extraction/digestion procedure. They are used to document the precision and bias of a method in a given sample matrix. Where there is not enough sample available to prepare a spiked sample, another known soil/sand or water (or Milli-Q water) may be used. A duplicate spiked sample is prepared at least every 20 samples.
Surrogate Spike: Added to all samples requiring analysis for organics (where relevant) prior to extraction. Used to determine the extraction efficiency. They are organic compounds which are similar to the target analyte(s) in chemical composition and behaviour in the analytical process, but which are not normally found in environmental samples.
Internal Standard: Added to all samples requiring analysis for organics (where relevant) after the extraction process; the compounds serve to give a standard of retention time and response, which is invariant from run-to-run with the instruments.
Control Standards: Prepared from a source independent of the calibration standards. At least one control standard is included in each run to confirm calibration validity.
Additional QC Samples: A calibration standard and blank are run after every 20 samples of an instrumental analysis run to assess analytical drift.

S151-52 WL25

coffey

Chain of Custody

No: 11113

Laboratory Quotation / Order No: S184-89JJT Job No: ENVIWARA00137AA Sheet 1 of 2

Dispatch to: (Address & Phone No.) SGS Laboratories 16/33 Maddox St Alexandria	Sampled by: Jonathan Tonk	Consigning Officer: / Date Dispatched:
Attention: Login	Project Manager: (report results to) James McMahon.	Courier Service: TNT. / Consignment Note No:

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
			Emily Lin	9/10	3.30

Comments	Sample Matrix	Container Type and Preservative	Sample No.	Date Sampled	PAHs	TPHs	BTEX	Metals: *	OC/PCB	Nutrients	Sample Condition on Receipt
1	Soil	Soil jars	S1	5/10/07	X	X	X	X	X	X	
2			S2		HOLD						
3			S3		HOLD						
4			S4		HOLD						
5			S5		HOLD						
6			S6		HOLD						
7			S7		X	X	X	X	X	X	
8			S8		HOLD						
9			S9		X	X	X	X	X	X	
10			S10		HOLD						
11			S11		HOLD						
12			S12		HOLD						
13			S13		X	X	X	X	X	X	
14			S14		HOLD						
15			S15		HOLD						
16			S16		HOLD						
17			D1		X	X	X	X	X	X	

SGS
Received 9.10.07
By
Time 9.10 am/pm
Samples Intact Yes/no
Ice/Cooler Pack Yes/no
Comments ESDAT

Special Laboratory Instructions: ALL ANALYSIS to be conducted by ANZECC sediment guidelines detection limit
*Heavy Metals Sb, Cd, Cr, Cu, Pb, Hg, Ni, Ag, Zn, As, Sn
Nutrients = Total Phosphorous, TKN, Nitrate, Nitrite

Detection Limits:

Turnaround Required:

JOB NUMBER MUST BE REFERENCED ON ALL SUBSEQUENT PAGES

Copies: WHITE: Sign on release. YELLOW: If dispatched to interstate Lab, Lab to sign on receipt and fax back to Coffey. BLUE: To be returned with results.

6422015-06

coffey

Chain of Custody

No: 11114

Laboratory Quotation / Order No: S18489 SJT. Job No: ENVIWARA00137AA Sheet 2 of 2.

Dispatch to: (Address & Phone No.) SGS Labs	Sampled by: Jonathan Tonks	Consigning Officer: Date Dispatched:
Attention: Login	Project Manager: (report results to) James McMahon.	Courier Service: Consignment Note No:

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
			[signature]	9/10	3.30

Comments	Sample Matrix	Container Type and Preservative	Sample No.	Date Sampled	PAHs	TPHs	~~MAHs~~ BTEX	Metals:	OCP/PCB	Nutrients									Sample Condition on Receipt
18	Soil	Soil jars	TRIP1	5/10/07	X	X	X	X	+	X		FORWARD TO ALS.							
19	Water	Metals bottle	BACKGROUND	↓				X											
20	Water	Metals bottle	RINSATE	↓				X											
21 Soil	Water	~~SS~~ Vial	TRIP BLANK	↓	-	X	X												
22 Soil	Water	Vial	TRIPSPIKE	↓			X												
23	Soil	Soil jar	D2.	↓	HOLD														

Special Laboratory Instructions: ALL ANALYSIS to be conducted by ANZECC GUIDELINES (sediment), detection limit
*Heavy metals Sb, Cd, Cr, Cu, Pb, Hg, Ni, Ag, Zn, As, Sn. Nutrients = Total Phosphorus, TKN, Nitrate, Nitrite

Detection Limits:

Turnaround Required:

JOB NUMBER **MUST** BE REFERENCED ON ALL SUBSEQUENT PAGES

Copies: WHITE: Sign on release. YELLOW: If dispatched to interstate Lab, Lab to sign on receipt and fax back to Coffey. BLUE: To be returned with results.

64220/9-06

coffey environments

PURCHASE ORDER

S 18489 JJT

Coffey Environments Pty Ltd ABN 45 090 522 759

DATE 9/10/07

TO SGS Laboratories
16/33 Maddox St.
Alexandria NSW 2015

SHIP TO 19 Warabrook Boulevard
Warabrook NSW 2304

JOB NAME	PROJECT MANAGER	JOB #	TASK #
Myall Keys	James McMahon	~~S18489 JJT~~ ENVIWARA00137AA	Sampling.

QTY. ORDERED	STOCK NO. / DESCRIPTION	UNIT PRICE	TOTAL

This purchase order is issued in accordance with the Terms & Conditions as listed overleaf.

J Tonkin
P. O. ORIGINATOR

APPROVED BY

PLEASE QUOTE PURCHASE ORDER NO. ON ALL INVOICES

GOWANS & SON PRINTERS (02) 9755 3545

AU.SampleReceipt.Sydney (Sydney)

From: Jonathan Tonks [Jonathan_Tonks@coffey.com]
Sent: Tuesday, 9 October 2007 3:29 PM
To: AU.SampleReceipt.Sydney (Sydney)
Subject: Attention Alex/Angelica
Importance: High
Attachments: 1285_001.pdf

In regard to the fax regarding the samples which arrived without a COC (ENVIRHOD00137AA) there were a couple of things I forgot to mention. The trip blank and spike are soil, not water as per the COC. Also, as we were late back, the samples went into the fridge and we forgot to put the trip blank and spike back in. They will be arriving tomorrow morning with the original paperwork; could you please test that as the same job please?

Thanks again

JONATHAN TONKS
Environmental Scientist

Coffey Environments Pty Ltd
19 Warabrook Boulevard Warabrook NSW 2304 Australia
T (+61) (2) 4016 2300 F (+61) (2) 4016 2380 M 0420 960 040

www.coffey.com

From: COFFEY GEOTECHNICS P/L [mailto:Wara_Scan@coffey.com.au]
Sent: Tuesday, 9 October 2007 2:38 PM
To: Jonathan Tonks
Subject: Attached Image

ALS Environmental

CERTIFICATE OF ANALYSIS

Client	: **COFFEY ENVIRONMENTS PTY LTD**	*Laboratory*	: **Environmental Division Sydney**	*Page*	: **1 of 6**
Contact	: **MR JAMES MCMAHON**	*Contact*	: **Victor Kedicioglu**	*Work Order*	: **ES0714015**
Address	: **19 WARABRROK BOULEVARD WARABROOK NSW AUSTRALIA 2304**	*Address*	: **277-289 Woodpark Road Smithfield NSW Australia 2164**		
E-mail	: **james_mcmahon@coffey.com**	*E-mail*	: **Victor.Kedicioglu@alsenviro.com**		
Telephone	: **4016 2300**	*Telephone*	: **+61-2-8784 8555**		
Facsimile	: **4016 2380**	*Facsimile*	: **+61-2-8784 8500**		
Project	: **ENVIWARA00137AA**	*Quote number*	: **EN/007/07**	*Date received*	: **10 Oct 2007**
Order number	: **S18489**			*Date issued*	: **18 Oct 2007**
C-O-C number	: **11114**			*No. of samples*	- *Received* : **1**
Site	: **- Not provided -**				*Analysed* : **1**

ALSE - Excellence in Analytical Testing

NATA Accredited Laboratory 825

This document is issued in accordance with NATA's accreditation requirements.

Accredited for compliance with ISO/IEC 17025.

This document has been electronically signed by those names that appear on this report and are the authorised signatories. Electronic signing has been carried out in compliance with procedures specified in 21 CFR Part 11.

Signatory	*Position*	*Department*
Ankit Joshi	**Inorganic Chemist**	**Inorganics - NATA 825 (10911 - Sydney)**
Celine Conceicao	**Spectroscopist**	**Inorganics - NATA 825 (10911 - Sydney)**
Hoa Nguyen		**Inorganics - NATA 825 (10911 - Sydney)**
PHALAK INTHAKESONE	**Organics Co-ordinator**	**Inorganics - NATA 825 (10911 - Sydney)**
PHALAK INTHAKESONE	**Organics Co-ordinator**	**Organics - NATA 825 (10911 - Sydney)**

ALS Environmental

Comments

This report for the ALSE reference ES0714015 supersedes any previous reports with this reference. Results apply to the sample as submitted. All pages of this report have been checked and approved for release.

This report contains the following information:

- **Analytical Results for Samples Submitted**
- **Surrogate Recovery Data**

The analytical procedures used by ALS Environmental have been developed from established internationally-recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported herein. Reference methods from which ALSE methods are based are provided in parenthesis.

When moisture determination has been performed, results are reported on a dry weight basis. When a reported 'less than' result is higher than the LOR, this may be due to primary sample extracts/digestion dilution and/or insuffient sample amount for analysis. Surrogate Recovery Limits are static and based on USEPA SW846 or ALS-QWI/EN38 (in the absence of specified USEPA limits). Where LOR of reported result differ from standard LOR, this may be due to high moisture, reduced sample amount or matrix interference. When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes. Abbreviations: CAS number = Chemical Abstract Services number, LOR = Limit of Reporting. * Indicates failed Surrogate Recoveries.

ALS Environmental

Analytical Results

				Client Sample ID :	TRIP1				
				Sample Matrix Type / Description :	SOIL				
				Sample Date / Time :	5 Oct 2007 15:00				
				Laboratory Sample ID :	ES0714015-001				
Analyte	**CAS number**	**LOR**	**Units**						
EA055: Moisture Content									
Moisture Content (dried @ 103°C)		1.0	%		33.4				
EG005T: Total Metals by ICP-AES									
Antimony	7440-36-0	5	mg/kg		<5				
Arsenic	7440-38-2	5	mg/kg		<5				
Cadmium	7440-43-9	1	mg/kg		<1				
Chromium	7440-47-3	2	mg/kg		5				
Copper	7440-50-8	5	mg/kg		<5				
Lead	7439-92-1	5	mg/kg		5				
Nickel	7440-02-0	2	mg/kg		<2				
Silver	7440-22-4	2	mg/kg		<2				
Tin	7440-31-5	5	mg/kg		<5				
Zinc	7440-66-6	5	mg/kg		20				
EG035T: Total Mercury by FIMS									
Mercury	7439-97-6	0.1	mg/kg		0.2				
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N (Sol.)		0.100	mg/kg		<0.100				
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N (Sol.)		0.100	mg/kg		<0.100				
EK059G: NOX as N by Discrete Analyser									
Nitrite + Nitrate as N (Sol.)		0.100	mg/kg		<0.100				
EK061G: Total Kjeldahl Nitrogen as N									
Total Kjeldahl Nitrogen as N		20	mg/kg		690				
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P		2	mg/kg		76				
EP066: Polychlorinated Biphenyls (PCB)									
Total Polychlorinated biphenyls		0.10	mg/kg		<0.10				
EP068A: Organochlorine Pesticides (OC)									
alpha-BHC	319-84-6	0.05	mg/kg		<0.05				
Hexachlorobenzene (HCB)	118-74-1	0.05	mg/kg		<0.05				
beta-BHC	319-85-7	0.05	mg/kg		<0.05				
gamma-BHC	58-89-9	0.05	mg/kg		<0.05				
delta-BHC	319-86-8	0.05	mg/kg		<0.05				
Heptachlor	76-44-8	0.05	mg/kg		<0.05				
Aldrin	309-00-2	0.05	mg/kg		<0.05				
Heptachlor epoxide	1024-57-3	0.05	mg/kg		<0.05				
trans-Chlordane	5103-74-2	0.05	mg/kg		<0.05				
alpha-Endosulfan	959-98-8	0.05	mg/kg		<0.05				

ALS Environmental

Analytical Results

	Client Sample ID :	TRIP1				
	Sample Matrix Type / Description :	SOIL				
	Sample Date / Time :	5 Oct 2007 15:00				
	Laboratory Sample ID :	ES0714015-001				
Analyte	CAS number	LOR	Units			
EP068A: Organochlorine Pesticides (OC)						
cis-Chlordane	5103-71-9	0.05	mg/kg	<0.05		
Dieldrin	60-57-1	0.05	mg/kg	<0.05		
4.4'-DDE	72-55-9	0.05	mg/kg	<0.05		
Endrin	72-20-8	0.05	mg/kg	<0.05		
beta-Endosulfan	33213-65-9	0.05	mg/kg	<0.05		
4.4'-DDD	72-54-8	0.05	mg/kg	<0.05		
Endrin aldehyde	7421-93-4	0.05	mg/kg	<0.05		
Endosulfan sulfate	1031-07-8	0.05	mg/kg	<0.05		
4.4'-DDT	50-29-3	0.2	mg/kg	<0.2		
Endrin ketone	53494-70-5	0.05	mg/kg	<0.05		
Methoxychlor	72-43-5	0.2	mg/kg	<0.2		
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons						
Naphthalene	91-20-3	0.5	mg/kg	<0.5		
Acenaphthylene	208-96-8	0.5	mg/kg	<0.5		
Acenaphthene	83-32-9	0.5	mg/kg	<0.5		
Fluorene	86-73-7	0.5	mg/kg	<0.5		
Phenanthrene	85-01-8	0.5	mg/kg	<0.5		
Anthracene	120-12-7	0.5	mg/kg	<0.5		
Fluoranthene	206-44-0	0.5	mg/kg	<0.5		
Pyrene	129-00-0	0.5	mg/kg	<0.5		
Benz(a)anthracene	56-55-3	0.5	mg/kg	<0.5		
Chrysene	218-01-9	0.5	mg/kg	<0.5		
Benzo(b)fluoranthene	205-99-2	0.5	mg/kg	<0.5		
Benzo(k)fluoranthene	207-08-9	0.5	mg/kg	<0.5		
Benzo(a)pyrene	50-32-8	0.5	mg/kg	<0.5		
Indeno(1.2.3.cd)pyrene	193-39-5	0.5	mg/kg	<0.5		
Dibenz(a.h)anthracene	53-70-3	0.5	mg/kg	<0.5		
Benzo(g.h.i)perylene	191-24-2	0.5	mg/kg	<0.5		
EP080/071: Total Petroleum Hydrocarbons						
C6 - C9 Fraction		10	mg/kg	<10		
C10 - C14 Fraction		50	mg/kg	<50		
C15 - C28 Fraction		100	mg/kg	<100		
C29 - C36 Fraction		100	mg/kg	<100		
EP080: BTEX						
Benzene	71-43-2	0.2	mg/kg	<0.2		
Toluene	108-88-3	0.5	mg/kg	<0.5		
Ethylbenzene	100-41-4	0.5	mg/kg	<0.5		

ALS Environmental

Analytical Results

	Client Sample ID :	TRIP1				
	Sample Matrix Type / Description :	SOIL				
	Sample Date / Time :	5 Oct 2007 15:00				
	Laboratory Sample ID :	ES0714015-001				
Analyte	CAS number	LOR	Units			
EP080: BTEX						
meta- & para-Xylene	108-38-3 106-42-3	0.5	mg/kg	<0.5		
ortho-Xylene	95-47-6	0.5	mg/kg	<0.5		
EP066S: PCB Surrogate						
Decachlorobiphenyl	2051-24-3	0.1	%	84.7		
EP068S: Organochlorine Pesticide Surrogate						
Dibromo-DDE	21655-73-2	0.1	%	97.4		
EP068T: Organophosphorus Pesticide Surrogate						
DEF	78-48-8	0.1	%	100		
EP075(SIM)S: Phenolic Compound Surrogates						
Phenol-d6	13127-88-3	0.1	%	103		
2-Chlorophenol-D4	93951-73-6	0.1	%	102		
2.4.6-Tribromophenol	118-79-6	0.1	%	76.7		
EP075(SIM)T: PAH Surrogates						
2-Fluorobiphenyl	321-60-8	0.1	%	104		
Anthracene-d10	1719-06-8	0.1	%	93.7		
4-Terphenyl-d14	1718-51-0	0.1	%	99.0		
EP080S: TPH(V)/BTEX Surrogates						
1.2-Dichloroethane-D4	17060-07-0	0.1	%	94.9		
Toluene-D8	2037-26-5	0.1	%	92.9		
4-Bromofluorobenzene	460-00-4	0.1	%	98.6		

ALS Environmental

Surrogate Control Limits

Matrix Type: SOIL - Surrogate Control Limits ***Surrogate Control Limits***

Method name	*Analyte name*	*Lower Limit*	*Upper Limit*
EP066: Polychlorinated Biphenyls (PCB)			
EP066S: PCB Surrogate	Decachlorobiphenyl	10	164
EP068: Pesticides by GCMS			
EP068S: Organochlorine Pesticide Surrogate	Dibromo-DDE	10	136
EP068T: Organophosphorus Pesticide Surrogate	DEF	10	136
EP075(SIM): PAH/Phenols (SIM)			
EP075(SIM)S: Phenolic Compound Surrogates	Phenol-d6	24	113
	2-Chlorophenol-D4	23	134
	2,4,6-Tribromophenol	19	122
EP075(SIM)T: PAH Surrogates	2-Fluorobiphenyl	30	115
	Anthracene-d10	27	133
	4-Terphenyl-d14	18	137
EP080: TPH Volatiles/BTEX			
EP080S: TPH(V)/BTEX Surrogates	1,2-Dichloroethane-D4	80	120
	Toluene-D8	81	117
	4-Bromofluorobenzene	74	121

coffey environments
SPECIALISTS IN LIVING AND WORKING PLACES

Important information about your **Coffey** Environmental Report

Uncertainties as to what lies below the ground on potentially contaminated sites can lead to remediation costs blow outs, reduction in the value of the land and to delays in the redevelopment of land. These uncertainties are an inherent part of dealing with land contamination. The following notes have been prepared by Coffey to help you interpret and understand the limitations of your report.

Your report has been written for a specific purpose

Your report has been developed on the basis of a specific purpose as understood by Coffey and applies only to the site or area investigated. For example, the purpose of your report may be:

- To assess the environmental effects of an on-going operation.
- To provide due diligence on behalf of a property vendor.
- To provide due diligence on behalf of a property purchaser.
- To provide information related to redevelopment of the site due to a proposed change in use, for example, industrial use to a residential use.
- To assess the existing baseline environmental, and sometimes geological and hydrological conditions or constraints of a site prior to an activity which may alter the sites environmental, geological or hydrological condition.

For each purpose, a specific approach to the assessment of potential soil and groundwater contamination is required. In most cases, a key objective is to identify, and if possible, quantify risks that both recognised and unrecognised contamination pose to the proposed activity. Such risks may be both financial (for example, clean up costs or limitations to the site use) and physical (for example, potential health risks to users of the site or the general public).

Scope of Investigations

The work was conducted, and the report has been prepared, in response to specific instructions from the client to whom this report is addressed, within practical time and budgetary constraints, and in reliance on certain data and information made available to Coffey. The analyses, evaluations, opinions and conclusions presented in this report are based on those instructions, requirements, data or information, and they could change if such instructions etc. are in fact inaccurate or incomplete.

Subsurface conditions can change

Subsurface conditions are created by natural processes and the activity of man and may change with time. For example, groundwater levels can vary with time, fill may be placed on a site and pollutants may migrate with time. Because a report is based on conditions which existed at the time of the subsurface exploration, decisions should not be based on a report whose adequacy may have been affected by time. Consult Coffey to be advised how time may have impacted on the project and/or on the property.

Interpretation of factual data

Environmental site assessments identify actual subsurface conditions only at those points where samples are taken and when they are taken. Data derived from indirect field measurements and sometimes other reports on the site are interpreted by geologists, engineers or scientists to provide an opinion about overall site conditions, their likely impact with respect to the report purpose and recommended actions. Actual conditions may differ from those inferred to exist, because no professional, no matter how well qualified, can reveal what is hidden by earth, rock and time. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions. For this reason, parties involved with land acquisition, management and/or redevelopment should retain the services of Coffey through the development and use of the site to identify variances, conduct additional tests if required, and recommend solutions to unexpected conditions or other problems encountered on site.

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Important information about your **Coffey** Environmental Report

Your report will only give preliminary recommendations

Your report is based on the assumption that the site conditions as revealed through selective point sampling are indicative of actual conditions throughout an area. This assumption cannot be substantiated until project implementation has commenced and therefore your report recommendations can only be regarded as preliminary. Only Coffey, who prepared the report, is fully familiar with the background information needed to assess whether or not the report's recommendations are valid and whether or not changes should be considered with redevelopment or on-going use of the site. If another party undertakes the implementation of the recommendations of this report there is a risk that the report will be misinterpreted and Coffey cannot be held responsible for such misinterpretation.

Your report is prepared for specific purposes and persons

To avoid misuse of the information contained in your report it is recommended that you confer with Coffey before passing your report on to another party who may not be familiar with the background and the purpose of the report. In particular, a due diligence report for a property vendor may not be suitable for satisfying the needs of a purchaser. Your report should not be applied for any purpose other than that originally specified at the time the report was issued.

Interpretation by other professionals

Costly problems can occur when other professionals develop their plans based on misinterpretations of a report. To help avoid misinterpretations, retain Coffey to work with other professionals who are affected by the report. Have Coffey explain the report implications to professionals affected by them and then review plans and specifications produced to see how they have incorporated the report findings.

Data should not be separated from the report

The report as a whole presents the findings of the site assessment and the report should not be copied in part or altered in any way. Logs, figures, laboratory data, drawings, etc. are customarily included in our reports and are developed by scientists, engineers or geologists based on their interpretation of field logs (assembled by field personnel), field testing and laboratory evaluation of field samples. This information should not under any circumstances be redrawn for inclusion in other documents or separated from the report in any way.

Contact Coffey for additional assistance

Coffey is familiar with a variety of techniques and approaches that can be used to help reduce risks for all parties to land development and land use. It is common that not all approaches will be necessarily dealt with in your environmental site assessment report due to concepts proposed at that time. As a project progresses through planning and design toward construction and/or maintenance, speak with Coffey to develop alternative approaches to problems that may be of genuine benefit both in time and cost.

Responsibility

Environmental reporting relies on interpretation of factual information based on judgement and opinion and has a level of uncertainty attached to it, which is far less exact than other design disciplines. This has often resulted in claims being lodged against consultants, which are unfounded. To help prevent this problem, a number of clauses have been developed for use in contracts, reports and other documents. Responsibility clauses do not transfer appropriate liabilities from Coffey to other parties but are included to identify where Coffey's responsibilities begin and end. Their use is intended to help all parties involved to recognise their individual responsibilities. Read all documents from Coffey closely and do not hesitate to ask any questions you may have.

72510 / 07-06