Appendix H: PID Calibration Certificate



Appendix I: Waterloo Sample Construction and Method

Appendix J: EPA Public Register Information







CIVIL / STRUCTURAL / LOCAL GOVERNMENT / ENVIRONMENTAL / BUILDING SURVEYING / TRANSPORTATION 55 Queen Street Adelaide South Australia 5000 / Facsimile (08) 223 5237 Telephone (08) 223 5583

97.0307/AMDH/DI

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18 April 1997

Mr Lee Morgan Environment Protection Officer Environment Protection Authority GPO Box 2607 ADELAIDE SA 5001

ENGINEERS



Dear Lee

FRANKLIN STREET BUS STATION, ADELAIDE ADVICE OF ENGAGEMENT AS ENVIRONMENTAL AUDITOR

This to inform you that I have been engaged as Environmental Auditor for the above site. Details are as follows:

1. SITE IDENTIFICATION

The address of the site is 85-129 Franklin Street, Adelaide, SA 5000.

The site comprises two parcels of land located on the eastern and western sides of Bowen Street with frontages to Franklin Street. Each of the parcels comprises a number of allotments which are described under different Certificates of Title as follows:

a) Eastern side of Bowen Street

CT Reference, Volume / Folio	Land Description
226/124	Town Acre 263
1639/119	Town Acre 310
1663/99	Town Acre 309
1751/37	Town Acre 311
1922/48	Town Acre 263
5060/608	Allotment 1 in DP 32560
5317/61	Allotment 12 in DP 546
5317/62	Allotment 91 in FP 166443
5317/63	Allotment 92 in FP 166444
5317/64	Allotment 93 in FP 166445
5317/65	Allotment 91 in FP 170401

T & R NOMINEES PTY LTD AS TRUSTEE FOR T & R UNIT TRUST TRADING AS BC TONKIN & ASSOCIATES / ACN 007 860 586

Directors: BC TONKIN AM, DIP CIVIL ENG, ASASM, HON FIE AUST, CP ENG / PK READ, B TECH, FIE AUST, CP ENG / WB HAGAN, B TECH, FIE AUST, FAITPM, CP ENG / GR BURTON, BE, MIE AUST, CP ENG / RAH ARENS, B ENG, GRAD DIP MUN ENG, MIE AUST, CP ENG / KS SCHALK, B ENG (CIVIL), MIE AUST, CP ENG / CB GILBERT, B ENG (CIVIL), MIE AUST, CP ENG / Associate Directors: RI WILLIAMS / AMDH HALL, MA, DIP ED, MIE AUST, CP ENG

BC TONKIN & ASSOCIATES

b) Western side of Bowen Street

CT Reference, Volume / Folio	Land Description
2023/96	Town Acre 311
2128/45	Town Acre 311
2201/187	Town Acre 311
3479/180	Town Acre 261& 262
3582/78	Town Acre 261
3582/79	Town Acre 262
3582/80	Town Acre 261& 262
3841/122	LTRO Plan 546

The total area of the site is approximately 1.41 hectares.

2. NAME OF PERSON REQUESTING SITE AUDIT REPORT

Mr Matthew Adcock, the Corporation of the City of Adelaide.

3. COUNCIL AREA

The Corporation of the City of Adelaide.

4. NAME OF PRIMARY CONSULTANT

Rust PPK, contact: Mr Stuart Taylor.

5. PREVIOUS, CURRENT AND INTENDED LAND USE

Previous uses of the site have been mainly residential, with known commercial premises and small light industries including a factory, garages, forges, stables, printing works, workshops, shops, offices, bakehouse and a private road.

There are currently a number of passenger and freight operators on the site, including those associated with bus transport. The Corporation of the City of Adelaide also operates two public car parks on the site.

Possible future land uses include high density residential development.

6. ANTICIPATED COMPLETION DATE

At this stage, the completion date is expected to be 30 June 1997.

I trust that this information is sufficient for your requirements at this stage.

If you have any queries or comments regarding this advice, please contact me on (08) 8223 5583.

Yours faithfully BC TONKIN & ASSOCIATES

f.M.D. Hall

AMD Hall, MIE Aust Chartered Professional Engineer Associate Director

10016 - Vol: 1 of 1

Corporation of the City of Adelaide

FRANKLIN STREET BUS STATION AND CAR PARKS

SITE AUDIT REPORT

Report No. 97.0307/1 31 July 1997



BC TONKIN & ASSOCIATES Consulting Engineers 55 Queen Street ADELAIDE SA 5000

ACN 007 860 586

Telephone:(08) 8223 5583Facsimile:(08) 8223 5237Email:reception@bctonkin.com.au

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Corporation of the City of Adelaide Franklin Street Bus Station and Car Parks Site Audit Report

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APPENDICES

A. Rust PPK Pty Ltd, 1997, Site History Report for the Franklin Street Bus Station, Located at 85-129 Franklin Street, Adelaide, for the Corporation of the City of Adelaide, 6 March 1997

B. Rust PPK Pty Ltd, 1997, Environmental Site Assessment, Franklin Street Bus Station and Car Parks, for the Corporation of the City of Adelaide, 30 June 1997

1. SUMMARY INFORMATION

This audit report has been prepared for the Franklin Street Bus Station and Car Parks, located at 85-129 Franklin Street, Adelaide (see Location Plan, Figure 1.1). The report has been prepared in accordance with guidelines provided in the South Australian Environment Protection Authority (EPA) Special Bulletin No. 1, 20 October 1995, *The Use of Environmental Auditors: Contaminated Land*, and the Victorian Environment Protection Authority (VicEPA) Guidelines for Environmental Auditors Contaminated Land, Issue of Certificates of Environmental Audit, WH 91/14, May 1992.

The Site Audit Report is based on site conditions at the time of issue of the report. The environmental auditor cannot be responsible for future activities on the site, or off site impacts, which may result in subsequent contamination of the site.

The purpose of the Site Audit Report is to present the auditor's opinion on the environmental condition of the site.

Summary information is set out as follows:

• Name of auditor

Mr Adrian Hall of BC Tonkin & Associates

• Date of appointment as an Accredited Environmental Auditor under the Environment Protection Authority Act, 1970, Victoria

7 January 1997

• Name of person making a request for a Site Audit Report

Mr Brian Fitzpatrick, Corporation of the City of Adelaide

• Address of the site being audited

85-129 Franklin Street, Adelaide



Lands Title Information

Allotment details are as follows:

Eastern Side of Bowen Street

Certificate of Title	Part Town Acre/Plan No	Area (m ²)
Volume 226, Folio 124	Town Acre 263	1983.80
Volume 1639, Folio 119	Town Acre 310	2760.50
Volume 1663, Folio 99	Town Acre 309	83.60
Volume 1751, Folio 37	Town Acre 311	648.80
Volume 1922, Folio 48	Town Acre 263	986.26
Volume 5060, Folio 608	Allotment 1 in DP 32560	580.00
Volume 5317, Folio 61	Allotment 12 in DP 546	149.60
Volume 5317, Folio 62	Allotment 91 in FP 166443	348.69
Volume 5317, Folio 63	Allotment 92 in FP 166444	271.50
Volume 5317, Folio 64	Allotment 93 in FP 166445	526.90
Volume 5317, Folio 65	Allotment 91 in FP 170401	816.37
	TOTAL	9156.02

Western Side of Bowen Street

Certificate of Title	Part Town Acre/Plan No	Area (m ²)
Volume 2023, Folio 96	Town Acre 311	260.67
Volume 2128, Folio 45	Town Acre 311	257.80
Volume 2201, Folio 187	Town Acre 311	259.70
Volume 3479, Folio 180	Town Acres 261 & 262	1744.00
Volume 3582, Folio 78	Town Acre 261	509.70
Volume 3582, Folio 79	Town Acre 262	490.04
Volume 3582, Folio 80	Town Acres 261 & 262	1122.90
Volume 3841, Folio 122	LTRO Plan 546	340.60

TOTAL

4985.41

• Land Use Zoning

,

The site is part of the F8 Franklin Street East Precinct

• Names of current site owner and occupier

The Corporation of the City of Adelaide

Documentation reviewed

Rust PPK Pty Ltd, 1997, Site History Report for the Franklin Street Bus Station, Located at 85-129 Franklin Street, Adelaide, for the Corporation of the City of Adelaide, 6 March 1997

Rust PPK Pty Ltd, 1997, Environmental Site Assessment, Franklin Street Bus Station and Car Parks, Adelaide, for the Corporation of the City of Adelaide, 30 June 1997

2. INTRODUCTION

Mr Adrian Hall of BC Tonkin & Associates has been appointed by the Corporation of the City of Adelaide to act as an environmental auditor for the Franklin Street Bus Station and Car Parks.

The site is described on the current Certificates of Titles as listed above. The current Certificates of Title show the site to be owned by the Corporation of the City of Adelaide.

The site contains the following features

Eastern Side of Bowen Street

- the Greyhound and McCafferty's Express bus terminals and canopy, on the north eastem side of Bowen Street (referred to collectively as 'Bus Depot 1')
- a single storey house, a private car park, a toilet block and a two storey building and adjacent car park, all utilised by the Adelaide Central Mission, on the eastern side of Bowen Street, in the south of the site (referred to collectively as '104 Grote Street')
- two bitumen sealed public car parks in the east of the site, owned and operated by the Corporation of the City of Adelaide (referred to as the Grote Street Car Park and the Franklin Street Car Park, respectively)

Western Side of Bowen Street

- the Premier Stateline bus terminal, canopy and private car park on the north west of the site (referred to collectively as 'Bus Depot 2')
- the Coachfreight parcel collection and drop off point, including storage shed, on the west of the site
- a bitumen sealed private car park in the south west of the site

A Site Plan, including sampling locations, is given in Figure 2.1.

The extent of the audit is also shown on Figure 2.1. It should be noted that as no soil testing was undertaken under the canopies, or under the floor slabs of the buildings, the extent of this audit has necessarily been confined to the open space areas of the site, with a total areal extent of approximately 0.98 hectares.

The site is surrounded by the following properties

- Dreamland Furniture and a disused warehouse to the east
- light industrial facilities to the west
- Franklin Street to the north
- Andrews Street, the Grote Street Church of Christ and Grote Street to the south.



Further background information on the Franklin Street Bus Station and Car Parks site is contained in the Site History Report prepared by Rust PPK. A copy of the document is provided in Appendix A.

Rust PPK Pty Ltd was commissioned by the Corporation of the City of Adelaide to undertake a comprehensive environmental assessment of the Franklin Street Bus Station and Car Parks site. The results of this work have been reported in the following document:

Rust PPK Pty Ltd, 1997, Environmental Site Assessment, Franklin Street Bus Station and Car Parks, Adelaide, for the Corporation of the City of Adelaide, 30 June 1997

A copy of the above document is provided in Appendix B. The assessment report should be read in conjunction with this audit.

The role of BC Tonkin & Associates in the audit of this site involved

- inspections of the site
- liaison with Rust PPK during their investigations
- assessment of the information provided in the above report.

No additional fieldwork was conducted by BC Tonkin & Associates during this audit.

3. SUMMARY OF ENVIRONMENTAL SITE ASSESSMENT

3.1 Background Studies

3.1.1 Site Identification and Description

This section of the assessment carried out by Rust PPK consisted of the following components

- site identification
- site description
- site ownership
- site topography
- local soil types
- local and regional groundwater.

Site identification and ownership have been described in Section 2.

The Rust PPK report provides comment on site topography and local soil types.

Comments on soil types and groundwater are provided in Section 3.1.3.

3.1.2 Site History

The site history section of the assessment incorporates the following elements

- historical overview
- summary of potential site contamination issues.

According to the site history prepared by Rust PPK

- from 1850 until the early 1900s the site was used generally for residential purposes, but there were also a number of commercial premises, including a garage, forge, workshop, bakehouse, and a private road
- from the 1920s a number of small light industries were established on the site; these included a factory, garages, forges, stables, printing works, workshops, shops and offices
- during the 1960s a large proportion of the residential land in the western part of the site had been cleared, and was used as an open lot car park
- by 1972 the Corporation of the City of Adelaide had acquired most of the land comprising the site, except for 104 Grote Street; the land was then cleared, and by 1979 the majority of the existing bus terminals and car parks had been constructed
- the residences on the 104 Grote Street site were acquired by the Corporation of the City of Adelaide in the early 1990s, and are currently used by the Adelaide Central Mission; the

front part of the building at 104 Grote Street has been condemned by the Council due to problems with rust and cracking

• between 1989 and 1995, a new terminal building was constructed on the eastern side of Bowen Street, on what was previously either car or bus parking space.

3.1.3 Geology and Hydrogeology

The Rust PPK report suggests that the soil profile at the site can be expected to include in the order of 1.0 m of surface fill, consisting of various reworked soils and building rubble. Underlying this the profile is likely to resemble a Brown Solonised Soil Type BS classification. Such profiles consist of brown sandy to clayey soils with abundant earthy lime and calcrete in the subsoil. Such soils vary from a thin layer to up to 3 m thick, and the layer overlies Hindmarsh Clay.

MESA records indicate regional standing groundwater levels at depths ranging from approximately 6 m to up to 40 m. No groundwater was encountered during the on-site drilling programme to a maximum depth of 2.3 m.

3.1.4 Potential Site Contamination Issues

Based on information obtained from the Site History investigation, Rust PPK considered that the following potential contamination may be present on site as a result of past on-site and adjacent activities

- Polycyclic Aromatic Hydrocarbon (PAH) contamination from the tar based subbase materials that may have been used beneath bitumen in the past, and from possible waste products associated with coal fires or furnaces
- Organochlorine Pesticide (OCP) contamination from the possible use of white ant treatments beneath former buildings
- possible petroleum contamination from the leakage of fuel or oil from vehicles
- possible heavy metal contamination from activities associated with a plumbing business, forging, oxy-welding, radio and electrical companies, wrecking and auto-mechanics or printing works, all of which existed on the site in the past.

3.2 Site Investigations

3.2.1 Soil Sampling

Rust PPK's sampling locations were based on a nominal grid across the site, and comprised 20 boreholes (refer to Figure 2.1). Sampling locations were agreed on site between Rust PPK and the auditor.

In general, 3 - 4 soil samples were collected from the top 1.0 m of the soil core, with an additional 1 - 3 samples recovered between 1.0 m and 2.0 m, and 1 sample below 2.0 m if the

borehole was drilled past 2.0 m. The specific sample depths were however dependent on the soil profile at each location.

3.2.2 Soil Conditions Encountered

Rust PPK reported that the soil conditions encountered during drilling could be summarised as follows

fill materials

- surface layer of yellow silty sand with some gravel overlying dark brown silty clays to depths ranging from 0.5 m to 1.2 m
- brick fragments and cinders in 13 out of the 20 boreholes, and fragments of vesicular slag were identified in one of the boreholes

natural sediments

- calcareous silty clays with some calcareous gravel to about 2.0 m
- at some boreholes the soil became greenish brown at around 2.0 m as it became Hindmarsh Clay.

Environmental soil monitoring borelogs are presented in Appendix D of the Rust PPK report. A site plan showing the approximate area of fill materials containing ash, cinders and/or slag is contained in Appendix E of the Rust PPK report.

3.2.3 Laboratory Analysis Programme

A total of 22 soil samples was submitted to the primary laboratory (AGAL) for analysis. 2 inter-laboratory duplicates were sent to the secondary laboratory (MGT) for analysis.

The samples were analysed for a range of chemical analytes, including

- pH
- heavy metals
- polycyclic aromatic hydrocarbons (PAHs)
- organochlorine pesticides (OCPs)
- total petroleum hydrocarbons (TPH)
- monocyclic aromatic hydrocarbons (BTEX)
- polychlorinated biphenyls (PCBs), phenols, chlorinated hydrocarbons, cyanide, fluoride.

Table 3.1 shows the full range of soil samples taken from each borehole, and the chemical analytes for each sample analysed.

In particular, 2 field duplicate samples and the 2 inter-laboratory duplicate samples were analysed for the full Victorian EPA screen.

The primary laboratory was Australian Government Analytical Laboratories (AGAL).

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Summary of Sampling & Analysis, FRANKLIN-XLS, 21/7/97

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	Soll Typa	FILL	FILL			Silt Clay			FILL		Silly Clay	Slity Clay	Silty Clay	FILE	FILL	FILL	FILL	FILL	Slity Clay	Silty Clay	FILL	FII					Slity Clay	Slity Clay	FILL		Clhr Clar		Silv Clav	Silty Clay							FILL		FILL	Silty Clay	Silty Clay	FILL	FILL	FILL	Slity Clay	Slity Clay	Slity Clay	FILL	FILL	Silty Clay	Silty Clay	FILL	FILL	FILE	En l	Silv Clav	Silv Clav							Tumber of Comp
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	MIN	8	350	350	200			2	550	550	850 1	1550 1	1850 2	20	200	350 1	1002	2007	1350 1	1800 2	20	150	550		3		1850 2	1850 2	150 5	100			1500 1	0000				900			8	220	350	800	1800 2	20	150	400	800	1450 1	2150 2	8	550	950 1	1850 2	50	200	450	450	850 1	1800	3				+	+	
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	Borehola	BH11						2118						BH13		_					BH14								BH15						DUAE	0110					BH17					BH18	ļ					BH19				BH20												

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Summary of Sampling & Analysis, FRANKLIN.XI.S. 21/7/97

The secondary laboratory was MGT Environmental Consulting Pty Ltd (MGT).

Both laboratories are NATA certified for all the nominated soil analyses.

3.2.4 Field Observations and Headspace Analysis

Rust PPK have advised that during the drilling and sampling programme, headspace testing was undertaken on soil from various depths at the majority of the boreholes drilled. A second set of between 2 and 5 samples was collected from each borehole, and transferred to labelled, resealable plastic bags. These samples were then left for approximately 20 minutes before the headspace analysis was undertaken, to determine the presence of volatile organic hydrocarbons, using a photoionisation detector (PID).

Due to operational difficulties with the PID during the sampling programme, PID readings were not taken at every borehole.

Rust PPK advised that the concentrations of VOCs detected by the PID were generally quite low (< 20 ppm); however, where the concentrations detected were elevated (e.g. > 50 ppm), the soil sample from around that depth was analysed for TPH/BTEX.

No visible or olfactory evidence of hydrocarbon contamination was recorded within the surface or subsurface soils at any of the boreholes.

3.2.5 Assessment Criteria

For the purpose of assessing potential long term human health risks, Rust PPK adopted the SAHC (1993) Health Investigation Levels as the initial investigation levels.

For the purpose of assessing potential environmental risks, Rust PPK adopted the ANZECC/NH&MRC (1992) Environmental Investigation Levels as the initial investigation levels.

As a preliminary aid in the evaluation of site specific health based risk analysis, the SAHC (1996) Proposed Health Based Soil Guidelines were used as reference criteria.

For the purpose of the preliminary contamination assessment, the criteria nominated within SAHC (1993) and ANZECC/NH&MRC (1992) were referenced as the primary assessment criteria.

For the purpose of the preliminary health risk assessment, the SAHC (1996) Proposed Health Based Soil Guidelines Exposure Settings D (residential with restricted soil access) and F (commercial/industrial) were used as the reference criteria.

In the case of analytes not covered by the nominated criteria, the Dutch Investigation and Intervention values were referenced. The former Dutch C levels and the NSW EPA Guidelines for Assessing Service Station Sites were used as guidelines for TPH/BTEX.

3.2.6 Contamination Assessment Results

Laboratory results from the soil analyses are presented in tabulated form in Appendix H of the Rust PPK report. Full certified laboratory test reports are provided in Appendix I of the Rust PPK report.

Selected results are presented in Table 3.2, in which they are compared against the various assessment criteria.

3.2.7 Quality Assurance/Quality Control (QA/QC)

QA/QC sampling and analysis procedures are documented in the Rust PPK report.

Of the 24 soil samples analysed, 2 were a blind field duplicates, and 2 were inter-laboratory duplicates.

In addition 2 equipment rinsate samples were analysed, as a check on the push tube decontamination procedures.

The laboratory QC programme comprised surrogate recoveries and replicate analyses.

3.2.8 Data Validation

Rust PPK assessed all analytical data for soil to ensure validation. Results of internal laboratory QC checks, including the results of surrogate recoveries and replicate analyses, are included within the Laboratory reports in Appendix I of the Rust PPK report. Tabulated results of all laboratory replicate analyses and field duplicate analyses are presented in Appendix J of the Rust PPK report.

The precision of the results for each analyte for both the laboratory replicate and field duplicate samples was determined by calculating the relative percentage difference (RPD) between the replicates and duplicates. The acceptance criterion for laboratory replicates was set at an RPD of 20%; the acceptance criterion for field duplicates was set at an RPD of 30%. These criteria were based on Rust PPK QA protocols, which were developed with regard to USEPA regulations. The percentage RPD values for the laboratory replicates and the field duplicates are presented in Appendix K of the Rust PPK report.

In order to obtain a measure of the overall precision, a relative standard deviation (RSD) was determined for each analyte. This involved normalising each sample result and the corresponding replicate/duplicate results, and then calculating the standard deviation of the complete set of normalised values for that analyte. The RSD was calculated as a percentage and is included in Appendix K of the Rust PPK report. For soil sampling programmes an RSD below 30% is considered satisfactory.

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Tabla 3.2 Laboratory Rasults : Soll - pH, Heavy Metals, PAHs

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					Bo	prehola No	BH1	BH2	BH3	. 8	H4	BH5	BH6	BH7	BH8	BH9	BH10	BH11	Bł	112
	1					Sample No						1 1								
					Sample D	epth (min)	60	1800	800	450	450	800	850	400	800	2000	700	800	550	550
	1				Sampla Da	epth (max)	300	2000	1000	600	800	1000	750	500	1000	2100	850	1000	700	700
						Soll Typa	FILL	FILL	FILL	FILL	FILL	Silty Clay	FILL	FILL	Silty Clay	Silty Clay	Silty Clay	Silty Clay	FILL	FILL
						QAVQC		1			LR				I					ILD
Contaminents	Dataction		Assass	ment	Critaria:															
(mg/kg)	Limit	ANZECC/	ANZECC/	SAHC	NEHF (4)	NEHF (5)						1 1								
	(тд/кд)	NHMRC	NHMRC	HIL 13	D	F														
pН	0.1			>5 <9			9.5 ³		9.5 ³			9.5 3	983	983	10 3			0.2.5	0.23	
M-4-4-		•															0.0	0.5	0. Z	-
Metals					1					ľ				1						
Amania		-	20	-	-	•	•	· ·	-		- 1	1 - 1	•	-	l .	-	-			<10
Arsenic	5	100	20	100	400	500	nd	9.4	7.4	7.6	7.5		5.6	nd	10	9.3	5	8.9	nd	2.8
Beryillum		-	-		80	100	•		-	1.2	1.2	! -	-	-	-	-	-	-	•	<2
Cadmium		20	3	20	80	100	nd	nd	nd	nd	nd	-	nd	nd	nd	nd	nd	nd	nd	<0.5
Chromium	2	-	50	•	-	-	9.2	29	31	31	29	.	22	13	17	18	46	11	29	26
Cobalt	1	-	-	-	-	-	•	-	-	8	7.6	.	-	-	-					8.5
Copper	2	-	60	100	4,000	5,000	9.5	7	7.3	32	_29	.	24	4.8	9	55	18	57	10	14
Leed	5	300	300	300	1,200	1,500	nd	7.5	10	448 1.20	670 123		4	nd	53	53	12	0.7 pd	11	14
Manganase	10	-	500	-	6,000	7,500	-	-	-	200	nd				0.0	5.5	13	110		14
Mercury	0.5	-	1	2	60	75	bd	bo	bd	nd								· 1	•	220
Molvbdenum	5	-	-	-					114	na	nd		110	na	na	na	na	na	nd	<0.1
Nickel		-	60		2 400	3.000	-		-	15	14	•	•		-	-	-	•	•	<10
Selenium	5				2,400	0,000			-	15	14	· · ·	•	-		-	-	-	-	14
Tin	2		50		_				-	20	10		•	•	-	-	-	-	•	<0.5
Zinc			200	500	28,000	35.000	0.7		-	20	20	•	•	-	-	-	-	-	•	<10
		-	200	500	20,000	35,000	0.7	19	21	280-	210	-	89	17	15	14	30	9.8	17	28
Polycyclic Arometic Hydrocarbons																		1		
Benzo(a)pyrene	0.1	1	-	1	4	5				0.1			0.0			1				
Total PAHs	0,1	20	-	20	60	100	-			nd			0.8	•	•	•	•	•	nd	<0.1
								است ا			L		5.3	<u> </u>	•	-	-	•	nd	· ·

Notes:

1 - Teble 1, Proposed Heetth Investigation Levels (ANZECC/NHMRC, 1992).

nd - below AGAL detection limits - - not enalysed ILD - Interleboretory duplicate

LR - teboretory repeat

.

2 - Table 2, Environmentel Soll Quelity Guidelines - Environmental Investigation Lovels (ANZECC/NHMRC, 1992).

3 - South Australian Health Commission (SAHC) Investigation Levels (SAHC 1993)

4 - NEHF Heelth Besed Investigation Level Soll Guidelines, According to Exposuro Setting D (Landuse), SAHC 1996

5 - NEHF Heelth Besed Investigation Level Soil Guidelines, According to Exposure Setting F (Landuae), SAHC 1998

446^{1,2,3} the relised numbers indicete the guideline exceeded

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Table 3.2 Laboratory Results : Soll - pH, Heavy Metels, PAHs

					B	orehole No	B	113	BH14	BI	115	BH16	BH17	BH16	BH19	BH20	BD2	BI	D6
	l.				:	Semple No			7		1	1							
	ł				Semple D)epth (min)	700	700	550	700	700	400	800	400	550	50	ł		
					Semple D	epth (mex)	900	900	700	850	650	500	1000	500	700	200	1		
						Soii Type	FILL	FILL	FILL	Silty Cley	Silty Clay	FILL	FILL	FILL	FILL	FILL			
· · ·						QA/QC		LR			ILD					4	BH4/D ?	BH13/D ?	LR
Contaminents	Detection		Aeeees	ment	Criterle:								1			1	1		
(mg/kg)	Limit	ANZECC/	ANZECC/	SAHC	NEHF (4)	NEHF (5)			}		1								
	(mg/kg)	NHMRC ⁽¹⁾	NHMRC ⁽²⁾	HIL (3)	0	F													
рН	0.1			>5 <9			-	-	11 3	9.3 ³	-	9.7 ³	9.8 ³	9.4 ³	9.1 ³	9.5 ³	9.2 ³	8,9	-
Metals																			
Antimony	5	-	20		-	- 1	•			-	<10						_		
Arsenic	5	100	20	100	400	500	5.1	nd	19	nd	2.8	9.5	11		hn	7.8	85		c.
Beryllium	1	-		_	80	100	1.1	1.2			<2	-		-					
Cedmlum	1	20	3	20	80	100	nd	nd	nd	nd	<0.5	nd	nd		bn l	bn	ba		nd
Chromium	2	-	50	.	-	i - I	29	29	18	28	28	29	13		23	33	28	33	34
Cobelt	1	-	•	-	•	- 	7,7	8.1			9.4								34
Copper	2	-	80	100	4,000	5,000	18	18	450 2.3	9.9	18	10	7.3		89	31	34	17	17
Leed	5	300	300	300	1,200	1,500	43	36	(1600 3	11	15	11	nd		28	140	-440 123	20	24
Mengenese .	10	-	500	-	8,000	7,500	260	270			280			_		140		50	بدن
Mercury	0.5	-	1	2	60	75	nd	nd	nd	nd	<0.1	hn	nd l	_	ba	nd	182		- nd
Molybdenum	5	-					nd	nd		· · ·	<10						1.0		
Nickel	1	-	60	-	2,400	3,000	15	15		l .	11	-	<u> </u>	-	_				-
Selenium	5	- 1	-	- 1	-	.	nd	nd	1 -	-	<0.5	-	_		-	-	· ·		
Tin	2	-	50		· •		2,8	2.8			<10		-						
Zinc	2	-	200	500	28,000	35,000	32	32	2000 2.3	14	28	21	11	-	17	410 ²	270 ²	32	32
Polycyclic Aromatic Hydrocerbone																			
Benzo(e)pyrene	0.1	1		1	4	5	nd	0.1	0.1	-	<0.1	nd		nd	h nd	1213	nd		
Totel PAHs	0.1	20	-	20	80	100	nd	1.4	nd	-	-	nd		nd	nd		nd		

3.2.9 Findings and Conclusions

Based on the laboratory results, and field observations, the findings of the environmental site assessment were reported by Rust PPK to be as follows (refer to the Executive Summary of the Rust PPK report):

"The assessment program undertaken during May 1997 has identified elevated concentrations of heavy metals (lead, zinc, and copper) in excess of the ANZECC environmental and/or the SAHC health based guidelines within the fill materials recovered from:

- the driveway of the Coachfreight parcel collection and drop off point to the west of Bowen Street (BH4, lead and zinc only);
- the north east corner of the Grote Street public car park (BH14); and
- the centre of the car park adjacent the storage building at 104 Grote Street used by the Adelaide Central Mission (BH20, zinc only).

"An elevated PAH (benzo(a)pyrene) concentration in excess of the SAHC health based guidelines, was identified within the fill materials in the car park adjacent the storage building at 104 Grote Street (BH20). Elevated Total fluoride concentrations were identified within the surficial fill materials recovered from the north eastern corner of the Franklin Street Car Park and the south eastern corner of the Grote Street Car Park. These elevated levels of heavy metals, PAHs and fluoride are considered to be associated with fragments of ash, cinders and/or slag which were observed within the sub-surface soil profile within these locations.

"Fragments of ash, cinders and/or slag were identified in thirteen out of the twenty sampling locations at the site and although elevated PAH, heavy metal and fluoride concentrations were not reported at all of these locations, it is considered that the relatively low proportion of the materials within the overall soil matrix may be resulting in a dilution effect on the analyte levels within the overall matrix. This therefore indicates the potential for high concentrations of localised (hotspot) PAH contaminants within the fill materials in boreholes BH4 and BH18 located on the western side of Bowen Street, and in all of the boreholes located on the eastern side of Bowen Street with the exception of boreholes BH9 and BH11. The fill materials containing ash and cinder fragments were generally identified to depths ranging from 0.5 m to 0.7 m across the site.

"The surficial fill materials and the underlying natural soil were identified as being moderately alkaline, with soil pH at all locations reported above the ANZECC environmental guidelines.

"The presence of moderately alkaline surface and sub-surface soils in conjunction with the natural tight clay profile and the apparent containment of any contaminants within the ash, cinder and/or slag fragments identified, indicates that the impacted fill materials are likely to pose negligible long term environmental risks to the underlying soils and groundwater. "As an aid in the identification of potential health based risks, all contaminant levels were also compared to the proposed health based soil guidelines (Langley et al 1996 - Exposure Settings D and F) for restricted residential (with limited soil access) and commercial/industrial land uses. The lead concentration reported in the fill materials recovered from the north eastern corner of the Grote Street Car Park was in excess of both landuse exposure scenarios. The concentrations of all analytes reported from the remaining sampling locations were below the prescribed levels for both land uses."

3.2.10 Recommendations

The recommendations arising from the environmental site assessment are presented by Rust PPK as follows (refer to Section 5 of the Rust PPK report):

Bus Depot 1 (Greyhound and McCaffertys), Grote Street and Franklin Street Car Parks

"In accordance with the continued use of these areas for commercial purposes, the results and findings of the assessment program have identified no requirements for any subsequent site characterisation or remedial works within these areas. This recommendation is with the exception of a site specific risk assessment required to address the elevated concentration of lead identified within the north eastern corner of the Grote Street Car Park. From a preliminary risk assessment perspective it is considered that the concentration and likely nature of the lead identified will not pose a limiting factor for the continued current usage of the site providing the bitumen surfaces are maintained and managed appropriately.

"If these areas of the site are to be developed for a more sensitive landuse, then further site characterisation is recommended, the extent of which will be dependent on the future landuse, due to the presence of ash and cinders within the fill materials at nine out of the eleven sampling locations in these areas. If this land is to be redeveloped to a landuse of the same or similar sensitivity (for example commercial or restricted residential with no access to underlying soil) then it is recommended that validation of any excavated soil be carried out in order to determine the required disposal method. Disposal as low-level contaminated waste may be necessary due to the potential for contamination to be present within the ash and cinders identified in these areas. It is also recommended that appropriate health and safety precautions are taken during any possible future on-site earthworks, in order to protect workers and adjoining sites from exposure to potentially contaminated soils.

104 Grote Street

"The investigation program has identified no requirements for any subsequent site characterisation or remedial works within this area (which includes the house, private car park, storage building and adjacent car park) provided the current uses are maintained. If this portion of the site is to be developed for a more sensitive landuse (for example residential), it is recommended that more extensive site characterisation is carried out prior to the redevelopment. This is due to the presence of ash and cinders within the fill materials recovered from the two boreholes in this area, and so that the soil can be further characterised in those areas not covered in this investigation. Similarly to the other areas of the site, if this land is to be redeveloped to a landuse of the same or similar sensitivity then validation of any excavated soil is recommended prior to disposal of the excavated soil, and the appropriate health and safety precautions should be taken during any excavation.

Coachfreight and adjacent car park

"If the current use of the land in this area is to be maintained, there are no requirements for remedial works in this area of the site. This is contingent upon the adequate maintenance and management of the bitumen surfaces. If this portion of the site is to be developed for a more sensitive landuse (for example residential), then further site characterisation is recommended prior to the redevelopment, the extent of which will be dependent on the future landuse, due to the presence of ash and cinders within the fill materials recovered from the two boreholes in this area. If this land is to be redeveloped to a landuse of the same or similar sensitivity then validation of any excavated soil is recommended prior to disposal of the excavated soil, and the appropriate health and safety precautions should be taken during any excavation (as described previously).

Bus Depot 2 (Premier Stateline)

"No contamination was identified in this area (which includes the bus parking area and the car park adjacent the terminal building) and so no remedial works or further site characterisation works are required provided the site use remains as at present. If this portion of the site is to be developed for a more sensitive landuse (for example residential), then further site characterisation is recommended prior to the redevelopment, the extent of which will be dependent on the future landuse, in order to further characterise the soil in those areas not covered in this investigation."

4. AUDITOR REVIEW OF ENVIRONMENTAL SITE ASSESSMENT

4.1 General

In order to assess whether the environmental consultant's report is satisfactory, the auditor has to determine whether

- the site history adequately defines the potential contaminants
- the sample density and testing frequency gives a representative picture of site conditions
- the selection of analytes adequately represents the potential contamination
- the selection of acceptance criteria is appropriate.

In determining the condition of the site, the auditor has to give consideration to defining the beneficial uses of the site. This includes issues relating to

- the health and wellbeing of humans, on or off the site
- environmental impacts to flora and fauna
- impacts of soil contamination on surface water and groundwater.

The EPA has indicated that the Site Audit Report should provide a concluding statement incorporating one of the following:

- the condition of the site is such that the site is suitable for unrestricted use
- the condition of the site is such that it is suitable only for certain stated uses; any conditions pertaining to the use of the site must be specified
- the condition of the site presents an unacceptable health and/or environmental risk, and is not suitable for any use unless remediated.

4.2 Background Studies

The background studies conducted by Rust PPK as part of the environmental assessment of the site were assessed by the auditor as being adequate to determine the potential for site contamination.

4.3 Sampling Frequency

A total of 20 soil boreholes was drilled to up to 2.3 m depth. This is equivalent to an average nominal grid spacing of about 22 m across the site.

The overall sampling frequency (i.e. the borehole spacing and the selection of samples) is considered by the auditor to be acceptable.

4.4 Laboratory Analysis Programme

The analytical requirements for the assessment were determined by Rust PPK in consultation with the auditor, and were based on an understanding of previous site activities and associated potential contaminants, together with the requirements of the Victorian EPA guidelines to provide a general screen for inorganic and organic compounds for a representative number of samples.

The analytical parameters are considered by the auditor to be sufficient to adequately characterise the level of contamination on the site.

4.5 Assessment Criteria

Selection of site specific assessment criteria can include the adoption of published criteria from regulatory authorities and from overseas publications, or the conduct of human health and ecological risk assessments.

For this environmental site assessment, Rust PPK adopted the SAHC (1993) Health Investigation Levels and the ANZECC/NH&MRC (1992) Environmental Investigation Levels, for assessing potential long term human health risks, and environmental risks, respectively. For the purpose of site specific health based risk analysis, the SAHC (1996) Proposed Health Based Soil Guidelines Exposure Settings D (residential with restricted soil access) and F (commercial/industrial) were used as reference criteria. In the case of analytes not covered by the nominated criteria, the Dutch Investigation and Intervention (Swartjes FA et al, 1993) values were referenced. The former Dutch C (ANZEC/NH&MRC, 1990), levels and the NSW EPA (1994) Guidelines for Assessing Service Station Sites were used as guidelines for TPH/BTEX.

The ANZECC/NH&MRC (1992) Environmental Investigation Levels are based on threshold levels for phytotoxicity and uptake of contaminants which may result in impairment of plant growth or reproduction, or unacceptable residue levels. These levels represent conservative values that protect the most sensitive receptor in the environment (i.e. plant life).

The proposed new Dutch Investigation and Intervention Levels are based on an integration of ecotoxicological and human-toxicological intervention values. These have not yet been adopted in Australia.

The former Dutch B and C criteria were developed for the protection of groundwater, which is the main source of potable water in the Netherlands.

The SAHC (1996) Proposed Health Based Soil Guidelines Exposure Setting D apply to residential developments with minimal opportunities for soil access, e.g. high rise apartments and flats. A 70 year exposure period has been assumed, except for those contaminants for which exposures over a much shorter period during childhood are critical.

The SAHC (1996) Proposed Health Based Soil Guidelines Exposure Setting F apply to commercial/industrial developments including shops, offices, factories and industrial sites. A 30 year exposure period has been assumed.

Given the nature and the findings of the environmental site assessment, and the proposed redevelopment strategy, adoption of the above assessment criteria is considered by the auditor to be appropriate.

4.6 Quality Assurance/Quality Control (QA/QC)

The QA/QC procedures undertaken for this assessment are documented in the Rust PPK report.

The quality assurance procedures adopted by Rust PPK included

- use of appropriate field sampling protocols
- use of appropriate sample containers, and sample preservation procedures (e.g. use of chilled esky) during transportation to the laboratory
- use of chain of custody forms, signed by the receiving laboratory
- laboratory quality control tests, including a field duplicate, an inter-laboratory duplicate, surrogate recoveries and replicate analyses
- quality assurance testing of a sample of rinse water.

The auditor was satisfied that these procedures were correctly implemented.

The laboratory analysis programme included the analysis of 4 field duplicates and 8 laboratory replicates.

The RPD was greater than 30% for the inter-laboratory duplicate results for copper and zinc. The RSD was also greater than 30% for copper. The Rust PPK report comments that the extraction methods used by the primary and the secondary laboratories were identical, and the analysis methods were compatible (ICP-AES/Flame Atomic Absorption Spectrometry). Therefore it was most likely that the difference in values for the inter-laboratory duplicates would be due to the heterogeneous nature of the soil, and the consequent difficulty in obtaining a true field duplicate sample. This explanation is accepted by the auditor.

One of the RPDs was greater than 20% for the laboratory replicate results for lead. The Rust PPK report comments that this could also be due to the heterogeneous nature of the soil, and the difficulty in obtaining two replicate samples from the soil sample in the laboratory. High RPDs can also be due to the relatively low quantities of analytes detected. This explanation is accepted by the auditor. The RSDs were within the accepted criteria for all of the replicates.

4.7 Findings and Recommendations

The detailed findings and recommendations presented by Rust PPK in their Environmental Site Assessment Report are endorsed by the auditor.

There was no background sampling or testing carried out. However, given the nature and the findings of the environmental site assessment, the absence of background data was not considered to pose a problem.

Groundwater was not intersected at the site to a depth of 2.3 m. While no leachability testing was conducted as part of this assessment, the alkaline nature and generally low permeability of the soils underlying the site should preclude leaching of contaminants.

5. CONCLUSIONS

A Site Audit Report has been prepared by Mr Adrian Hall of BC Tonkin & Associates for the Franklin Street Bus Station and Car Parks, Adelaide, for the Corporation of the City of Adelaide. An Environmental Site Assessment was performed by Rust PPK Pty Ltd.

As no soil testing was undertaken under the canopies, or under the floor slabs of the buildings, the extent of this audit has necessarily been confined to the open space areas of the site, with a total areal extent of approximately 0.98 hectares, as shown in Figure 2.1.

In the opinion of the auditor, the investigations have satisfactorily defined the nature and extent of contamination at the site.

The conclusions of this Site Audit Report are set out as follows:

- 1. The assessment program undertaken during May 1997 has identified elevated concentrations of heavy metals (lead, zinc, and copper) in excess of the ANZECC environmental and/or the SAHC health based guidelines within the fill materials recovered from:
- the driveway of the Coachfreight parcel collection and drop off point to the west of Bowen Street (BH4, lead and zinc only)
- the north east corner of the Grote Street public car park (BH14)
- the centre of the car park adjacent the storage building at 104 Grote Street used by the Adelaide Central Mission (BH20, zinc only).
- 2. An elevated PAH (benze (apprene) concentration in excess of the SAHC health based guidelines, was identified within the fill materials in the car park adjacent the storage building at 104 Grote Street (BH20). Elevated Total fluoride concentrations were identified within the surficial fill materials recovered from the north eastern corner of the Franklin Street Car Park and the south eastern corner of the Grote Street Car Park. These elevated levels of heavy metals, PAHs and fluoride are considered to be associated with fragments of ash, cinders and/or slag which were observed within the sub-surface soil profile within these locations.
- 3. Fragments of ash, cinders and/or slag were identified in thirteen out of the twenty sampling locations at the site and although elevated PAH, heavy metal and fluoride concentrations were not reported at all of these locations, it is considered that the relatively low proportion of the materials within the overall soil matrix may be resulting in a dilution effect on the analyte levels within the overall matrix. This therefore indicates the potential for high concentrations of localised (hotspot) PAH contaminants within the fill materials in boreholes BH4 and BH18 located on the western side of Bowen Street, and in all of the boreholes located on the eastern side of Bowen Street with the exception of boreholes BH9 and BH11. The fill materials containing ash and cinder fragments were generally identified to depths ranging from 0.5 m to 0.7 m across the site.
- 4. The surficial fill materials and the underlying natural soil were identified as being moderately alkaline, with soil pH at all locations reported above the ANZECC

environmental guidelines. The presence of moderately alkaline surface and sub-surface soils in conjunction with the natural tight clay profile and the apparent containment of any contaminants within the ash, cinder and/or slag fragments identified, indicates that the impacted fill materials are likely to pose negligible long term environmental risks to the underlying soils and groundwater.

5. As an aid in the identification of potential health based risks, all contaminant levels were also compared to the proposed health based soil guidelines (Langley et al 1996 - Exposure Settings D and F) for restricted residential (with limited soil access) and commercial/industrial land uses. The lead concentration reported in the fill materials recovered from the north eastern corner of the Grote Street Car Park was in excess of both landuse exposure scenarios. The concentrations of all analytes reported from the remaining sampling locations were below the prescribed levels for both land uses.

On the basis of the above conclusions, the auditor's considerations regarding the condition of the open space areas of the site are set out separately for the following four zones:

- Zone A Bus Depot 1 (Greyhound and McCaffertys), Grote Street and Franklin Street Car Parks
- Zone B 104 Grote Street
- Zone C Coachfreight and Adjacent Car Park
- Zone D Bus Depot 2 (Premier Stateline).

Zone A - Bus Depot 1 (Greyhound and McCaffertys), Grote Street and Franklin Street Car Parks

The auditor considers that this zone is suitable for continued existing use provided that the conditions as specified below are satisfied:

- 1. Generally, the findings of the assessment program have identified no requirements for any subsequent site characterisation or remedial works within this zone.
- 2. The exception is that a site specific risk assessment is required to address the elevated concentration of lead identified within the north eastern corner of the Grote Street Car Park. From a preliminary risk assessment perspective it is considered that the concentration and likely nature of the lead identified will not pose a limiting factor for the continued current usage of this area providing the bitumen surfaces are maintained and managed appropriately.

If this zone is to be developed for a more sensitive landuse, then further site characterisation is required, the extent of which will be dependent on the future land use, due to the presence of ash and cinders within the fill materials. If this zone is to be redeveloped to a land use of the same or similar sensitivity (for example commercial or restricted residential with no access to underlying soil), then

- 1. It is required that validation of any excavated soil be carried out in order to determine the required disposal method. Disposal as low-level contaminated waste may be necessary due to the potential for contamination to be present within the ash and cinders identified in this zone.
- 2. It is also required that appropriate health and safety precautions are taken during any possible future on-site earthworks, in order to protect workers and adjoining sites from exposure to potentially contaminated soils.

Zone B - 104 Grote Street

The auditor considers that this zone is suitable for continued existing use with no requirements for any subsequent site characterisation or remedial works.

If this zone is to be developed for a more sensitive landuse (for example residential), then it is required that more extensive site characterisation is carried out prior to the redevelopment. This is due to the presence of ash and cinders within the fill materials in this zone.

If this zone is to be redeveloped to a land use of the same or similar sensitivity (for example commercial or restricted residential with no access to underlying soil), then

- 1. It is required that validation of any excavated soil be carried out in order to determine the required disposal method. Disposal as low-level contaminated waste may be necessary due to the potential for contamination to be present within the ash and cinders identified in this zone.
- 2. It is also required that appropriate health and safety precautions are taken during any possible future on-site earthworks, in order to protect workers and adjoining sites from exposure to potentially contaminated soils.

Zone C - Coachfreight and Adjacent Car Park

The auditor considers that this zone is suitable for continued existing use with no requirements for any subsequent site characterisation or remedial works. This is contingent upon the adequate maintenance and management of the bitumen surfaces.

If this zone is to be developed for a more sensitive landuse (for example residential), it is required that more extensive site characterisation is carried out prior to the redevelopment. This is due to the presence of ash and cinders within the fill materials in this zone.

If this zone is to be redeveloped to a land use of the same or similar sensitivity (for example commercial or restricted residential with no access to underlying soil), then

- 1. It is required that validation of any excavated soil be carried out in order to determine the required disposal method. Disposal as low-level contaminated waste may be necessary due to the potential for contamination to be present within the ash and cinders identified in this zone.
- 2. It is also required that appropriate health and safety precautions are taken during any possible future on-site earthworks, in order to protect workers and adjoining sites from exposure to potentially contaminated soils.

Zone D - Bus Depot 2 (Premier Stateline)

The auditor considers that this zone is suitable for continued existing use with no requirements for any subsequent site characterisation or remedial works.

If this zone is to be developed for a more sensitive landuse (for example residential), it is required that more extensive site characterisation is carried out prior to the redevelopment, the extent of which will be dependent on the future landuse.

It is also a requirement of this audit that the auditor be kept informed of the progress of any site redevelopment activities, and that opportunity be given to the auditor to ensure that the above conditions are adhered to.

If any part of the site is redeveloped, then a report, containing evidence by way of checks and test surveys that the above requirements have been met, is to be submitted to the auditor for approval.

Signed:

A.M.D. Kall

AMD Hall, MIE Aust Chartered Professional Engineer Associate Director Environmental Auditor (Contaminated Land)

BC TONKIN & ASSOCIATES

Date: 1 August 1997
6. **REFERENCES**

- ANZEC/NH&MRC (1990), Draft Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites, Australia and New Zealand Environment Council (ANZECC), National Health and Medical Research Council (NH&MRC), June 1990.
- ANZECC/NH&MRC (1992), Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites, Australian and New Zealand Environment and Conservation Council and National Health and Medical Research Council.

NSW EPA (1994) Guidelines for Assessing Service Station Sites, December 1994.

- SAHC (1996) The Health Risk Assessment and Management of Contaminated Sites, Proceedings of the Third National Workshop on the Health Risk Assessment and Management of Contaminated Sites, Contaminated Sites Monograph Series No 5.
- SAHC (1993) A Practical Guide to the Health Risk Assessment and Management of Contaminated Land in SA, Public and Environmental Health Service, January 1993.
- Swartjes FA and van den Berg R (1993), Remediation of Contaminated Soil and Groundwater: Proposals for Criteria and Priority Setting.

APPENDIX A

Rust PPK Pty Ltd, 1997, Site History Report for the Franklin Street Bus Station, Located at 85-129 Franklin Street, Adelaide, for the Corporation of the City of Adelaide, 6 March 1997

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Site History Report for the Franklin Street **Bus Station**, Located at 85-129 Franklin Street, Adelaide

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The Corporation of the City of Adelaide

Rust PPK Pty Ltd Environment & Infrastructure Adelaide SA 5000 11 March 1997 27J062A 97/143

100 North Terrace PO Box 398 Adelaide SA 5001 Australia Telephone: (61 8) 8405 4300 Facsimile: (61 8) 8212 4686

A NATA Certified Quality Company

Our Reference 2735/2905/27J062A

1 July 1997

Mr Brian Fitzpatrick The Corporation of the City of Adelaide GPO Box 2252 ADELAIDE SA 5001

Dear Sir

Site History Report for the Franklin Street Car Park

We are pleased to provide the Draft Site History report for the Franklin Street Bus Station. Potential contamination issues have been identified and we have made recommendations accordingly. If you have any queries regarding the content of this report, or would like to engage our services in carrying out the recommendations, please contact the undersigned.

Yours faithfully

John Iddles Senior Environmental Consultant Rust PPK Pty Ltd

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Executive Summary

Rust PPK Pty Ltd was commissioned by The Corporation of the City of Adelaide, to investigate and report on potential site contamination, environmental and other related issues arising from historical and current site activities on a 0.5 hectare section of land on the western side of Bowen Street, and a 0.9 hectare section of land on the eastern side of Bowen Street, Adelaide. The purpose of this report is to identify potential contaminants in the soil and other environmental issues.

Site Description

The site currently contains the following features:

- the Premier Stateline bus terminal and canopy on the north-west of the site;
- the Coachfreight parcel collection and drop off point (including storage shed) in the west of the site;
- *a bitumen-sealed private car park in the south-west of the site;*
- the Greyhound and McCafferty's Express bus terminals and canopy on the north-east of Bowen Street;
- a single storey house, a private car park, a toilet block and a two-storey building occupied by the Adelaide Central Mission on the south-east of Bowen Street; and
- two bitumen sealed public car parks in the east of the site owned and operated by The Corporation of the City of Adelaide.

Historic Overview

- From 1850 until the early 1900s the site was used generally for residential purposes, but there were also a number of commercial premises, a garage, forge, workshop, bakehouse, and a private road.
- From the 1920s a number of small light industries were established on the site. These included a factory, garages, forges, stables, printing works, workshops, shops and offices. Some of the occupants included the Franklin Wrecking Co, J.W. Turner, a plumber, Oxywelders Ltd, the O'Donnell Brothers Ltd, and a number of radio and electrical companies.
- During the 1960's a large proportion of the residential land in the western part of the site had been cleared and was used as an open lot car park by Dimet Corrosion Prevention Pty Ltd and I. and M. Jedynak.
- The Corporation of the City of Adelaide had acquired most of the land comprising the site by 1972, excepting the land contained in Certificates of Title 5060/608 and 1751/37. The land was then cleared and by 1979 the majority of the existing bus terminals and car parks had been constructed.
- The residences on land contained in Certificates of Title 5060/608 and 1751/37 were acquired by The Corporation of the City of Adelaide in the early 1990s, and are currently used by the Adelaide Central Mission to store furniture. The front part of the building at 104 Grote Street has been condemned by the Council due to problems with rust and cracking.
- Between 1989 and 1995, a new terminal building was constructed on the eastern side of Bowen Street, on what was previously either car or bus parking space.

Potential Contamination Associated with Previous Land Uses

- Polycyclic aromatic hydrocarbons (PAHs) may be potential contaminants from residential land uses where coal and ashes may have been disposed of on-site.
- Benzoyl peroxide, polycyclic aromatic hydrocarbons (PAHs) (due to the disposal of coal and ashes on-site) and hydrocarbons (due to the storage of fuels on-site) are potential contaminants associated with bakeries, and therefore may be present in the north-eastern part of the site.
- J.W. Turner operated a plumbing business in the north-east of the site. A range of contaminants are associated with plumbing supplies and their usage, including acids, solvents, lead, silver, zinc and arsenic.
- Two forges were established on the site at various times. Potential contaminants that may have been generated by their operation include a broad range of metals and heavy metals, solvents, cyanides, phenols, phosphorous, halogenated compounds, polychlorinated biphenyls (PCBs), hydrocarbons, monocyclic aromatic hydrocarbons (MAHs) and polycyclic aromatic hydrocarbons (PAHs).
- An oxy-welding company was established in a warehouse in the north-east of the site, and remained in operation for at least 10 years. Similar contaminants would have been generated by the welding processes, as in the forge, however specific contaminants may include chromium, fluorides, nitrogen, thorium, titanium, vanadium, zinc and benzene.
- A number of radio and electrical companies occupied a warehouse in the south-eastern part of the site. Potential contaminants from these businesses may include metals, PCBs, MAHs, halogenated compounds, boron, chlorinated naphthalenes, chlorodiphenyls, phthalates and hydrocarbons.
- A wrecking company and two garages have also been in operation on the site. Contaminants associated with these businesses include petroleum hydrocarbons, a range of heavy metals including lead, volatile organic compounds, degreasing solvents, anti-freeze compounds, PCBs, asbestos, MAHs and other organic compounds. Underground fuel storage tanks may possibly have been used to store the fuels. It could not be ascertained whether these have ever existed on the site.
- Printing works may have caused contamination with heavy metals (in particular chromium, magnesium, and zinc), other metals (particularly silver), alkalis, inorganic acids, petroleum hydrocarbons, solvents, MAHs, halogenated compounds, ethyl acetate, ethanol, and isopropanol.
- Dimet Corrosion Pty Ltd also owned some land in the north-west of the site, however the aerial photographs did not indicate any structures on the site at that time. If corrosion inhibitors were used or manufactured on the site then the potential contaminants may include heavy metals (including Boron associated with Borax), other metals (including tin, lead, copper, and zinc), and amines, phosphates and nitrates.

There were also various leases on some of the properties to occupants whose business could not be ascertained, therefore there may be contaminants present in addition to those already mentioned above.

Potential Contamination Associated with Current Land Uses

- There may be polycyclic aromatic hydrocarbons (PAHs) in the soil underlying the bitumen due to tar based sub-base materials used in the past.
- Hydrocarbon spillages and leaks from cars and buses may have leached through the bitumen into the soil strata where there are cracks in the bitumen surface.
- Power switchboards in a number of the terminal buildings may contain asbestos.
- A rubber conveyor belt in the Coachfreight storage shed may contain asbestos.
- Asbestos may exist in the building materials of the old houses on the eastern side of Bowen Street that are currently used by The Adelaide Central Mission.
- White ant treatments may have used on the soil beneath the buildings and on surfaces prior to sealing with bitumen. Potential contaminants associated with this may include, organochlorine pesticides (OCPs), organophosphate pesticides (OPPs) and heavy metals such as arsenic.

1. Introduction

Rust PPK Pty Ltd was commissioned by The Corporation of the City of Adelaide, to investigate and report on potential site contamination, environmental and other related issues arising from historical and current site activities at The Franklin Street Bus Station, some residential properties and two associated public car park sites. The site is divided into two irregularly shaped parcels of land located on the eastern and western sides of Bowen Street. The section to the east of Bowen Street has an area of approximately 0.9 hectares and incorporates 85-107 Franklin Street, 2-40 Bowen Street, 84-94 Grote Street, 102-106 Grote Street, and an access road from Rowlands Place. The section to the west of Bowen Street has an area of approximately 0.5 hectares, and incorporates 111-129 Franklin Street, 4-8 Andrew Street, and 1-29 Bowen Street, Adelaide.

2. Background Information

2.1 Site Identification

The subject site comprises two irregularly shaped parcels of land to the east and west of Bowen Street. Each of these parcels comprises a number of allotments which are described under different Certificates of Title, as listed in Table 2.1 and Table 2.2 below.

The Locality Plan for the site is contained in Appendix A, and the site plans showing the current layout of the site are contained in Appendix B.

The total area of the site is approximately 1.41 hectares.

Certificate of Title Reference	Land Description	Area (m ²)
226/124	Town Acre 263	1983.80
1639/119	Town Acre 310	2760.50
1663/99	Town Acre 309	83.60
1751/37	Town Acre 311	648.80
1922/48	Town Acre 263	986.26
5060/608	Allotment 1 in DP 32560	580.00
5317/61	Allotment 12 in DP546	149.60
5317/62	Allotment . 91 in FP166443	348.69
5317/63	Allotment 92 in FP166444	271.50
5317/64	Allotment 93 in FP166445	526.90
5317/65	Allotment 91 in FP170401	816.37
TOTAL	· · · · ·	9156.02

Table 2.1Allotment Details for the Eastern Side of Bowen Street

Table 2.2Allotment Details for the Western Side of Bowen Street

Certificate of Title Reference	Land Description	Area (m ²)
2023/96	Town Acre 311	260.67
2128/45	Town Acre 311	257.80
2201/187	Town Acre 311	259.70
3479/180	Town Acres 261 & 262	1744.00
3582/78	Town Acre 261	509.70
3582/79	Town Acre 262	490.04
3582/80	Town Acres 261 & 262	1122.90
3841/122	LTRO Plan 546	340.60
TOTAL		4985.41

2.2 Ownership

The current Certificates of Title show the site to be owned by The Corporation of the City of Adelaide.

2.3 Party Responsible for Assessment

The Corporation of the City of Adelaide GPO Box 2252 ADELAIDE SA 5001.

2.4 Environmental Consultant

Rust PPK Pty Ltd 100 North Terrace Adelaide SA 5000.

2.5 **Proposed Land Use**

At the time of the report, the proposed land use was unknown.

2.6 **Operator of Site**

There are currently a number of passenger and freight transport operators on the site. These include Premier Stateline, Coachfreight, Greyhound Pioneer Australia, McCafferty's Express Coaches, as well as The Adelaide Central Mission. The Corporation of the City of Adelaide also operates two public car parks on the site.

3. Site History

3.1 Site Location

The site is divided into two irregularly shaped parcels of land located on the eastern and western sides of Bowen Street. The street addresses for the section to the east of Bowen Street includes 85-107 Franklin Street, 2-40 Bowen Street, 84-94 Grote Street, 102-106 Grote Street, and an access road from Rowlands Place. The section to the west of Bowen Street has an area of approximately 0.5 hectares, and incorporates 111-129 Franklin Street, 4-8 Andrew Street, and 1-29 Bowen Street, Adelaide.

To the east, the site is bordered by the Dreamland Furniture store on Grote Street, and a disused warehouse on Franklin Street. Some light industrial facilities exist to the west of the site, such as the Jaguar Daimler Service Centre on Andrew Street. The Grote Street Church of Christ, and the accompanying church hall divide the south-eastern part of the site into two portions. These latter two buildings are included on the Register of the City of Adelaide Heritage Items.

The Corporation of the City of Adelaide have advised that the site is part of the F8 Franklin Street East Precinct. Any proposed development must comply with the zoning regulations specified by the Council which apply to this area. These regulations, which are contained within Appendix C, specify the desired and non-complying land uses. Desired uses include general offices, consulting rooms, cafes, shops, ancillary retail services, licensed premises, leisure studios, showrooms, passenger terminals and minor transport depots.

3.2 Site History of Land East of Bowen Street

3.2.1 History of Ownership

The following tables summarise the land ownership on the eastern side of Bowen Street from the early 1900's to the present, as documented in Certificates of Title which are held at the Land Titles Office.

Date	Ownership	CT Reference
15/3/1935	Goode Durrant and Company Limited, of Grenfell Street, Adelaide.	1639/119 (Current)
22/2/1935	Company name change to Goode Durrant and Murray Limited.	
27/7/1938	Portion leased to A.Z. Radio Pty Ltd, for 5 years. Lease number 1269127.	
28/11/1947	Leased to National Radio Corporation Ltd for 3 years. Lease number 1521372.	
7/2/1955	Portion leased to Servex Electrical Company Pty Ltd for 5 years. Lease number 1874445.	1639/119

Table 3.1
History of Ownership - Part Town Acre 310, Grote Street

Date	Ownership	CT Reference
23/12/1957	Name change to Goode Durrant and Murray (Consolidated) Ltd of 45	1639/119 (Contd)
	Grenfell Street, Adelaide.	
12/5/1964	Goode Durrant and Murray (Australia) Limited of Durrant house,	
	Cheswell Street, London.	
29/10/1968	The Corporation of the City of Adelaide.	

Table 3.2History of Ownership - Part Town Acre 263, Off Rowlands Place

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Date	Ownership	CT Reference
	This title is for a right of way from Rowlands Place to the land	1663/99 (Current)
	contained in Certificate of Title 1639/119.	
	Leases and transfers as for 1639/119, above.	
29/10/1968	The Corporation of the City of Adelaide.	

Table 3.3
History of Ownership - Part Town Acre 263, Franklin Street

Date	Ownership	CT Reference
3/1/1947	John William Turner, Plumber, of 85 Franklin Street, Adelaide.	1922/48 (Current)
21/11/1946	Abraham Silk and Hyman Silk, Merchants, of Queen Victoria	
	Markets, Melbourne.	
24/6/1947	Portion of land leased to J.W. Turner.	
1/10/1962	Death of Hyman Silk.	
16/2/1970	The Corporation of the City of Adelaide.	

Table 3.4History of Ownership - Part Town Acre 263, Franklin Street

Date	Ownership	CT Reference
18/5/1876	Albert Ogilvie Laffer and Henry Laffer, Drapers, of Adelaide. Various leases (no occupations given) until 10/9/1938	226/124 (Current)
10/9/1938	Lease to O'Donnell Brothers Ltd.	
14/8/1948	Death of last owner.	
6/4/1970	Caveat lodged over the land by O'Donnell Brothers Pty Ltd (No 3091291).	
23/5/1972	Transfer of land, subject to the above caveat, to The Corporation of the City of Adelaide.	

Table 3.5
History of Ownership - Part Town Acre 262, Allotment 4
(corner of Franklin Street and Bowen Street)

Date	Ownership	CT Reference
19/7/1944	Trustees:	1833/140
	-E.H. Bakewell, pastoralist;	
	-A.F. Gray, out of business; and	
	-Sir W. Goodman, General Manager of Tramways Trust	
29/6/1944	Vested in Gray, Goodman and L.Walter (co-director)	
5/9/1958	As trustees of an Estate:	2608/122
	-L.W. Walter, co-director;	
	-H.Pickering, chartered accountant; and	
	-Executor Trustee and Agency Co of SA Ltd.	
15/2/1968	The Corporation of the City of Adelaide.	
15/2/1968	The Corporation of the City of Adelaide	5317/65
		(current)

Table 3.6History of Ownership - Part Town Acre 262, Allotment 12
(Private Road)

Date	Ownership	CT Reference
7/11/1871	James Smith, Daniel Kekwick and George Shaw, Gentlemen of Adelaide.	160/22
	Various transfers of potions of land.	
	In DP546, this road was redesignated as allotment 12.	
20/1/1972	Private road closed (announced in the Gazette of this date).	
18/10/1989	Private Road acquired by the Corporation of the City of Adelaide.	
12/2/1990	The Corporation of the City of Adelaide	4353/276
	The Corporation of the City of Adelaide	5317/61
		(current)

Table 3.7

History of Ownership - Part Town Acres 262 and 263

Date	Ownership	CT Reference
23/9/1880	Alfred Simpson and Alfred Muller Simpson, Manufacturers.	343/35
11/5/1892	Alfred Muller Simpson and Violet Laura Simpson, his wife.	
16/7/1913	Alfred Muller Simpson, manufacturer (as above).	
19/3/1936	Alfred Allen Simpson, Frederick Neighbour Simpson, Alfred Moxon	
	Simpson (manufacturer).	
5/2/1957	Alfred Moxon Simpson, Thomas Bridge Simpson, David Owen Crompton.	
12/1/1960	Portion of lot sold to Auriga Limited (Certificate of Title 2762/199, which is now Certificate of Title 5317/64, refer below). Remaining portion changed to Certificate of Title 2762/200, now Certificate of Title 5317/62.	
6/6/1960 16/1/1968	Auriga Limited of 47 Waymouth Street, Adelaide. The Corporation of the City of Adelaide.	2762/199

Date	Ownership	CT Reference
	The Corporation of the City of Adelaide.	5317/64 (Current)
6/6/196 0	-A.M. Simpson, manufacturer, of Pirie Street, Adelaide	2762/200
	-T.B. Simpson, merchant, of Pirie Street, Adelaide	(from 343/35)
	-D.O. Crompton of 149 Barton Terrace, North Adelaide, Medical	
	Practitioner.	
23/5/1966	The Corporation of the City of Adelaide	
	The Corporation of the City of Adelaide.	5317/62 (Current)

Table 3.8History of Ownership - Part Town Acre 262

Date	Ownership	CT Reference
8/1/1872	William Bloor of Adelaide, Cooper	161/121
28/9/1896	After W. Bloor's death, transfer to M.Bloor (widow), C. Bloor	
	(spinster), and E. Hague (storekeeper of Truro).	
22/1/1903	C.Bloor, M. A. Bloor, and S. Bloor, all spinsters of Park Street,	
	Unley.	
12/12/1907	The Church of Christ, Grote Street, Adelaide Incorporated.	
21/4/1970	The Corporation of the City of Adelaide.	
,	The Corporation of the City of Adelaide	5317/63

Table 3.9History of Ownership - Part Town Acre 310, Allotment 1

Date	Ownership	CT Reference
11/12/1888	William Bloor of Adelaide, Cooper	94/119
28/9/1896	After W. Bloor's death, transfer to M.Bloor (widow), C. Bloor	
	(spinster), and E. Hague (storekeeper).	
22/1/1903	C.Bloor, M. Bloor, and S. Bloor, all spinsters of Park Street, Unley.	
12/12/1907	The Church of Christ, Grote Street, Adelaide Incorporated.	
	This is a small 8 foot wide strip of land at the southern end of the main block (Certificate of Title $94/(19)$)	1751/38
6/6/1940	The Church of Christ Grote Street Adelaide Incorporated	
0/0/1940	This Certificate of Title includes previous Certificate of Titles 1751/38 and 94/119.	4391/861
20/11/1991	The Church of Christ, Grote Street, Adelaide Incorporated.	
	The Corporation of the City of Adelaide	5060/608 (current)

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Date	Ownership	CT Reference
6/6/1940	May E.A. Leditschke of 9 South Terrace, Adelaide, married woman.	1751/37 (Current Title, from original title 134/49)
19/3/1970	The Churches of Christ Evangelistic Union Incorporated, of 189 Gawler Place Adelaide	
30/9/1988	The Corporation of the City of Adelaide	
30/9/1988	Leased to The Churches of Christ Evangelistic Union Incorporated for 2 years from 30/9/1988. Lease Number 6611267.	

Table 3.10History of Ownership - Part Town Acre 311, Allotment 1

3.2.2 Adelaide City Council Archives

The Assessment Books at the Adelaide City Council Archives were reviewed on the basis of the relevant Town Acre reference, to provide an indication of the occupation, ownership and use of the properties on the eastern side of Bowen Street in 1850, 1900, 1922, 1934, 1939 and 1949. This information correlates well with that provided by the review of the Certificate of Titles as summarised in Section 3.2 above.

- In 1850; the site was being established as a residential area, with some existing houses, a few houses in the construction phase, and some vacant land.
- In 1900 the eastern side of Bowen Street contained a number of houses, some vacant land, a few shops, a bakehouse (off Franklin Street) and the United Disciples Church. These premises were all owned by various Adelaide residents.
- The land use had not changed significantly by 1922, however a number of families owned significant portions of the land, for example the Simpson family owned two houses, two shops and some vacant land. The family retained ownership of the houses, shops and vacant land on Bowen Street at least until 1949. The shop on Bowen Street was occupied by the Franklin Wrecking Co. in 1949, and a marine store and shed had been built on the vacant land (also on Bowen Street) by that year.
- In 1922 Albert and Henry Laffer owned the following which were leased out to various tenants; workshop, stables, forge, showroom, shop, offices, a house and some vacant land. There was no longer evidence of the forge and stables in 1934, however the Laffer's retained ownership of the offices, workshops, showroom, house and yard until 1949.
- In 1922, the Church of Christ, Grote Street, Adelaide Incorporated owned a church, a school, a house at 22 Bowen Street, a trap (a term used in the assessment books), a shed and some vacant land on Bowen Street. By 1934, the Church had built some additional buildings on the land that they owned. At this point in time in addition to the structures listed above, the Union owned two houses at 24 and 26 Bowen Street, printing offices and works, a yard and some sheds, and offices and rooms which were leased out to various occupants at least up until 1949.

- By 1934, Goode, Durrant and Co Ltd owned a warehouse on Grote Street. The warehouse was unoccupied in 1934, and was leased out to the National Radio Corporation Ltd in 1939. The Education Department were also using some of the offices in the building in 1949.
- The Grays Estate (Bakewell, Gray and Goodman) owned a garage, workshop and offices at 101-111 Franklin Street at least from 1934 to 1949.
- J.W. Turner had acquired a house, workshop and offices by 1934. Oxy-welders Ltd occupied part of the workshop at least from 1934 until 1949. Turner himself occupied the remainder of the workshop for at least the same period. Ownership of this property had been transferred to A. and H. Silks by 1949, however the occupants remained unchanged.

3.2.3 Aerial Photographs

Aerial photographs of the site were examined from 1949 and thereafter at ten year intervals. The most recent photograph available was also examined. The features noted in each photograph for the section of the site to the east of Bowen Street are detailed below.

1949

This photograph was difficult to discern, however the layout of the buildings seemed to adhere approximately to the boundaries set by the current Certificates of Title. In some cases fences were visible along the allotment boundaries.

There was clearly a large warehouse type building in the south-east corner of the site. In the south west corner there were a number of smaller buildings, and possibly some small private parking lots, and vacant land.

There were a number of buildings ranging in size from small buildings (possibly houses) to warehouses, across the northern part of the site. Especially distinct was a large warehouse in the north-west corner. There was also some vacant space around the northern part of the site which appeared to be used as a car park.

1959

The layout of the site in this photograph was very similar to the photograph taken in 1949, however the images were much more distinct.

1968

There were only a few changes to the layout of the site from the earlier photographs. There was a small change in some of the fencelines in the south-western part of the site, and a car park in the central part of the site (accessed from Bowen Street) appeared to have been bitumenised.

1979

The entire site has been completely restructured. The current bus terminals and car parks were clearly visible.

1989

As above.

1995

A new terminal building had been constructed just off Bowen Street, on the current Certificate of Title 5317/63. This area was previously used as either car or bus parking space.

Aerial photographs examined are listed in Table 3.11 below:

Photo No	Survey No	Scale	Month	Year
661	5001	1:20000	26/9/95	1995
190	4091	1:20000	6/9/89	1989
19	2408	1:16000	19/3/79	1979
0151	1126	1:15800	15/11/68	1968
9396	326	1:16000	3/1/59	1959
106	7	1:15840	· 18/1/49	1949

Table 3.11List of the aerial photographs examined

3.2.4 Historical Overview

The following information summarises the knowledge gleaned from the Certificate of Titles, the Assessment Books at the Adelaide City Council Archives, and the aerial photographs, for the section of the site located to the east of Bowen Street.

- From 1850 up until the early 1900s, the land was used generally for residential purposes, with a few shops, and a bakehouse, and a private road.
- In 1900 the eastern side of Bowen Street was generally used as private premises, containing a number of houses, some vacant land, a few shops, a bakehouse (off Franklin Street) and the United Disciples Church. These premises were all owned by various Adelaide residents.
- The land use had not changed significantly by 1922, however a number of families had begun to own significant portions of the land, these are discussed further below.
- The property in the north-western corner of the site, which appeared to be a large warehouse in the early photographs, included a garage, workshop and offices. This property was transferred between a number trustees from 1934 to 1968, when it was transferred to The Corporation of the City of Adelaide.
- From 1880, the Simpson family owned property in the northern part of the site, including two houses, two shops and some land. The shop on Bowen Street was occupied by the Franklin Wrecking Co. in 1949, and a marine store and shed had been built on the vacant land (also on Bowen Street) by that year. The family retained ownership of most of the land on Franklin Street until 1966, when it was transferred to The Corporation of the City of Adelaide, however the land on Bowen

Street was sold to Auriga Ltd in 1960, and then transferred to The Corporation of the City of Adelaide in 1968.

- In 1876 Albert and Henry Laffer, drapers, owned some land in the north-central part of the site. By 1922 this land included the following which were leased out to various tenants; workshop, stables, forge, showroom, shop, offices, a house and some vacant land. There was no longer evidence of the forge and stables in 1934, however the Laffers retained ownership of the offices, workshops, showroom, house and yard until 1949. The O'Donnell Brothers Ltd were leased the property, from 1938 until the death of the last owner in 1948. They lodged a caveat over the land in 1970, and in 1972, ownership was transferred to The Corporation of the City of Adelaide.
- J.W. Turner, a plumber, had acquired a house, workshop and offices in the north-east corner of the site by 1934. Oxy-welders Ltd occupied part of the workshop at least from 1934 until 1949. Turner himself occupied the remainder of the workshop for at least the same period. Ownership of this property was transferred to A. and H. Silks in 1946, however the occupants remained unchanged. This land was then handed over to The Corporation of the City of Adelaide in 1970.
- The Bloor family owned a house and some vacant land on Bowen Street from 1872 until 1907 when it was transferred to the Church of Christ, Grote Street, Adelaide Incorporated. By 1934 the church owned three houses (at 22, 24 and 26 Bowen Street), printing works, a yard and sheds, and various offices and rooms which were leased out to various occupants at least up until 1949. In 1940 Mrs M.A. Leditschke owned a house on the corner of Bowen and Grote Streets which was also transferred to The Churches of Christ Evangelistic Union Incorporated in 1970. By 1991, Certificates of Title 5060/608, 5317/63 and 1751/37 had been transferred to The Corporation of the City of Adelaide. These allotments are currently occupied by The Adelaide Central Mission and used to store furniture. The building at 104 Grote Street has recently been condemned by the Council due to cracking and rust problems, and is therefore disused.
- By 1934, Goode, Durrant and Co Ltd owned a factory in the south-east of the site on Grote Street which was later expanded to include some offices and a warehouse. The factory was unoccupied in 1934, however from 1938 to approximately 1960, a number of radio and electrical companies occupied the warehouse. The Education Department were also using some of the offices in the building in 1949. This land was then handed over to The Corporation of the City of Adelaide in 1968.
- The Corporation of the City of Adelaide had acquired most of the land on the eastern side of Bowen Street by 1972, excepting Certificates of Title 5060/608 and 1751/37. The land was then cleared and by 1979 the existing bus terminal (which is currently occupied by Greyhound Pioneer Australia) and car parks had been constructed.
- Between 1989 and 1995, a new terminal building was constructed on Bowen Street, on what was previously either car or bus parking space. This building is currently occupied by McCafferty's Express Coaches.

3.3 Site History of Land West of Bowen Street

3.3.1 History of Ownership

The following tables summarise the land ownership on the western side of Bowen Street from the early 1900's to the present, as documented in Certificates of Title which are held at the Land Titles Office.

 Table 3.12

 History of Ownership - Part Town Acre 311, Andrew Street

Date	Ownership	CT Reference
29/4/1952	Eva Marjory Halliday, widow, of Forest Gardens.	2201/187 (Current, from 248/83)
12/7/1966	E.M. Halliday and Malcolm G. Halliday of the same address, Engineer	
12/7/1966	Lease to R.H. Halliday Engineers Pty Ltd from 1/6/1966 to 31/5/1971.	
13/7/1971	The Corporation of the City of Adelaide.	

Table 3.13History of Ownership - Part Town Acre 311, Andrew Street

Date	Ownership	CT Reference
17/5/1949	Robert H. Halliday, Engineer, of Forest Gardens, Engineer.	2128/45 (Current - from 276/248
28/3/1952	After the death of R.H. Halliday, ownership was transferred by Public Trustee to Eva M. Halliday, widow.	
12/7/1966	E.M. Halliday and M.G. Halliday	
12/7/1966	Lease to R.H. Halliday Engineers Pty Ltd from 1/6/1966 to 31/5/1971.	
13/7/1971	The Corporation of the City of Adelaide.	

Table 3.14

History of Ownership - Part Town Acre 311, Andrew Street

Date	Ownership	CT Reference
17/5/1949	Robert Harold Halliday, Engineer, of Andrew Street, Adelaide (the	2023/96 (Current -
	first of the three adjacent blocks acquired by the Halliday's).	from 318/55)
	Transfers as per Certificate of Titles 2128/45 and 2201/187.	
13/7/1971	The Corporation of the City of Adelaide.	

Date	Ownership	CT Reference
	This Certificate of Title refers to Lots 1,2,3,5 and 6 of Town Acres	249/169
	261 and 262.	
10/5/1877	Andrew Tennant, Gentleman of Adelaide.	
19/7/1913	Death of A. Tennant.	
10/8/1919	-John Tennant, Sheep Farmer	
	-Frederick Augustus Tennant, of Adelaide, Solicitor	
	-John Tennant Love, of Adelaide, Stock Salesman	
21/11/1937	F.A. Tennant died.	
13/7/1938	J.Tennant, J.Tennant Love, Andrew Tennant	
3/5/1940	-Richard George Hawker of Bungaree, Clare	249/169 (Old)
	-Andrew Tennant of Stony Gap, Pastoralist.	
24/2/1967	lzydor Jedynak and Maria Jedynak purchased lots 5 and 6, which	
	then became Certificate of Title 3479/180.	
7/3/1967	Tennant Industries Pty Ltd retain ownership of Lots 1,2 and 3, which	
	then became Certificate of Title 3479/181.	
3/4/1967	Tennant Industries Pty Ltd own Lots 1, 2 and 3 of Town Acres 261 and 262	3479/181
16/8/1968	Dimet Corrosion Prevention Ptv Ltd purchased Lot 1, which then	
	became Certificate of Title 3582/78 (refer below).	
16/8/1968	Ownership of Lots 2 and 3 is divided amongst several stakeholders:	
	-Dimet Corrosion Prevention Pty Ltd (3/9)	
	-Oak Pty Ltd (3/9)	
•	-Clive Langdon Bonython (1/9)	
	-Richard Martin Bonython (1/9)	
	-James Langdon Bonython (1/9)	
	This then became Certificate of Title 3582/79 and 3582/80, refer	
	below.	
1/3/1971	Dimet Corrosion Pty Ltd of Cawley Rd, Brooklyn, Victoria.	3582/78 (Current)
1/3/1971	The Corporation of the City of Adelaide.	
1/3/1971	Transfer from the Dimet Corrosion Pty Ltd, Oak Pty Ltd, and C.L,	3582/79
	R.M. and J.L. Bonython to the Corporation of the City of Adelaide.	(Current)
1/3/1971	Transfer from the Dimet Corrosion Pty Ltd, Oak Pty Ltd, and C.L,	3582/80
	R.M. and J.L. Bonython to the Corporation of the City of Adelaide.	

Table 3.15History of Ownership - Part Town Acre 261 and 262, Franklin Street

3.3.2 Adelaide City Council Archives

The Assessment Books at the Adelaide City Council Archives were reviewed on the basis of the relevant Town Acre reference, to provide an indication of the occupation, ownership and use of the properties in 1850, 1900, 1922, 1934, 1939 and 1949. This data correlates well with that provided by the review of the Certificate of Titles as summarised in Section 3.6 above.

- In 1850, the site was being established as a residential area, with some existing houses, a few houses in the construction phase, and some vacant land.
- In 1900, the western side of Bowen Street was basically used as a residential area.
- The land use had not changed significantly by 1922, however a number of families had begun to own significant portions of the land. The Tennant Estate owned several houses on Bowen Street, Franklin Street and Little Bowen Street (a private road

which later became known as Tennant Court), which they maintained at least until 1949. J.E. Bateup owned 3 houses and a garage on Andrew Street.

- No significant changes had occurred in 1934.
- By 1939, the houses owned by J.E. Bateup had been transferred to R.H. Halliday, however Bateup retained ownership of the garage at least until 1949. Halliday had constructed a forge by 1939, probably on current Certificate of Title 2128/45.
- By 1949 Halliday had also constructed a workshop on one of his Andrew Street properties.

3.3.3 Aerial Photographs

Aerial photographs of the site were examined from 1949 and thereafter at ten year intervals. The most recent photograph available was also examined. The features noted in the area to the west of Bowen Street in each photograph are detailed below.

1949

This photograph was difficult to discern, however there appeared to be a number of small buildings along Franklin Street, with a lot of vacant land, which may have been private gardens.

1959

The layout of the site in this photograph was similar to the photograph taken in 1949, however it was much clearer.

The land represented under Certificate of Title 3841/122 appears to be a road, which ran parallel to Franklin Street providing a throughway from Bowen Street to Morphett Street. This was originally known as Little Bowen Street, but later came to be known as Tennant Court.

There appeared to be a row of terraced houses fronting on to Bowen Street, south of Tennant Court, with additional buildings behind them. Three large buildings running parallel to Andrew Street existed on the southern-most section of the site. The land use of the remainder of the area was still unclear, but appeared to be either residential or vacant land.

1968

The north-western corner of the site has been cleared and replaced with a bitumen sealed open-lot car park. A number of buildings existed in the north-eastern corner of the site, although it is difficult to tell if these were new buildings, or the same ones that had appeared on the earlier photographs.

The terraced houses still exist on Bowen Street, however the area to the west of these buildings, south of Tennant Court had also been cleared for use as an open-lot car park.

The three large buildings to the south of the site were also still in existence.

1979

The entire site has been completely restructured. The current bus terminals and car parks were clearly visible.

1989

The layout of the site has not changed since the previous photograph.

1995

The layout of the site has not changed since the photograph taken 1979.

Aerial photographs examined are listed in Table 3.16 below:

Photo No	Survey No	Scale	Month	Year
661	5001	1:20000	26/9/95	1995
190	4091	1:20000	6/9/89	1989
19	2408	1:16000	19/3/79	1979
0151	1126	1:15800	15/11/68	1968
9396	326	1:16000	3/1/59	1959
106	7	1:15840	18/1/49	1949

Table 3.16List of the Aerial Photographs Examined

3.3.4 Historical Overview

The following information summarises the knowledge gleaned from the Certificate of Titles, the Assessment Books at the Adelaide City Council Archives, and the aerial photographs, for the section of the site located to the west of Bowen Street.

- From 1850 up until the late 1960s, the land was used for residential purposes, with the exception of a garage owned by J.E. Bateup, and a forge and workshop operated by R.H. Halliday, both on Andrew Street.
- During the 1960's a large proportion of the residential land in the western part of the site had been cleared and was used as an open lot car park, as is evident in the aerial photograph taken in 1968. This change probably corresponded with the transfer of land from the Tennant Estate to J. and M. Jedynak in 1967, and to Dimet Corrosion Pty Ltd, Oak Pty Ltd, and C.L., R.M., and J.L. Bonython in 1968.
- By 1971, The Corporation of the City of Adelaide had acquired the entire site to the west of Bowen Street. The site was then cleared to allow for the construction of the current bus terminals, which were identifiable on the aerial photograph taken in 1979.
- There have been no significant changes of the layout of the allotment since the construction of the bus terminals was completed.

3.4 Information Sources

- (a) Mapland Department of Environment and Natural Resources, Land and Geographic Information Group, 282 Richmond Road, Netley. Aerial photographs were viewed.
- (b) Lands Titles Office, 25 Pirie Street. History of Ownership was researched.
- (c) Adelaide City Council Archives, Topham Mall off 55 Currie and 56 Waymouth Streets, Adelaide. Assessment Books were viewed to provide an indication of the occupation, ownership and use of properties.
- (d) The Corporation of the City of Adelaide, Planning Department. Information with respect to site zoning provided by Greg Vincent.
- (e) The Corporation of the City of Adelaide, Environmental Health Department. Information with respect to environmental health issues provided by Murray Phillips.
- (f) Sue Park. The Adelaide Central Mission Inc.
- (g) South Australian Health Commission:
 - Publication "Identification and Assessment of Contaminated Land Improving Site History Appraisal" by JW Edwards, M Van Alphen and A Langley, Contaminated Sites Monograph Series, No 3, 1994.
- (h) The RPS Group plc (1994). The RPS Manual. Published by the RPS Group (UK).
- (i) Shineblecker C.L. (1992) "Handbook of Environmental Contaminants: A Guide for Site Assessment". Lewis Publications, Michigan, America.

4. Site Inspection

4.1 Topography

The site was flat.

4.2 Local Soil Types and Groundwater

Published information and previous experience in the area suggests that the soil profile at the site can be expected to include in the order of 1.0m of surface fill, consisting of various reworked soils and building rubble. Underneath this, the natural soil profile is likely to resemble a Brown Solonised Soil type BS classification.

The natural profile can be expected to include a thin calcareous silt containing silts, sands and gravels overlying stiff plastic clay (Keswick Clay). Slickensided fissures are likely to be encountered within the Keswick Clay.

Borelogs for the surrounding area have been obtained from the Department of Mines and Energy and have been included in Appendix D.

References:

- Department of Mines, (1974) Soil Association Map of the Adelaide Region. Bulletin 46.
- Sheard M.J., and Bowman G.M. (1996) Soils, stratigraphy and engineering geology of near surface materials of the Adelaide Plains. Report Book 94/9.

4.3 General Observations - East of Bowen Street

The site, which was inspected on the 25th of February 1997, consisted of the McCafferty's Express Coaches and Greyhound Pioneer Australia bus terminals, 2 public car parks, a house, a private car park, a toilet block, and a two-storey building.

There were two public car parks operated by The Corporation of the City of Adelaide, on the eastern part of the site. The northern car park was accessed from Franklin Street, whilst the southern car park was accessed from Grote Street. Both car parks had a bitumen seal that was in a reasonable condition, with the exception of a few potholes, and heave around the trees which were dispersed throughout the site. The trees themselves, however, looked quite healthy. There appeared to be a number of underground services, including power in the vicinity of the car park. An old paint drum had been left in the northern car park next to a ticket vending machine. The Greyhound Pioneer Australia bus terminal was located in the north western corner of this section of the site, and consisted of a two-storey building, and an attached canopy structure for the parking of passenger buses. The building housed a sales counter, booking office, waiting room and toilets on the ground floor, and a number of offices on the first floor. It was also noted that all cleaning and fuelling of coaches occurred off-site at Mile End. The attached canopy ran north-south, connecting the McCafferty's and Greyhound terminal buildings.

The McCafferty's terminal building contained similar features to the Greyhound Building, however it was only single storey.

The canopy was directly accessible from Bowen Street along it's entire length, and was sealed with a bitumen surface. The bitumen appeared to be in good condition, however there were a few small patches which had been replaced. All of the stormwater runoff from this area ran directly into the drains on Bowen Street.

There are two buildings on the south-western part of the site that are currently only used for storage purposes by the Adelaide Central Mission Incorporated. The building on the corner of Grote and Bowen Streets was a two-storey building with a single storey extension to the north. There was also a garage north of the building, and a small private car park west of the building. The car park was accessible from both streets, was lined with trees and bitumen sealed. There had been some illegal dumping of rubbish at the corner of the building.

Just north of the two-storey building was a fenced area containing public toilets and a private car park. There was a large pothole in the bitumen surface of the car park. An old brick wall along the rear of the lot provided evidence of a building which had previously existed on the site.

At 22 Bowen Street, between the private car park and McCafferty's bus terminal, was a small single storey dwelling which was boarded up and could not be accessed. This building is also occupied by the Adelaide Central Mission Incorporated, and is understood to only be used for storage purposes.

4.4 General Observations - West of Bowen Street

The site, which was inspected on the 25th of February 1997, consisted of a private car park, and the Coachfreight and Premier Stateline bus terminals.

The private car park was on the corners of Andrew and Bowen Streets. It was an open lot car park with a bitumen surface that was cracked in places but was otherwise in reasonable condition. The site was basically flat and any stormwater drainage would run into drainage pits in the kerb at the roadside. There was also an access road which ran parallel to Bowen Street from Andrew Street, to the Coachfreight parcel pick up point.

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Coachfreight operated from a single storey office and storage shed off Bowen Street, on current Certificate of Title 3479/80. The floor in the shed was completely sealed with bitumen which was in good condition. No chemicals or fuels were stored on the site at the time of inspection, excepting some disinfectants and cleaning agents that were used by the cleaner. These chemicals were kept in a locked cage on a sealed bitumen floor. A conveyor belt ran along the length of the shed and into the office to convey heavy parcels from the storage point to the collection point. The motor and gear box which operated the belt was located at it's western end. The equipment was very greasy, and there were a few stains on the bitumen beneath it. It was also noted that a section of the bitumen floor had been replaced here.

To the north of the site was the Premier Stateline Bus Terminal. This comprised a two storey building at the eastern end of the site, an attached canopy structure which provided some shelter for the parking of passenger buses, and an open lot car park to the north of the canopy. The building housed the sales counter, a waiting room, cafe and public toilets on the first floor, and offices on the second floor. There was also a power unit on the ground floor. A cement swale guided any stormwater runoff from the site (which could possibly be contaminated with oil or fuels) into a stormwater drain at the western end of the canopy. The car park was also sealed with bitumen which seemed to be of a reasonable quality.

The central portion of this site was used as a roadway to allow access to the buses from Bowen Street. This area was completely covered with a bitumen seal. There were two large Collex waste disposal bins, two 44 gallon drums and one 45 Litre drum located at the western end of the site, next to a stormwater drain. The drums contained unknown substances.

5. Summary of Potential Contamination Issues

5.1 Potential Contamination Issues Associated with Previous Uses of the Site

Over the past 70 years a number of industries existed on the site which may have the potential to cause significant site contamination. The potential risk of contamination caused by the various land uses have been outlined below:

- Polycyclic aromatic hydrocarbons (PAHs) may be potential contaminants from residential land uses where coal and ashes may have been disposed of on-site.
- Benzoyl peroxide, polycyclic aromatic hydrocarbons (PAHs) (due to the disposal of coal and ashes on-site) and hydrocarbons (due to the storage of fuels on-site) are potential contaminants associated with bakeries, and therefore may be present in the north-eastern part of the site.
- J.W. Turner operated a plumbing business in the north-east of the site. A range of contaminants are associated with plumbing supplies and their usage, including acids, solvents, lead, silver, zinc and arsenic.
- Two forges were established on the site at various times. Potential contaminants that may have been generated by their operation include a broad range of metals and heavy metals, solvents, cyanides, phenols, phosphorous, halogenated compounds, polychlorinated biphenyls (PCBs), hydrocarbons, monocyclic aromatic hydrocarbons (MAHs) and polycyclic aromatic hydrocarbons (PAHs).
- An oxy-welding company was established in a warehouse in the north-east of the site, and remained in operation for at least 10 years. Similar contaminants would have been generated by the welding processes, as in the forge, however specific contaminants may include chromium, fluorides, nitrogen, thorium, titanium, vanadium, zinc and benzene.
- A number of radio and electrical companies occupied a warehouse in the southeastern part of the site. Potential contaminants from these businesses may include metals, PCBs, MAHs, halogenated compounds, boron, chlorinated naphthalenes, chlorodiphenyls, phthalates and hydrocarbons.
- A wrecking company and two garages have also been in operation on the site. Contaminants associated with these businesses include petroleum hydrocarbons, a range of heavy metals including lead, volatile organic compounds, degreasing solvents, anti-freeze compounds, PCBs, asbestos, MAHs and other organic compounds. Underground fuel storage tanks may possibly have been used to store the fuels. It could not be ascertained whether these have ever existed on the site.
- Printing works may have caused contamination with heavy metals (in particular chromium, magnesium, and zinc), other metals (particularly silver), alkalis, inorganic acids, petroleum hydrocarbons, solvents, MAHs, halogenated compounds, ethyl acetate, ethanol, and isopropanol.
- Dimet Corrosion Pty Ltd also owned some land in the north-west of the site, however the aerial photographs did not indicate any structures on the site at that time. If corrosion inhibitors were used or manufactured on the site then the potential contaminants may include heavy metals (including Boron associated with Borax),

other metals (including tin, lead, copper, and zinc), and amines, phosphates and nitrates.

There were also various leases on some of the properties to occupants whose business could not be ascertained, therefore there may be contaminants present in addition to those already mentioned above.

5.2 Potential Contamination Issues Associated with the Current Use of the Site

The site currently contains a number of car parks, houses and bus terminals.

- If the bitumen was laid in the car park more than 15 years ago, the soil underlying the bitumen may contain some residues of polycyclic aromatic hydrocarbons (PAHs) due to tar based sub-base materials used in the past.
- The parking of the cars and buses has lead to some hydrocarbon staining of the bitumen surfaces. If the bitumen was cracked there is potential for these contaminants to be washed in the soil strata below. In addition, the contaminants may have been washed directly into the stormwater system.
- At the western end of Bowen Street there were a number of waste bins and large drums containing hydrocarbons located on a sealed surface next to a stormwater drain. Any leakage from either the drums or the waste bins would be washed directly into the stormwater system whenever it rains.
- Power switchboards were noted in a number of the terminal buildings. The switchboards may contain asbestos.
- There was a conveyor belt which ran the length of the Coachfreight storage shed.
- The rubber belt used to operate this system may potentially contain asbestos.
- Cleaning disinfectants were stored in a locked cage on a sealed floor in the Coachfreight storage shed. If a spillage did occur, there is potential for seepage directly into the stormwater drainage system.
- Asbestos may have been used in the building materials of the old houses on the eastern side of Bowen Street that are currently used by The Adelaide Central Mission.
- White Ant Treatments may have been used on the soil beneath the buildings and on the surfaces prior to sealing. Potential contaminants associated with this may include arsenic, organochlorine pesticides (OCPs), or organophosphate pesticides (OPPs).

6. **Recommendations**

The site history investigation has highlighted a number of past activities that have been undertaken at the site. It is likely that contaminants are present on site however given the current site use those do not present an immediate concern.

If future plans for the site include redevelopment to a more sensitive land use (ie residential housing), it is recommended that further (soul) samples are taken from within those areas identified as potentially being contaminated and analysed to determine if these areas of the site contain significant levels of contamination.

97/143 Site History Report for the Franklin Street Bus Station27J062A Located at 85-129 Franklin Street, Adelaide

7. Statement of Limitations

This report has been prepared by the Consultant with all reasonable skill, care and diligence in accordance with the terms of agreement with the Client, and taking account of the human and other resources utilised by agreement with the Client.

The data in the report was derived by applying the methodology described in subsequent sections of this report. To the best of the Consultant's knowledge, the information contained in the report is accurate at the date of issue. However there should be a recognition of the limitations of the site environmental assessment process. These are referred to, for example in Section 4 of ASTM Practice E 1527-94. Clause 4.5 states the following:

No environmental site assessment can wholly eliminate uncertainty regarding the potential for recognised environmental conditions in connection with a property. This site assessment is intended to reduce, but not eliminate, uncertainty regarding the potential for recognised environmental conditions in connection with a property, and both practices recognise limits of time and cost.

It should also be recognised that site conditions, including contaminant extent and concentrations, can change with time. This may be particularly relevant if the report is used after a protracted delay, such that further investigation of the site may be necessary.

In preparing this report, the Consultant has relied on and presumed accurate certain information provided by the Client or third parties. Unless otherwise stated in the report, the Consultant has not attempted to verify the accuracy or completeness of any such information.

The consultant has prepared this report for the Client in accordance with generally accepted consulting practice and the Consultant's Terms of Business. No other warranty, express or implied, is made as to the professional advice included in this report. The Consultant disclaims any responsibility in respect of any matters outside the scope of the terms of agreement with the Client.

This report has not been prepared for use by parties other than the Client. It may or may not contain sufficient information for purposes of other parties or for other uses. The Consultant accepts no responsibility to third parties to whom this report, or any part thereof, is made known.

A third party relies upon the report at its own risk.

In accordance with standard practice, the assessment carried out is site specific. Consequently, the assessment does not address environmental liabilities which may or may not pertain to other properties either currently or previously owned or operated by the Client or other off-site environmental liabilities.

Appendix A

Location Map

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Location Map

Map courtesy of Universal F

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Appendix B

Site Plan

MORPHETT



STREET


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Appendix C

Current Zoning Regulations

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F8 FRANKLIN STREET EAST PRECINCT

The Franklin Street East Precinct should develop as a high quality low to medium intensity office area with a range of retail, ancillary retail and support activities at ground floor level. High-density residential and visitor accommodation is also appropriate. The substantial redevelopment opportunities which exist within the Precinct should be used to establish a new commercial character in the area, complemented by the upgrading of the public environment.

The Precinct should remain highly accessible for both local and through traffic. Pedestrian links to the Central Market Precinct and the Western Core Precinct should be maintained and improved to provide for increasing numbers of pedestrians.

USE OF LAND

The primary activity in the Precinct should be general offices supported by ground floor retailing. The redevelopment of a comprehensive bus terminal and supporting facilities is appropriate in the Precinct. The Morphett Street frontage should accommodate offices and showroom activities. Showrooms will be considered elsewhere in the Precinct on their ments. Residential and visitor accommodation may also be appropriate at higher densities.

Public parking stations are non-complying on Franklin and Morphett Street frontages, but elsewhere will be considered on merit.

Desired Uses

general offices, consulting rooms cafes shops licensed premises ancillary retail services telsure studios showrooms (on Morphett Street frontages) passenger terminals, minor transport depots

Non-complying and Other Uses - Indicated in Use Chart F.

BUILT-FORM

Density

Basic plot ratio: 2.4

Maximum plot ratio: 3.0

Bonus plot ratio of up to 0.6 can be achieved by the following means:

(a) by purchase of transferable floor area from a Local Heritage Item or an Item of City Heritage;

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- (b) for the provision of dwellings, multiple dwellings, institutional care, residential care accommodation, visitor accommodation or any combination of the above where the bonus floor area is equal to the floor area used exclusively for these purposes:
- (c) for the provision of a child care centre and associated open space where the bonus floor area is equal to the area used exclusively for this purpose; and
- (d) for the provision of a required medantrian link on Tewn Agree 263 and 210 as indicated on Precinct Map F8. (The amount of floor area which may be achilaved from the awarding of this bonus is equivalent to the site area devoted to the pedestrian link and multiplied by a factor of 2.0).





F.8 FRANKLIN STREET EAST

LEGEND

PRECINCT BOUNDARY TOWN ACRE BOUNDARY TOWN ACRE BOUNDARY TOWN ACRE NUMBER CT BOUNDARY REQUIRED PEDESTRIAN LINK (Existing) REQUIRED PEDESTRIAN LINK (Proposed) BUILDING (within Precinct) BUILDING (outside Precinct) HERITAGE ITEM LOCAL HERITAGE ITEM

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Height, Scale and Siting

The built-form in the Precinct should effect a transition from the higher intensity and scale of the Western Core to the lower scale of the Central Market Precinct.

Accordingly, the maximum building height in the Precinct is 21 metres or six storeys. Buildings on Franklin Street should achieve a minimum of two storeys. Front and side boundary set-backs should be minimal to Franklin and Morphett Streets, and be in accordance with the prevailing siting pattern in order to produce a largely continuous built-form wall along these major street frontages. On minor streets front and side set-backs may be varied to provide landscaped frontages to buildings.

Townscape Context

Development should relate well to neighbouring buildings and contribute to the development of a cohesive townscape. New buildings should respect the traditional scale, massing and architectural detail of the Franklin Hotel and adjacent buildings.

Heritage

Within the Franklin Street East Precinct the following items are included on the Register of City of Adelaide Heritage items contained in Schedule 4 to these Principles:

Item 0961Workshop, 25 Eliza Street;Item 97Young Street Chambers (former Printing House), 25 to 29 Young Street and 26-30
Eliza Street;Item 98Offices (former Houses), 82 to 86 Franklin Street;Item 99Church of Christ and Church Hall, rear of 96 to 100 Grote Street (part in F9
Precinct);Item 100Hotel Franklin, 88 to 92 Franklin Street;Item 101Har Majesty's Theatre, 54 to 58 Grote Street (part in F9 Precinct).

The location of the above buildings contained within the items is indicated on Precinct Map F8.

ENVIRONMENT AND AMENITY

Public Environment and Pedestrian Shelter

A high level of pedestrian amonity should be achieved in the public environment of the Precinct with large growing street-trees on the major streets and attractive paving where appropriate. Where footpath widths and existing or proposed street tree-planting allow, development may provide verandahs, awnings or balconies for pedestrian shelter.

Design of the public environment should contribute to the safety and security of pedestrians.

On-site Landscaped Open Space

On-site landscaped open space is not required, but the provision of landscaped pedestrian spaces such as arcades, mails and small pocket parks on pedestrian links is desirable.

Signs

The provision of signs should be in accordance with Principle 37 and Sign Chart F.

A variety of well-designed signs may be permitted in the Precinct. Illumination of signs and buildings is appropriate, providing there is no adverse impact on residential premises.

Within the indicated sign levels the following signs are appropriate:

- (a) above canopy level flat wall signs (at parapet height), vertical projecting signs;
- (b) canopy level fascia signs, flat wall signs, horizontal projecting signs;

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- (c) below canopy level business plates, flat wall signs, horizontal projecting signs, under canopy signs; and
- (d) ground level low free-standing signs.

Within the indicated sign levels the following signs are non-complying.

- (a) roof leval all signs; and
- (b) ground level pylon signs.

All other signs and the animation of signs will be considered on their individual merits, but third party advertising is *non-complying*.

MOVEMENT

Pedestrians

Existing through-site and on-street pedestrian links should be maintained and developed on Town Acres 241, 242, 263, 265, 308 and 310.

A new pedestrian link is required between Grote and Franklin Streets to run from Young Street to Moonta or California Streets through Town Acre 263 and 310 as shown on Precinct Map F8.

The pedestrian route along Bentham Street and Pitt Street should be developed as a key route linking the railway station with the Central Market. Pedestrian safety and security should also be improved along Young Street.

Vehicle Access and Servicing

Provision for vehicle access and servicing should be in accordance with Principles 44, 46 and 50.

Parking

Provision for car parking should be in accordance with Principles 48, 50, 52 and 53.

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Appendix D

Borelogs from the Surrounding Area



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Depth From	a Depth Te	Nature of Siraia
01	11	Fill. Sandy loam and rubble.
1	2	Fill. Fairly soft trownish limey clay with some greenish-grey clay with red and yellow mottling
2	4	Dark brown limey clay loam with some rubble, (tru
		topsoil) grading to light brown limey and sandy
		. clay with abundant grit and travertine fragment
. h	L C	Slightly mottled.
**		mottling and numerous traventine particles
		becoming greenish-grey clay with brown and
		yellow-brown mottling. Quite firm and puggy.
6	8	Mainly greenish-grey slightly silty clay with
		slight yellow-brown (ochreous) and brown mott-
		ling. Some small patches of red iron staining.
8	18	Some gritty fragments. Stiff and puggy.
•		Datches of reddish material and lesses vellow
		brown ochreous mottling. Some brown mottling.
		Numerous small grit and travertine fragments.
•		Some blobs of black organic matter. Stiff and
		puggy.
10	20	Greenish-grey silty clay, but mottling mainly yell
		patches. Less gritty, no travertine fragments.
	· .	Some moderately large patches. Less gritty, no
		travertine fragments. Some moderately large
	!	patches of brownish-black organic material.
00		Stiff and puggy.
20	20	urseniss-grey slightly silty clay with reddish-
		patches. Stiff to very stiff.
26	38	Greenish-grey slightly silty clay with yellow-brow
		and brown mottling, reddish mottling only very
		slight.
32	39	Red-brown very sandy clay with small blobs of
	1	greenish-grey yellow-brown and brown clay.
-	1	FRIGGES OF TEG~DROWNBANG AND PRIC. VERY STIF.

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6628-257

HD.	ADRLATOR	, T.A. BLOCK 266, AUGER HOLE NO. 4 C LOG OF BORE
D epth Pro	a Depth To	Nature of Strata
01	21	Brown gandy fill. Numerous rock framents
2	4	Dark brown limey clay (True topsoil). Mottled
		light brown. Somewhat silty but with numerou
		gritty Iragments of quartz, travertine etc. becoming more light brown with depth. Fairly
. 4	6.	Light brown liney clay with abundant gritty
	• • •	travertine fragments etc.
. 6	Ö	Light brown limey clay with some green-grey and
		gritty travertine. gtz. some black organic
-		matter and whitish limey patches. Moderately
8	. 10	Mainly green-grey silty clay, with brown, yell
		brown and slight red mottling. Thence as about
. 10.	14	Ditto but limey patches absent whilst reddish-
	20	Vainly green-grey years attach and attach
• •		Slight brownish mottling. Some red and yellow iron oxide patches in varying amount. Some gr fragments.
20	22	Ditto i.e. green-grey, but with excessive reddi
	·	patches and lesser yellow-brown patches. Agai
22	24	very stirr and puggy. Ditto but more uellow-brown mottling
24	26	Ditto - raddiah-olay more abundant - appears to
		form harder kernels in otherwise very stiff
		and puggy clay.
26	33 1	Jitto 1.c. green-grey silty clay, mottled maini
		reddish. Very stiff and unger with keynals Af
,		even harder clay. Some gritty particles etc.
		Abundant dark organic material at about 32ft.
35	34.0	reanggrey silty clay. Very stiff. Small patche
		or well charned light red-brown clayey sand.
		Aumerous gritty particies.
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... STAUNGEN DATA HOSTURE ODE TO DATE BORING FIELD ELLA 1831 1151 Tipt CF MUTLE STHES 1 ----179.00 RUNDIN SHEM SVICIUS MOSTINE 011 1-00 1193 UNIT \$73-(a.5/H NONVE 110866 Dest. 9441 v630, PHIMA Obverser, Net 1 1857 LOWENA REPRESE, 1.16/1.16/1 111101 1911 2017 . NUMPH ELEVATION 101 2 FEET 266 . Alfelt PAVEMENT Disk brawn SkiDf CLAY (CL) (firm, bricks, pocksts of send) (alight suspage) ••• FILL 25.4 DS .700 21.7 .1100 24,9 **W** 5/10/9* And-brown SILTY CLAY (CH) (firs) 14 *#K (atiff, gray) 23.6 25 1 1030 21.3 1440 23.3 101 5 . 11 27.9 DS DS 1310 1600 20.2 1500 28.2 94 5-14/5-(groom-gray, mottled with yellow) 70 39.4 LINEAR SHRINKAGE - 175 (moist jons) D5 2990 32.4 2430 (very stiff) 23.4 89 5-11/9-Н ٠ ٠. ٤. 24.1 [cove-in fiom fill, patrol mapage] 19 2530 32.5 2900 32.5 5 - 23 86 33.7 1 03 2739 0520 3.16 37.4 85 S-L0/3-۰. 33.8 33.7 15.2 N = 42 Light groon-gray and red SANDY CLAY (CL) lvery ptiff, near SC) ا ور Calle 25 1070 19.0 4400 19.0 110 5-24/6* 38.2' · . 19.2 Light grash-gray SILTY CLAY (CH) [vary stiff, mottlad with yollow] 63 4300 24.1 4500 24.1 101 \$-32/7" . 26.8 (grading loss yelles) DS. 5220 30.1 4800 30.1 72 5-27/5 BORINC DEPTH SA FEET DEPTH SA •• • •



Appendix E

Aerial Photographs

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Appendix F

Photographs



Photo 1: The Private Carpark on Andrew Street and the entrance driveway into Coachfreight (looking north).



Photo 2: The Coachfreight storage shed (and bus shelter), looking west, across Bowen Street.





Photo 3: The Coachfreight storage shed, with the conveyor belt along the rear wall (looking south).



Photo 4: The Premier Stateline passenger terminal, and attached canopy for bus parking (looking west across Bowen Street).



Photo 5: The large drums containing waste oils near the stormwater drainage pit at the western edge of the site.



Photo 6: The Collex waste collection bins next to the stormwater drainage pit at the western edge of the site.



Photo 7: The Greyhound terminal and attached canopy for bus parking (looking north-west).



Photo 8: The carpark at the eastern edge of the site (looking east from the Greyhound terminal).

Rust PPK Pty Ltd



Photo 9: The carpark at the eastern edge of the site (looking east from the Greyhound terminal).



Photo 10: The private car park on Bowen Street with the remains of an old wall along the rear of the site (looking east from Bowen Street).

APPENDIX B

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Rust PPK Pty Ltd, 1997,

Environmental Site Assessment, Franklin Street Bus Station and Car Parks, Adelaide, for the Corporation of the City of Adelaide, 30 June 1997

Corporation of the City of Adelaide Franklin Street Bus Station and Car Parks Site Audit Report, No. 97.0307/1, 31 July 1997

Environmental Site Assessment Franklin Street Bus Station and Car Parks

The Corporation of The City of Adelaide

Rust PPK Pty Ltd

Environment & Infrastructure

30 June 1997 27J097A 97-459.DOC 101 Pirie Street Adelaide SA 5000 PO Box 398 Adelaide SA 5001 Australia Telephone: (61 8) 8405 4300 Facsimile: (61 8) 8405 4301

A NATA Certified Quality Company



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Our Reference 2706/2916/27J097A

30 June 1997

The Corporation of The City of Adelaide Town Hall Adelaide GPO Box 2252 South Australia 5001

Attention: Mr Brian Fitzpatrick

Dear Brian

Environmental Site Assessment Franklin Street Bus Station and Car Parks

Rust PPK is pleased to submit two (2) copies of the above assessment report for your consideration.

The findings of the assessment program have identified no requirements for remedial works at the site in accordance with the continued long term use of the site for commercial purposes. Recommendations have been made with regard to the potential redevelopment of various parts of the site for either similar commercial landuses or for restricted residential purposes (with no access to underlying soil), and also for more sensitive landuses (such as unrestricted residential) where there maybe potential access to underlying soil. It is understood that the recommendations are subject to approval by the appointed environmental auditor, Adrian Hall.

1 trust that I have interpreted your requirements correctly. If you have any queries or questions relating to the above report or the assessment program, please do not hesitate to call me on (08) 8405 4300 or 0414 245353.

Yours faithfully

Stuart P Taylor Team Leader, Environmental Assessment and Remediation Rust PPK Pty Ltd

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Appendices

- Appendix A Site Location Plan
- Appendix B Department of Mines and Energy Groundwater Data

Appendix C Location of Soil Sampling Points

Appendix D Soil Borelogs

Appendix E Interpolated Area of Potentially Impacted Soils

Appendix F Chain of Custody Forms

Appendix G Assessment Criteria for Analytical Results

Appendix H Tabulated Soil Analysis Results

Appendix I Certified Laboratory Results

Appendix J Tabulated Results of Replicate and Duplicate Analysis

Appendix K Data Validation

Executive Summary

Rust PPK Pty Ltd (Rust PPK) was commissioned by The Corporation of the City of Adelaide (The Corporation) to undertake a preliminary environmental assessment of the Franklin Street Bus Station and several surrounding car park sites. The entire subject site which includes the bus station and car parks is located at 85-129 Franklin Street however the site is divided into two sections on the eastern and western sides of Bowen Street.

The environmental assessment program follows a site history investigation undertaken by Rust PPK in March 1997 (Rust PPK doc no 97/143).

The objectives of the environmental assessment program were to investigate and report on any potential soil and groundwater contamination resulting from past site activities, prior to the possible future redevelopment of various parts of the site.

In order to achieve these objectives Rust PPK undertook a comprehensive desktop study and on-site investigation comprising targeted soil investigations and detailed laboratory analysis.

The assessment program undertaken during May 1997 has identified elevated concentrations of heavy metals (lead, zinc, and copper) in excess of the ANZECC environmental and/or the SAHC health based guidelines within the fill materials recovered from:

- the driveway of the Coachfreight parcel collection and drop off point to the west of Bowen Street (BH4, lead and zinc only);
- the north east corner of the Grote Street public car park (BH14); and
- the centre of the car park adjacent the storage building at 104 Grote Street used by the Adelaide Central Mission (BH20, zinc only).

An elevated PAH (benzo(a)pyrene) concentration in excess of the SAHC health based guidelines, was identified within the fill materials in the car park adjacent the storage building at 104 Grote Street (BH20). Elevated Total fluoride concentrations were identified within the surficial fill materials recovered from the north eastern corner of the Franklin Street Car Park and the south eastern corner of the Grote Street Car Park. These elevated levels of heavy metals, PAHs and fluoride are considered to be associated with fragments of ash, cinders and/or slag which were observed within the sub-surface soil profile within these locations.

Fragments of ash, cinders and/or slag were identified in thirteen out of the twenty sampling locations at the site and although elevated PAH, heavy metal and fluoride concentrations were not reported at all of these locations, it is considered that the relatively low proportion of the materials within the overall soil matrix may be resulting in a dilution effect on the analyte levels within the overall matrix. This therefore indicates the potential for high concentrations of localised (hotspot) PAH contaminants within the fill materials in boreholes BH4 and BH18 located on the western side of Bowen Street, and in all of the boreholes located on the eastern side of Bowen Street with the exception of boreholes BH9 and BH11. The fill materials containing ash and cinder fragments were generally identified to depths ranging from 0.5 m to 0.7 m across the site.

The surficial fill materials and the underlying natural soil were identified as being moderately alkaline, with soil pH at all locations reported above the ANZECC environmental guidelines.

The presence of moderately alkaline surface and sub-surface soils in conjunction with the natural tight clay profile and the apparent containment of any contaminants within the ash, cinder and/or slag fragments identified, indicates that the impacted fill materials are likely to pose negligible long term environmental risks to the underlying soils and groundwater.

As an aid in the identification of potential health based risks, all contaminant levels were also compared to the proposed health based soil guidelines (Langley et al 1996 - Exposure Settings D and F) for restricted residential (with limited soil access) and commercial/industrial landuses. The lead concentration reported in the fill materials recovered from the north eastern corner of the Grote Street Car Park was in excess of both landuse exposure scenarios. The concentrations of all analytes reported from the remaining sampling locations were below the prescribed levels for both landuses.

In accordance with the continued use of all site areas for current commercial purposes, the results and findings of the assessment program have identified no requirements for any subsequent site characterisation or remedial works at the site. The only possible exception is the need for a site \mathcal{I} specific risk assessment to address the elevated concentration of lead identified within the north eastern corner of the Grote Street Car Park. From a preliminary risk assessment perspective it is considered that the concentration and likely nature of the elevated lead level identified will not pose a limiting factor for the continued current usage of the site providing the bitumen surfaces are maintained and managed appropriately.

If any part of the site is to be developed for a more sensitive landuse, then further site characterisation is recommended, the extent of which will be dependent on the future landuse. This is necessary in order to further characterise the soil in those areas of the site which were not investigated, particularly due to the presence of ash and cinders within the fill materials at thirteen out of the twenty sampling locations on-site. If any part of the site, with the exception of the Premier Stateline Terminal, is to be redeveloped to a landuse of the same or similar sensitivity (for example commercial or restricted residential with no access to underlying soil) then it is recommended that charcterisation of any excavated soil be carried out in order to determine off-site disposal options. Disposal as low-level contaminated waste may be necessary due to the potential for contamination to be present within the ash and cinders identified in many areas of the site. It is also recommended that appropriate health and safety precautions are taken during any possible future on-site earthworks, in order to protect workers and adjoining sites from exposure to potentially contaminated soils.

1. Introduction

Rust PPK Pty Ltd (Rust PPK) was commissioned by The Corporation of the City of Adelaide (The Corporation) to undertake a preliminary environmental assessment of the Franklin Street Bus Station and several surrounding car park sites. The entire subject site which includes the bus station and car parks is located at 85-129 Franklin Street however the site is divided into two sections on the eastern and western sides of Bowen Street.

The environmental assessment program follows a site history investigation undertaken by Rust PPK in March 1997 (Rust PPK doc no 97/143)

The objectives of the environmental assessment program were to investigate and report on any potential soil and groundwater contamination resulting from past site activities, prior to the possible future redevelopment of various parts of the site.

In order to achieve these objectives Rust PPK undertook a detailed desktop study and onsite investigation comprising:

- review of historical site usage;
- review of local soil and groundwater;
- drilling and sampling of twenty (20) soil bores;
- laboratory analysis of selected soil samples for a full range of chemical parameters characteristic of suspected potential contaminants resulting from previous on-site and adjacent site activities; and
- review and assessment of soil contaminant levels in accordance with the proposed future landuse.

The scope of works undertaken was in general accordance with the proposed work plan provided to The Corporation in April 1997 (Rust PPK document no. 97-219) and was subject to discussion and approval by The Corporation appointed Environmental Auditor, Mr Adrian Hall (BC Tonkin & Associates).

This report details the results and findings of the assessment program including a summary of available site history, assessment methodology and recommendations for limited site remediation and future site management.

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2. Site Identification and Description

2.1 Site Identification

The subject site comprises two irregularly shaped parcels of land to the east and west of Bowen Street. Each of these parcels comprises a number of allotments which are described under different Certificates of Title, as listed in Table 2.1 and Table 2.2 below.

The total area of the site is approximately 1.41 hectares.

The site is located at 85-129 Franklin Street, Adelaide, and has an approximate total area of 1.41 hectares. The Corporation have advised that the site is part of the F8 Franklin Street East Precinct. Any proposed development must comply with the zoning regulations specified by the council which apply to this area. These regulations specify the desired and non-complying land uses and specify that any development should be used to establish a new commercial character in the area, complemented by the upgrading of the public environment.

Certificate of Title Reference	Land Description	Area (m ²)
226/124	Town Acre 263	1983.80
1639/119	Town Acre 310	2760.50
1663/99	Town Acre 309	83.60
1751/37	Town Acre 311	648.80
1922/48	Town Acre 263	986.26
5060/608	Allotment 1 in DP 32560	580.00
5317/61	Allotment 12 in DP546	149.60
5317/62	Allotment 91 in FP166443	348.69
5317/63	Allotment 92 in FP166444	271.50
5317/64	Allotment 93 in FP166445	526.90
5317/65	Allotment 91 in FP170401	816.37
TOTAL		9156.02

 Table 2.1

 Allotment Details for the Eastern Side of Bowen Street

	Т	able 2.2			
Allotment Detai	ls for the	Western	Side of	Bowen	Street*

Certificate of Title Reference	Land Description	Area (m ²)	
2023/96	Town Acre 311	260.67	
2128/45	Town Acre 311	257.80	
2201/187	Town Acre 311	259.70	
3479/180	Town Acres 261 & 262	1744.00	
3582/78	Town Acre 261	509.70	
3582/79	Town Acre 262	490.04	
3582/80	Town Acres 261 & 262	1122.90	
3841/122	LTRO Plan 546	340.60	
TOTAL		4985.41	

The site is surrounded by the following properties:

- Dreamland Furniture and a disused warehouse to the east;
- light industrial facilities to the west;
- Franklin Street to the north; and
- Andrews Street, the Grote Street Church of Christ and Grote Street to the south.

A location map for the site is presented in Appendix A.

2.2 Site Description

The site currently contains the following features:

- the Premier Stateline bus terminal, canopy and private car park on the north-west of the site (collectively referred to as Bus Depot 2);
- the Coachfreight parcel collection and drop off point (including storage shed) in the west of the site;
- a bitumen-sealed private car park in the south-west of the site;
- the Greyhound and McCafferty's Express bus terminals and canopy on the north-eastern side of Bowen Street (collectively referred to as Bus Depot 1);
- a single storey house, a private car park, a toilet block and a two-storey building and adjacent car park all utilised by the Adelaide Central Mission on the eastern side of Bowen Street, in the south of the site (collectively referred to as 104 Grote Street); and
- two bitumen sealed public car parks in the east of the site owned and operated by The Corporation of the City of Adelaide (referred to as the Grote Street Car Park and the Franklin Street Car Park).

2.3 Site Ownership

The current Certificates of Title show the site to be owned by The Corporation of the City of Adelaide.

2.4 Site Topography

The site is situated on a flat parcel of land and is surrounded by similarly flat parcels of land.

2.5 Local Soil Types

Published information and previous experience in the area suggests that the natural soil profile at this site can be expected to include in the order of 1.0m of surface fill, consisting of various reworked soils and building rubble. Underlying this the profile is likely to resemble a Brown Solonized Soil type BS classification. Type BS soil profiles consist of brown sandy to clayey
soils with abundant earthy lime and calcrete in the subsoil. Type BS soils are alkaline and often contain significant amounts of soluble salts. Over most of the city area, Type BS soils vary from a thin layer up to three metres thick and the layer overlies Hindmarsh Clay. Surface absorption in Type BS soils is rapid due to the highly permeable profile and as such external drainage is slight.

2.6 Local and Regional Groundwater

Department of Mines and Energy (MESA) records indicate regional standing groundwater levels at depths ranging from approximately 6 to 40 metres (refer Appendix B).

No groundwater was intersected during the on-site drilling program to a maximum depth of 2.3 m.

3. Site History

3.1 Historical Overview

The following information summarises the information obtained from Certificates of Title, Assessment Books in the Adelaide City Council Archives, the Sands and McDougall Directories of South Australia and historical aerial photographs of the site, all of which was documented in more detail in the Site History Report prepared by Rust PPK in March 1997:

- From 1850 until the early 1900s the site was used generally for residential purposes, but there were also a number of commercial premises including a garage, forge, workshop, bakehouse, and a private road.
- From the 1920s a number of small light industries were established on the site. These included a factory, garages, forges, stables, printing works, workshops, shops and offices. Some of the occupants included the Franklin Wrecking Co, J.W. Turner, a plumber, Oxy-welders Ltd, the O'Donnell Brothers Ltd, and a number of radio and electrical companies.
- During the 1960's a large proportion of the residential land in the western part of the site had been cleared and was used as an open lot car park by Dimet Corrosion Prevention Pty Ltd and I. and M. Jedynak.
- The Corporation of the City of Adelaide had acquired most of the land comprising the site by 1972, excepting the land contained in Certificates of Title 5060/608 and 1751/37 (the land referred to as 104 Grote Street). The land was then cleared and by 1979 the majority of the existing bus terminals and car parks had been constructed.
- The residences on land contained in Certificates of Title 5060/608 and 1751/37 were acquired by The Corporation of the City of Adelaide in the early 1990s, and are currently used by the Adelaide Central Mission. The front part of the building at 104 Grote Street has been condemned by the Council due to problems with rust and cracking.
- Between 1989 and 1995, a new terminal building was constructed on the eastern side of Bowen Street, on what was previously either car or bus parking space.

3.2 Summary of Potential Site Contamination Issues

Based on the historical information obtained from the Site History Investigation, it is considered that the following potential contamination may be present on site as a result of past on-site and adjacent site activities:

- Polycyclic Aromatic Hydrocarbon (PAH) contamination from the tar-based sub-base materials that have been used beneath bitumen in the past;
- PAH contamination from possible waste products associated with coal fires or furnaces which may have been used on the site in the past;
- Organochlorine Pesticide (OCP) contamination from the possible use of white ant treatments beneath buildings that have existed on-site;

- possible petroleum hydrocarbon (TPH) contamination from leakage of fuel or oil from vehicles; and
- possible heavy metal contamination from activities associated with a plumbing business, forging, oxy-welding, radio and electrical companies, wrecking and auto-mechanics or printing works, all of which existed on the site in the past.

97-459.DOC 27J097A Environmental Site Assessment Franklin Street Bus Station and Carparks

4. Soil Assessment program

4.1 Assessment Rationale

The assessment program was undertaken in general accordance with the proposed scope of works provided to The Corporation in April 1997 (Rust PPK document no. 97-219).

In designing the soil assessment program, reference was drawn from the following sources:

- the Australian and New Zealand Guidelines for the Assessment and management of Contaminated Sites" (ANZECC 1994);
- the guidelines prepared by the South Australian Health Commission in the publication "A Practical Guide to the Health Risk Assessment and Management of Contaminated Land in South Australia" (1993); and
- site history information.

The soil sampling program targeted only the open space areas of the site. The approximate open space area of the site is 0.98 hectares therefore in accordance with the Draft Australian Standard for the Sampling of Soils, the minimum number of sampling points recommended for a site with an area of 0.9 hectares is 20 points. The soil assessment program therefore incorporated twenty (20) soil monitoring bores targeted within the open and accessible areas of the site.

The location of all soil sampling boreholes were discussed with and approved by the appointed auditor, Adrian Hall and the approximate location of the soil monitoring bores are presented in Appendix C.

Drilling and sampling of the soil boreholes was undertaken between 20 - 22 of May 1997. Soil boring was undertaken using stainless steel push tubes, driven by a pneumatic hammer, to a maximum depth of 2.3 m. Soil cores were extracted from the push tubes directly onto clean plastic core trays for logging and collection of soil samples by the Rust PPK field investigator. Soil samples were recovered directly from core trays and transferred to prechilled 250 ml glass jars and sealed with teflon lined metal lids. Collected samples were immediately labelled and transferred to a chilled esky for storage.

On completion of field activities all samples were checked for labelling consistency against the field sampling record. Samples were then packed into eskies with fresh ice bricks and sealed for transport to the nominated laboratory for storage and analysis. Chain of Custody forms were completed and accompanied the samples to the laboratory.

To reduce any cross-contamination of soil samples all push tubes were decontaminated and cleaned using a pressurised spray gun prior to the drilling of all soil bores. An equipment rinsate (ER) was taken on one push tube in every ten (10) boreholes, a procedure which involves rinsing the tube with de-ionised water into a sample bottle which can then be sent to the laboratory for analysis to ensure that the tubes were washed correctly.

A field duplicate sample was recovered from a particular depth at each borehole in addition to the primary sample for that depth. Selected field duplicates were analysed along with the primary sample in order to monitor the precision and accuracy of the laboratory analysis and the distribution of contaminants within the soil profile.

4.2 Ground Conditions Encountered

The generalised soil types encountered during drilling are summarised as follows:

- Fill Materials: generally consisted of a surface layer of yellow silty sand with some gravel overlying dark brown silty clays to depths ranging from 0.5 m to 1.2 m. Brick fragments and cinders were identified in 13 out of the 20 boreholes and fragments of vesicular slag were identified in one of the boreholes.
- Natural Sediments: calcareous silty clays with some calcareous gravel ranging from creamy brown mottled brown to orange brown mottled creamy brown to a depth of approximately 2.0 m. At some boreholes the soil became greenish brown at around 2.0 m as it became Hindmarsh clay.

The fill materials which showed visual evidence of contamination are detailed as follows:

- BH4: Some ash and cinders and very occasional vesicular slag fragments from 0.7 1.0m.
- BH5: Occasional ash and cinders from 0.7-0.8 m.
- BH6 : Occasional ash and cinders from 0.65-0.75 m.
- BH10: Occasional ash and cinders from 0.65-0.7 m.
- BH12: Very occasional ash and cinders from 0.55-0.7 m.
- BH13: Occasional surface bitumen fragments from 0.035-0.15 m, some ash and cinders from 0.6-0.9 m,
- BH14: Occasional ash and cinders from 0.15-0.7 m.
- BH15: Occasional ash and cinders from 0.55-0.7 m.
- BH16: Occasional ash and cinders from 0.3-0.6 m.
- BH17: Occasional ash and cinders from 0.65-0.7 m.
- BH18: Occasional ash and cinders from 0.4-0.5 m.
- BH19: Occasional ash and cinders from 0.6-0.7 m.
- BH20: Very occasional ash and cinders from 0.015-0.2 m, occasional ash and cinders from 0.35-0.55 m

Environmental soil monitoring borelogs are presented in Appendix D and a site plan showing the approximate area of fill materials containing ash, cinders and/or slag is contained in Appendix E.

4.3 Sampling Depths and Analytes

In general 3 to 4 soil samples were collected from the first metre of the soil core, with an additional 1 to 3 samples recovered between 1.0 m and 2.0 m, and then one sample was taken below 2.0 m, if the borehole was drilled past 2.0 m. The sampling generally included between 2 and 5 soil samples from the fill materials depending on the depth of fill. The specific sample depths were dependent on the soil profile at each location.

Selected soil samples were analysed for a range of chemical analytes including:

- Organochlorine Pesticides (OCPs);
- Heavy Metals arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), mercury (Hg), and zinc (Zn);
- Total Petroleum Hydrocarbons (TPHs);
- Benzene, Toluene, Ethyl Benzene and Xylene (BTEX);
- Polycyclic Aromatic Hydrocarbons (PAHs); and
- pH.

Four soil samples were also analysed for the full Victorian EPA Chemical Suite which generally consists of a selection (or all) of the following analytes:

- Heavy Metals As, Be, Cd, Co, Cr, Cu, Hg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Zn;
- Organochlorine Pesticides (OCPs);
- Total Petroleum Hydrocarbons (TPHs);
- Benzene, Toluene, Ethyl Benzene and Xylene (BTEX);
- Poly Aromatic Hydrocarbons (PAHs);
- Poly Chlorinated Biphenyls (PCBs);
- Chlorinated Hydrocarbons;
- Cyanide;
- Fluoride; and
- Phenols.

The four samples which were analysed for the full Victorian EPA screen were all field duplicates. Two of the duplicates were labelled as blind duplicates (the borehole number and depth was not indicated) and analysed by the primary laboratory along with the original samples in order to provide an intra-laboratory comparison between the results. The other field duplicates were analysed by the secondary laboratory while the original samples were analysed by the primary laboratory comparison. These analyses were undertaken as a quality control measure.

Two Equipment Rinsates (ER1 and ER2) was also analysed for PAHs, heavy metals and OCPs.

Chain of Custody documentation showing all of the samples recovered and the analysis selected for particular samples is presented in Appendix F.

4.3.1 Rationale for Analyte Selection

Metals (As, Be, Cd, Co, Cr, Cu, Hg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Zn)

Analysis for the nominated range of heavy metals was undertaken to target metallic species which may have been present within any fill materials on-site. Heavy metals could be present on-site from activities associated with many of the businesses which existed on-site in the past. The metals selected are in accordance with the suite of metals recommended within the Victorian EPA Screen and have the potential for posing health and/or environmental concerns if significant elevated levels are identified.

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Analysis for pH was undertaken on the majority of the samples as it is a measure of the relative acidity or alkalinity of the soil. The soil pH provides valuable information relating to the potential for leachate generation and solubility of certain metallic and non metallic analytes.

TPH/BTEX

TPH and BTEX analyses were undertaken as a measure of potential petroleum hydrocarbon residues within the soil profile. The potential for on-site petroleum hydrocarbon impacted soils was identified from the possibility of leakage of fuel and oil from cars in those areas that are used as an open bitumen car park.

PAHs

Analysis for PAHs was undertaken due to the possibility that tar-based materials were used beneath the bitumen car park and also due to the possibility that wastes associated with coal, coke or fuel oil fires or furnaces may be present on-site. PAHs typically result from the incomplete combustion and partial pyrolysis of petroleum hydrocarbon products (ie. fuel oils, coke and coal). Some PAH compounds, particularly Benzo(a)pyrene are known human carcinogens, whilst other PAHs including Benzo(a)anthracene and Dibenz(a,h)anthracene are suspected human carcinogens.

OCPs

Analysis for OCPs was carried out due to the possibility of residual contamination from the use of white ant treatments beneath or around any of the residences or other buildings that existed on the site in the past. OCPs have the potential to pose significant health risks for future occupiers of the site as the more residual OCPs such as Dieldrin, Heptachlor and DDT have a predicted environmental persistence time of 5-15 years.

97-459.DOC Environmental Site Assessment Franklin Street 27J097A Bus Station and Carparks

Victorian EPA Screen

Analysis of selected soil samples for the Victorian EPA screen was undertaken in accordance with the requirements of the independently appointed Environmental Auditor. The range of analytes contained within the Vic EPA screen provide a broad chemical characterisation of the site targeted towards a wide range of common industrial and commercial pollutants.

4.4 Laboratory Analysis Program

The primary laboratory soil analyses were conducted by:

Australian Government Analytical Laboratories (AGAL) 51-65 Clarke Street South Melbourne, Victoria.

AGAL laboratories are NATA certified for all of the nominated soil analyses.

Two duplicate samples were sent to a secondary laboratory as a Quality Control (QC) measure. The inter-laboratory QC duplicate analysis was conducted by:

MGT Environmental Consulting Pty Ltd 3 Kingston Town Close Oakleigh, Victoria.

MGT are also NATA certified for all of the nominated soil analyses.

4.5 Soil Assessment Criteria

In order to assess the level and significance of any potential contaminants detected through analytical laboratory testing it is usual to reference established environmental investigation levels and/or human health threshold exposure levels.

For the purpose of assessing potential long term human health risks, the South Australian Health Commission (SAHC) Investigation Levels as specified within the publication "A Practical Guide to the Health Risk Assessment and Management of Contaminated Land in SA" (SAHC January 1993), are referenced as the adopted initial investigation levels.

For the purpose of assessing potential environmental risks, the Environmental Investigation Levels specified in the Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC/NH&MRC 1992) are referenced as the adopted initial investigation levels. The ANZECC Environmental investigation guidelines are primarily based on threshold levels for phytotoxicity and surface water receptors and are derived to protect the most sensitive receptor likely to be placed at risk and to reflect a level at which there is no observed effect on that receptor.

The SAHC (health) and the ANZECC (environmental) Investigation Levels do not necessarily represent an immediate action level if exceeded during the course of the initial investigation, however, they indicate contaminant levels which need to be assessed further through risk analysis to determine the relative level and significance of the contaminant concentrations on a site specific basis.

As a preliminary aid in the evaluation of site specific health based risk analysis, the Proposed Health Based Soil Guidelines (Langley et al 1996) as presented in the Health Risk Assessment and Management of Contaminated Sites - Contaminated Sites Monograph Series No. 5, 1996 are used as reference criteria. The Langley Criteria incorporate health based soil guidelines for a range of potential exposure settings including:

Exposure setting A	- 'standard' residential;
Exposure setting B	- 'restricted' residential with substantial vegetable garden (limits on poultry meat intake);
Exposure setting C	- 'restricted' residential with substantial vegetable garden (exclusions on poultry meat intake);
Exposure setting D	- residential with restricted soil access (includes medium to high density residential);
Exposure setting E	- parks, recreational open space and playing fields: includes secondary schools;
Exposure setting F	- commercial/industrial sites.

For the purpose of the preliminary contamination assessment the assessment criteria nominated within the SAHC Health Based Guidelines and the ANZECC Environmental Investigation levels will be referenced as the primary assessment criteria. For the purpose of the preliminary health risk assessment reference will be drawn from the Langley Criteria for restricted residential landuse with limited soil access and commercial/industrial landuse (Langley et al 1996 - Exposure Settings D and F) in order to provide information regarding the health risks associated with the site depending on the potential future landuse.

In the case of analytes not covered by the nominated guidelines the Dutch Investigation and Intervention values will be referenced and the former Dutch C levels and the NSW EPA Guidelines for Assessing Service Station Sites will be used as the guidelines for TPH/BTEX.

4.6 Soil Contamination Assessment

Assessment Criteria for comparison with soil analytical results is contained in Appendix G and laboratory results from the nominated soil analyses are presented in tabulated form in Appendix H. Full certified laboratory results are presented in Appendix I. Refer to Appendix C for the sampling location plan.

Heavy Metals

Elevated levels of zinc (280 mg/kg, 2000 mg/kg and 410 mg/kg) in excess of the ANZECC Environmental Investigation level (200 mg/kg), were reported within the fill materials (0-0.7 m) at boreholes BH4, BH14 and BH20. At borehole BH14, located in the north eastern corner of the Grote Street Car Park, the zinc concentration was also above the SAHC Health Based Investigation level of 500 mg/kg. From a preliminary human health risk assessment perspective the zinc concentrations identified at these locations were well below the proposed health based soil guidelines for both restricted residential landuse (limited soil access) and commercial/industrial landuse (Langley et al 1996, Exposure settings D and F) of 28000 mg/kg and 35000 mg/kg.

Elevated lead concentrations (670 mg/kg and 1600 mg/kg) in excess of the ANZECC Environmental Investigation level and the SAHC Health Based Investigation level, both of which have a level of 300 mg/kg, were reported within the fill materials (0-0.7 m) recovered from boreholes BH4 and BH14. The lead concentration from BH14 was also in excess of the proposed health based soil guidelines for both restricted residential landuse and commercial/industrial landuse (Langley et al 1996, Exposure Settings D and F) of 1200 mg/kg and 1500 mg/kg respectively.

An elevated **copper** concentration of 450 mg/kg which is in excess of the ANZECC Environmental Investigation level (60 mg/kg) and the SAHC Health Based Investigation level (100 mg/kg) was reported within the fill materials (0.55-0.7 m) recovered from borehole BH14 located in the north eastern corner of the Grote Street Car Park. The concentration reported was however well below the proposed health based soil guidelines for both restricted residential landuse (limited soil access) and commercial/industrial landuse (Langley et al 1996, Exposure settings D and F) of 4000 mg/kg and 5000 mg/kg.

Analysis for heavy metals was undertaken on eight natural soil samples across the site and the concentrations were all well below the relevant assessment criteria.

The concentrations of heavy metals were below the referenced acceptance criteria for the remainder of the boreholes however fragments of ash and cinders were identified in all of the boreholes located on the eastern side of Bowen Street with the exception of boreholes BH9 and BH11, and in boreholes BH4 and BH18 located on the western side of Bowen Street therefore there is the potential for localised or 'hotspot' heavy metal contamination at all of these locations.

Polycyclic Aromatic Hydrocarbons (PAHs)

An elevated Benzo(a)pyrene level of 1.7 mg/kg which is in excess of the SAHC Health Based Investigation level of 1 mg/kg, was reported within the surficial fill materials (0.05-0.2 m) recovered from borehole BH20 located in the Adelaide Central Mission Car Park on the corner of Bowen Street and Grote Street. Ash and cinders were identified in the fill materials, which extended to 0.55 m, at this location. The Total PAH concentration at this location was 15 mg/kg which is not above the SAHC Health Based Investigation level 20 mg/kg, however the presence of the ash and cinder fragments indicates the potential for localised or 'hotspot' PAH contamination at this location.

Although the concentrations of Total PAH and benzo(a)pyrene were below the acceptance criteria for the remainder of the boreholes, fragments of ash and cinders were identified in boreholes BH4 and BH18 located on the western side of Bowen Street and in all of the boreholes located on the eastern side of Bowen Street with the exception of boreholes BH9 and BH11. There is therefore the potential for localised or 'hotspot' PAH contamination at these locations.

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Laboratory analysis reported soil pH levels ranging from 8.8 to 11.0 which is indicative of moderately alkaline soils. The analysis reported that all of the eighteen samples analysed for pH were found to exceed the ANZECC Environmental Investigation criteria which recommends an upper pH of 8, with sixteen out of the eighteen samples also exceeding the SAHC health based investigation criteria which recommends an upper pH of 9. The range of pH values reported in the fill materials were found to be very similar to those reported in the underlying natural soils.

Organochlorine Pesticides (OCPs) and Organophospate Pesticides (OPPs)

All soil samples analysed for OCPs reported concentrations below the respective laboratory detection limits and consequently well below the nominated intervention criteria.

Total Petroleum Hydrocarbons (TPHs) and Mono Aromatic Hydrocarbons (BTEX)

All soil samples analysed for TPH and BTEX compounds reported concentrations below the respective laboratory detection limits and consequently well below the nominated intervention criteria.

Victorian EPA Screen

The four samples that was analysed for a Victorian EPA Screen (BH4, BH13, BH12/D and BH15/D) reported concentrations of Polychlorinated Biphenyls (PCBs), phenol and chlorinated hydrocarbons below the laboratory detection limits. The samples from boreholes BH12 and BH15 were also analysed for cyanide and cresols and the concentrations reported were below the laboratory detection limits.

Elevated levels of fluoride of 260 mg/kg and 190 mg/kg were reported in the fill materials (0.55-0.85 m) recovered from boreholes BH12 and BH15, located in the north eastern corner of the Franklin Street Car Park and the south eastern corner of the Grote Street Car Park, respectively. The levels were below the Dutch intervention level of 2000 mg/kg. It is likely that the fluoride is associated with the ash and cinders, which were identified at both locations.

Equipment Rinsate

The equipment rinsate which was from the push tube used in BH8, was analysed for PAHs, metals and OCPs. The laboratory results reported all PAHs, OCPs and metals below the respective laboratory detection limits and hence below the specific environmental and health based guidelines for these analytes.

4.7 Data Validation Report

All analytical data for soil was assessed to ensure validation. Results of internal laboratory Quality Control (QC) for soils are included within the laboratory reports in Appendix I. This includes results of surrogate recoveries and replicate analysis carried out as part of the laboratory QC program. Tabulated results of all of laboratory replicate analysis and field duplicate analysis is contained in Appendix J.

The precision of the results for each analyte for both the laboratory replicate and field duplicate samples was determined by calculating the Relative Percentage Difference (RPD) between a replicates and duplicates. This was calculated a follows:

$$RPD = \frac{(Concentration 1 - Concentration 2) \times 100}{(Concentration 1 + Concentration 2) \div 2}$$

The acceptance criteria for laboratory replicates is generally set at an RPD of 20%, with an RPD of 30% used for field duplicates. This criteria is based on Rust PPK quality assurance (QA) protocols, which were developed with regard to the US EPA regulations. The %RPD values for the laboratory replicate and field duplicates are contained in Appendix K.

In order to obtain a measure of overall precision, a relative standard deviation (%RSD) was determined for each analyte. This involved normalising each sample result and the corresponding replicate/duplicate results and then calculating the standard deviation of the complete set of normalised values for that analyte. This relative standard deviation is calculated as a percentage and is included in Appendix K. For soil sampling programs an RSD below 30% is considered satisfactory.

The laboratory analysis program included the analysis of four field duplicates and eight laboratory replicates. The RPD was greater than 30% for the inter-laboratory duplicate results for copper and zinc. The extraction methods used by the primary and the secondary laboratory are identical and the analytical methods are compatible (ICP-AES/Flame Atomic Absorption Spectrometry) and therefore the difference between the inter-laboratory duplicate results would most likely be due to the heterogeneous nature of soil and the consequent difficulty in obtaining a 'true' duplicate sample in the field.

One of the RPDs was greater than 20% for the laboratory replicate results for lead and this could also be due to the hetergeneous nature of soil and the difficulty in obtaining two replicate samples from the soil sample in the laboratory. The RSDs were within the accepted criteria for all of the replicates as shown in Appendix K.

5. Conclusions

The investigation program undertaken during May 1997 has identified elevated concentrations of heavy metals (lead, zinc, and copper) in excess of the ANZECC environmental and/or the SAHC health based guidelines within the fill materials recovered from:

- the driveway of the Coachfreight parcel collection and drop off point to the west of Bowen Street (BH4, lead and zinc only);
- the north east corner of the Grote Street public car park (BH14); and
- the centre of the car park adjacent the storage building at 104 Grote Street used by the Adelaide Central Mission (BH20, zinc only).

The concentrations of heavy metals were reported to depths ranging from 0.2 m to 0.7 m.

An elevated PAH (benzo(a)pyrene) concentration in excess of the SAHC health based guidelines, was identified within the fill materials in the car park adjacent the storage building at 104 Grote Street to a maximum depth of 0.85 m. Elevated Total fluoride concentrations were also identified within the surficial fill materials recovered from the north eastern corner of the Franklin Street Car Park and the south eastern corner of the Grote Street Car Park.

These elevated levels of heavy metals, PAHs and fluoride are considered to be associated with fragments of ash, cinders and/or slag which were observed within the sub-surface soil profile within these locations. The presence of these ash, cinders and/or slag is indicative of former waste products such as coke, coal and potential fuel oil wastes which may result from the incomplete combustion of petroleum hydrocarbon products (which may occur in domestic fires or furnaces for example). The ash, cinders and/or slag may also be waste products resulting from former forging operations which occurred at the site from around the 1920s to the 1970s.

Fragments of ash, cinders and/or slag were identified in boreholes BH4 and BH18 located on the western side of Bowen Street, and in all of the boreholes located on the eastern side of Bowen Street with the exception of boreholes BH9 and BH11. Due to the fragmented nature and uneven distribution of the ash, cinders and/or slag within the fill materials, the concentrations of contaminants that have been reported may not necessarily be indicative of the level of potential contamination in the soil. In addition to this, the relatively low proportion of the ash, cinders and/or slag within the overall soil matrix may be resulting in a dilution effect on the contaminant levels within the overall matrix. There is therefore the potential for high concentrations of localised (hotspot) PAH, heavy metal and/or fluoride contaminants within the fill materials at all of the locations where the ash, cinders and/or slag were observed. The fill materials containing ash and cinder fragments were generally identified to depths ranging from 0.5 m to 0.7 m across the site.

Heavy metal concentrations from eight of the soil samples recovered from the natural underlying soils reported concentration levels below both the ANZECC and SAHC investigation levels. From an environmental perspective it is considered that the presence of moderately alkaline surface and subsurface soils will act to minimise the potential for heavy metal leachate generation and infiltration by acting to favour the complexing of the ions within the clay matrix.

As a preliminary health risk assessment, the concentrations of all analytes were also compared to the proposed health based soil guidelines (Langley et al 1996) for restricted residential landuse and commercial/industrial landuse (Exposure Settings D and F). The preliminary risk assessment identifies the lead concentration reported in the fill materials recovered from the north eastern corner of the Grote Street Car Park (BH14) in excess of both landuse exposure scenarios. The concentrations of all analytes reported from the remaining sampling locations were below the prescribed levels for restricted residential and commercial/industrial landuses.

The presence of moderately alkaline surface and sub-surface soils in conjunction with the natural tight clay profile and the apparent containment of any contaminants within the ash, cinder and/or slag fragments identified, indicates that the impacted fill materials are likely to pose negligible long term environmental risks to the underlying soils and groundwater.

6. **Recommendations**

Bus Depot 1 (Greyhound and McCaffertys), Grote Street and Franklin Street Car Parks

In accordance with the continued use of these areas for commercial purposes, the results and findings of the assessment program have identified no requirements for any subsequent site characterisation or remedial works within these areas. This recommendation is with the exception of a site specific risk assessment required to address the elevated concentration of lead identified within the north eastern corner of the Grote Street Car Park. From a preliminary risk assessment perspective it is considered that the concentration and likely nature of the lead identified will not pose a limiting factor for the continued current usage of the site providing the bitumen surfaces are maintained and managed appropriately.

If these areas of the site are to be developed for a more sensitive landuse, then further site characterisation is recommended, the extent of which will be dependent on the future landuse, due to the presence of ash and cinders within the fill materials at nine out of the eleven sampling locations in these areas. If this land is to be redeveloped to a landuse of the same or similar sensitivity (for example commercial or restricted residential with no access to underlying soil) then it is recommended that validation of any excavated soil be carried out in order to determine the required disposal method. Disposal as low-level contaminated waste may be necessary due to the potential for contamination to be present within the ash and cinders identified in these areas. It is also recommended that appropriate health and safety precautions are taken during any possible future on-site earthworks, in order to protect workers and adjoining sites from exposure to potentially contaminated soils.

104 Grote Street

The investigation program has identified no requirements for any subsequent site characterisation or remedial works within this area (which includes the house, private car park, storage building and adjacent car park) provided the current uses are maintained. If this portion of the site is to be developed for a more sensitive landuse (for example residential), it is recommended that more extensive site characteristion is carried out prior to the redevelopment. This is due to the presence of ash and cinders within the fill materials recovered from the two boreholes in this area, and so that the soil can be further characterised in those areas not covered in this investigation. Similarly to the other areas of the site, if this land is to be redeveloped to a landuse of the same or similar sensitivity then validation of any excavated soil is recommended prior to disposal of the excavated soil, and the appropriate health and safety precautions should be taken during any excavation.

Coachfreight and adjacent car park

If the current use of the land in this area is to be maintained, there are no requirements for remedial works in this area of the site. This is contingent upon the adequate maintenance and management of the bitumen surfaces. If this portion of the site is to be developed for a more sensitive landuse (for example residential), then further site characterisation is

recommended prior to the redevelopment, the extent of which will be dependent on the future landuse, due to the presence of ash and cinders within the fill materials recovered from the two boreholes in this area. If this land is to be redeveloped to a landuse of the same or similar sensitivity then validation of any excavated soil is recommended prior to disposal of the excavated soil, and the appropriate health and safety precautions should be taken during any excavation (as described previously).

Bus Depot 2 (Premier Stateline)

No contamination was identified in this area (which includes the bus parking area and the car park adjacent the terminal building) and so no remedial works or further site characterisation works are required provided the site use remains as at present. If this portion of the site is to be developed for a more sensitive landuse (for example residential), then further site characterisation is recommended prior to the redevelopment, the extent of which will be dependent on the future landuse, in order to further characterise the soil in those areas not covered in this investigation.

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7. Statement of Limitations

This report has been prepared by the consultant with all reasonable skill, care and diligence in accordance with the terms of agreement with the client, and taking into account the human and other resources utilised by agreement with the client.

The data in this report was derived by applying the methodology described in previous sections of this report. To the best of the consultant's knowledge, the information contained in the report is accurate at the date of issue. However, there should be a recognition of the limitations of the environmental site assessment process. These are referred to, for example, in Section 4 of ASTM Practice E 1527-94. Clause 4.5 states the following:

No environmental site assessment can wholly eliminate uncertainty regarding the potential for recognised environmental conditions in connection with a property. This site assessment is intended to reduce, but not eliminate, uncertainty regarding the potential for recognised environmental conditions in connection with a property, and both parties recognise limits of time and cost.

It should also be recognised that site conditions, including the extent of contamination and contaminant concentrations, can change with time. This may be particularly relevant if the report is used after a protracted delay, such that further investigation of the site may be necessary.

In preparing this report, the consultant has relied upon, and presumed accurate, certain information provided by the client or third parties. Unless otherwise stated in the report, the consultant has not attempted to verify the accuracy or completeness of any such information.

The consultant has prepared this report for the client in accordance with generally accepted consulting practice and the consultant's terms of business. No other warranty, express or implied, is made as to the professional advice included in this report. The consultant disclaims any responsibility in respect of any matters outside the scope of the terms of agreement with the client.

This report has not been prepared for use by parties other than the client. It may or may not contain sufficient information for the purposes of other parties or for other uses. The consultant accepts no responsibility to third parties to whom this report, or any part thereof, is made known.

A third party relies upon the report at its own risk.

In accordance with standard practice, the assessment carried out is site specific. Consequently, the assessment does not address environmental liabilities which may or may not pertain to other properties either currently or previously owned or operated by the client, or to other off-site environmental liabilities.

Appendix A

Site Location Plan



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Appendix B

Department of Mines and Energy Groundwater Data



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624	41 1	263	EN	7.62	01/71	7.62	¢1/71	ADBLAIDE	5 266										υ	U	r	U	
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628	41 (n 688 1	WINE	100.00	03/78	100.00	07/78	ADELAIDE	E 19	18.90	03/78	300.92	01/78	2403	03/78	7.80	2794	63.60	υ	Y	U	σ	BXP
628	41 :	a 1172)	5 111	17.50	05/81	17.50	05/81	ADELAIDE	8 378	15.00	05/81			1804	05/81	7.€0	8778	17.50	U	¥	0	υ	OPR
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628	43	n 1172	s imi	16.50	05/81	16.50	05/81	NOBLAICE	S 378	14.00	05/81			1832	05/B1	7.60	8781	16.50	ס	Y	U	υ	OPR
628	41	n 1173	O SINA	16.00	95/41	16.00	05/81	Adela:12	8 378	13.50	05/81			1832	0 5/81	7.60	8712	16.00	ับ	Y	บ	U	OPR
623	41	n 1173	2 1111	19.00	55/81	19.00	95/81	ADELAIDE	8 378	16.50	05/81			1804	05/81	8.10	2784	19.00	α	Y	σ	ឋ	CP2
628	41	n 1173	3 N N	19.00	05/81	19.00	- 55/81	ADRIAIDS	8 378	16.50	05/81			1804	05/81	7.70	4785	19.00	J	Y	U	U	0 91
628	41	m 1173	4 WH	19.00	05/81	19.00	05/81	ADELA108	5 378	16.50	05/81			1804	05/81	7.70	\$786	19.00	ט	Y	U	υ	OPL

The Department will not assume rasponsibility for any errors or omissions in the data provided

South Austranian Department of Mines and Zastry

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Appendix C

Location of Soil Sampling Points

FRANKLIN STREET



C ODE

REVISIONS

DATE

Environment & Infrastructure

100 NORTH TERRACE ADELAIL

27J097A4

SOUTH AUSTRALIA, 5000

TEI.EPHONE 1081 2125733 FAX 1081 2124686

SAMPLING POINT

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Appendix D

Soil Borelogs

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BH1



Project: Franklin Street Bus Station

Job No: 27J097A

Date: 20/5/97

Coordinates (AMG): N E

Reduced Level (mAHD)

Location No:

Soil Classification and Description of Each Visible Soil Profile

Time:

11:15 am

Depth (m)	Sample No	Soil Description		Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.06		BITUMEN.				
0.06- 0.5	0.06-0.3 0.4-0.5	FILL. Sand, off-white/yellow becoming yello to medium gravel.	ow, some fine	0		
0.5-1.0	0.8-1.0	Sitty CLAY. Orange brown.		0		
1.0-2.1	1.4-1.55 2.0-2.1/D	Silty CLAY. Creamy brown, mottled off-wh becoming more clayey with depth.	ite and brown,	0		
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			4			
		· · · · · · · · · · · · · · · · · · ·				
Logged b	oy: JRH	Sa	m pled by: JRH			
Field Clas 0 No c 1 Sligh 2 Visu 3 Gross	ssification obvious contamir nt visual contamin al contamination	Co nation nation and/or slight odour and/or odour nation and/or strong odour	mments			



Project:	Franklin Street Bus	Station				Job No: 27J097A
Date:	20/5/97	Time:	12:00 pm	Location No:	BH2	
Coordinat	es (AMG): NE			Reduced Leve	l (mAHD)	

Depth (m)	Sample No	Soil Description	Fie Clas	ld ss.	Headspace Vapour (ppm)	Analytes Selected
0-0.055		BITUMEN.				
0.055- 0.7	0.1-0.3/D 0.4-0.5	FILL. Sand, off-white/yellow becoming yell to coarse gravel.	low, some fine 0			
0.7- 1.55	0.8-1.0 1.35-1.5	Silty Sandy CLAY. Orangey/brown, becom (less sandy) and calcareous with depth.	ning more silty 0			
1.55- 2.0	1.8-2.0	Silty CLAY. Grey brown mottled off-white a calcareous.	and brown, 0			
	-					
					L.	
		,				
		4				
						· .
				7		
	by: JRH	c	ampled by: IPH			
Field Cla 0 No 1 Slig 2 Visu 3 Gro	issification obvious contamin ht visual contamir ual contamination	ation ation and/or slight odour and/or odour pation and/or strong odour	om me nts	• •		• •

roject: ate:	20/5/07	Time 12:40 pm	Location	No: P	Ji H3	DD NO: 27J
ale.	zoisiar	N F	Reduced			
oil Cla	ssification a	Ind Description of Each Visible	Soil Profile			
Depth (m)	Sample No	Soil Description		Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.055		BITUMEN.				
0.055- 0.65	0.1-0.3/D 0.4-0.5	FILL. Sand, yellow, some fine to coarse	e gravel.	· 0		·.
).65- 1.2	0.8-1.0	Silty CLAY. Greyish green, mottled brow (calcareous nodules).	wn and off-white	0		
1.2-2 .1	1.4-1.55 2.0-2.1	Silty CLAY. Greyish green, mottled red yellow. (Hindmarsh clay).	and mu st ard	0		
	-					
		. I	Sampled by: IDI	<u> </u>		
ogged i				1		



Project:	Franklin Street B	us Station				Job No: 27J097
Date:	20/5/97	Time:	1:10 pm	Location No:	BH4	
Coordina	tes (AMG): N	E		Reduced Leve	l (mAHD)	

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description		Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.25		BITUMEN.	:			
0.025- 0.4	0.1-0.3	FILL. Sand, yellow, some fine to coars	e gravel.	·. 0		
0.4-1.0	0.45-0.6/D 0.8-1.0	FILL. Sandy clay, dark brown, occasio gravel, occasional fine to medium oran some fine to coarse black ash and cinc brown calcareous nodules, very occasi medium silvery black, vesicular slag fra occasional medium china fragments.	nal fine to medium ge brick fragments, lers, some creamy onal fine to gments, very	1		
1.0-1.6	1.55-1.7	Silty CLAY. Creamy brown, mottled bro	own, calcareous.	0		
1.6-2.1	2.0-2.1	Silty CLAY. Greyish green, mottled cre brown, and yellow brown, some grey/b towards bottom.	amy brown and ack mottling	0		
Logged t	Logged by: JRH					
Field Cla	ssification		Comments	•		
0 No c 1 Sligi 2 Visu 3 Gros	obvious contamina ht visual contamin Ial contamination ss visual contamir	ation ation and/or slight odour and/or odour nation and/or strong odour	· ·			

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Environ	ment & I	nfrastr	ucture	

Project: Franklin Street Bus Station

Job No: 27J097A

Date: 2

20/5/97

Time: 2:00 pm

Location No:

o: BH5

Coordinates (AMG): N E

Reduced Level (mAHD)

Depth (m)	Sample No	Soil Description	l	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.4		BITUMEN.				:
0.04- 0.7	0.1-0.3 0.4-0.5/D	FILL. Sand, yellow, some fine to med	ium gravel.	0		
0.7- 0.85	0.7-0.8	FILL. Sandy clay, dark brown, occasion ash/cinders, occasional fine to mediun fragments, occasional fine gravel.	onal fine black n orange brick	. 1		
0.85- 1.3	0.8-1.0	Silty CLAY. Orangey brown, mottled o	creamy brown.	0		
1.3-2.1	1.35-1.5 1.7-1.8 2.0-2.1	Silty CLAY. Greyish brown, mottled of (calcareous).	f-white and brown	0		P ₂ 2
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1						
1						
						·
		·				۰
Logged b	y: JRH		Sampled by: JRH			
Field Clas	sification	······································	Comments			
0 No o 1 Sligh 2 Visua 3 Gros	bvious contamina It visual contamina al contamination a Is visual contamin	ation ation and/or slight odour and/or odour ation and/or strong odour				



3

Gross visual contamination and/or strong odour

Project:	Franklin Street	Bus Station				Job No: 27J097A
Date:	20/5/97	Time:	2:40 pm	Location No:	BH6	
Coordina	tes (AMG): N	E		Reduced Level	(mAHD)	

Depth (m)	Sample No	Soil Description		Field Class.	Headspace Vapour (ppm)	Analytes Selected		
0-0.05		BITUMEN.						
0.05- 0.65	0.1-0.3 0.4-0.5	FILL. Sand, yellow, some fine to mediu	ım gravel.	0				
0.65- 0.75	0.65-0.75	FILL Sandy clay, dark brown, some fir gravel, occasional fine to medium orang occasional fine to medium black ash/cir	ne to medium ge brick fragments, nders.	1				
0.75- 1.2	1.0-1.2/D	Silty CLAY. Creamy brown mottled bro	wn.	0				
1.2-1.8	1.7-1.8	Hindmarsh CLAY. Greyish green, mott and reddy brown.	led brown, yellow	0				
			U					
	. •					4		
				1				
			· · · · ·					
Logged I	by: JRH	· .	Sampled by: JRH					
Field Cla	ssification		Comments					
0 No 1 Slig 2 Visu	obvious contamin ht visual contamin ual contamination	nation nation and/or slight odour and/or odour						

ampling Record

Project: Date:	: Franklin \$ 20/5/97	Street Bus Station Time: 3:30 pm Location	No: B	H7
Coordir	nates (AMG)	N E Reduced	Level (n	nAHI
Soil Cla	ssification a	and Description of Each Visible Soil Profile		
Depth (m)	Sample No	Soil Description	Field Class.	Hea V
0-0.07				
0.07- 0.8	0.1-0.3 0.4-0.5	FILL. Silty sand, yellow, some powered green siltstone, some fine to coarse gravel.	0	
0.8- 1.35	0.8-1.0	Silty CLAY. Orangey brown.	0	
1.3 5- 2.0	1.35-1.5/D 1.8-2.0	Silty CLAY. Creamy brown, mottled brown and off-white, calcareous.	0	
	-			
				2
	: •			

Logged by: JF	RH	Sampled by: JRH	-
Field Classific	cation -	Comments	
0 No obvior	us contamination		
1 Slight visu	ual contamination and/or slight odour		
2 Visual co	ntamination and/or odour		· .
3 Gross vis	ual contamination and/or strong odour		

Job No: 27J097A

Analytes Selected

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3

Gross visual contamination and/or strong odour

Project: Franklin Street Bus Station

Job No: 27J097A

Date: 2	0/5/97	Time:	4:00 pm	Location No:	BH8	
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Coordinates (AMG): N E

Reduced Level (mAHD)

Depth (m)	Sample No	Soil Description		Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.10		BITUMEN.				
0.1-0.5	0.1-0.3 0.4-0.5/D	FILL. Silty sand, yellow (creamy brown) to medium gravel.	, occasional fine	0		
0.5-1.8	0.8-1.0 1.35-1.55	Silty CLAY. Creamy brown mottled brow	vn.	0		
1.8-2.0	1.8-2.0	Silty CLAY. Off-white, some fine limesto perched water table).	ne gravel (moist -	0		
	-					
		·····				
Logged I	by: JRH		Sampled by: JRH			
Field Cla	ssification	- 6	Comments	·	-	
1 Slig 2 Visu	ht visual contamination	auon ation and/or slight odour and/or odour		••		

BH9



21/5/97

Date:

Project:	Franklin Street Bus Station

Time:

Job No: 27J097A

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Coordinates (AMG): N	E	Reduced Level (mAHD)

9:30 am

Location No:

Depth (m)	Sample No	Soil Description		_Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.45		BITUMEN.				Ť
0.045- 0.9	0.1-0.3 0.35-0.5	FILL. Silty sand, yellow, fine to coarse to coarse gravel.	grains, some fine	· 0	(0.3-0.4) 4.3	- -
0.9-2.1	0.7-0.9/D 1.3-1.45 2.0-2.1	Silty CLAY. Creamy brown, mottled brown,	own, calcareous.	0	(0.6-0.7) 5.3 (1.5-1.6) 6.8	
	-					
				-		
Logged I	by: JRH		Sampled by: JRH			
Field Cla	ssification		Comments			· ·
0 No 1 Slig 2 Visu 3 Gro	obvious contamin ht visual contamir Ial contamination ss visual contamir	ation ation and/or slight odour and/or odour nation and/or strong odour	· .		· · · · · · · · · · · · · · · · · · ·	



Project: Franklin Street Bus Station

Job No: 27J097A

Date:	21/5/97	Time:	10:10 am	Location N
				• • •

No: BH10

Coordinates (AMG): N E

Reduced Level (mAHD)

Depth (m)	Sample No	Soil Description		Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.45		BITUMEN.				
0.045- 0.65	0.1-0.3 0.35-0.5	FILL. Silty sand, yellow, fine to coarse to coarse gravel.	grains, some fine	0	(0.55-0.65) 4.5	
0.65- 0.7		FILL. Silty clay, dark brown, occasiona ash/cinders, occasional fine orange bri occasional fine gravel.	al fine black ck fragments,	1		
0.7- 0.85	0.7-0.85/D	Silty CLAY. Orangey brown mottled cr occasional fine yellow roots, occasiona brown roots.	eamy brown, I fine to medium	0	(0.7 5-0.85) 10.5	-
0.85- 2.0	1.0-1.2 1.4-1.55 1.8-2.0	Silty CLAY. Creamy brown mottled bro occasional fine black spots,, very occas calcareous.	wn and off-white, sional fine roots,	ο	(1.2-1.3) 8.0	
				•		
			. .			
				.		
Logged t	by: JRH		Sampled by: JRH			
Field Cla	ssification		Comments			
0 No d 1 Sligh	obvious contamina ht visual contamin	ation ation and/or slight odour				ļ,
2 Visu 3 Gros	al contamination ss visual contamir	and/or odour nation and/or strong odour		•		

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					Jo	b No: 2 7J0
ate:	22/5/97	Time: 11:00 ar	m Location	No: B	H11	
oordir	nates (AMG)	N E	Reduced	Level (n	nAHD)	
oil Cla	Sample	and Description of Each Visib	le Soil Profile	Field	Headsnace	Analyton
(m)	No		•	Class.	Vapour (ppm)	Selected
0-0.03		BITUMEN.				y
).03-).7	0.1-0.3 0.35-0.5/D	FILL. Silty sand, yellow, fine to coarse to coarse gravel, some silty clay pock	e grains, some fine ets (orangey brown).	0	(0.3-0.4) 11.2	
0.7-1.0	0.8-1.0	Silty CLAY. Orangey brown, mottled calcareous, occasional fine to medium	creamy brown, n roots.	0	(0.65-0.75) 11.9	
1.0-2.0	1.3-1.45 1.8-2.0	Silty CLAY. Creamy brown, mottled c calcareous, very occasional fine to co	off-white and brown arse brown roots.	0	(1.6-1.7) 27.9	
						·
.oggea I	oy: JKH		Sampled by: JRH			······································

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Project:	Franklin Street	Job No: 27J097A			
Date:	22/5/97	Time:	9:00 am	Location No: BH12	
Coordina	tes (AMG): N	E		Reduced Level (mAHD)	

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description		Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.03		BITUMEN.		•		
0.03- 0.45	0.15-0.3	FILL. Silty sand, yellow, fine to coarse coarse gravel.	sand, some fine to	0	(0.4-0.5) 66.7	
0.45- 0.55		FILL. Silty sand, brown and yellow, or pockets, dark brown, fine to medium g	ccasional silty clay gravel.	0		
0.55- 0.7	0.55-0.7/D	FILL. Silty clay, dark brown, very occa ash/cinders.	isional fine black	1		
0.7-1.0	0.85-1.0	Silty CLAY. Orangey brown, calcareou and brown.	us, mottled off-white	0	(0.7-0.8) 25.8	
1.0-2.0	1.55-1.7 1.85-2.0	Silty CLAY. Creamy brown, mottled of very occasional large roots, becoming mottled off-white and brown.	ff-white and brown, greeny brown	0	(1.7-1.8) 49.3	
						,.
9						
						. [
Logged b	y: J RH	Sampled by: JRH				
Field Clas	ssification		Comments		<u></u>	
0 No c 1 Sligh 2 Visu 3 Gros	No obvious contamination 1 Slight visual contamination and/or slight odour 2 Visual contamination and/or odour 3 Gross visual contamination and/or strong odour			-	· · ·	

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Environmental	Field	Sampling	Record

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Date	22/5/97	Time: 11:45 o	m Location	No. D	U10	.
		1111e. 11.40 a	Location			
Soil Cla	ssification a	IN E	Reduced le Soil Profile	Level (n	nAHD)	
Depth (m)	Sample No	Soil Description	n	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.35		BITUMEN.		1		· · · · · · · · · · · · · · · · · · ·
0.035- 0.15	0.05-0.15 0.2-0.35	FILL. Silty sand, yellow, fine to coars bitumen fragments from surface, som gravel.	e grains, occasional ne fine to coarse	0		
0.15- 0.6	0.35-0.5	FILL. Silty sand, grey/brown, some fi	ne to coarse gravel.	0	(0.5-0.6) 6.0	
0.6-0.9	0.7-0.9/D	FILL. Silty clay, dark brown, some fin some fine to medium roots, some fine ash/cinders and orange brick fragmer	e to medium gravel, e to medium black nts from 0.7-0.8 m.	1		3-
0.9-2.0	1.35-1.5 1.8-2.0	Silty CLAY. Creamy brown mottled o calcareous.	ff-white and brown,	0	(1.0-1.2) 8.2 (1.2-1.8) 6.9	· .
	•					
Logged t	oy: JRH		Sampled by: JRH			
			Sampled by. JRH	<u></u>		



Date:

Project: Franklin Street Bus Station

Job No: 27J097A

Time: 12:30 pm Location No: BH14

Coordinates (AMG): N E

22/5/97

Reduced Level (mAHD)

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description		Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.035		BITUMEN.				
0.035- 0.15	0.05-0.15	FILL. Silty sand, yellow, fine to coarse to coarse gravel.	grains, some fine	• 0 • •		
0.15- 0.70	0.15-0.3 0.55-0.7	FILL. Silty sand, grey/brown, some fine occasional silty clay pockets with fine b and occasional fine to medium orange	e to coarse gravel, lack ash/cinders brick fragments.	1		
0.70 <u>-</u> 1.2	0.7-0.85 1.0-1.2	FILL. Silty clay. Some fine to medium fragments, some fine to medium gravel calcareous limestone fragments.	orange brick , some off-white	0	(0.8-1.0) 9.3	
1.2-2.0	1.85-2.0/D	Silty CLAY. Creamy brown mottled off calcareous.	white and brown,	0	(1.3-1.4) 16.6	
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					-	
	-			<u>^</u>		
		· · ·				
	*					
Logged b	Logged by: JRH		Sampled by: JRH	I		
Field Clas	ssification		Comments			
0 No c 1 Sligh 2 Visu 3 Gros	obvious contamina ht visual contamin Ial contamination ss visual contamir	ation nation and/or slight odour and/or odour nation and/or strong odour			< colored and set of the set of t	

Date:	22/5/97	Time: 1:00 pm Location	No: B	H15	•
Coordin	ates (AMG):	N E Reduced	l Level (n	nAHD)	
Soil Cla	ssification a	nd Description of Each Visible Soil Profile			.•
Depth (m)	Sample No	Soil Description	Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.055		BITUMEN.			
0.055- 0.55	0.15-0.3 0.3-0.5	FILL. Silty sand, yellow, fine to coarse grains, some fine to coarse gravel.	• 0	(0.3-0.4) 6.6	:
0.55- 0.7		FILL. Silty clay, dark brown mottled off-white and orangey brown, occasional fine to medium black ash/cinders, occasion fine orange brick fragments, occasional fine to medium roots, some off-white pockets.	1	(0.55-0.65) 10.7	
0.7-1.1	0.7-0.85/D	Silty clay, orangey brown (disturbed natural soil?).	0	(0.8-0.9) 9.2	
1.1-2.1	1.5-1.6 2.0-2.1	Silty CLAY. Creamy brown, mottled brown and off-white.	0	(1.6-1.7) 13.0	<u>:</u>
Logged b	y: JRH	Sampled by: JR	H		

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BH16



Date:

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Project:	Franklin Street Bus Station	
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Time: 1:45 pm

Job No: 27J097A

Coordinates	(AMG):	Ν	Е	
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22/5/97

Reduced Level (mAHD)

Location No:

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description		Field Class.	Headspace Vapour (ppm)	Analytes Selected	
0-0.045		BITUMEN.					
0.045- 0.3	0.1-0.3/D	FILL. Silty sand, yellow, fine to coarse to coarse gravel.	grains, some fine	0			
0.3-0.6	0.4-0.5	FILL. Silty clay, greeny brown, occasion roots, mottled off-white and brown, occ brick fragments, occasional fine black a	nal fine to medium asional fine orange sh/cinders.	1 	(0.3-0.4) 6.9		
0.6-1.2	0.85-1.0	Silty CLAY. Greeny brown mottled off-v	white and brown.	0 -			
1.4-2.0	1.75-1.85	Silty CLAY. Grey/green mottled yellow brown. (Hindmarsh clay).	and reddish	0	(1. 5 -1.6) 8.6		
	-					ð	
	-						
Logged by: JRH			Sampled by: JRH				
Field Cla	Field Classification			Comments			

1 Slight visual contamination and/or slight odour

2 Visual contamination and/or odour

3 Gross visual contamination and/or strong odour

BH17

Project:	Franklin Street Bus Station
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Job No: 27J097A

Coordinates (AMG): N E

22/5/97

6.51

Date:

Environment & Infrastructure

Reduced Level (mAHD)

Location No:

Soil Classification and Description of Each Visible Soil Profile

Time:

2:50 pm

Depth (m)	Sample No	Soil Description		Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.075		BITUMEN.				•
0.075- 0.65	0.1-0.3 0.35-0.5/D	FILL. Silty sand, yellow, fine to coarse gratter to coarse gravel.	ains, some fine	· 0	(0.3-0.4) 6.9	
0.75- 0.7		FILL. Silty clay, dark brown, occasional fi ash/cinders, occasional fine to medium or fragments, occasional fine to medium gra	ne black ange brick vel.	1		
0.7-1.0	0.8-1.0	Silty CLAY. Orangey brown mottled brow coarse limestone gravel.	n, occasional	0	(0.7-0.8) 7.3	
1.0-2.0	1.8-2.0	Silty CLAY. Creamy brown mottled brown calcareous, becoming greenish brown wit	n and off-white, . h depth.	0	(1.4-1.5) 12.5	
			,			
						۰.
		μ				
Logged	by: JRH	s	Sampled by: JRH			
Field Cl	assification	. (Comments			
0 No	obvious contamin abt visual contami	ation				
2 Vis	ual contamination	and/or odour				



Soil Classification and Description of Each Visible Soil Profile

Environment & Infrastructure

Depth (m)	Sample No	Soil Description		Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.055		BITUMEN.				
0.055- 0.15	0.05-0.15	FILL. Gravelly sand, fine to coarse gravely	vel, browny yellow.	0		
0.15- 0.4	0.15-0.3	FILL. Silty sand, yellow, fine to coarse to coarse gravel.	grains, some fine	0		
0.4-0.5	0.4-0.5	FILL. Silty clay, dark brown, occasiona ash/cinders, occasional fine orange brid occasional fine to medium gravel.	l fine black ck fragments,	1		
0.5-1.6	0.8-1.0 1.45-1.6	Silty CLAY. Orangey brown mottled off	-white and brown.	0	(0.75-0.85) 25.7 (1.0-1.2) 9.0	
1.6-2.3	2.15-2.3	Silty CLAY. Creamy brown, mottled bro becoming greeny brown mottled off-wh depth.	own and off-white, ite and brown with	0	(1.6-1.7) 130	
			·-	-		
			-			
			-			
	- -				· .	
Logged L	by: JRH	•	Sampled by: JRH			
Field Classification Comments 0 No obvious contamination 1 Slight visual contamination and/or slight odour						

2 Visual contamination and/or odour

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3 Gross visual contamination and/or strong odour

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ate:	22/5/97	Time: 10:00 a	am Location	No: B	H19	••
oordir	ates (AMG)	N E	Reduced	Level (n	nAHD)	
oil Cla	ssification a	and Description of Each Visil	ble Soil Profile			
Depth (m)	Sample No	Soil Descriptio	Dn	Field Class.	Headspace Vapour (ppm)	Analytes Selected
)-0.01		BITUMEN.	<u> </u>			
).01-).4	0.1-0.3/D	FILL. Silty sand, yellowy brown, fine some fine to coarse gravel.	e to coarse sand,	0	(0.3-0.4) 10.5	
).4-0.6		FILL. Silty sand, brown and yellow, occasional fine to coarse gravel, occ orange brick fragments	fine to coarse sand, casional fine to coarse	0		
).6-0.7	0.55-0.7	FILL. Silty clay, dark brown, very oc ash/cinders, occasional fine orange	casional fine black brick fragments.	1		- 20
).7-0.9		Silty clay, brown (disturbed natural s	- oil?).	0	(0.7-0.8) 201	÷
).9-1.4	0.95-1.1	Silty CLAY. Orangey brown, mottled calcareous, occasional fine to coarse fragments.	d off-white and brown, e limestone	0		
.4-2.0	1.85-2.0	Silty CLAY. Creamy brown mottled calcareous.	brown and off-white,	0	(1.6-1.7) 195	· .
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1						
						r.
ogged b	y: JRH		Sampled by: JRH			
eld Clas	sification		Comments			

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Environment & Infrastructure



Project: Franklin Street Bus Station

Job No: 27J097A

 Date:
 22/5/97
 Time:
 10:40 am
 Location No:

o: BH20

Coordinates (AMG): N E

Reduced Level (mAHD)

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description		Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.015		BITUMEN.				
0.015- 0.2	0.05-0.2	FILL. Silty clay, brown, occasional fine occasional fine orange brick fragments fine black ash/cinders.	to medium gravel, , very occasional	. 1		
0.2- 0.35	0.2-0.35	FILL. Sitty sand, grey/brown, some fine occasional fine orange brick fragments	e to coarse gravel,	0		
0.35- 0.55	0.45-0.55/D	FILL. Silty clay, dark brown, very occas brick fragments, occasional fine black a	sional fine orange ash/cinders	1	(0.5-0.6) 99.0	
0.55- 1.1	0.85-1.0	Silty CLAY. Orangey brown, mottled of calcareous, occasional fine limestone g	ff-white and brown, Jravel.	0	(1.0-1.2) 33	
1.1-2.0	1.8-1.95	Silty CLAY. Creamy brown mottled off- calcareous.	white and brown,	0	(1.7-1.8) 25.4	
			•			
						· -
						·
Logged b	oy: JRH		Sampled by: JRH			
Field Cla	ssification		Comments			
0 No 0	obvious contamin	ation	**			
2 Visu	nt visual contamin	ation and/or slight odour		·		
3 Gros	ss visual contamir	nation and/or strong odour				

Appendix E

Interpolated Area of Potentially Impacted Soils



UNDERCOVER (CANOPY) AREAS. <u>.</u> j,

SAMPLING POINT . .

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CODE

		FRANK BUS Interpolated Imp
		RUST PPK
REVISIONS	DATE	Environment & Infrastructure

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	SCALE			METRES	
	SCALE 010	20	30 4	METRES	· · · · · · · · · · · · · · · · · · ·
	SCALE 0 10	20	30 4	METRES 0 50	••••••
	SCALE 0 10	20	30 4	METRES	
	SCALE 0 10	20	30 4 СНЕСКЕР	METRES 0 50	
VKLIN	SCALE 0 10 STREE	20 ET	30 4	METRES 0 50	
NKLIN S S1	SCALE 0 10 STREI ATION	20 ET	30 4 CHECKED DRAWN	METRES 0 50	
NKLIN S S1	SCALE 0 10 STREI ATION	20 ET	30 4 CHECKED DRAWN	METRES 0 50 JRH JRD	
NKLIN S ST I Area	SCALE 0 10 STREI ATION a of Pot	20 ET entially	30 4 CHECKED DRAWN DATF	METRES 0 50 JRH JRD	
NKLIN S ST Area pacte	SCALE 0 10 STREI ATION a of Pot ed Soil.	20 ET entially	30 4 CHECKED DRAWN DATE	METRES 0 50 JRH JRD 29.5.97	
NKLIN S S1 Area pacte	SCALE 0 10 STREI ATION a of Pot of Soil.	20 ET entially	30 4 CHECKED DRAWN DATE DRAWING	METRES 0 50 JRH JRD 29.5.97	
NKLIN S S1 I Area pacte	SCALE 0 10 STREI ATION a of Pot ad Soil.	20 ET entially	30 4 CHECKED DRAWN DATE DRAWING	METRES 0 50 JRH JRD 29.5.97 No.	
NKLIN S S1 Area pacte	SCALE 0 10 STREI ATION a of Pot a of Pot a Soil.	20 ET entially	30 CHECKED DRAWN DATE DRAWING 27	METRES 0 50 JRH JRD 29.5.97 №.	
NKLIN S S1 Area pacte	SCALE 0 10 STREI ATION a of Pot a of Pot a Soil.	20 ET entially RALIA, 5000 081 2125733 24686	30 4 CHECKED DRAWN DATE DRAWING 27	METRES 50 JRH JRD 29.5.97 No.	
NKLIN S ST Area pacte	SCALE 0 10 STREI ATION a of Pot a of Pot a of Pot a Soil.	20 ET entially FERRACE ADELAI RALIA, 5000 08) 2125733 24686	30 4 CHECKED DRAWN DATE DRAWING 27	METRES 0 50 JRH JRD 29.5.97 № JO97A4	

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Appendix F

Chain of Custody Forms

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Lab Name		AGAL					l									1.0			R	esults	Du	ie		,				
Address	•	5 r-65 Clarke St, Sth Mell	bourne.							5		E	ð	A					Γ	urnaro	ound	d Time	3-5 days					
Phone Numbe	er 1.	(03) 9685 1777						Envi	ron	mer	nt &	Infr	astr	uch	Jre				F	ax Re	sult	s To	Jane Hev	vitt				
••••••••••••••••••••••••••••••••••••••					_	_													۴	ax Nu	mbe	er	(08) 8405	54301				
Job Location	Kant	the Ament Ric	station						R	ust P	PK J	ob Ny	mbei	r					P	hone	Nun	nber	(08) 8405	i 4300				
Ï			1		İ					27	7J0	97/	Ą						P	roject	Ma	inager	Stuart Ta	ylor				1
<u>[</u>					1	Ľ										· · · · · ·	1		[]u	voice	То		Stuart Ta	iylor				
Relinguished I	By	Jane Hewitt		Received b	y	Pe	-10	1	P	6	nua	21]											
Date		22/5/97		Date			こう	.0	5.	- 9	٦.	~							ſ	3	Sanı	ples on Ice:	YES					
Company		Rust PPK Pty Ltd, Adela	ide	Company	•		1	40	AL		ot	C																٦
Signature		The Amilt		Signature			0									l				Meta	IS. 4	As, Cd, Cr, C	Ju, Hg, P	b, Zn				
							Ž	J.C	2										<u> </u>								x	_ `
							Z_						Ar	nalyte	es									X		<u></u>		
				¢		- 9																						ł
				r Siz	(MS)	tive			•	x	<i>.</i>											•	· ·	·.•				
			Location /:	aine	Ę	eva	য	s		BTE	s											Sampler			:			
Sampled	Time	Sample ID	Depth	Cont	Medi	Pres	Meta	PAH	Ŧ	Нал	р С О								[Initials			Comme	ents		
20/5/97	11:15	BH1	0.06-0.3	250ml	S	<4°C	X		х		10	17	$\begin{bmatrix} 1 \end{bmatrix}$	85	4	2						JRH	·			· · .	•	
20/5/97	11:15	BH1	0.4-0.5	250ml	s	<4°C			;				1	1					_			JRH	`		_ :			
20/5/97	11:15	BH1	0.8-1.0	250ml	s	<4°C																JRH			 .			
20/5/97	11:15	BH1	1.4-1.55	250ml	s	<4°C																JRH			·			
20/5/97	11:15	P:11	2.0-2.1	250ml	s	<4°C										L_						JRH						
20/5/97	11:15	BH1	2.0-2.1	250ml	s	<4°C																JRH						
20/5/97	12:00	BH2	0.1-0.3	250ml	s	<4°C																JRH						
20/5/97	12:00	BH2	0.4-0.5	250ml	s	<4°C																JRH						
20/5/97	12:00	BH2	0.8-1.0	250ml	S	<4°C																JRH						
20/5/97	12:00	BH2	1.35-1.5	250ml	S	<4°C																JRH			_			
20/5/97	12:00	BH2	1.8-2.0	250ml	S	<4°C	X			Π	85	पप										JRH						
20/5/97	12:40	ВНЗ	0.1-9.3	250ml	្រ	<4°C				<u> </u>				·	<u> </u>]	 1			JRH						
20/5/97	12:40	внз	0.1-0.3	250ml	s	<4°C																JRH						
20/5/97	12:40	BH3	0.4-0.5	250ml	s	<4°C																JRH						
20/5/97	12:40	ВНЗ	0.8-1.0	250ml	s	<4°C	X		x		8	54	1									JRH						-
20/5/97	12:40	ВНЗ	1.4-1.55	250ml	s	<4°C									T							JRH						

Page 1 of 8

.:3, 05. 97 10:01	Lab Name Address Phone Numb Job Location	er '	AGAL 57-65 Clarke St, Sth Me (03) 9685 1777 Llin δtreet &	lbourne. 18 Statti	0n				Env	iron	imer tust P 27	лt & РК J 7 J 0	Infr ob Nu 97	astr umbe	ucto r	ure					Results Turnarc Fax Re Fax Nu Phone Project	s Du ounc osult umbe Nun Ma	e 1 Time s To er nber nage:	3-5 days Jane Hewitt (08) 8405 4301 (08) 8405 4300 Stuart Taylor	
P01	Relinguished	By	Jane Hewill		Received b	y		\mathcal{P}	-10	 2		λο		<u>c</u>				1		Į			J]
ĥ	Date		22/5/97		Date			_ <u>_</u>		2.3		à	- , «	17						ĺ		Sam	pies on loe:	YES	
Û	Company		Rust FPK Pty Ltd, Adel	aide	Company						FG1	C	ι	$\overline{\mathcal{X}}$	-			<u>ľ</u>							
:	Signature	· J	RHamilt		Signature					Λí.											Meta	ils: /	As, Cd, Cr, (Cu, Hg, Pb, Zn	.
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	<u> </u>							K.	Z					A	nalyte	BS									
•	Date Sampled	Time	Sample ID	Location /	Container Size	Medium (s/w)	Preservative	Metals	PAHs	Hq	TPH/BTEX	ocPs											Sampler Initials	Comments	
ш	20/5/97	12:40	внз	2.0-2.1	250ml	s	<4°C										1	1					JRH		
તુ.	20/5/97	1:10	BH4	0.1-0.3	250ml	s	<4°C										1						JRH		
Ы	20/5/97	1:10	BH4	0.45-0.6	250ml	s	<4°C		FUL		TOR	AN C	IPA S	CRE	EN		18	55	96				JRH	OCPs by GC ECD	
Ē	20/5/97	1:10	BH4	0.8-1.0	250ml	s	<4°C																JRH		···-· · · · · · · · · · · · · · · · · ·
	20/5/97	1:10	BH4	1.55-1.7	250ml	s	<4°C																JRH		
51	20/5/97	1:10	BH4	2.0-2.1	250ml	s	<4°C																,JRH		
л Ч	20/5/97	2:00	BH5	0.1-0.3	250mi	s	<4 ^ö C																JRH		
Ø	20/5/97	2:00	BH5	0.4-0.5	250ml	s	<4°C																JRH		
17	20/5/97	2:00	BH5/D	0.4-0.5	250ml	s	<4°C																JRH		
231	20/5/97	2:00	BH5	0.8-1.0	250ml	s	<4°C		x	x				18	ى	4	7			;			JRH		
618 1	20/5/97	2:00	BH5	1.35-1.5	250ml	s	<4°C													•			JRH		
-	20/5/97	2:00	BI 15	1.7-1.8	250ml	s	<4°C		+ 	• 								1	1				JRii		[
	20/5/97	2:00	BH5	2.0-2.1	250ml	s	<4°C		1							1		-					JRH		
	20/5/97	2:40	BH6	0.1-0.3	250ml	s	<4°C		1								1						JRH		
	20/5/97	2:40	BH6	0.4-0.5	250ml	s	<4°C										-	1					JRH		
	- 20/5/97	2:40	BH6	0.65-0.75	250ml	s	<4°C	x	X	x		1	1	55	98	1			1.				JRH		

	ab Name Iddress Yhone Number	r (AGAL 51-65 Clarke St, Sth Melb (03) 9685 1777	ourne.			 ſŕ		Envi	ron	mer	nt &	Infr	astr	K uctu	X ure	·	• •• ••	τ., π	Resul Turna Fax F Fax N	its Du iround Result Iumbo	e d Time s To er	3-5 days Jane Hewitt (08) 8405 4301
.) 	ob Location	rein	iklin Street B	ius Stat	1011		ľ			R	ust P クマ	9K J. 7 10		imbe Á	ſ					Phon	e Nur	nber	(08) 8405 4300
							L					50	511	-						Invoi	стма се То	nager	Stuart Taylor
	Relinguished E	<u></u> 3y	Jane Hewitt		Received by	 1		'Y	e ~ \ 0	<u> </u>	X	λα	nu	e]						<u></u>			
Į.	Date		22/5/97		Date			ŧ	2	3	~ C	20	-9	7							San	ples on Ico:	YES
k	Company		Rust PPK Pty Ltd, Adela	de	Comrany					4	5+0	<u>c</u>	VI	C									
	Signature	7	+Refer TA		Signature				(1)									Me	tals: .	As, Cd, Cr,	Cu, Hg, Pb, Zn
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1=									Z					A	nalyte	95	r					-	
					iner Size	m (s/w)	vative				тех												
	Date Sampled	Time	Sample ID	Location /	Contai	Mediu	Prese	Metals	PAHs	H	TPHVE	OCPs							.			Sampler Initiais	Comments
¶ 	20/5/97	2:40	BH6	1.0-1.2	250ml	S	<4°C											-	-		·	JRH	n inggang bang bang bang bang bang bang ban
ľ	20/5/97	2:40	BH6/D	1.0-1.2	250ml	S	<4°C							_								JRH	
	20/5/97	2:40	BH6	1.7-1.8	250ml	s	<4°C															JRH	
	20/5/97	3:30	BH7	0.1-0.3	250ml	S	<4°C															JRH	
Ĩ	20/5/97	3:30	BH7	0.4-0.5	250ml	s	<4°C	X		x		8.	59	9								JRH	
ļ	20/5/97	3:30	BH7	0.8-1.0	250ml	s	<4°C															, JRH	
	20/5/97	3:30	BH7	1.35-1.5	250ml	s	<4°C						i									JRH	
	20/5/97	3:30	BH7	1.8-2.0	250ml	s	<4°C														•	JRH	* • · · ·
	20/5/97	4:00	BH8	0.1-0.3	.250ml	S	<4°C															JRH	
	20/5/97	4:00	BH8	0.4-0.5	250ml	S	<4°C															JRH	
	20/5/07	4:00	BH8/D	0,4-0,5	250ml	S	<4°C															JRH	
	20/5/97	4:00	BH8	0.8-1.0	250ml	s	<4°C	x		X		18	i Zt	0								JRH	
Ĭ	20/5/97	4:00	BH8	1.35-1.55	250ml	s	<4°C															JRH	
	20/5/97	4:00	BH8	1.8-2.0	250ml	s	<4°C															JRH	
· .	21/5/97	9:30	BH9	0.1-0.3	250ml	s	<4°C															JRH	
	21/5/97	9:30	вн9	0.35-0.5	250ml	S	<4°C		!									.				JRH	

Page 3 of 8 4

Lab Add Pho	Name dress one Numb	er Freu	AGAL 51-65 Clarke St, Sth Me (03) 9685 1777 nKlin Street	lbourne. Bus Sta	thion				Env	viron	nme Rust F	nt 8 PPK .	k Infi	rast	ruct	ure				Results Turnaro Fax Res Fax Nur Phone N	Due und Time sults To nber tumber	3-5 days Jane Hewitt (08) 8405 430 (08) 8405 430	1 0		
)r	9 	,													Invoice	wanager To	Stuart Taylor			
Rei	inquished	Ву	Jane Hewitt		Received t	у		1	2-1	7.	I	$\lambda =$	tnu	.e.											
Date	6 		ZZ/5/97	ido	Date			,	2	3.	0	<u>۲</u>	97							S	ample s on ice	: YES			
			nusi FFK Fly Liu, Adela	110a	Company		·····			AC	AL	<u> </u>	JIC												
Sigr	nature		Triffenut		Signature					۵	to	/							,	Metals	: As, Cd, Cr,	Cu, Hg, Pb, Zr	l		
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			· · · · · · · · · · · · · · · · · · ·		1		1	4	<u> </u>	_		i	<u>ا۔ </u>	A	ralyte	33					<u> </u>			<u></u>	
Si	Date ampled	Time	Sample ID	Location / Depth	Container Size	Medium (s/w)	Preservative	Metals	PAHs	Hd	TPH/BTEX	ocps									Sampler Initials		Commer	its	· · · · · · · · · · · · · · · · · · ·
2	1/5/97	9:30	BH9	0.7-0.9	250ml	s	<4°C																		
2	1/5/97	9:30	BH9/D	0.7-0.9	250mi	s	<4°C										└ ── . 				JRH		•••		<u> </u>
2	1/5/97	9:30	BH9	1.3-1.45	250ml	s	<4°C															·· · · · · · · · · · · · · · · · · · ·	·		
2	1/5/97	9:30	BH9	2.0-2.1	250ml	S	<4ºC	х			185	L.	- 1												
2	1/5/97	10:10	BH10	0.1-0.3	250ml	s	<4°C														JRH		·····		
2	1/5/97	10:10	BH10	0.35-0.5	250ml	s	<4°C														JRH	<u> </u>			
2	1/5/97	10:10	BH10	0.7-0.85	250ml	s	<4°C	x		х	1	8	53	2							JRH				
2	1/5/97	10:10	BH10	1.0-1.2	250ml	s	<4°C														JRH	<u> </u>			
2	1/5/97	10:10	BH10	1.4-1.55	250ml	s	<4°C											····	1		JRH				
2	1/5/97	10:10	BH10	1.8-2.0	250mi	s	<4°C														JRH				
2	1/5/97	11:00	BH11	0.1-0.3	250ml	s	<4°C															<u> </u>			<u></u>
2	1/5/97	11:00	BH11	0.35-0.5	250ml	S	<4 [^] C							···-			╾╴╴╀╴		+			ł			
2	1/5/97	11:00	BH11/D	0.35-0.5	250ml	s	<4°C												┼──┤						
2	1/5/97	11:00	BH11	0.8-1.0	250ml	s	<4°C	x		x	†	78	5	-3								<u> </u>		<u> </u>	
21	1/5/97	11:00	BH11	1.3-1.45	250ml	s	<4°C					<u>'</u>]							┼╍┥					<u> </u>	
2	1/5/97	11:00	BH11	1.8-2.0	250ml	s	<4°C												$\left - \right $				•••	<u> </u>	

CHAIN OF CUSTODY

	Lab Name Address Phone Numb	Der	AGAL 51-65 Clarke St, Sth Me (03) 9685 1777	elbourne.					Env	/iror	Ime	S ent a	& Inf	rast	ruct	Cure					Resi Tum Fax	aroui Resu	Due nd Time Ilts To	3-5 days Jane Hewitt
	Job Location	Fra	nklin street	Bus Stat	ion]				F	Rust	РРК	Jop V	iumb	er]			Pho	ne Nu	umber	(08) 8405 4300
									_		2	7J	<u>097</u>	Ά							Proje	ect M	anager	Stuart Taylor
1	·				;					<u> </u>								ย 			Invol	ce To	0	Stuart Taylor
	Relinquished	Ву	Jane Hewitt		Received b	by			t	ca	2		M٠	> (مدره	21								
	Date		22/5/97		Date					23	<u>ج</u>	05	9	ר ז								Sar	mples on Ice	YES
	Company		RUST PPK Pty Ltd, Adel		Company						YG.	AL	. L	$\sum_{i=1}^{n}$	<u></u>						.			_
	Signature	5	KHUUP		Signature					/	Ý	Ð					>				Me	tais:	As, Cd, Cr,	Cu, Hg, Pr, Zn
									$ \leftarrow $		/					_							1	
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÷.	Date Sampled	Time	Sample ID	Location /	Container Size	Medium (s/w)	Preservative	Metals	PAHs	Hd Hd	TPHUBIEX	ocps											Sampler . Initials	Comments
	22/5/97	9:00	BH12	0.15-0.3	250mi	S	<4°C						ŀ								<u> </u>		JRH	
	22/5/97	9:00	BH12	0.55-0.7	250ml	s	<4°C	<u>×</u>	x	х		1	2.7	44									JRH	
	22/5/97	9:00	BH12	0.85-1.0	250ml	s	<4°C										† 		j —			; ;	JRH	
	22/5/97	9:00	BH12	1.55-1.7	250ml	s	<4°C																JRH	
	2/5/97	9:00	BH12	1.85-2.0	250ml	s	<4°C				 												JRH	
ľ	21/5/97	11:45	BH13	0.05-0.15	250ml	S	<4°C																' JRH	
	21/5/97	11.45	BH13	0.2-0.35	250ml	S	<4°C																JRH -	
	21/5/97	11:45	BH13	0.35-0.5	250ml	S	<4°C	i															JRH	
	21/5/97	11:45	BH13	0.7-0.9	250mi	S	<4°C		FUL		TOP	RIAN	EPA S	SCRE	EN		18	55	5				JRH	OCPs by GC ECD
l	21/5/97	11:45	BH13	1,35-1.5	250ml	S	<4°C	· ·				<u> </u>					<u> </u>						JRH	
	21/5/97	11:45	BH13	1.8-2.0	<u>250ml</u>	S	<4°C											L					IRH	
	21/5/97	12:30	<u>БН14</u>	0.05-0,15	250ml	S	<4°C				İ				İ]	JRH	
	21/5/9/	12:30	BH14	0.15-0.3	250ml	S	<4°C	<u> </u>				 											JRH	
ľ	21/5/9/	12:30	BH14	0.55-0.7	250ml	S	<4°C	×	• X	X		<u> </u>	119	5	16								JRH	· · · · · · · · · · · · · · · · · · ·
·	21/5/9/	12:30	BH14	0.7-0.85	250ml	S	<4°C					 								\square			JRH	
U	Z1/2/A	12:30	BH14	1.0-1.2	250mi	S	<4°C			1							1		•				JRH	

. 97 20:35	Lab Name Address Phone Num	ber v	AGAL 51-65 Clarke St, Sth M (03) 9685 1777	Aelbourne.					En	Viro	nme	nt 8	k Inf							Re Tu Fa	esults maro x Res	Due bund Time sults To	CHANY OF CUSTODY 3-5 days Jane Hewitt
1 22.05	Job Location	ran	Win street B	us Statio	g~						Rust 2	ррк. 7ј(Job N 097	lumb A	er					Fa Ph Pro	x Nur one N oject I	nber Number Manager	(08) 8405 4301 (08) 8405 4300 Stuart Taylor
P04	Relinquished	1 By	Jane Hewitt		Received			P		_					f			a		Inv	oice	То	Stuart Taylor
5	Date		22/5/97		Data			<u>_</u>	-M	<u>а</u>		Ma	27	ue	1								
ß	Company		Rust PPK Pty Ltd. Ade	laide	Company	<u></u>			2	3.	0.	5-0	ר ז								S	amples on Ice	YES
	Signature		planill		Company		· —		/	42	AL		UL	C.									
	Oignature	S	Tronun	· · ·	Signature						<u>Je</u>	6 -				_				N	fetals	s: As, Cd, Cr,	Cu, H ₅ , Pb, Zn
									$\overline{\prec}$							_	2			المسير			
	[<u> </u>	1		<u>ir</u>		1	∥ ╬	\leftarrow	<u></u>	ر	r		A	nalyt	35							
	Date Sampled	Time	Sample ID	Location /	ontainer Size	ledium (s/w)	reservative	etals	AHs	-	PH/BTEX	CPs										Sampler	
in .	21/5/97	12:30	BH14	1 85-2 0	250ml	2		<u>μΣ_</u>	<u>a</u>	ġ.	Ë.	ŏ					ļ		_			Initials	Comments
JIDE	21/5/97	12:30	BH14/D	1.85-2.0	250ml	0	<4 C	 														JRH	
Ш	21/5/97	1:00	BH15	0 15-0 3	250ml	0	<4 C		┝─┤				· -									JRH	
g	21/5/97	1:00	BH15	0.3-0.5	250ml	0	40												_	_		JRH	
Å	21/5/97	1:00	BH15	0.7-0.85	250ml	3 c	<4 C						-	_								JRH	
L L	21/5/97	1:00	BH15	1.5-1.6	250ml		<4 C	 ▲		<u> </u>	,	18	5							_		JRH	
SUS 1	21/5/97	1:00	BH15	2021	250ml	3	<4 C				<u>`</u>											' JRH	
0	21/5/97	1:45	BH16	0.1.0.2	250ml	5	<4 0															JRH	
290	21/5/97	1:45	BH16/D	0.1.0.3	250mi	S	<4°C					·							_			JRH	
31	21/5/97	1:45	BH16	0.1-0.5	250mi	S	<4°C							-								JRH	
182	21/5/97	1:45	BH16	0.4-0.5	250mi	S	<4°C	X	_X	×		16	55	5	8							JRH	
ະວ (21/5/97	1.45	BH16	0.00-1.0	250ml	S	<4°C		L	_	ļ	[_			JRH	
	21/5/97	2:50	BH17	1.75-1.85	250ml	S	<4°C															JRH	· · · · · · · · · · · · · · · · · · ·
	21/5/97	2:50	0117	0.1-0.3	250ml	<u>s</u>	<4°C															JRH	
	21/5/97	2.50		0.35-0.5	250ml	s	<4°C															JRH	
	21/5/97	2:50	BU17	0.35-0.5	250ml	S	<4°C						\square									JRH	
Ш.				0.8-1.0	250ml	S	<4°C	X		X		185	5.5	9	ſ		T		·			IPH	

CHAIN OF CUSTODY

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Address 51-65 Clarke St, Sth Melbourne. Phone Number (03) 9685 1777 Turnaround Tir	ime 3-5 days
Phone Number 1 (03) 9685 1777	ime 3-5 days
Environment & Infrastructure	o Jane Hewitt
Fax Number	· (08) 8405 4301
Plione Number Phone Number	or (08) 8405 4300
Project Manag	er Stuart Taylor
	Stuart Taylor
Received by June Hewitt Received by June Manue	
Date 23.05.97 Samples	s on Ice: YES
The company AGAL VIC	<u> </u>
Signature KHEMP Signature Ht	Cd, Cr, Cu, Hg, Pb, Zn
Analytes	
Date Location / E S S S S S	
Sampled Time Sample ID Depth O B P P A B C B C B C B C B C B C B C B C B C B	ampler nitials Comments
21/5/97 2:50 BH17 1.8-2.0 250ml S <4°C	JRH
21/5/97 3:45 BH18 0.05-0.15 250ml S <4°C	iBH
21/5/97 3:45 BH18 0.15-0.3 250ml S <4°C	JRH
21/5/97 3:45 BH18 0.4-0.5 250ml S <4°C X X / S 60	IBH
21/5/97 3:45 BH18 0.8-1.0 250ml S <4°C	JRH
01 21/5/97 3:45 BH18 1.45-1.6 250ml S <4°C	IBH
21/5/97 3:45 BH18 2.15-2.3 250ml S <4°C	IBH
S 22/5/97 10:00 BH19 0.1-0.3 250ml S <4°C	
1 22/5/97 10:00 BH19/D 0.1-0.3 250ml S <4°C	
M 22/5/97 10:00 BH19 0.55-0.7 250ml S <4°C X X X X / 856	
22/5/97 10:00 BH19 0.95-1.1 250ml S <4°C	
22/5/97 10:00 BH19 1.25-2.0 250ml S <4°C	
22/5/97 10:40 BH20 0.05-0.2 250ml S <4°C X X X X / STOR	
22/5/97 10:40 BH20 0.2-0.35 250ml S <4°C	KH
· <u>22/5/97 10:40 BH20 0.45-0.55 250ml S <4°C J</u>	
22/5/97 10:40 BH20/D 0.45-0.55 250ml S <4°C J	

Please fax back a signed copy when samples are recieved of the interrate

Address Phone Nu	mber •	AGAL 51-65 Clarke St, Sth M (03) 9685 1777	Aelbourne.					En	Viron		1 t &		P				Resull Turnai Fax R	ts Due round Tim esults To	e	3-5 days Jane Hewitt
Job Locati	ion Fr	anklin street	Sus sta	ntion					R	Rust PF 27	^{эк} .и	ob Nui 974	nber				Fax Ni Phone Projec	umber Number t Manager		(08) 8405 4301 (08) 8405 4300 Stuart Taylor
Relinquish Date	ed By	Jane Hewitt 22/5/97	······································	Received Date	by		2.	P	,-(, ,	n	Ť	Lau	ne	2			Invoice	e To		Stuart Taylor
Company Signature)	Rust PPK Pty Ltd, Ade TRHCuit	laide	Company Signature				Ā	GA () Ur) .C.					Meta	Samples o is: As, Co	i, Cr	e: YES , Cu, Hg _: Pb, Zn
	<u> </u>				<u> </u>			$\overline{\langle}$					Analy) /tas		 		7		
Date Sampled	Time	Sample ID	Location /	Container Size	Aedium (s/w)	reservative	Aetais	AHs	r	PH/BTEX CPe	2 2							Sam	pler	
22/5/97	10:40	BH20	0.85-1.0	250ml	s	<4°C					2				+	 _			als	Comments
22/5/97	10.40	BH20	1.8-1.95	250ml	s	<4°C			+	-+-						 	┥━╴┥━╸	JR	H .	
20/5/97	· 	BD1		250ml	S	<4°C			·‡. 		j	- ;			+	 +		- <u> </u> - <u>.</u> -	<u> </u>	
20/5/9/		BD2		250ml	s	<4°C	X	х	Χ.	1	83	-6-) }	+	┼──┤	 				
20/3/8/	·	BD3		250ml	s	<4°C							+ -	1-		 			ן ש	
21/5/07	+	BD4		250ml	s	<4°C							1	-					י ש	
20/5/97	+	BD6		250ml	s	<4°C	x		x		1	84	4	1					<u>'</u>	
21/5/97	<u> </u>	ER1	BH8	2x500ml	w	<4°C	X	x		X	:	18	56	5					. <u>'</u> 1	
			BH18	2x500ml	W	<4°C	X	x		x		18	56	6	+			JRH	 I	Please composite before analysing
21/5/97		ER2	8H18	2x500ml	W	<4°C	X 0	x		×			56	5				JRH JRH	1	Please composite before a Please composite before a

9 Page 8 of 8

. . . .



Please fax back a signed copy when samples are recieved at the laboratory.

Environment & Infrastructure

Facsimile

Attention	Jane/Perla		Fax No:	(03) 96851788	
Το:	AGAL		Reference	æ: 27 J 097A	
From:	Jane Hewitt	······································	Date:	22 May 1997	
Re:	Soil samples arriving Friday 23/5	-	No of Pa	No of Pages (incl. this page):	

Please phone this office if any part of this transmission failed or was misdirected

NË 28-05

Jane/Perla

Four eskies of samples will be arriving to you today (Friday 23/5) and enclosed in this fax are the revised chain of custody forms which show the required analysis and must replace the chain of custody forms which were sent with the samples. If you could sign and write the lab numbers on these new chain of custody forms when the samples arrive that would be great. The samples that require analysis have been marked with an X on the lid.

In addition to this the following water samples, which you already have in storage (all from Job Number 27J097A), need to be analysed:

18466 1. JOB LOCATION: Tynte Street Carpark DATE SAMPLED: 12/5/97 SAMPLE ID: ER1 SAMPLE LOCATION: BH6 CONTAINER SIZE: 1 Litre la Manuel ANALYSIS REQUIRED: Metals, PAHs and OCPs 2. JOB LOCATION: Vaughan Place Carpark DATE SAMPLED: 14/5/97 DATE: SAMPLE ID: ER1 TIME: SAMPLE LOCATION: BH8 CONTAIN ER SIZE: 2 x 500 ml (please composite before analysing) ANALYS: REQUIRED: Metals, PAHs and OCPs 3. JOB LOCATION: Palais Carpark DATE SAI-IPLED: 15/5/97 18514 SAMPLE ID: ER1 SAMPLE LOCATION: BH8 CONTAINER SIZE: 2 x 500 ml (please composite before analysing) ANALYSIS REQUIRED: Metals, PAHs and OCPs NB. Metals are As, Cd, Cr, Cu, Hg, Pb, Zn All OCP analysis is to be by GC ECD Thanks Heist Jane Hewitt į۶. Page 1 P:DATA\SHAREDURH\27J087A\AGALVIC1.DOC

ACN 058 381 507

101 Plrie Street Adelaide, South Australia GPO Box 39%, Adelaide SA 5001 Australia Jelephone (08) 8405 4300 Int Tel - 61 8 8405 4300 Facsimile (08) 8405 4301 Email ppkadel@ozemail.com.au

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Appendix G

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Assessment Criteria for Analytical Results

Assessment Criteria for Comparison with Soil Analytical Results Metals, pH and PAH

All criteria expressed in mg/kg (ppm)

Analyte Assessment Criteria						
	ANZECC	SAHC	Langley (D)	Langley (F)		
Metals:						
Ar s enic	20	100	400	500		
Beryllium			80	100		
Cadmium	3	20	80	100		
Cobait						
Chromium	50					
Copper	60	100	4000	5000		
Viercury	1	2	60	75		
/langane s e	500		6000	7500		
lolybdenum						
lickel	60		2400	3000		
ead	300	300	1200	1500		
Antimony	20	000	1200	1500		
Selenium	20					
in	50					
Zinc	200	500	00000			
H	200	500	28000	35000		
lycyclic Aromatic	0	9				
drocarbons (PAH)						
anthalene	5					
enaphthylene	5					
enanhthene						
iorene	10					
enanthrene	10					
ithracene	10					
ioranthrene	10					
/rene	10					
enz(a)anthracene						
)rvsene						
enzo(b)fluoranthene ar	nd					
enzo(k)fluoranthrene						
enzo(a)pyrene		1	٨	F		
deno(1,2,3-cd)pyrene	·	1	7	5		
benz(a,h)anthracene						
enzo(a.h.i)pervlene						
- (31) - 01 - 101 - 0						
tal PAH	·	20	80	100		
ZECC	Environmental	Guidelines	(1992)			
HC	South Australia	n Health Co	ommission healt	h based Guid		
igley (D)	Proposed Healt	h Based So	oil Guidelines			
	(Langley et al 1	996, Expos	sure Setting D -	restricted resi		
ngley (F)	Proposed Healt	h Based So	oil Guidelines			
	(Langley et al 1	996, Expos	ure Setting F - o	commercial/in		

Assessment Criteria for Comparison with Soil Analytical Results OCPs and PCBs

All results expressed in mg/kg (ppm)

Analyte	Assessment Criteria						
	ANZECC	SAHC	Langley (D)	Langley (F)			
Organochlorine							
Pesticides:							
НСВ				-			
Dichloran							
Total BHC							
Lindane							
Heptachlor			40	50			
Heptachlor Epoxide							
Total Chlordane (ocy, cis,			200	250			
trans, chlordene, nonachlor)							
Total endosulphan							
Aldrin			40	50			
Dialdrin	0.2		40	50			
	0.2		40	50			
Enumin Fotal Disefet							
op-DDE, pp-DDE							
op-DDD pp-DDD							
op DDT pp-DDT			800	1000			
Methoxychlor							
Total OCPs							
Polychlorinated							
Biphenyls (PCB's):							
A1016							
A1221							
A1232							
A1242							
A1248							
A1254							
A1260							
A1262							
	4		10	56			
I OTAL AFOCIORS	1		40	50			
ANZECC	Environmenta	l Guidaliaa	c (1002)				
SAHC	South Australi	ian Health (Commission ber	alth based Guid	leline		
Langley (D)	Proposed Hea	alth Based (Soil Guidelines		ienne:		
	(Landlev et al.	1996 Evo	osure Setting D	- restricted res	identi		
Lappley (F)	Proposed Hea	alth Based 9	Soil Guidelines	reatholed 185	acritic		
	(Langlev et al.	1996 Exp	osure Setting F	- commercial/ir	duetri		
•	(Langley et al	1996, Expo	osure Setting F	 commercial/ir 	dus		

Assessment Criteria for Comparison with Soil Analytical Results BTEX, TPH, Phenols, Fluoride, Cyanide, Cresols

All results expressed in mg/kg (ppm)

Analyte		Assessment Criteria						
•	ANZECC	SAHC	Langley (D)	Lanolev (F)	Dutch	NSW EPA	Dutch C	
BTEX:							Duton C	
Benzene	1				1	0.5		
Toluene					130	.3		
Ethyl Benzene					50	5		
Xylene					25	5		
Total BTEX								
Total Petroleum								
Hydrocarbons (TPH):								
C ₆ -C ₉						65	800	
C ₁₀ -C ₁₄	1					00	000	
C ₁₅ -C ₂₈						1000	5000	
$C_{29}-C_{36}$						1000	3000	
- 25 - 30	I							
Total TPH								
Phenols:				<u></u>				
Phenol			34000	42500				
3-Methylphenol								
2-Methylphenol								
4-Methylphenol								
2-Ethylphenol								
4-Ethylphenol								
2,4-Dimehtylphenol								
2,3,5-Trimethylphenol								
4-Nitrophenol							•	
Cresols					5			
Fluoride					2000			
Cyanide	·····	250	2000	2500	······			
ANZECC	Environment	n Cuidati						
SAHC			nes (1992)			(4000)		
Langley (D)	Bronosed Ho	alth Pace		nealth based (suldelines	(1993)		
	(Landlev et al	1996 F	nosure Setting	to D - restricted	rosidontial	۱		
Langley (F)	Proposed Ho	alth Baco			CSIGGUGU)		
	(Landlev et al			es I E - commorci	al/inductria	n		
Dutch		ntion Crit	eria (1004)	ji - commercia	amuustria	1)		
NSW EPA	Guidelines for	r Assessi	na Service Stat	tion Sites Thr	eshold Co	ncontrations fé	Nr.	
	sensitive land	luse (soil	(1994)				//	
Dutch C	Dutch C Crite	ria						
		···•••••••••••••••••••••••••••••••••••						

Appendix H

Tabulated Soil Analysis Results

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All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH1	BH2	BH3	BH4	BH4*	BH4/D
Sample Depth	Reporting	0.06-0.3	1.8-2.0	0.8-1.0	0.45-0.6	0.45-0.6	0.45-0.6
Metals:	_						
Arsenic	5	<lor< td=""><td>9.4</td><td>7.4</td><td>7:6</td><td>7.5</td><td>8.5 ~</td></lor<>	9.4	7.4	7:6	7.5	8.5 ~
Cadmium	1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Cobalt	1				8 -	7.6	
Chromium (total)	2	9.2	29	31	31	29	26
Copper	2	9.5	7	7.3	32	29	34
Mercury	0.5	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td>1.6 ¹</td></lor<></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td>1.6 ¹</td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""><td>1.6 ¹</td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td>1.6 ¹</td></lor<></td></lor<>	<lor< td=""><td>1.6 ¹</td></lor<>	1.6 ¹
Nickel	1				15	14	
Lead	5	<lor< td=""><td>7.5</td><td>10</td><td>446 ^{1,2}</td><td>670 ^{1,2}</td><td>440 ^{1,2}</td></lor<>	7.5	10	446 ^{1,2}	670 ^{1,2}	440 ^{1,2}
Selenium	5				<lor< td=""><td><lor< td=""><td>_</td></lor<></td></lor<>	<lor< td=""><td>_</td></lor<>	_
Zinc	2	8.7	19	21	280 ¹	270 ¹	270 ¹
Manganese	10				200		
Beryllium	1				1.2	1.2	
Molybdenum	5				<lor< td=""><td><lor< td=""><td></td></lor<></td></lor<>	<lor< td=""><td></td></lor<>	
Antimony	5				<lor< td=""><td><lor< td=""><td></td></lor<></td></lor<>	<lor< td=""><td></td></lor<>	
Tin	2				28	26	
pH	0.1	9.5 ^{1,2}		9.5 ^{1,2}			9.2 ^{1,2}
Polycyclic Aromatic							
Hydrocarbons (PAH):	•						
Naphthalene	0.1				<lor< td=""><td></td><td><lor< td=""></lor<></td></lor<>		<lor< td=""></lor<>
Acenaphthylene	0.1				<lor< td=""><td></td><td><lor< td=""></lor<></td></lor<>		<lor< td=""></lor<>
Acenaphthene	0.1				<lor< td=""><td></td><td><lor< td=""></lor<></td></lor<>		<lor< td=""></lor<>
Fluorene	0.1				<lor< td=""><td></td><td><lor< td=""></lor<></td></lor<>		<lor< td=""></lor<>
Phenanthrene	0.1				<lor< td=""><td></td><td><lor< td=""></lor<></td></lor<>		<lor< td=""></lor<>
Anthracene	0.1				<lor< td=""><td></td><td><lor< td=""></lor<></td></lor<>		<lor< td=""></lor<>
Fluoranthrene	0.1				0.1		<lor< td=""></lor<>
Pyrene	0.1				0.1		<lor< td=""></lor<>
Benz(a)anthracene	0.1				<lor< td=""><td></td><td><lor< td=""></lor<></td></lor<>		<lor< td=""></lor<>
Chrysene	0.1				<lor< td=""><td></td><td><lor< td=""></lor<></td></lor<>		<lor< td=""></lor<>
Benzo(b)fluoranthene an	0.1				0.1		<lor< td=""></lor<>
Benzo(k)fluoranthrene	0.1				<lor< td=""><td></td><td><lor< td=""></lor<></td></lor<>		<lor< td=""></lor<>
Benzo(a)pyrene	0.1				0.1		<lor< td=""></lor<>
Indeno(1,2,3-cd)pyrene	0.1				<lor< td=""><td></td><td><lor< td=""></lor<></td></lor<>		<lor< td=""></lor<>
Dibenz(a,h)anthracene	0.1				<lor< td=""><td></td><td><lor< td=""></lor<></td></lor<>		<lor< td=""></lor<>
Benzo(g,h,i)perylene	0.1				<lor< td=""><td></td><td><lor< td=""></lor<></td></lor<>		<lor< td=""></lor<>
Total PAH	1.6				<lor< td=""><td></td><td><lor< td=""></lor<></td></lor<>		<lor< td=""></lor<>

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory) * indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

¹ denotes greater than the ANZECC environmental guidelines

² denotes greater than the SAHC health based guidelines

³ denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting D)

All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH4/D*	BH5	BH6	BH7	BH8	BHQ
Sample Depth	Reporting	0.45-0.6	0.8-1.0	0.65-0.75	0.4-0.5	0.8-1.0	2 0-2 1
Metals:							2.0 2.1
Arsenic	5			5.6	<lor< td=""><td>10</td><td>03</td></lor<>	10	03
Cadmium	1			<lor< td=""><td>-<lor< td=""><td></td><td></td></lor<></td></lor<>	- <lor< td=""><td></td><td></td></lor<>		
Cobalt	1				-	LOIN	LON
Chromium (total)	2			22	13	17	16
Copper	2			24	4.6	9	5.5
Mercury	0.5			<lor< td=""><td><lor< td=""><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td></lor<></td></lor<>	<lor< td=""><td></td></lor<>	
Nickel	1					-0.1	LOIN
Lead	5			45	<lor< td=""><td>53</td><td>53</td></lor<>	53	53
Selenium	5				2011	0.0	0.0
Zinc	2			69	17	15	14
Manganese	10			•••			14
Beryllium	1						
Molybdenum	5						
Antimony	5						
Tin	2						
pН	0.1		9.5 ^{1,2}	9.4 ^{1,2}	9.8 ^{1,2}	10 ^{1,2}	
Polycyclic Aromatic							· · · · · · · · · · · · · · · · · · ·
Hydrocarbons (PAH):					•		
Naphthalene	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Acenaphthylene	0.1	<lor< td=""><td><lor< td=""><td>0.1</td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>0.1</td><td></td><td></td><td></td></lor<>	0 .1			
Acenaphthene	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Fluorene	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Phenanthrene	0.1	<lor< td=""><td><lor< td=""><td>0.2</td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>0.2</td><td></td><td></td><td></td></lor<>	0.2			
Anthracene	0.1	<lor< td=""><td><lor< td=""><td>0.1</td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>0.1</td><td></td><td></td><td></td></lor<>	0.1			
Fluoranthrene	0.1	<lor< td=""><td><lor< td=""><td>0.9</td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>0.9</td><td></td><td></td><td></td></lor<>	0.9			
Pyrene	0.1	<lor< td=""><td><lor< td=""><td>0.9</td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>0.9</td><td></td><td></td><td></td></lor<>	0.9			
Benz(a)anthracene	0.1	<lor< td=""><td><lor< td=""><td>0.5</td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>0.5</td><td></td><td></td><td></td></lor<>	0.5			
Chrysene	0.1	<lor< td=""><td><lor< td=""><td>0.4</td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>0.4</td><td></td><td></td><td></td></lor<>	0.4			
Benzo(b)fluoranthene an	0.1	<lor< td=""><td><lor< td=""><td>0.4</td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>0.4</td><td></td><td></td><td></td></lor<>	0.4			
Benzo(k)fluoranthrene	0.1	<lor< td=""><td><lor< td=""><td>0.4</td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>0.4</td><td></td><td></td><td></td></lor<>	0.4			
Benzo(a)pyrene	0.1	<lor< td=""><td><lor< td=""><td>0.6</td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>0.6</td><td></td><td></td><td></td></lor<>	0.6			
Indeno(1,2,3-cd)pyrene	0.1	<lor< td=""><td><lor< td=""><td>0.4 ·</td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>0.4 ·</td><td></td><td></td><td></td></lor<>	0.4 ·			
Dibenz(a,h)anthracene	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Benzo(g,h,i)perylene	0.1	<lor< td=""><td><lor< td=""><td>0.4</td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>0.4</td><td></td><td></td><td></td></lor<>	0.4			
Total PAH	1.6	<lor< td=""><td><lor< td=""><td>53</td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>53</td><td></td><td></td><td></td></lor<>	53			

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory) * indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

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All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH10	BH11	BH11*	BH12	BH12/D	BH12/D*
Sample Depth	Reporting	0.7-0.85	0.8-1.0	0.8-1.0	0.55-0.7	0.55-0.7	0.55-0.7
Metals:							
Arsenic	5	5	8.9	9.8	<lor< td=""><td>2.8</td><td>2.8</td></lor<>	2.8	2.8
Cadmium	· 1	<lor< td=""><td><lor< td=""><td><lor< td=""><td>- <lor< td=""><td><0.5</td><td>< 0.5</td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td>- <lor< td=""><td><0.5</td><td>< 0.5</td></lor<></td></lor<></td></lor<>	<lor< td=""><td>- <lor< td=""><td><0.5</td><td>< 0.5</td></lor<></td></lor<>	- <lor< td=""><td><0.5</td><td>< 0.5</td></lor<>	<0.5	< 0.5
Cobalt	1				-	8.5	8.5
Chromium (total)	2	46	11	12	29	28	26
Copper	2	18	5.7	6	. 10	14	14
Mercury	0.5	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td><0.1</td><td><0.1</td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""><td><0.1</td><td><0.1</td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><0.1</td><td><0.1</td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><0.1</td></lor<>	<0.1	<0.1
Nickel	1					14	12
Lead	5	13	<lor< td=""><td><lor< td=""><td>11</td><td>14</td><td>15</td></lor<></td></lor<>	<lor< td=""><td>11</td><td>14</td><td>15</td></lor<>	11	14	15
Selenium	5					<0.5	<0.5
Zinc	2	30	9.8	10	17	28	32
Manganese	10					220	210
Beryllium	1					<2	<2
Molybdenum	5					<10	<10
Antimony	5					<10	<10
Tin	2					<10	<10
pH ·	0.1	8.8 ¹	9.3 ^{1,2}		9.2 ^{1,2}		
Polycyclic Aromatic							
Hydrocarbons (PAH):							
Naphthalene	0.1				<lor< td=""><td><0.1</td><td></td></lor<>	<0.1	
Acenaphthylene	0.1				<lor< td=""><td><0.1</td><td></td></lor<>	<0.1	
Acenaphthene	0.1				<lor< td=""><td><0.1</td><td></td></lor<>	<0.1	
Fluorene	0.1				<lor< td=""><td><0.1</td><td></td></lor<>	<0.1	
Phenanthrene	0.1				<lor< td=""><td><0.1</td><td></td></lor<>	<0.1	
Anthracene	0.1				<lor< td=""><td><0.1</td><td></td></lor<>	<0.1	
Fluoranthrene	0.1				<lor< td=""><td><0.1</td><td></td></lor<>	<0.1	
Pyrene	0.1				<lor< td=""><td><0.1</td><td></td></lor<>	<0.1	
Benz(a)anthracene	0.1				<lor< td=""><td><0.1</td><td></td></lor<>	<0.1	
Chrysene	0.1				<lor< td=""><td><0.1</td><td></td></lor<>	<0.1	
Benzo(b)fluoranthene an	0.1				<lor< td=""><td><0.1</td><td></td></lor<>	<0.1	
Benzo(k)fluoranthrene	0.1				<lor< td=""><td><0.1</td><td></td></lor<>	<0.1	
Benzo(a)pyrene	0.1				<lor< td=""><td><0.1</td><td></td></lor<>	<0.1	
Indeno(1,2,3-cd)pyrene	0.1				<lor< td=""><td><0.1</td><td></td></lor<>	<0.1	
Dibenz(a,h)anthracene	0.1				<lor< td=""><td><0.1</td><td></td></lor<>	<0.1	
Benzo(g,h,i)perylene	0.1				<lor< td=""><td><0.1</td><td></td></lor<>	<0.1	
Total PAH	16						

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory) * indicates laboratory replicate

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All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH13	BH13*	BH13/D	BH13/D*	BH14	BH15
Sample Depth	Reporting	0.7-0.9	0.7 - 0.9	0.7-0.9	0.7-0.9	0.55-0.7	0.7-0.85
Metals:							
Arsenic	5	5.1	<lor< td=""><td><lor< td=""><td>· .5</td><td>19</td><td><lor< td=""></lor<></td></lor<></td></lor<>	<lor< td=""><td>· .5</td><td>19</td><td><lor< td=""></lor<></td></lor<>	· .5	19	<lor< td=""></lor<>
Cadmium	1	<lor< td=""><td><lor< td=""><td><lor< td=""><td>-<lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td>-<lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td>-<lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	- <lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Cobalt	1	7.7	8.1		-		
Chromium (total)	2	29	29	33	34	18	26
Copper	2	16	16	17	17	450 ^{1,2}	9.9
Mercury	0.5	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Nickel	1	15	15				
Lead	5	43	36	39	34	1600 ^{1,2,3,4}	11
Selenium	5	<lor< td=""><td><lor< td=""><td></td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td><td></td></lor<>				
Zinc	2	32	32	32	32	2000 ^{1,2}	14
Manganese	10	260	270				
Beryllium	1		1.2	1.1			
Molybdenum	5		<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Antimony	5		<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Tin	2		2.6	2.8			
рН	0.1			8.9 ¹		11 ^{1,2}	9.3 ^{1,2}
Polycyclic Aromatic		•					
Hydrocarbons (PAH):							
Naphthalene	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<>			<lor< td=""><td></td></lor<>	
Acenaphthylene	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<>			<lor< td=""><td></td></lor<>	
Acenaphthene	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<>			<lor< td=""><td></td></lor<>	
Fluorene	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<>			<lor< td=""><td></td></lor<>	
Phenanthrene	0.1	<lor< td=""><td>0.2</td><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<>	0.2			<lor< td=""><td></td></lor<>	
Anthracene	0.1	<lor< td=""><td>0.1</td><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<>	0.1			<lor< td=""><td></td></lor<>	
Fluoranthrene	0.1	0.1	0.3			0.2	
Pyrene	0.1	0.1	0.2			0.2	
Benz(a)anthracene	0.1	<lor< td=""><td>0.2</td><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<>	0.2			<lor< td=""><td></td></lor<>	
Chrysene	0.1	<lor< td=""><td>0.1</td><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<>	0.1			<lor< td=""><td></td></lor<>	
Benzo(b)fluoranthene an	0.1	0.1	0.1	\$		0.1	
Benzo(k)fluoranthrene	0.1	<lor< td=""><td>0.1</td><td></td><td></td><td>0.1</td><td>•</td></lor<>	0.1			0.1	•
Benzo(a)pyrene	0.1	<lor< td=""><td>0.1</td><td></td><td></td><td>0.1</td><td></td></lor<>	0.1			0.1	
Indeno(1,2,3-cd)pyrene	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<>			<lor< td=""><td></td></lor<>	
Dibenz(a,h)anthracene	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<>			<lor< td=""><td></td></lor<>	
Benzo(g,h,i)perylene	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<>			<lor< td=""><td></td></lor<>	
Total PAH	1.6	<lor< td=""><td>1.4</td><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<>	1.4			<lor< td=""><td></td></lor<>	

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory) * indicates laboratory replicate

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All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH15/D	BH15/D*	BH16	BH17	BH18	BH18*
Sample Depth	Reporting	0.7-0.85	0.7-0.85	0.4-0.5	0.8-1.0	0.4-0.5	0.4-0.5
Metals:							
Arsenic	5	2.8		9.5	- 11		
Cadmium	1	<0.5		<lor< td=""><td>-<lor< td=""><td></td><td></td></lor<></td></lor<>	- <lor< td=""><td></td><td></td></lor<>		
Cobalt	1	9.4					
Chromium (total)	2	28		29	13		
Copper	2	16		10	7.3		
Mercury	. 0.5	<0.1		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Nickel	1	11					
Lead	5	15		11	<lor< td=""><td></td><td></td></lor<>		
Selenium	5	<0.5					
Zinc	2	26		21	11		
Manganese	10	260					
Beryllium	1	<2					
Molybdenum	5	<10					
Antimony	5	<10 ·					
Tin	2	<10		•			
рН	0.1			9.7 ^{1,2}	9.8 ^{1,2}	9.4 1.2	9.4 ^{1,2}
Polycyclic Aromatic							
Hydrocarbons (PAH):							
Naphthalene	0.1	<0.1	<0.1	<lor< td=""><td></td><td><lor< td=""><td></td></lor<></td></lor<>		<lor< td=""><td></td></lor<>	
Acenaphthylene	0.1	<0.1	<0.1	<lor< td=""><td></td><td><lor< td=""><td></td></lor<></td></lor<>		<lor< td=""><td></td></lor<>	
Acenaphthene	0.1	<0.1	<0.1	<lor< td=""><td></td><td><lor< td=""><td></td></lor<></td></lor<>		<lor< td=""><td></td></lor<>	
Fluorene	0.1	<0.1	<0.1	<lor< td=""><td></td><td><lor< td=""><td></td></lor<></td></lor<>		<lor< td=""><td></td></lor<>	
Phenanthrene	0.1	<0.1	<0.1	<lor< td=""><td></td><td><lor< td=""><td></td></lor<></td></lor<>		<lor< td=""><td></td></lor<>	
Anthracene	0.1	<0.1	<0.1	<lor< td=""><td></td><td><lor< td=""><td></td></lor<></td></lor<>		<lor< td=""><td></td></lor<>	
Fluoranthrene	0.1	<0.1	<0.1	<lor< td=""><td></td><td><lor< td=""><td></td></lor<></td></lor<>		<lor< td=""><td></td></lor<>	
Pyrene	0.1	<0.1	<0.1	<lor< td=""><td></td><td><lor< td=""><td></td></lor<></td></lor<>		<lor< td=""><td></td></lor<>	
Benz(a)anthracene	0.1	<0.1	<0.1	<lor< td=""><td></td><td><lor< td=""><td></td></lor<></td></lor<>		<lor< td=""><td></td></lor<>	
Chrysene	0.1	<0.1	<0.1 _.	<lor< td=""><td></td><td><lor< td=""><td></td></lor<></td></lor<>		<lor< td=""><td></td></lor<>	
Benzo(b)fluoranthene an	0.1	<0.1	<0.1	<lor< td=""><td></td><td><lor< td=""><td>•</td></lor<></td></lor<>		<lor< td=""><td>•</td></lor<>	•
Benzo(k)fluoranthrene	0.1	<0.1	<0.1	<lor< td=""><td></td><td><lor< td=""><td></td></lor<></td></lor<>		<lor< td=""><td></td></lor<>	
Benzo(a)pyrene	0.1	<0.1	<0.1	<lor< td=""><td></td><td><lor< td=""><td>•</td></lor<></td></lor<>		<lor< td=""><td>•</td></lor<>	•
Indeno(1,2,3-cd)pyrene	0.1	<0.1	<0.1	<lor< td=""><td></td><td><lor< td=""><td></td></lor<></td></lor<>		<lor< td=""><td></td></lor<>	
Dibenz(a,h)anthracene	0.1	<0.1	<0.1	<lor< td=""><td></td><td><lor< td=""><td></td></lor<></td></lor<>		<lor< td=""><td></td></lor<>	
Benzo(g,h,i)perylene	.0.1	<0.1	<0.1	<lor< td=""><td></td><td><lor< td=""><td></td></lor<></td></lor<>		<lor< td=""><td></td></lor<>	
Total PAH	1.6			<lor< td=""><td></td><td><1.0R</td><td></td></lor<>		<1.0R	

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All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH19	BH20	ER1	FR2
Sample Depth	Reporting	0.55-0.7	0.05-0.7	0.05-0.8	0.05-0.9
Metals:					0.00 0.0
Arsenic	5	<lor< td=""><td>7.6</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	7.6	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Cadmium	1	<lor< td=""><td><lor< td=""><td><lor< td=""><td>- <lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td>- <lor< td=""></lor<></td></lor<></td></lor<>	<lor< td=""><td>- <lor< td=""></lor<></td></lor<>	- <lor< td=""></lor<>
Cobalt	1				-
Chromium (total)	2	23	33	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Copper	2	8.9	31	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Mercury	0.5	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Nickel	1				
Lead	5	28	140	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Selenium	5				
Zinc	2	17	410 ¹	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Manganese	10				
Beryllium	1				
Molybdenum	5		/		
Antimony	5				
Tin	2				
рН	0.1	9.1 ^{1,2}	9.5 ^{1,2}		
Polycyclic Aromatic					
Hydrocarbons (PAH):					
Naphthalene	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Acenaphthylene	0.1	<lor< td=""><td>0.3</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	0.3	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Acenaphthene	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Fluorene	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Phenanthrene	0.1	<lor< td=""><td>0.3</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	0.3	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Anthracene	0.1	<lor< td=""><td>0.2</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	0.2	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Fluoranthrene	0.1	<lor< td=""><td>2.1</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	2.1	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Pyrene	0.1	<lor< td=""><td>2.2</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	2.2	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Benz(a)anthracene	0.1	<lor< td=""><td>1.3</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	1.3	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Chrysene	0.1	<lor< td=""><td>1.3</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	1.3	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Benzo(b)fluoranthene an	0.1	<lor< td=""><td>1.3</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	1.3	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Benzo(k)fluoranthrene	0.1	<lor< td=""><td>1.5</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	1.5	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Benzo(a)pyrene	0.1	<lor< td=""><td>1.7 ²</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	1.7 ²	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Indeno(1,2,3-cd)pyrene	0.1	<lor< td=""><td>1.3</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	1.3	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Dibenz(a,h)anthracene	0.1	<lor< td=""><td>0.3</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	0.3	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Benzo(g,h,i)perylene	0.1	<lor< td=""><td>1.3</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	1.3	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Total PAH	1.6	<lor< td=""><td>15</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	15	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>

ER is an equipment rinsate, the results for which are in ug/L

¹ denotes greater than the ANZECC environmental guidelines

² denotes greater than the SAHC health based guidelines

³ denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting D)

⁴ denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting F)

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Analytical Results - Soil OCPs and OPPs

All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH4	BH13	BH13*	BH12/D	BH15/D	BH15/D*
Sample Depth	Reporting	0.45-0.6	0.7-0.9	0.7-0.9	0.55-0.7	0.7-0.85	0.7-0.85
Organochlorine Pesticides:							
НСВ	0.05	<lor< td=""><td><lor< td=""><td><lór< td=""><td></td><td></td><td></td></lór<></td></lor<></td></lor<>	<lor< td=""><td><lór< td=""><td></td><td></td><td></td></lór<></td></lor<>	<lór< td=""><td></td><td></td><td></td></lór<>			
Dichloran	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Total BHC	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Lindane	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td><0.1</td><td><0.1</td><td><0.01</td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><0.1</td><td><0.1</td><td><0.01</td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><0.1</td><td><0.01</td></lor<>	<0.1	<0.1	<0.01
Heptachlor	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Heptachlor Epoxide	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Total Chlordane (ocy, cis,	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
trans, chlordene, nonachlor)							
Total endosulphan	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Aldrin	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td><0.1</td><td><0.1</td><td><0.01</td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><0.1</td><td><0.1</td><td><0.01</td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><0.1</td><td><0.01</td></lor<>	<0.1	<0.1	<0.01
Dieldrin	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td><0.1</td><td><0.1</td><td><0.01</td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><0.1</td><td><0.1</td><td><0.01</td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><0.1</td><td><0.01</td></lor<>	<0.1	<0.1	<0.01
Endrin Total	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td><0.1</td><td><0.1</td><td><0.01</td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><0.1</td><td><0.1</td><td><0.01</td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><0.1</td><td><0.01</td></lor<>	<0.1	<0.1	<0.01
Dicofol	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
op-DDE, pp-DDE	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td><0.1</td><td><0.1</td><td><0.01</td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><0.1</td><td><0.1</td><td><0.01</td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><0.1</td><td><0.01</td></lor<>	<0.1	<0.1	<0.01
op-DDD pp-DDD	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td><0.1</td><td><0.1</td><td><0.01</td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><0.1</td><td><0.1</td><td><0.01</td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><0.1</td><td><0.01</td></lor<>	<0.1	<0.1	<0.01
op DDT pp-DDT	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td><0.1</td><td><0.1</td><td><0.01</td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><0.1</td><td><0.1</td><td><0.01</td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><0.1</td><td><0.01</td></lor<>	<0.1	<0.1	<0.01
Methoxychlor	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Total OCPs	0.2	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Organophosphate Pesticides:							
Dichlorvos	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Mevinphos	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Diazinon	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Chlorpyrifos-Methyl	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Fenchlorvos	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Parathion-methyl	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Chlorpyriphos	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td>• •</td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td>• •</td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td>• •</td><td></td></lor<>		• •	
Malathion	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Fenitrothion	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Parathion	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Chlorfenvinphos	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Bromophos-Ethyl	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Tetrachlorvinphos	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td>. <i>•</i></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td>. <i>•</i></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td>. <i>•</i></td></lor<>			. <i>•</i>
Ethion	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Total OPPs	0.2	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

Analytical Results - Soil OCPs and OPPs

All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	ER1	ER2
Sample Depth	Reporting		
Organochlorine Pesticides:			
НСВ	0.05	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Dichloran	0.05	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Total BHC	0.05	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Lindane	0.05	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Heptachlor	0.05	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Heptachlor Epoxide	0.05	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Total Chlordane (ocy, cis,	0.05	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
trans, chlordene, nonachlor			
Total endosulphan	0.05	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Aldrin	0.05	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Dieldrin	0.05	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Endrin Total	0.05	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Dicofol	0.05	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
op-DDE, pp-DDE	0.05	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
op-DDD pp-DDD	0.05	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
op DDT pp-DDT	0.05	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Methoxychlor	0.05	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Total OCPs	0.2	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Organophosphate Pesticides:			
Dichlorvos	0.1		
Mevinphos	0.1		
Diazinon	0.1		
Chlorpyrifos-Methyl	0.1		
Fenchlorvos	0.1		
Parathion-methyl	0.1		
Chlorpyriphos	0.1		
Malathion	0.1		
Fenitrothion	0.1		
Parathion	0.1		
Chlorfenvinphos	0.1		
Bromophos-Ethyl	0.1		
Tetrachlorvinphos	0.1		
Ethion	0.1		
Total OPPs	0.2		

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

ER is an equipment rinsate, the results for which are in ug/L

Analytical Results BTEX, TPH, Phenols, Fluoride, Cyanide, Cresols, PCBs All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH4	BH4*	BH12/D	BH12/D*	BH13	BH13*
	Reporting	0.45-0.6	0.45-0.6	0.55-0.7	0.55-0.7	0.7-0.9	0.7-0.9
BTEX:							
Benzene	0.5	<lor< td=""><td><lor< td=""><td><0.01</td><td><0.01</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><0.01</td><td><0.01</td><td><lor< td=""><td></td></lor<></td></lor<>	<0.01	<0.01	<lor< td=""><td></td></lor<>	
Toluene	0.5	<lor< td=""><td><lor< td=""><td><0.01</td><td><0.01</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><0.01</td><td><0.01</td><td><lor< td=""><td></td></lor<></td></lor<>	<0.01	<0.01	<lor< td=""><td></td></lor<>	
Ethyl Benzene	0.5	<lor< td=""><td><lor< td=""><td><0.01</td><td><0.01</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><0.01</td><td><0.01</td><td><lor< td=""><td></td></lor<></td></lor<>	<0.01	<0.01	<lor< td=""><td></td></lor<>	
Xylene	1	<lor< td=""><td><lor< td=""><td><0.01</td><td><0.01</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><0.01</td><td><0.01</td><td><lor< td=""><td></td></lor<></td></lor<>	<0.01	<0.01	<lor< td=""><td></td></lor<>	
Total BTEX	2	<lor< td=""><td><lor< td=""><td><0.01</td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><0.01</td><td></td><td><lor< td=""><td></td></lor<></td></lor<>	<0.01		<lor< td=""><td></td></lor<>	
Total Petroleum							
Hydrocarbons (TPH):							
C ₆ -C ₉	25	<lor< td=""><td><lor< td=""><td><20</td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><20</td><td></td><td><lor< td=""><td></td></lor<></td></lor<>	<20		<lor< td=""><td></td></lor<>	
C ₁₀ -C ₁₄	25	<lor< td=""><td><lor< td=""><td><50</td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><50</td><td></td><td><lor< td=""><td></td></lor<></td></lor<>	<50		<lor< td=""><td></td></lor<>	
C ₁₅ -C ₂₈	25	<lor< td=""><td><lor< td=""><td><100</td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><100</td><td></td><td><lor< td=""><td></td></lor<></td></lor<>	<100		<lor< td=""><td></td></lor<>	
C ₂₉ -C ₃₆	25	<lor< td=""><td><lor< td=""><td><100</td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><100</td><td></td><td><lor< td=""><td></td></lor<></td></lor<>	<100		<lor< td=""><td></td></lor<>	
Total TPH	100	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<>			<lor< td=""><td></td></lor<>	
Phenols					•		
Phenol	0.1	<lor< td=""><td><lor< td=""><td><0.1</td><td><0.1</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><0.1</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	<0.1	<0.1	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
3-Methylphenol	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>			<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
2-Methylphenol	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>			<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
2-Ethylphenol	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>			<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
2,4-Dimehtylphenol	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>			<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
2,3,5-Trimethylphenol	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>			<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
4-Nitrophenol	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>			<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Cresols			·	<0.1	<0.1		
Fluoride				260			
Cyanide				<5			
Polychlorinated						-	
Biphenyls (PCBs)							
A1016	0.2	<lor< td=""><td></td><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>				<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
A1221	0.2	<lor< td=""><td></td><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>				<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
A1232	0.2	<lor< td=""><td></td><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>				<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
A1242	0.2	<lor< td=""><td></td><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>				<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
A1248	0.2	<lor< td=""><td></td><td></td><td></td><td><lor< td=""><td><lor<sup>®</lor<sup></td></lor<></td></lor<>				<lor< td=""><td><lor<sup>®</lor<sup></td></lor<>	<lor<sup>®</lor<sup>
A1254	0.2	<lor< td=""><td></td><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>				<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
A1260	0.2	<lor< td=""><td></td><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>				<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
A1262	0.2	<lor< td=""><td></td><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>				<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Total Aroclors	1	<lor< td=""><td></td><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>				<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory) * indicates laboratory replicate

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LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.
Analytical Results BTEX, TPH, Phenols, Fluoride, Cyanide, Cresols, PCBs All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH4	BH4*	BH12/D	BH12/D*	BH13	BH13*
	Reporting	0.45-0.6	0.45-0.6	0.55-0.7	0.55-0.7	0.7-0.9	0.7-0.9
BTEX:							
Benzene	0.5	<lor< td=""><td><lor< td=""><td><0.01</td><td><0.01</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><0.01</td><td><0.01</td><td><lor< td=""><td></td></lor<></td></lor<>	<0.01	<0.01	<lor< td=""><td></td></lor<>	
Toluene	0.5	<lor< td=""><td><lor< td=""><td><0.01</td><td><0.01</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><0.01</td><td><0.01</td><td><lor< td=""><td></td></lor<></td></lor<>	<0.01	<0.01	<lor< td=""><td></td></lor<>	
Ethyl Benzene	0.5	<lor< td=""><td><lor< td=""><td><0.01</td><td><0.01</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><0.01</td><td><0.01</td><td><lor< td=""><td></td></lor<></td></lor<>	<0.01	<0.01	<lor< td=""><td></td></lor<>	
Xylene	1	<lor< td=""><td><lor< td=""><td><0.01</td><td><0.01</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><0.01</td><td><0.01</td><td><lor< td=""><td></td></lor<></td></lor<>	<0.01	<0.01	<lor< td=""><td></td></lor<>	
Total BTEX	2	<lor< td=""><td><lor< td=""><td><0.01</td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><0.01</td><td></td><td><lor< td=""><td></td></lor<></td></lor<>	<0.01		<lor< td=""><td></td></lor<>	
Total Petroleum							
Hydrocarbons (TPH):							
C ₆ -C ₉	25	<lor< td=""><td><lor< td=""><td><20</td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><20</td><td></td><td><lor< td=""><td></td></lor<></td></lor<>	<20		<lor< td=""><td></td></lor<>	
C ₁₀ -C ₁₄	25	<lor< td=""><td><lor< td=""><td><50</td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><50</td><td></td><td><lor< td=""><td></td></lor<></td></lor<>	<50		<lor< td=""><td></td></lor<>	
C ₁₅ -C ₂₈	25	<lor< td=""><td><lor< td=""><td><100</td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><100</td><td></td><td><lor< td=""><td></td></lor<></td></lor<>	<100		<lor< td=""><td></td></lor<>	
C ₂₉ -C ₃₆	25	<lor< td=""><td><lor< td=""><td><100</td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><100</td><td></td><td><lor< td=""><td></td></lor<></td></lor<>	<100		<lor< td=""><td></td></lor<>	
Total TPH	100	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<>			<lor< td=""><td></td></lor<>	
Phenols					·		
Phenol	0.1	<lor< td=""><td><lor< td=""><td><0.1</td><td><0.1</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><0.1</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	<0.1	<0.1	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
3-Methylphenol	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>			<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
2-Methylphenol	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>			<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
2-Ethylphenol	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>			<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
2,4-Dimehtylphenol	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>			<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
2,3,5-Trimethylphenol	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>			<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
4-Nitrophenol	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>			<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Cresols				<0.1	<0.1		
Fluoride				260			
Cyanide				<5			
Polychlorinated							
Biphenyls (PCBs)							
A1016	0.2	<lor< td=""><td></td><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>				<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
A1221	0.2	<lor< td=""><td></td><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>				<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
A1232	0.2	<lor< td=""><td></td><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>				<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
A1242	0.2	<lor< td=""><td></td><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>				<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
A1248	0.2	<lor< td=""><td></td><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>				<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
A1254	0.2	<lor< td=""><td></td><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>				<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
A1260	0.2	<lor< td=""><td></td><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>				<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
A1262	0.2	<lor< td=""><td></td><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>				<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Total Aroclors	1	<lor< td=""><td></td><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>				<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>

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/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory) * indicates laboratory replicate

Analytical Results Volatile Organic Scan

All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH4	BH13
Sample Depth	Reporting	0.45-0.6	0.7-0.9
Monocyclic Aromatic			
Hydrocarbons			
Benzene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Toluene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Ethylbenzene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
m.p-xylene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
o-xylene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Styrene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Isopropylbenzene	1.0	· <lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
n-propylbenzene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
1,3,5-Trimethylbenzene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
tert-Butylbenzene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
1,2,4-Trimethylbenzene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
sec-Butylbenzene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
n-Butylbenzene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Fumigants			
2,2-Dichloropropane	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
1,2-Dichloropropane	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
1,2-dibromoethane	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Halogenated Aliphatic			
Hydrocarbons:			
Dichlorofluoromethane	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Chloromethane	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Vinyl Chloride	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Bromomethane	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Chlorethane	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Trichlorofluoromethane	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
1,1-Dichloroethene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Methylene Chloride	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
trans-1,2-Dichloroethene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
1,1-Dichloroethane	1.0	<lor< td=""><td><i or<="" td=""></i></td></lor<>	<i or<="" td=""></i>
cis-1,2-Dichloroethene	1.0	<lor< td=""><td></td></lor<>	
Bromochloromethane	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
1,1,1-Trichloroethane	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Carbon Tetrachloride	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
1.1-Dichloropropene	1.0	<lor< td=""><td></td></lor<>	
1,2-Dichloroethane	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory

.

* indicates laboratory replicate

Analytical Results Volatile Organic Scan (Cont)

Borehole Number	Limit Of	BH4	BH13	BH12/D*	BH15/D*
Sample Depth	Reporting	0.45-0.6	0.7-0.9	0.55-0.7	0.7-0.85
Trichloroethene	1.0	<lor< td=""><td><lor< td=""><td>• •</td><td></td></lor<></td></lor<>	<lor< td=""><td>• •</td><td></td></lor<>	• •	
Dibromomethane	1.0	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
cis-1,3-dichloropropene	1.0	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
trans-1,3-dichloropropene	1.0	<lor< td=""><td><lor< td=""><td>-</td><td></td></lor<></td></lor<>	<lor< td=""><td>-</td><td></td></lor<>	-	
1,1,2-Trichloroethane	1.0	<lor< td=""><td><lor< td=""><td>-</td><td></td></lor<></td></lor<>	<lor< td=""><td>-</td><td></td></lor<>	-	
Tetrachloroethene	1.0	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
1,3-Dichloropropane	1.0	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
1,1,1,2-Tetrachloroethane	1.0	-LOR	<lor< td=""><td></td><td></td></lor<>		
1,1,2,2-Tetrachloroethane	1.0	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
1,2,3-Trichloropropane	1.0	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
4-Isopropyltoluene	1.0	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
1,2-Dibromo-3-chloropropane	1.0	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Hexachlorobutadiene	1.0	<lor< td=""><td><lor< td=""><td><0.1</td><td><0.1</td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><0.1</td></lor<>	<0.1	<0.1
Hexachloroethane				<0.1	<0.1
Hexachlorocyclopentadiene				<0.1	<0.1
Halogenated Aromatic					
Hydrocarbons					
1,2,3-Trichlorobenzene	1.0	<lor< td=""><td>· <lor< td=""><td></td><td></td></lor<></td></lor<>	· <lor< td=""><td></td><td></td></lor<>		
1,2,4-Trichlorobenzene	1.0	<lor< td=""><td><lor< td=""><td><0.1</td><td><0.1</td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><0.1</td></lor<>	<0.1	<0.1
1,2-Dichlorobenzene	1.0	<lor< td=""><td><lor< td=""><td><0.1</td><td><0.1</td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><0.1</td></lor<>	<0.1	<0.1
1,4-Dichlorobenzene	1.0	<lor< td=""><td><lor< td=""><td><0.1</td><td><0.1</td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><0.1</td></lor<>	<0.1	<0.1
1,3-Dichlorobenzene	1.0	<lor< td=""><td><lor< td=""><td><0.1</td><td><0.1</td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><0.1</td></lor<>	<0.1	<0.1
2-Chlorotoluene	1.0	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
4-Chlorotoluene	1.0	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Bromobenzene	1.0	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Chlorobenzene	1.0	<lor< td=""><td><lor< td=""><td><0.1</td><td><0.1</td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><0.1</td></lor<>	<0.1	<0.1
2-Choronapthalene	•			<0.1	<0.1
hexachlorobenzene				<0.1	<0.1
tetrachlorobenzene				<0.1	<0.1
Trihalomethanes					
(Volatiles)					
Chloroform	1.0	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Dibromochloromethane	1.0	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Bromodichloromethane	1.0	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Bromoform	£ 1.0	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Naphthalene	1.0	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory) * indicates laboratory replicate

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Appendix I

Certified Laboratory Results

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REPORT OF ANALYSIS

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Client:	RE-ISSUE OF REPORT Rust PPK GPO Box 398 ADELAIDE SA 5001 -
Attention:	Stuart Taylor/Jane Hewitt
Sample Description:	Soil/Water - Project No27J097A -
	Franklin Street Bus Station
Lab Registration Nos:	V97/18543 to V97/18566
Date Received:	23rd May 1997

Samples submitted to AGAL have been analysed as received. The information below is provided as part of our commitment to the quality of the analytical results. Please contact the undersigned for any further details relating to this Report.

Methods of Analysis:

 BTEX & TPH (C₆-C₉) TPH (C₁₀-C₃₆) - Soil VOC's PAH's - Soil/Water Metals - Soil/Water OC/OP pesticides/PCB's - Soil/Water Phenols - Soil pH 	AGAL(Vic) Method VL234 (Purge & Trap GC/MS) AGAL(Vic) Method VL228 (GC/FID) AGAL(Vic) Method VL234 (Purge & Trap GC/MS) AGAL(Vic) Method VL221/222 (GC/MS) AGAL(Vic) Method VL239/250 (ICP/MS/AES) AGAL(Vic) Method VL206/207 (GC determination) AGAL(Vic) Method VL210 (HPLC determination) AGAL(Vic) Method VL271 (Using APHA 4500B)
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Quality Assurance:

The QA procedures conducted with the analyses include -

- Analysis of reagent blanks
- Analysis of recoveries
- Analysis of samples in duplicate

Results obtained for recoveries of selected analytes were as follows:

<u>Analyte</u>	Soil	Water
Toluene-d8	95%	
ТРН	91%	-
Phenanthrene	87%	106%
Dieldrin	84%	103%
3-Methyl phenol	81%	-
Lead	85%	101%
Zinc	78%	99%

Results of Analysis:

Analytical results on samples as received appear on the following page(s). All results are based on using one technique for each test. Soil results are reported on a dry weight basis.

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Barrie Magor B.Sc.(Hons), Grad.Dip.App.Sci., MRACI (Organics Analyses)

Date: 18-6-97

Roger Cromie Dip.App.Sci., Grad.Dip.App.Sci., MRACI (Metals Analyses)

Anthony Crane B.App.Sci. (Inorganies Analyses)

File : h:\word\reports\1997\18593.doc

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Australian Gavernment Analytical Labarataries 51 - 65 Clarke Street South Melbaurne VIC 3205







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Results for soil

Client Reference No:			B (0.4	H4 5-0.6)	BH13 (0.7-0.9)	BH19 (0.55-0.7)	BH20 (0.05-0.2)	
Lab Registration No:	Units	LOR	V97/	18546	V97/18555	V97/18561	V97/18562	
BTEX:		Γ	1		*			
Benzene	mg/kg	0.5	<0.5	<0.5	<0.5	< 0.5	<0.5	
Toluene	mg/kg	0.5	<0.5	< 0.5	< 0.5	< 0.5	<0.5	
Ethylbenzene	mg/kg	0.5	<0.5	< 0.5	<0.5	<0.5	<0.5	
Xylenes	mg/kg	1.0	<1.0	<1.0	<1.0	<1.0	<1.0	
Total BTEX	mg/kg	2.0	<2.0	<2.0	<2.0	<2.0	<2.0	
Petroleum Hydrocarbons:								
C ₆ - C ₉	mg/kg	25	<25	<25	<25	<25	<25	
C ₁₀ - C ₁₄	mg/kg	25	<25	<25	<25	<25	<25	
C ₁₅ - C ₂₈	mg/kg	25	<25	<25	<25	<25	<25	
C ₂₉ - C ₃₆	mg/kg	25	<25	<25	<25	<25	<25	
Total Hydrocarbons	mg/kg	100	<100	<100	<100	<100	<100	
			1					

Lab Registration No:	Units	LOR	BH4 (0.45-0.6) V97/18546	BH13 (0.7-0.) V97/18	3 .9) 555	· · ·	
Phenols:				101/100			
Phenol 3-Methylphenol 2-Methylphenol 2-Ethylphenol 2,4-Dimethylphenol 2,3,5-Trimethylphenol 4-Nitrophenol	mg/kg mg/kg mg/kg mg/kg mg/kg mg/kg	0.1 0.1 0.1 0.1 0.1 0.1	<0.1 <0.1 <0.1 <0.1 <0.1 <0.1 <0.1	<0.1 < <0.1 < <0.1 < <0.1 < <0.1 < <0.1 < <0.1 <	<0.1 <0.1 <0.1 <0.1 <0.1 <0.1		

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Client Reference No:	1	Τ	BH4	BH13	
			(0.45-0.6)	(0.7-0.9)	
Lab Registration No:	Units	LOR	V97/18546	V97/18555	
Dichlorodifluoromethane	mg/kg	1.0	<1.0	<1.0	
Chloromethane	mg/kg	1.0	<1.0	<1.0	
Vinyl chloride	mg/kg	1.0	<1.0	<1.0	
Bromomethane	mg/kg	1.0	<1.0	<1.0	
Chloroethane	mg/kg	1.0	<1.0	<1.0	
Trichlorofluoromethane	mg/kg	1.0	<1.0	<1.0	
1,1-Dichloroethene	mg/kg	1.0	<1.0	<1.0	
Methylene chloride	mg/kg	1.0	<1.0	<1.0	
trans-1,2-Dichloroethene	mg/kg	1.0	<1.0	<1.0	
1,1-Dichloroethane	mg/kg	1.0	<1.0	<1.0	
2,2-Dichloropropane	mg/kg	1.0	<1.0	<1.0	
cis-1,2-Dichloroethene	mg/kg	1.0	<1.0	<1.0	•
Bromochloromethane	mg/kg	1.0	<1.0	<1.0	
Chloroform	mg/kg	1.0	<1.0	<1.0	
1,1,1-Trichloroethane	mg/kg	1.0	<1.0	<1.0	<i>i</i>
Carbon tetrachloride	mg/kg	1.0	<1.0	<1.0	
1,1-Dichloropropene	mg/kg	1.0	<1.0	<1.0	
Benzene	mg/kg	1.0	<1.0	<1.0	
1,2-Dichloroethane	mg/kg	1.0	<1.0	<1.0	
Trichloroethene	mg/kg	1.0	<1.0	<1.0	
1,2-Dichloropropane	mg/kg	1.0	<1.0	<1.0	
Dibromomethane	mg/kg	1.0	<1.0	<1.0	
Bromodichloromethane	mg/kg	1.0	<1.0	<1.0	
cis-1,3-dichloropropene	mg/kg	1.0	<1.0	<1.0	
Toluene	mg/kg	1.0	<1.0	<1.0	
trans-1,3-dichloropropene	mg/kg	1.0	<1.0	<1.0	
1,1,2-Trichloroethane	mg/kg	1.0	<1.0	<1.0	
Tetrachloroethene	mg/kg	1.0	<1.0	<1.0	
1,3-Dichloropropane	mg/kg	1.0	<1.0	<1.0	
Dibromochloromethane	mg/kg	1.0	<1.0	<1.0	
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Client Reference No:			BH4 BH13 (0.45-0.6) (0.7-0.9)
Lab Registration No:	Units	LOR	V97/18546 V97/18555
1,2-dibromoethane	mg/kg	1.0	<1.0 <1.0
Chlorobenzene	mg/kg	1.0	<1.0 - <1.0
1,1,1,2-Tetrachloroethane	mg/kg	1.0	<1.0 <1.0
Ethylbenzene	mg/kg	1.0	<1.0 <1.0
m,p-xylene	mg/kg	1.0	<1.0 <1.0
o-xylene	mg/kg	1.0	<1.0 <1.0
Styrene	mg/kg	1.0	<1.0 <1.0
Bromoform	mg/kg	1.0	<1.0 <1.0
Isopropylbenzene	mg/kg	1.0	<1.0 <1.0
Bromobenzene	mg/kg	1.0	<1.0 <1.0
1,1,2,2-Tetrachloroethane	mg/kg	1.0	<1.0 <1.0
1,2,3-Trichloropropane	mg/kg	1.0	<1.0 <10
n-propylbenzene	mg/kg	1.0	<1.0 <1.0
2-Chlorotoluene	mg/kg	1.0	<1.0 <1.0
4-Chlorotoluene	mg/kg	1.0	<1.0 <1.0
1,3,5-Trimethylbenzene	mg/kg	1.0	<1.0 <1.0
tert-Butylbenzene	mg/kg	1.0	<1.0 <1.0
1,2,4-Trimethylbenzene	mg/kg	1.0	<1.0 <1.0
sec-Butylbenzene	mg/kg	1.0	<1.0 <1.0
1,3-Dichlorobenzene	mg/kg	1.0	<1.0 <1.0
4-Isopropyltoluene	mg/kg	1.0	<1.0 <1.0
1,4-Dichlorobenzene	mg/kg	1.0	<1.0 <1.0
1,2-Dichlorobenzene	mg/kg	1.0	<1.0 <1.0
n-Butylbenzene	mg/kg	1.0	<1.0 <1.0
1,2- Dibromo-3-chloropropane	mg/kg	1.0	<1.0 <1.0
1,2,4-Trichlorobenzene	mg/kg	1.0	<1.0 <1.0
Hexachlorobutadiene	mg/kg	1.0	<1.0 <1.0
Naphthalene	mg/kg	1.0	<1.0 <1.0
1,2,3-Trichlorobenzene	mg/kg	1.0	<1.0 <1.0



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Client Reference No:			BH4	BH5	BH6	BH12	RI	J12
			(0.45-0.6)	(0.8-1.0)	(0.65-0.75)	(0.55-0.7)	(07	-U 8)
Lab Registration No:	Units	LOR	V97/18546	V97/18547	V97/18548	V97/18554	V97/	18555
PAH's:			1		<u>,</u>			
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	0.1	<0.1	<0.1	< 0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	< 0.1	<0.1	<0.1	< 0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	< 0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	0.2	<0.1	<0.1	0.2
Anthracene	mg/kg	0.1	<0.1	<0.1	0.1	< 0.1	<0.1	0.1
Fluoranthene	mg/kg	0.1	0.1	<0.1	0.9	<0.1	0.1	0.3
Pyrene	mg/kg	0.1	0.1	<0.1	0.9	< 0.1	0.1	0.2
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	0.5	< 0.1	<0.1	0.2
Chrysene	mg/kg	0.1	<0.1	<0.1	0.4	<0.1	<0.1	0.1
Benzo(b)fluoranthene	mg/kg	0.1	0.1	<0.1	0.4	<0.1	0.1	0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	0.4	<0.1	<0.1	0.1
Benzo(a)pyrene	mg/kg	0.1	0.1	<0.1	0.6	<0.1	<0.1	0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	0.4	<0.1	<0.1	<0.1
Dibenz(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	0.4	<0.1	<0.1	<0.1
Total PAH's (as above)	mg/kg	1.6	<1.6	<1.6	5.3	<1.6	<1.6	1.4
Total PAH's (as above)	mg/kg	1.6	<1.6	<1.6	5.3	< 1.6	< 1.6	1.4

Client Reference No:		[BH14	BH16	BH18	BH19	BH20	B	D2
		1	(0.55-0.7)	(0.4-0.5)	(0.4-0.5)	(0.55-0.7)	(0.05-0.2)		
Lab Registration No:	Units	LOR	V97/18556	V97/18558	V97/18560	V97/18561	V97/18562	V97 /2	18563
PAH's:							······································		
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	< 0.1	< 0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.3	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	< 0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	< 0.1	<0.1	< 0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.3	< 0.1	<0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.2	<0.1	<0.1
Fluoranthene	mg/kg	0.1	0.2	<0.1	<0.1	<0.1	2.1	<0.1	<0.1
Pyrene	mg/kg	0.1	0.2	<0.1	<0.1	<0.1	2.2	< 0.1	<0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	1.3	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	1.3	< 0.1	<0.1
Benzo(b)fluoranthene	mg/kg	0.1	0.1	<0.1	<0.1	<0.1	1.3	< 0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	0.1	<0.1	<0.1	<0.1	1.5	<0.1	<0.1
Benzo(a)pyrene	mg/kg	0.1	0.1	<0.1	<0.1	<0.1	1.7	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	1.3	<0.1	<0.1
Dibenz(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.3	<0.1	<0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	1.3	<0.1	<0.1
Total PAH's (as above)	mg/kg	1.6	<1.6	<1.6	<1.6	<1.6	15	<1.6	<1.6
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Client Reference No:			BH4 BH13
			(0.45 - 0.6) $(0.7 - 0.9)$
Lab Registration No:	Units	LOR	V97/18546 V97/18555
OC Pesticides:	[
HCB	mg/kg	0.05	<0.05 - <0.05 <0.05
Dichloran	mg/kg	0.05	<0.05 <0.05 <0.05
BHC (α,β,δ)	mg/kg	0.05	<0.05 <0.05 <0.05
Lindane (y-BHC)	mg/kg	0.05	<0.05 <0.05 <0.05
Heptachlor	mg/kg	0.05	<0.05 <0.05 <0.05
Heptachlor Epoxide	mg/kg	0.05	<0.05 <0.05 <0.05
Chlordane (total)	mg/kg	0.05	<0.05 <0.05 <0.05
Endosulphan (total)	mg/kg	0.05	<0.05 <0.05 <0.05
Aldrin	mg/kg	0.05	<0.05 <0.05 <0.05
Dieldrin	mg/kg	0.05	<0.05 <0.05 <0.05
Endrin (total)	mg/kg	0.05	<0.05 <0.05 <0.05
Dicofol	mg/kg	0.05	<0.05 <0.05 <0.05
DDT's (total)	mg/kg	0.05	<0.05 <0.05 <0.05
Methoxychlor	mg/kg	0.05	<0.05 < 0 .05 <0.05
Total OC's (as above)	mg/kg	0.2	<0.2 <0.2 <0.2

Client Reference No:			BH4 BH13 (0.45-0.6) (0.7-0.9)
Lab Registration No:	Units	LOR	V97/18546 V97/18555
OP Pesticides:			
Mevinphos	mg/kg	0.1	<0.1 <0.1 <0.1
Diazinon	mg/kg	0.1	<0.1 <0.1 <0.1
Chlorpyrifos-methyl	mg/kg	0.1	<0.1 <0.1 <0.1
Fenchlorphos	mg/kg	0.1	<0.1 <0.1 <0.1
Parathion-methyl	mg/kg	0.1	<0.1 <0.1 <0.1
Chlorpyrifos	mg/kg	0.1	<0.1 <0.1 <0.1
Malathion	mg/kg	0.1	<0.1 <0.1 <0.1
Fenitrothion	mg/kg	0.1	<0.1 <0.1 <0.1
Parathion	mg/kg	0.1	<0.1 <0.1 <0.1
Chlorfenvinphos	mg/kg	0.1	<0.1 <0.1 <0.1
Bromophos-ethyl	mg/kg	0.1	<0.1 <0.1 <0.1
Tetrachlorvinphos	mg/kg	0.1	<0.1 <0.1 <0.1
Ethion	mg/kg	0.1	<0.1 <0.1 <0.1
Total OP's (as above)	mg/kg	0.2	<0.2 <0.2 <0.2

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Client Reference No: Lab Registration No:	Units	LOR	BH4 (0.45-0.6) V97/18546	BH13 (0.7-0.9) V97/18555	
PCB's (as Aroclors):					
A1016	mg/kg	0.2	<0.2 -	<0.2 <0.2	
A1221	mg/kg	0.2	<0.2	< 0.2 < 0.2	
A1232	mg/kg	0.2	<0.2	<0.2 <0.2	
A1242	mg/kg	0.2	<0.2	<0.2 <0.2	
A1248	mg/kg	0.2	<0.2	<0.2 <0.2	
A1254	mg/kg	0.2	<0.2	<0.2 <0.2	
A1260	mg/kg	0.2	<0.2	<0.2 <0.2	
Total PCB's	mg/kg	1.0	<1.0	<1.0 <1.0	

Client Reference No:			BH1	BH3	BH5	BH6	BH7
Lab Registration No:	Units	LOR	(0.06-0.3) V97/18543	(0.8-1.0) V9718545	(0.8-1.0) V97/18547	(0.65-0.75) V97/18548	(0.4-0.5) V97/18549
pH .		0.1	9.5	9.5	9.5	9.4	9.8

Client Reference No:			BH8 (0.8-1.0)	BH10 (0.7-0.85)	BH11 (0.8-1.0)	BH12 (0.55-0.7)	BH14 (0.55-0.7)
Lab Registration No:	Units	LOR	V97/18550	V97/18552	V97/18553	V97/18554	V97/18556
pH		0.1	10	8.8	9.3	9.2	11

Client Reference No:	Unite	LOP	BH15 (0.7-0.85)	BH16 (0.4-0.5)	BH17 (0.8-1.0)	BH18 (0.4-0.5)	BH19 (0.55-0.7)
	<u> </u>	DOR	1 10001	V 91/10000	<u>v9</u> 7/18559	<u>v97/18560</u>	<u>v9</u> //18561
pH		0.1	9.3	9.7	9.8	9.4 9.4	9.1

Client Reference No:			BH20 (0.05-0.2)	BD2	BD6		· •
Lab Registration No:	Units	LOR	V97/18562	V97/18563	V97/18564	•	· .
рН		0.1	9.5	9.2	8.9		



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SAMPLE	CLIENT REF.	As	Cd	Co	Cr	Cu	Mn	Ni	РЬ	Se	Zn
Minimum level	of reporting	5.0	1.0	1.0	2.0	2.0	10	1.0	5.0	5.0	2.0
V97/018543	BH1 .06-	<5.0	<1.0		9.2	9.5			<5.0		8.7
V97/018544	BH2 1.8-	9.4	<1.0		29	7		-	7.5		19
V97/018545	BH3 .8-1.0	7.4	<1.0		31	7.3			10		21
V97/018546	BH4 .45-	7.6	<1.0	. 8	31	32	200	15	446	<5.0	280
V97/018546 du	p BH4.45-	7.5	<1.0	7.6	29	29		14	670	<5.0	270
V97/018548	BH6.65-	5.6	<1.0		22	24			45		69
V97/018549	BH7 .45	<5.0	<1.0		13	4.6			<5.0		17
V97/018550	BH8.8-1.0	10	<1.0		17	9			5.3		15
V97/018551	BH9 2.0-	9.3	<1.0		16	5.5			5.3		14
V97/018552	BH10.7-	5	<1.0		46	18			13	·	30
V97/018553	BH11.8-	8.9	<1.0		11	5.7			<5.0		9.8
V97/018553 dup	BH11.8-	9.8	<1.0		12	6			<5.0		10
V97/018554	BH12.55-	<5.0	<1.0		29	10			11		17
V97/018555	BH13.7-	5.1	<1.0	7.7	29 ·	16	260	15	43	<5.0	32
V97/018555 dup	BH13.7-	<5.0	<1.0	8.1	29	16	270	15	36	<5.0	32
V97/018556	BH14.55	19	<1.0		18	450			1600		2000
V97/018557	BH15 .7-	<5.0	<1.0		26	9.9			11		14
V97/018558	BH16.4-	9.5	<1.0		29	10			11		21
V97/018559	BH17.8-	11	<1.0		13	7.3			<5.0		11
V97/018561	BH19.55-	<5.0	<1.0		23	8.9			28		17
V97/018562	BH20 .05-	7.6	<1.0		33	31			140		410
V97/018563	BD2	8.5	<1.0		26	34			440		270
V97/018564	BD6	<5.0	<1.0		33	17			39		32
V97/018564 dup	BD6	5	<1.0		34	17			34		32

Results above are expressed in mg/kg.



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REPORT OF ANALYSIS

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<u>Results for water</u>

Client Reference No:		1	ER1 ER2
Lab Registration No:	Units	LOR	V97/18565 V97/18566
OC Pesticides:	Τ.		
HCB	μg/L	0.05	<0.05 - <0.05
Dichloran	μg/L	0.05	<0.05 <0.05
ΒΗC (α,β,δ)	μg/L	0.05	<0.05 <0.05
Lindane (y-BHC)	μg/L	0.05	<0.05 <0.05
Heptachlor	μg/L	0.05	<0.05 <0.05
Heptachlor Epoxide	μg/L	0.05	<0.05 <0.05
Chlordane (total)	μg/L	0.05	<0.05 <0.05
Endosulphan (total)	μg/L	0.05	<0.05 <0.05
Aldrin	μg/L	0.05	<0.05 <0.05
Dieldrin	μg/L	0.05	<0.05 <0.05
Endrin (total)	μg/L	0.05	<0.05 <0.05
Dicofol	μg/L	0.05	<0.05 <0.05
DDT's (total)	μg/L	0.05	<0.05 <0.05
Methoxychlor	μg/L	0.05	<0.05 <0.05
Total OC's (as above)	µg/L	0.2	<0.2 <0.2

Client Reference No:	· /	[ER1 ER2
Lab Registration No:	Units	LOR	V97/18565 V97/18566
PAH's:			
Naphthalene	μg/L	0.1	<0.1 <0.1
Acenaphthylene	μg/L	0.1	<0.1 <0.1
Acenaphthene	μg/L	0.1	<0.1 <0.1
Fluorene	μg/L	0.1	<0.1 <0.1
Phenanthrene	μg/L	0.1	<0.1 <0.1
Anthracene	μg/L	0.1	<0.1 <0.1
Fluoranthene	μg/L	0.1	<0.1 <0.1
Pyrene	μg/L	0.1	<0.1 <0.1
Benzo(a)anthracene	μg/L	0.1	<0.1 <0.1
Chrysene	μg/L	0.1	<0.1 <0.1
Benzo(b)fluoranthene	μg/L	0.1	<0.1 <0.1
Benzo(k)fluoranthene	μg/L	0.1	<0.1 <0.1
Benzo(a)pyrene	μg/L	0.1	<0.1 <0.1
Indeno(1,2,3-cd)pyrene	μg/L	0.1	<0.1 <0.1
Dibenz(ah)anthracene	μg/L	0.1	<0.1 <0.1
Benzo(ghi)perylene	μg/L	0.1	<0.1 <0.1
Total PAH's (as above)	μg/L	1.0	<1.0 <1.0

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REPORT OF ANALYSIS

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SAMPLE	CLIENT REF.	DESCRIPTION	As	Cd	Cr	Cu	Hg	Pb	Zn
Minimum leve	of reporting		5	<u>1</u>	5	5	0.5	5	5
V97/018565	ER1 20/05	WATER FRANKLIN ST 27J097A	<5	<1	<5	<5	<0.5	<5	<5
V97/018566	ER2	WATER FRANKLIN ST 27J097A	<5	<1	<5	<5	<0.5	<5	<5
		Results in ug/L							

• Sample was filtered through a 0.45um filter and acidified on receipt. The resulting solution was analysed for dissolved elements by AGAL method VL250 using ICP-MS.

Results above are expressed in μ g/L.

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REPORT OF ANALYSIS

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Client:	Rust PPK GPO Box 398 ADELAIDE SA 5001					
Attention:	Stuart Taylor/Jane Hewitt					
Sample Description:	Soil/Water - Project No27J097A -					
	Franklin Street Bus Station					
Lab Registration Nos:	V97/18543 to V97/18566					
Date Received:	23rd May 1997					

Samples submitted to AGAL have been analysed as received. The information below is provided as part of our commitment to the quality of the analytical results. Please contact the undersigned for any further details relating to this Report.

Methods of Analysis:

Metals - Soil

AGAL(Vic) Method VL239 (ICP/MS/AES)

Quality Assurance:

The QA procedures conducted with the analyses include -

- Analysis of reagent blanks
- Analysis of recoveries
- Analysis of samples in duplicate

Results obtained for recoveries of selected analytes were as follows: <u>Analyte</u> <u>Soil</u>

Beryllium	98%
Mercury	106%
Antimony	89%

Results of Analysis:

Analytical results on samples as received appear on the following page(s). All results are based on using one technique for each test. Soil results are reported on a dry weight basis. This report shall not be reproduced except in full.

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Dip.App.Sci., Grad.Dip.App.Sci., MRACI (Metals Analyses)

Date:



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REPORT OF ANALYSIS

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SAMPLE	CLIENT REF.	Be	Hg	Мо	Sb	Sn
Minimum level o	of reporting	1.0	0.50	5.0	5.0	2.0
V97/018543	BH1 .06-	<u></u>	<0.50			
V97/018544	BH2 1.8-		<0.50	-		
V97/018545	BH3 .8-1.0		<0.50			
V97/018546	BH4 .45-	1.2	<0.50	<5.0	<5.0	28
V97/018546 dup	BH4 .45-	1.2	<0.50	<5.0	<5.0	26
V97/018548	BH6 .65-		<0.50			
V97/018549	BH7 .45		<0.50			
V97/018550	BH8 .8-1.0		<0.50			
V97/018551	BH9 2.0-		<0.50			
V97/018552	BH10.7-		<0.50	1		
V97/018553	BH11.8-		<0.50			
V97/018553 dup	BH11.8-		<0.50			
V97/018554	BH12.55-		<0.50		-	
V97/018555	BH13.7-	1.1	<0.50	<5.0	<5.0	2.8
V97/018555 dup	BH13.7-	1.2	<0.50	<5.0	<5.0	2.6
V97/018556	BH14.55		<0.50			
V97/018557	BH15.7-		<0.50			
V97/018558	BH16 .4-	,	<0.50			
V97/018559	BH17.8-		<0.50			
V97/018561	BH19.55-		<0.50			
V97/018562	BH20 .05-		<0.50			
97/018563	BD2		÷ 1.6	·		
v97/018564	BD6		<0.50			
/97/018564 dup	BD6		<0.50			

Results above are expressed in mg/kg.

PAS -rvice is our business

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RUST PPK Pty. Ltd. 101 Pirie Street Adelaide South Australia 5001 Site : FRANKLIN ST BUS STATION 27J097A

CHLORINATED HYDROCARBONS US EPA SW486 METHOD 8010 & 8080. Sample BH12/D BH15/D BH15/D Dup Method Blank Lab. No. MY1968 MY1969 MY1969D Benzyl chloride <0.01 <0.01 <0.01 <0.001 2-Chloronaphthalene <0.01 <0.01 <0.01 <0.001 1,2-Dichlorobenzene <0.01 <0.01 <0.01 <0.001 1,3-Dichlorobenzene <0.01 <0.01 <0.01 <0.001 1,4-Dichlorobenzene <0.01 <0.01 <0.01 <0.001 Hexachlorobenzene <0.01 <0.01 <0.01 <0.001 Hexachlorobutadiene <0.01 <0.01 <0.01 <0.001 Hexachlorocyclopentadiene <0.01 <0.01 <0.01 <0.001 Hexachloroethane <0.01 <0.01 <0.01 <0.001 Tetrachlorobenzenes <0.01 <0.01 <0.01 <0.001 1,2,4-Trichlorobenzene <0.01 <0.01 <0.01 <0.001 Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 23/05/97

Date Reported 10/06/97



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Sample	BH12/D	BH12/D Dup	BH15/D	Method Blank	Spike % Recov
Lab. No.	MY1968	MY1968D	MY1969		
ntimony	<10	<10	<10	<0.5	-
rsenic	2.8	2.8	2.8	<0.02	
eryllium	· <2	<2	<2	<0.05	
admium	<0.5	<0.5	<0.5	<0.02	
hromium	28	26	28	<0.05	92%
obalt	8.5	8.5	9.4	<0.05	-
opper	14	14	16	<0.05	90%
ead	14	15	15	<0.05	90%
anganese	220	210	260	<0.05	_
ercury	<0.1	<0.1	<0.1	<0.001	
olybdenum	<10	<10	<10	<0.5	_
ickel	14	12	11	<0.05	
elenium	<0.5	<0.5	<0.5	<0.02	
in	<10	<10	<10	<0.5	
inc	28	32	26	<0.05	

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RUST PPK Pty. Ltd. 101 Pirie Street Adelaide South Australia 5001 Site : FRANKLIN ST BUS STATION 27J097A

MISCELLANEOUS ANALYSES. METHODS US EPA SW846 OR APHA STANDARD METHODS 19TH ED. 1995.

	·····			
Sample	BH12/D	BH15/D		
Lab. No.	MY1968	M¥1969		
Fluoride (Total)	260	190		
			·	
	······································	· · · · · · · · · · · · · · · · · · ·		
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Results in ppm (soils mg/kg dry, water	rs mg/l.)	4	 L	

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RUST PPK Pty. Ltd. 101 Pirie Street Adelaide South Australia 5001 Site : FRANKLIN ST BUS STATION 27J097A

	CYANID	<u>E (CN-) US EPA S</u>	W846 METHOD 901(0		
Sample	BH12/D	BH15/D				
Lab. No.	MY1968	MY1969				
Cyanide, total	<5	<5	·····			
				·····		
				······································		
					-	
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				······		
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RUST PPK Pty. Ltd. 101 Pirie Street Adelaide South Australia 5001 Site : FRANKLIN ST BUS STATION 27J097A

M	MAH'S AROMATIC VOLATILE ORGANICS US EPA SW846 METHODS 8020&5030.						
Sample	BH12/D	BH12/D Dup	BH15/D	Method Blank	Spike % Recov		
Lab. No.	MY1968	MY1968D	MY1969				
Benzene	<0.01	<0.01	<0.01	<0.001	112%		
Toluene	<0.01	<0.01	<0.01	<0.001	106%	· · · · · · · · · · · · · · · · · · ·	
Ethyl Benzene	<0.01	<0.01	<0.01	<0.001	104%		
Xylenes	<0.01	<0.01	<0.01	<0.001	108%		
·							
			· · · · · · · · · · · · · · · · · · ·				
· · · · · · · · · · · · · · · · · · ·					· · ·		
Results in ppm (soils mg/kg dry,	, waters mg/l).		<u> </u>	L	<u>. 1</u>		

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RUST PPK Pty. Ltd. 101 Pirie Street Adelaide South Australia 5001 Site : FRANKLIN ST BUS STATION 27J097A

ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8080 Sample BH12/D BH15/D BH15/D Dup Method Blank Lab. No. MY1968 MY1969 MY1969D Aldrin <0.01 <0.01 <0.01 <0.001 Lindane <0.01 <0.01 <0.01 <0.001 4,4'-DDD <0.01 <0.01 <0.01 <0.001 4,4'-DDE <0.01 <0.01 <0.01 <0.001 4,4'-DDT <0.01 <0.01 <0.01 <0.001 Dieldrin <0.01 <0.01 <0.01 <0.001 Endrin <0.01 <0.01 <0.01 <0.001

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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RUST PPK Pty. Ltd. 101 Pirie Street Adelaide South Australia 5001 Site : FRANKLIN ST BUS STATION 27J097A

Sample	BH12/D	BH15/D	BH15/D Dup	Method Blank	Spike % Recov
Jab. No.	MY1968	MY1969	MY1969D		
Japhthalene	<0.1	<0.1	<0.1	<0.001	-
Acenaphthylene	<0.1	<0.1	<0.1	<0.001	-
Acenaphthene	<0.1	<0.1	<0.1	<0.001	-
Sluorene	<0.1	<0.1	<0.1	<0.001	-
Phenanthrene	<0.1	<0.1	<0.1	<0.001	
nthracene	<0.1	<0.1	<0.1	<0.001	-
luoranthrene	<0.1	<0.1	<0.1	<0.001	90%
Yrene	<0.1	<0.1	<0.1	<0.001	92%
Benzo(a)anthracene	<0.1	<0.1	<0.1	<0.001	-
hrysene	<0.1	<0.1	<0.1	<0.001	-
Benzo(b)fluoranthene	<0.1	<0.1	<0.1	<0.001	-
Benzo(k)fluoranthene	<0.1	<0.1	<0.1	<0.001	-
Benzo(a)pyrene	<0.1	<0.1	<0.1	<0.001	96%
bibenzo(a,h)anthracene	<0.1	<0.1	<0.1	<0.001	-
enzo(g,h,i)perylene	<0.1	<0.1	<0.1	<0.001	_
Indeno(1,2,3-cd)pyrene	<0.1	<0.1	<0.1	<0.001	-

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RUST PPK Pty. Ltd. 101 Pirie Street Adelaide South Australia 5001 Site : FRANKLIN ST BUS STATION 27J097A

POLYCHLORINATED BIPHENYLS (PCB'S) US EPA SW846 METHOD 8080 Sample BH12/D BH15/D BH15/D Dup Method Blank Lab. No. MY1968 MY1969 MY1969D Total PCB's as Arochlor 1260 <0.1 <0.1 <0.1 <0.01 . Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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RUST PPK Pty. Ltd. 101 Pirie Street Adelaide South Australia 5001 Site : FRANKLIN ST BUS STATION 27J097A

PHENOLS & CRESOLS - HPLC- JRNL. CHROM 464 (1989) 405-410, GC- US EPA SW846 8040 Sample BH12/D BH12/D Dup BH15/D Method Blank Lab. No. MY1968 MY1968D MY1969 Phenol <0.1 <0.1 <0.1 <0.01 Cresols (Total) <0.1 <0.1 <0.1 <0.01 . Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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RUST PPK Pty. Ltd. 101 Pirie Street Adelaide South Australia 5001 Site : FRANKLIN ST BUS STATION 27J097A

TOTAL 1	PETROLEUM HYDRO	DCARBONS (GC)	MGT METHOD 100A	- GC FID & MS.		
Sample	BH12/D	BH15/D	BH15/D Dup	Method Blank	Spike % Recov	
Lab. No.	MY1968	MY1969	MY1969D			····
T.R.H. $C_6 - C_9$ Fraction by GC	<20	<20	<20	<0.02	-	
T.R.H. $C_{10}-C_{14}$ Fraction by GC	<50	<50	<50	<0.05	_	
T.R.H. C ₁₅ -C ₂₈ Fraction by GC	<100	<100	<100	<0.1	89%	
T.R.H. C_{29} - C_{36} Fraction by GC	<100	<100	` <100	<0.1	-	
· 12						
· · · · · · · · · · · · · · · · · · ·			_			
Results in ppm (soils mg/kg dry, wate	ers mg/l). Extr	action MGT300A	soils, US EPA 3	510 waters.	1	

Date received 23/05/97

Date Reported 10/06/97



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CRITERIA USED TO ASSESS QUALITY CONTROL RESULTS

VALIDITY AND RELIABILITY OF TEST RESULTS

The continuing validity and reliability of results is accomplished by monitoring a number of factors :

Analysis of duplicates. Duplicates run at a minimum of 5 %
 Recovery of known additions. Spikes run at a minimum of 5 % with each batch of samples.

3. Analysis of reagent blanks run with each batch of samples.

I Analysis of Duplicates

Duplicates are analysed as a matter of course and the data analysed by means of a range chart type system. The range for each duplicate pair is determined and 'normalised' by dividing by the average of the duplicate results.

Once enough data has been gathered control data for each method can be developed. The mean range (R) is determined as :

$R = (\Sigma R_i)$

where n = number of observations and R_i = normalised range

and the variance (square of the standard deviation) is determined as :

$$s_r^2 = (\Sigma R_i^2 - nR^2)$$

n - 1

The control criteria thus become :

Average range	R
Warning Limit	R + 2s,
Control Limit	R + 3s,

The normalised range for each duplicate pair is calculated and compared with the above criteria. (This can be achieved either graphically or by visual comparison of the data.) Since the limits are based on 95 % and 90 % confidence levels respectively, the following actions are taken, based on these statistical parameters.

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Control Limit

If one measurement exceeds the C.L. repeat the analysis, If the repeat is within the C.L. continue analyses. If it exceeds the C.L. discontinue analyses and correct the problem.

Warning Limit

If two out of three successive points exceed the W.L. analyse another sample. If the next point is less than the W.L. continue analyses, if the next point exceeds the W.L. discontinue analyses and correct the problem.

***Particular care needs to be taken with some soil samples with regard to sample homogeneity, especially with regard to 'organics' analyses. Statistical analysis may indicate a problem exists when in fact the problem is really only sample homogeneity.

2. Recovery of known additions,

The recovery of known additions is used to verify the absence of matrix effects and absence of interferences. Recovery from standards is used to verify method performance. Recovery data is compared against acceptance criteria published in Standards Methods for Examination of Water and Waste water, or appropriate U.S. EPA Methods.

If recoveries fall outside acceptance criteria, analyses should be discontinued and the problem rectified.

3.0 Analysis of Reagent Blanks

Reagent blanks are used to monitor purity of reagents and the overall procedural blank. Reagent blanks are run as a matter of course with each batch for analysis. Unusual or out of the 'norm' results for blanks are investigated and corrective action taken before analysis of any batch is completed.

G. Black.



This Laboratory is registered by the National Association of Testing Authonties, Australia. The Iss(a) reported herein have been performed in accordance with its terms of registration This Pointmini Stall truth be reporting in strategies in full

Appendix J

Tabulated Results of Replicate and Duplicate Analysis

Analytical Results - Laboratory Replicates Metals, pH and PAH

All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH4	BH4*	BH4/D		DU44	DUI44t
Sample Depth	Reporting	0.45-0.6	0.45-0.6	0.45-0.6	0 45-0 6	0.8-1.0	0 8-1 0
Metals:							0.0-1.0
Arsenic	5	7.6	7.5	8.5		89	9.8
Cadmium	1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td><1 OR</td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td><1 OR</td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td><1 OR</td><td></td></lor<>		<1 OR	
Cobalt	1	8	7.6		-	LON	LOK
Chromium (total)	· 2	31	29	26	-	11	12
Copper	2	32	29	34		5.7	6
Mercury	0.5	<lor< td=""><td><lor< td=""><td>1.6 ¹</td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>1.6 ¹</td><td></td><td></td><td></td></lor<>	1.6 ¹			
Nickel	1	15	14			LOIN	LOIN
Lead	5	446 ^{1,2}	670 ^{1,2}	440 ^{1,2}		<lor< td=""><td><1 OR</td></lor<>	<1 OR
Selenium	5	<lor< td=""><td><lor< td=""><td></td><td></td><td></td><td>2011</td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td><td>2011</td></lor<>				2011
Zinc	2	280 ¹	270 ¹	270 ¹		9.8	10
Manganese	10	200					
Beryllium	1	1.2	1.2				
Molybdenum	5	<lor< td=""><td><lor< td=""><td></td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td><td></td></lor<>				
Antimony	5	<lor< td=""><td><lor< td=""><td></td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td><td></td></lor<>				
Tin	2	28	26				
рН	0.1			9.2		9.3 '.2	
Polycyclic Aromatic							
Hydrocarbons (PAH):							
Naphthalene	0.1	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Acenaphthylene	0.1	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Acenaphthene	0.1	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Fluorene	0.1	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Phenanthrene	0.1	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Anthracene	0.1	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Fluoranthrene	0.1	0.1		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Pyrene	0.1	0.1		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Benz(a)anthracene	0.1	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Chrysene	0.1	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Benzo(b)fluoranthene and	0.1	0.1		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Benzo(k)fluoranthrene	0.1	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Benzo(a)pyrene	0.1	0.1		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Indeno(1,2,3-cd)pyrene	0.1	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Dibenz(a,h)anthracene	0.1	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Benzo(g,h,i)perylene	0.1	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Total PAH	. 1	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

¹ denotes greater than the ANZECC environmental guidelines

² denotes greater than the SAHC health based guidelines

³ denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting D)

Analytical Results - Laboratory Replicates Metals, pH and PAH

All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH12/D	BH12/D*	BH13	BH13*	BH13/D	BH13/D*
Sample Depth	Reporting	0.55-0.7	0.55-0.7	0.7-0.9	0.7-0.9	0.7-0.9	0.7-0.9
Metals:			·				
Arsenic	[·] 5	2.8	2.8	5.1	<lor< td=""><td><lor< td=""><td>5</td></lor<></td></lor<>	<lor< td=""><td>5</td></lor<>	5
Cadmium	1	<0.5	<0.5	<lor< td=""><td>_ <lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	_ <lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Cobalt	1	8.5	8.5	7.7	_ 8.1		
Chromium (total)	2	28	26	29	29	33	34
Copper	2	14	14	16	16	17	17
Mercury	0.5	<0.1	<0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Nickel	1	14	12	15	15		
Lead	5	14	15	43	36	39	34
Selenium	5	<0.5	<0.5	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Zinc	2	28	32	32	32	32	32
Manganese	10	220	210	260	270		
Beryllium	1	<2	<2	1.1	1.2		
Molybdenum	5 .	<10	<10	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Antimony	5	<10	<10	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Tin	2	<10	<10	2.8	2.6		
pH	0.1					8.9	·
Polycyclic Aromatic							
Hydrocarbons (PAH):							•
Naphthalene	0.1			<lor< td=""><td><lor< td=""><td></td><td>·</td></lor<></td></lor<>	<lor< td=""><td></td><td>·</td></lor<>		·
Acenaphthylene	0.1			<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Acenaphthene	0.1			<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Fluorene	0.1			<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Phenanthrene	0.1			<lor< td=""><td>0.2</td><td></td><td>. •</td></lor<>	0.2		. •
Anthracene	0.1		·	<lor< td=""><td>0.1</td><td></td><td></td></lor<>	0.1		
Fluoranthrene	0.1			0.1	0.3		
Pyrene	0.1			0.1	0.2		
Benz(a)anthracene	0.1			<lor< td=""><td>0.2</td><td></td><td></td></lor<>	0.2		
Chrysene	0.1			<lor< td=""><td>0.1</td><td></td><td>-</td></lor<>	0.1		-
Benzo(b)fluoranthene and	0.1			0.1	0.1		· ·
Benzo(k)fluoranthrene	0.1			<lor< td=""><td>0.1</td><td></td><td></td></lor<>	0.1		
Benzo(a)pyrene	0.1			<lor< td=""><td>0.1</td><td></td><td>· ·</td></lor<>	0.1		· ·
Indeno(1,2,3-cd)pyrene	0.1			<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Dibenz(a,h)anthracene	0.1			<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Benzo(g,h,i)perylene	0.1			<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Total PAH	1	_		<lor< td=""><td>1.4</td><td></td><td></td></lor<>	1.4		

7D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

¹ denotes greater than the ANZECC environmental guidelines

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Analytical Results - Laboratory Replicates Metals, pH and PAH

All results expressed in mg/kg (ppm)

Borehole Number		BH15/D	BH15/D*	BH18	BH18*
Sample Depth	Reporting	0.7-0.85	0.7-0.85	0.4-0.5	0.4-0.5
Metals:	-				
Arsenic	5				
Cadmium	1			-	
Cobalt	1				-
Chromium (total)	2				
Copper	2				
Mercury	0.5				
Nickel	1				
Lead	5				
Selenium	5				
Zinc	2				
Manganese	10				
Beryllium	1				
Molybdenum	5				
Antimony	5				
Tin	2				
pH .	0.1		· · · · · · · · · · · · · · · · · · ·	9.4 ',2	9.4
Polycyclic Aromatic					
Hydrocarbons (PAH):					
Naphthalene	0.1	<0.1	<0.1		
Acenaphthylene	0.1	<0.1	<0.1		
Acenaphthene	0.1	<0.1	<0.1		
Fluorene	0.1	<0.1	<0.1		
Phenanthrene	0.1	<0.1	<0.1		
Anthracene	0.1	<0.1	<0.1		
Fluoranthrene	0.1	<0.1	<0.1		
Pyrene	0.1	<0.1	<0.1		
Benz(a)anthracene	0.1	<0.1	<0.1		
Chrysene	0.1	<0.1	<0.1		
Benzo(b)fluoranthene and	0.1	<0.1	<0.1		
Benzo(k)fluoranthrene	0.1	<0.1	<0.1		
Benzo(a)pyrene	0.1	<0.1	<0.1		
ndeno(1,2,3-cd)pyrene	0.1	<0.1	<0.1		
Dibenz(a,h)anthracene	0.1	<0 1	<0 1		
Benzo(a.h.i)pervlene	0.1	<0.1	<0.1		
fotal PAH	. 1	·V. I	· • • •		

7D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

¹ denotes greater than the ANZECC environmental guidelines

² denotes greater than the SAHC health based guidelines

³ denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting D)

Analytical Results - Laboratory Replicates OCPs and OPPs

All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH13.	BH13*	BH15/D	BH15/D*	_
Sample Depth	Reporting	0.7-0.9	0.7-0.9	0.7-0.85	0.7-0.85	
Organochlorine Pesticides:						
НСВ	0.05	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Dichloran	0.05	<lor< td=""><td><lor< td=""><td>-</td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>-</td><td></td><td></td></lor<>	-		
Total BHC	0.05	<lor< td=""><td><lor< td=""><td>-</td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>-</td><td></td><td></td></lor<>	-		
Lindane	0.05	<lor< td=""><td><lor< td=""><td><0.01</td><td><0.01</td><td></td></lor<></td></lor<>	<lor< td=""><td><0.01</td><td><0.01</td><td></td></lor<>	<0.01	<0.01	
Heptachlor	0.05	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Heptachlor Epoxide	0.05	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Total Chlordane (ocy, cis,	0.05	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
trans, chlordene, nonachlor)						
Total endosulphan	0.05	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Aldrin	0.05	<lor< td=""><td><lor< td=""><td><0.01</td><td><0.01</td><td></td></lor<></td></lor<>	<lor< td=""><td><0.01</td><td><0.01</td><td></td></lor<>	<0.01	<0.01	
Dieldrin	0.05	<lor< td=""><td><lor< td=""><td><0.01</td><td><0.01</td><td></td></lor<></td></lor<>	<lor< td=""><td><0.01</td><td><0.01</td><td></td></lor<>	<0.01	<0.01	
Endrin Total	0.05	<lor< td=""><td><lor< td=""><td>< 0.01</td><td><0.01</td><td></td></lor<></td></lor<>	<lor< td=""><td>< 0.01</td><td><0.01</td><td></td></lor<>	< 0.01	<0.01	
Dicofol	0.05	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
op-DDE, pp-DDE	0.05	<lor< td=""><td><lor< td=""><td><0.01</td><td><0.01</td><td></td></lor<></td></lor<>	<lor< td=""><td><0.01</td><td><0.01</td><td></td></lor<>	<0.01	<0.01	
op-DDD pp-DDD	0.05	<lor< td=""><td><lor< td=""><td><0.01</td><td><0.01</td><td></td></lor<></td></lor<>	<lor< td=""><td><0.01</td><td><0.01</td><td></td></lor<>	<0.01	<0.01	
op DDT pp-DDT	0.05	<lor< td=""><td><lor< td=""><td><0.01</td><td><0.01</td><td></td></lor<></td></lor<>	<lor< td=""><td><0.01</td><td><0.01</td><td></td></lor<>	<0.01	<0.01	
Methoxychlor	0.05	<lor< td=""><td><lor< td=""><td>•</td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>•</td><td></td><td></td></lor<>	•		
Total OCPs	0.2	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Organophosphate Pesticides:						
Dichlorvos	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Mevinphos	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Diazinon	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td>•</td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td>•</td></lor<>			•
Chlorpyrifos-Methyl	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Fenchlorvos	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Parathion-methyl	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Chlorpyriphos	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Malathion	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Fenitrothion	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Parathion	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Chlorfenvinphos	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Bromophos-Ethyl	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Tetrachlorvinphos	0.1	<i 0r<="" td=""><td></td><td></td><td></td><td></td></i>				
Ethion	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Total OPPs	0.2					
Chlorfenvinphos Bromophos-Ethyl Tetrachlorvinphos Ethion Total OPPs	0.1 0.1 0.1 0.1 0.1 0.2	<lor <lor <lor <lor <lor< td=""><td><lor <lor <lor <lor <lor< td=""><td>•</td><td></td><td></td></lor<></lor </lor </lor </lor </td></lor<></lor </lor </lor </lor 	<lor <lor <lor <lor <lor< td=""><td>•</td><td></td><td></td></lor<></lor </lor </lor </lor 	•		

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory) * indicates laboratory replicate

Analytical Results - Laboratory Replicates BTEX, TPH, Phenols, Cresols,

All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH4	BH4*	BH13	BH13*	BH12/D	BH12/D*
Sample Depth	Reporting	0.45-0.6	0.45-0.6	0.7-0.9	0.7-0.9	0.55-0.7	0.55-0.7
BTEX:							
Benzene	0.5	<lor< td=""><td><lor< td=""><td></td><td></td><td><0.01</td><td><0.01</td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><0.01</td><td><0.01</td></lor<>			<0.01	<0.01
Toluene	0.5	<lor< td=""><td><lor< td=""><td></td><td>-</td><td><0.01</td><td><0.01</td></lor<></td></lor<>	<lor< td=""><td></td><td>-</td><td><0.01</td><td><0.01</td></lor<>		-	<0.01	<0.01
Ethyl Benzene	0.5	<lor< td=""><td><lor< td=""><td></td><td>-</td><td><0.01</td><td><0.01 ´</td></lor<></td></lor<>	<lor< td=""><td></td><td>-</td><td><0.01</td><td><0.01 ´</td></lor<>		-	<0.01	<0.01 ´
Xylene	1	<lor< td=""><td><lor< td=""><td></td><td></td><td><0.01</td><td><0.01</td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><0.01</td><td><0.01</td></lor<>			<0.01	<0.01
Total BTEX	2	<lor< td=""><td><lor< td=""><td></td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td><td></td></lor<>				
Total Petroleum							
Hydrocarbons (TPH):							
C ₆ -C ₉	25	<lor< td=""><td><lor< td=""><td></td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td><td></td></lor<>				
C ₁₀ -C ₁₄	25	<lor< td=""><td><lor< td=""><td></td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td><td></td></lor<>				
C ₁₅ -C ₂₈	25	<lor< td=""><td><lor< td=""><td></td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td><td></td></lor<>				
C ₂₉ -C ₃₆	25	<lor< td=""><td><lor< td=""><td></td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td><td></td></lor<>				
Total TPH	100	<lor< td=""><td><lor< td=""><td></td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td><td></td></lor<>				
Cresols						<0.1	<0.1
Phenols							
Phenol	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td><0.1</td><td><0.1</td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""><td><0.1</td><td><0.1</td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><0.1</td><td><0.1</td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><0.1</td></lor<>	<0.1	<0.1
3-Methylphenol	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
2-Methylphenol	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
2-Ethylphenol	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
2,4-Dimentylphenol	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td>•</td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td>•</td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td>•</td></lor<></td></lor<>	<lor< td=""><td></td><td>•</td></lor<>		•
2,3,5-Trimethylphenol	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
4-Nitrophenol	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Polychlorinated							
Biphenyls (PCBs)							
A1016	0.2	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
A1221	0.2	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
A1232	0.2	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
A1242	0.2	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td>. '</td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td>. '</td></lor<></td></lor<>	<lor< td=""><td></td><td>. '</td></lor<>		. '
A1248	0.2	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
A1254	0.2	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
A1260	0.2	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
A1262	0.2	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Total Aroclors	. 1	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

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* indicates laboratory replicate

Analytical Results - Laboratory Replicates BTEX, TPH, Phenols, Cresols,

All results expressed in mg/kg (ppm)

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/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are in * indicates laboratory replicate

Analytical Results - Laboratory Replicates Volatile Organic Scan

All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH15/D	BH15/D*
Sample Depth	Reporting	0.7-0.85	0.7-0.85
Trichloroethene	1.0		
Dibromomethane	1.0		
cis-1,3-dichloropropene	1.0		
trans-1,3-dichloropropene	1.0		
1,1,2-Trichloroethane	1.0		
Tetrachloroethene	1.0		
1,3-Dichloropropane	1.0		
1,1,1,2-Tetrachloroethane	1.0		
1,1,2,2-Tetrachloroethane	1.0		
1,2,3-Trichloropropane	1.0		
4-Isopropyltoluene	1.0		
1,2-Dibromo-3-chloropropane	1.0		
Hexachlorobutadiene	1.0	<0.1	<0.1
Hexachloroethane		<0.1	<0.1
Hexachlorocyclopentadiene		<0.1	<0.1
Halogenated Aromatic			
Hydrocarbons	1.0		
1,2,3-Trichlorobenzene	1.0		
1,2,4-Trichlorobenzene	1.0	<0.1	<0.1
1,2-Dichlorobenzene	1.0	<0.1	<0.1
1,4-Dichlorobenzene	1.0	<0.1	<0.1
1,3-Dichlorobenzene	1.0	<0.1	<0.1
2-Chlorotoluene	1.0		
4-Chlorotoluene	1.0		
Bromobenzene	10		
Chlorobenzene		<0.1	-01
2-Choronapthalene		<0.1	~0.1
hexachlorobenzene		>∪. I ∠0. 1	►U. I
tetrachlorobenzene	10	SU. T	<u.1< td=""></u.1<>
IEI ACHUI UDEN ZEN E	1.0	<0.1	<0.1
	1.0		
	1.0		
(volatilės)	1.0		
Chloroform	1.0		
Dibromochloromethane			
Bromodichloromethane			
Bromoform			
Naphthalene			

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/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

Analytical Results - Soil Duplicates Metals, pH and PAH

All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH4	BH4/D	BH12	BH12/D	BH13	BH13/D
Sample Depth	Reporting	0.45-0.6	0.45-0.6	0.55-0.7	0.55-0.7	0.7-0.9	07-09
Metals:							
Arsenic	5	7.6	8.5	- LOR	. 2.8	5.1	<lor< td=""></lor<>
Cadmium	1	<lor< td=""><td><lor< td=""><td><lor< td=""><td>- <0.5</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td>- <0.5</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td>- <0.5</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	- <0.5	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Cobalt	1	8			- 8.5	7.7	
Chromium (total)	1	31	26	29	28	29	33
Copper	2	32	34	10	14	16	° 17
Mercury	2	<lor< td=""><td>1.6 ¹</td><td><lor< td=""><td><0.1</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	1.6 ¹	<lor< td=""><td><0.1</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	<0.1	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Nickel	0.5	15			14	15	
Lead	10	446 ^{1,2}	440 ^{1,2}	11	14	43	39
Selenium	5	<lor< td=""><td></td><td></td><td><0.5</td><td><lor< td=""><td></td></lor<></td></lor<>			<0.5	<lor< td=""><td></td></lor<>	
Zinc	1	280 ¹	270 ¹	17	28	32	32
Manganese	5	200			220	260	
Beryllium	5	1.2			<2		1.1
Molybdenum	5	<lor< td=""><td></td><td></td><td><10</td><td></td><td><lor< td=""></lor<></td></lor<>			<10		<lor< td=""></lor<>
Antimony	2	<lor< td=""><td></td><td></td><td><10</td><td></td><td><lor< td=""></lor<></td></lor<>			<10		<lor< td=""></lor<>
Tin	2	28			<10		2.8
рН	0.1		9.2 ^{1,2}	9.2 ^{1,2}			8.9 [†]
Polycyclic Aromatic							
Hydrocarbons (PAH):							
Naphthalene	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<>	<0.1	<lor< td=""><td></td></lor<>	
Acenaphthylene	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<>	<0.1	<lor< td=""><td></td></lor<>	
Acenaphthene	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<>	<0.1	<lor< td=""><td></td></lor<>	
Fluorene	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<>	<0.1	<lor< td=""><td></td></lor<>	
Phenanthrene	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<>	<0.1	<lor< td=""><td></td></lor<>	
Anthracene	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<>	<0.1	<lor< td=""><td></td></lor<>	
Fluoranthrene	0.1	0.1	<lor< td=""><td><lor< td=""><td><0.1</td><td>0.1</td><td></td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td>0.1</td><td></td></lor<>	<0.1	0.1	
Pyrene	0.1	0.1	<lor< td=""><td><lor< td=""><td><0.1</td><td>0.1</td><td></td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td>0.1</td><td></td></lor<>	<0.1	0.1	
Benz(a)anthracene	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<>	<0.1	<lor< td=""><td></td></lor<>	
Chrysene	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<>	<0.1	<lor< td=""><td></td></lor<>	
Benzo(b)fluoranthene and	0.1	0.1	<lor< td=""><td><lor< td=""><td><0.1</td><td>0.1</td><td></td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td>0.1</td><td></td></lor<>	<0.1	0.1	
Benzo(k)fluoranthrene	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<>	<0.1	<lor< td=""><td></td></lor<>	
Benzo(a)pyrene	0.1	0.1	<lor< td=""><td><lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<>	<0.1	<lor< td=""><td></td></lor<>	
Indeno(1,2,3-cd)pyrene	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<>	<0.1	<lor< td=""><td></td></lor<>	
Dibenz(a,h)anthracene	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><0.1</td><td><lor< td=""><td>-</td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><0.1</td><td><lor< td=""><td>-</td></lor<></td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><lor< td=""><td>-</td></lor<></td></lor<>	<0.1	<lor< td=""><td>-</td></lor<>	-
Benzo(g,h,i)perylene	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><0.1</td><td><lor< td=""><td></td></lor<></td></lor<>	<0.1	<lor< td=""><td></td></lor<>	
Total PAH	1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td><l or<="" td=""><td></td></l></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td><l or<="" td=""><td></td></l></td></lor<></td></lor<>	<lor< td=""><td></td><td><l or<="" td=""><td></td></l></td></lor<>		<l or<="" td=""><td></td></l>	

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)
* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

¹ denotes greater than the ANZECC environmental guidelines

² denotes greater than the SAHC health based guidelines

³ denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting D)
Analytical Results - Soil Duplicates Metals, pH and PAH

All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH15	BH15/D
Sample Depth	Reporting	0.7-0.85	0.7-0.85
Metals:			
Arsenic ´	5	<lor< td=""><td>2.8</td></lor<>	2.8
Cadmium	1	<lor< td=""><td><0.5</td></lor<>	<0.5
Cobalt	1		9.4
Chromium (total)	1	26	28
Copper.	2	9.9	16
Mercury	2	<lor< td=""><td><0.1</td></lor<>	<0.1
Nickel	0.5		11
Lead	10	11	15
Selenium	5		<0.5
Zinc	1	14	26
Manganese	5		260
Beryllium	5		<2
Molybdenum	5		<10
Antimony	2		<10
Tin	2		<10
pH .	0.1	9.3 ^{1,2}	
Polycyclic Aromatic			-
Hydrocarbons (PAH):			
Naphthalene	0.1		<0.1
Acenaphthylene	0.1		<0.1
Acenaphthene	0.1		<0.1
Fluorene	0.1		<0.1
Phenanthrene	0.1		<0.1
Anthracene	0.1		<0.1
Fluoranthrene	0.1		<0.1
Pyrene	0.1		<0.1
Benz(a)anthracene	0.1		<0.1
Chrysene	0.1	,	<0.1
Benzo(b)fluoranthene and	0.1		<0.1
Benzo(k)fluoranthrene	0.1		<0.1
Benzo(a)pyrene	0.1		<0.1
Indeno(1,2,3-cd)pyrene	0.1		<0.1
Dibenz(a,h)anthracene	0.1		<0.1
Benzo(g,h,i)perylene	0.1		<0.1
	•		

Total PAH

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory) * indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

¹ denotes greater than the ANZECC environmental guidelines

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² denotes greater than the SAHC health based guidelines

³ denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting D)

⁴ denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting F)

Appendix K

Data Validation

Franklin Street Bus Station

Summary of Quality Control Laboratory Replicates

Location			Arsenic			Cadmium					
Number	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	
BH4 (0.45-0.6) BH11 (0.8-1.0) BH12/D (0.55-0.7) BH13 (0.7-0.9) BH13/D (0.7-0.9)	7.6 8.9 2.8 5.1 <lor< td=""><td>7.5 9.8 2.8 <lor 5.0</lor </td><td>1 10 0 0 0</td><td>1.01 0.95 1.00 1.00 1.00</td><td>0.99 1.05 1.00 1.00 1.00</td><td><lor <lor <lor <lor <lor< td=""><td><lor <lor <lor <lor <lor< td=""><td>0 0 0 0 0</td><td>1.00 1.00 1.00 1.00 1.00</td><td>1.00 1.00 1.00 1.00 1.00</td></lor<></lor </lor </lor </lor </td></lor<></lor </lor </lor </lor </td></lor<>	7.5 9.8 2.8 <lor 5.0</lor 	1 10 0 0 0	1.01 0.95 1.00 1.00 1.00	0.99 1.05 1.00 1.00 1.00	<lor <lor <lor <lor <lor< td=""><td><lor <lor <lor <lor <lor< td=""><td>0 0 0 0 0</td><td>1.00 1.00 1.00 1.00 1.00</td><td>1.00 1.00 1.00 1.00 1.00</td></lor<></lor </lor </lor </lor </td></lor<></lor </lor </lor </lor 	<lor <lor <lor <lor <lor< td=""><td>0 0 0 0 0</td><td>1.00 1.00 1.00 1.00 1.00</td><td>1.00 1.00 1.00 1.00 1.00</td></lor<></lor </lor </lor </lor 	0 0 0 0 0	1.00 1.00 1.00 1.00 1.00	1.00 1.00 1.00 1.00 1.00	
				RSD (%)	2				RSD (%)	0	

Location			Chromiun	n	ļ	Copper				
Number	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate-	RPD (%)	Norm, Val.	Norm. Dup.
'	1									
BH4 (0.45-0.6)	31	29	7	1.03	0.97	32	29	10	1.05	0.95
BH11 (0.8-1.0)	11 '	12	9	0.96	1.04	6	6	5	0.97	1.03
BH12/D (0.55-0.7)	28	26	7	1.04	0.96	14	14	0	1.00	1.00
BH13 (0.7-0.9)	29	29	0	1.00	1.00	16	16	0	1.00	1:00
BH13/D (0.7-0.9)	33	34	3	0.99	1.01	17	17	0	1.00	1.00
/	L	<u> </u>				i		1	1	
/				RSD (%)	, 3	······	·h		RSD (%)	3

Location			Lead			Nickel					
Number	Actual	Duplicate	RPD (%)	Norm, Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	
		/				1					
BH4 (0.45-0.6)	446	670	40	0.80	1.20	15	14	7	1.03	0.97	
BH11 (0.8-1.0)	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td>l</td><td></td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td>l</td><td></td><td></td><td></td><td></td></lor<>	0	1.00	1.00	l					
BH12/D (0.55-0.7)	14	15	7	0.97	1.03	14	12	15	1.08	0.92	
BH13 (0.7-0.9)	43	36	18	1.09	0.91	15	15	0	1.00	1.00	
BH13/D (0.7-0.9)	39	34	14	1.07	0.93	1	1				
	1						/	1			
				RSD (%)	11				RSD (%)	5	

Location			Mercury			Zinc				
Number	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm, Val.	Norm. Dup.
BH4 (0.45-0.6)	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td>280</td><td>270</td><td>4</td><td>1.02</td><td>0.98</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td>280</td><td>270</td><td>4</td><td>1.02</td><td>0.98</td></lor<>	0	1.00	1.00	280	270	4	1.02	0.98
BH11 (0.8-1.0)	<lor <lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td>9.8</td><td>10</td><td>2</td><td>0.99</td><td>1.01</td></lor<></td></lor<></lor 	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td>9.8</td><td>10</td><td>2</td><td>0.99</td><td>1.01</td></lor<>	0	1.00	1.00	9.8	10	2	0.99	1.01
BH12/D (0.55-0.7)	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td>28</td><td>32</td><td>13</td><td>0.93</td><td>1.07</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td>28</td><td>32</td><td>13</td><td>0.93</td><td>1.07</td></lor<>	0	1.00	1.00	28	32	13	0.93	1.07
BH13 (0.7-0.9)	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td>32</td><td>32</td><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td>32</td><td>32</td><td>0</td><td>1.00</td><td>1.00</td></lor<>	0	1.00	1.00	32	32	0	1.00	1.00
BH13/D (0.7-0.9)	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td>32</td><td>32</td><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td>32</td><td>32</td><td>0</td><td>1.00</td><td>1.00</td></lor<>	0	1.00	1.00	32	32	0	1.00	1.00
	RSD (%) 0				0				RSD (%)	3

Location			Cobalt			Selenium				
Number	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6)	8.0	7.6	5	1.03	0.97	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<>	0	1.00	1.00
BH12/D (0.55-0.7)	8.5	8.5	0	1.00	1.00	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<>	0	1.00	1.00
BH13 (0.7-0.9)	7.7	8.1	5	0.97	1.03	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<>	0	1.00	1.00
				RSD (%)	2	***********************		L.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	RSD (%)	0

Location			Manganes	e		Beryllium				
Number	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
								1		
BH4 (0.45-0.6)						1.2	1.2	0	1.00	1.00
BH12/D (0.55-0.7)	220	210	5	1.02	0.98	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<>	0	1.00	1.00
BH13 (0.7-0.9)	260	270	4	0.98	1.02	1.1	1.2	9	0.96	1.04
								1		
				RSD (%)	2			1		3

Franklin Street Bus Station

Summary of Quality Control Laboratory Replicates

Location		Ν	lolybdenu	m		Antimony				
Number	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6) BH12/D (0.55-0.7) BH13 (0.7-0.9)	<lor <lor <lor< td=""><td><lor <lor <lor< td=""><td>0 0 0</td><td>1.00 1.00 1.00</td><td>1.00 1.00 1.00</td><td><lor <lor <lor< td=""><td><lor <lor <lor< td=""><td>0 0 0</td><td>1.00 1.00 1.00</td><td>1.00 1.00 1.00</td></lor<></lor </lor </td></lor<></lor </lor </td></lor<></lor </lor </td></lor<></lor </lor 	<lor <lor <lor< td=""><td>0 0 0</td><td>1.00 1.00 1.00</td><td>1.00 1.00 1.00</td><td><lor <lor <lor< td=""><td><lor <lor <lor< td=""><td>0 0 0</td><td>1.00 1.00 1.00</td><td>1.00 1.00 1.00</td></lor<></lor </lor </td></lor<></lor </lor </td></lor<></lor </lor 	0 0 0	1.00 1.00 1.00	1.00 1.00 1.00	<lor <lor <lor< td=""><td><lor <lor <lor< td=""><td>0 0 0</td><td>1.00 1.00 1.00</td><td>1.00 1.00 1.00</td></lor<></lor </lor </td></lor<></lor </lor 	<lor <lor <lor< td=""><td>0 0 0</td><td>1.00 1.00 1.00</td><td>1.00 1.00 1.00</td></lor<></lor </lor 	0 0 0	1.00 1.00 1.00	1.00 1.00 1.00
				RSD (%)	0	·		·	RSD (%)	0

Location			Tin			Phenoi				
Number	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
							,			
BH4 (0.45-0.6)	28	26	7	1.04	0.96	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<>	0	1.00	1.00
BH12/D (0.55-0.7)	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td><lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td><lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<></td></lor<>	0	1.00	1.00	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<>	0	1.00	1.00
BH13 (0.7-0.9)	2.8	2.6	7	1.04	0.96	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<>	0	1.00	1.00
		** *********************************	******	RSD (%)	3		I	•••••••	RSD (%)	0

Location			PAH			Benzo(a)pyrene				
Number	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4/D (0.45-0.6) BH13 (0.7-0.9) BH15/D (0.7-0.85)	<lor <lor< td=""><td><lor 1.4</lor </td><td>0</td><td>1.00</td><td>1.00</td><td><lor <lor <lor< td=""><td><lor 0.1 <lor< td=""><td>0</td><td>1.00 1.00</td><td>1.00 1.00</td></lor<></lor </td></lor<></lor </lor </td></lor<></lor 	<lor 1.4</lor 	0	1.00	1.00	<lor <lor <lor< td=""><td><lor 0.1 <lor< td=""><td>0</td><td>1.00 1.00</td><td>1.00 1.00</td></lor<></lor </td></lor<></lor </lor 	<lor 0.1 <lor< td=""><td>0</td><td>1.00 1.00</td><td>1.00 1.00</td></lor<></lor 	0	1.00 1.00	1.00 1.00
				RSD (%)	0		••••••	•••••	RSD (%)	0

Location			TPH			BTEX				
Number	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6) BH12/D (0.55-0.7) BH15/D (0.7-0.85)	⁻ <lor <lor< td=""><td><lor <lor< td=""><td>0</td><td>1.00</td><td>1.00 1.00</td><td><lor <lor< td=""><td><lor <lor< td=""><td>0 0</td><td>1.00 1.00</td><td>1.00 1.00</td></lor<></lor </td></lor<></lor </td></lor<></lor </td></lor<></lor 	<lor <lor< td=""><td>0</td><td>1.00</td><td>1.00 1.00</td><td><lor <lor< td=""><td><lor <lor< td=""><td>0 0</td><td>1.00 1.00</td><td>1.00 1.00</td></lor<></lor </td></lor<></lor </td></lor<></lor 	0	1.00	1.00 1.00	<lor <lor< td=""><td><lor <lor< td=""><td>0 0</td><td>1.00 1.00</td><td>1.00 1.00</td></lor<></lor </td></lor<></lor 	<lor <lor< td=""><td>0 0</td><td>1.00 1.00</td><td>1.00 1.00</td></lor<></lor 	0 0	1.00 1.00	1.00 1.00
	ł –			RSD (%)	0				RSD (%)	0

Location	OCPs						OPPS				
Number	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	
BH13 (0.7-0.9)	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td><lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td><lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<></td></lor<>	0	1.00	1.00	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<>	0	1.00	1.00	
				RSD (%)	0		*** ** * *** - *** - *** - *** ***		RSD (%)	0	

Location ··· = ·	C	hiorinated	Hydrocar	bons (VOC	(s)	PCBs (A1260)				
Number	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH15/D (0.7-0.85) BH7 (0.4-0.55)	<lor <lor< td=""><td><lor <lor< td=""><td>0 0</td><td>1.00 1.00</td><td>1.00 1.00</td><td><lor< td=""><td><lor< td=""><td>.0</td><td>1.00</td><td>1.00</td></lor<></td></lor<></td></lor<></lor </td></lor<></lor 	<lor <lor< td=""><td>0 0</td><td>1.00 1.00</td><td>1.00 1.00</td><td><lor< td=""><td><lor< td=""><td>.0</td><td>1.00</td><td>1.00</td></lor<></td></lor<></td></lor<></lor 	0 0	1.00 1.00	1.00 1.00	<lor< td=""><td><lor< td=""><td>.0</td><td>1.00</td><td>1.00</td></lor<></td></lor<>	<lor< td=""><td>.0</td><td>1.00</td><td>1.00</td></lor<>	.0	1.00	1.00
	· ·		•	RSD (%)	0			••••••••••	RSD (%)	0

Location			pH					Cresols		
Number	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH18 (0.4-0.5)	9	9.4	0	1.00	1.00	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<>	0	1.00	1.00
				RSD (%)	0				RSD (%)	0

Franklin Street Bus Station

Summary of Quality Control Field Duplicates

Location	Arsenic					Cadmium				
Number	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6) BH12 (0.55-0.7) BH13 (0.7-0.9) BH15 (0.7-0.85)	7.6 <lor 5.1 <lor< td=""><td>8.5 2.8 <lor 2.8</lor </td><td></td><td>0.94</td><td>1.06</td><td><lor <lor <lor <lor< td=""><td><lor <lor <lor <lor< td=""><td>0 0 0 0</td><td>1.00 1.00 1.00 1.00</td><td>1.00 1.00 1.00 1.00</td></lor<></lor </lor </lor </td></lor<></lor </lor </lor </td></lor<></lor 	8.5 2.8 <lor 2.8</lor 		0.94	1.06	<lor <lor <lor <lor< td=""><td><lor <lor <lor <lor< td=""><td>0 0 0 0</td><td>1.00 1.00 1.00 1.00</td><td>1.00 1.00 1.00 1.00</td></lor<></lor </lor </lor </td></lor<></lor </lor </lor 	<lor <lor <lor <lor< td=""><td>0 0 0 0</td><td>1.00 1.00 1.00 1.00</td><td>1.00 1.00 1.00 1.00</td></lor<></lor </lor </lor 	0 0 0 0	1.00 1.00 1.00 1.00	1.00 1.00 1.00 1.00
		<u>I</u>		RSD (%)	8	-	i		RSD (%)	0

Location	Chromium				- Copper					
Number	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6)	31	26	18	1.09	0.91	32	34	6	0.97	1.03
BH12 (0.55-0.7)	29	28	4	1.02	0.98	10	14	33	0.83	1.17
BH13 (0.7-0.9)	29	33	13	0.94	1.06	16	17	6	0.97	1.03
BH15 (0.7-0.85)	26	28	7	0.96	1.04	9.9	16	47	0.76	1.24
		/l		RSD (%)	6	•••••••••••••••••••••••	<u>.</u>		RSD (%)	16

Location	Mercury									
Number	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.					
BH4 (0.45-0.6)	<lor< td=""><td>1.6</td><td>0</td><td>1.00</td><td>1.00</td></lor<>	1.6	0	1.00	1.00					
BH12 (0.55-0.7)	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<>	0	1.00	1.00					
BH13 (0.7-0.9)	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<>	0	1.00	1.00					
BH15 (0.7-0.85)	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<>	0	1.00	1.00					
		/		RSD (%)	0					

Location	Lead					Zinc				
Number	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
		440		1.01	0.00	200				
BH4 (0.45-0.6)	446	440	1	1.01	0.99	280	270	4	1.02	0.98
BH12 (0.55-0.7)	11	14	24	0.88	1.12	17	28	49	0.76	1.24
BH13 (0.7-0.9)	43 ·	39	10	1.05	0.95	32	32	0	1.00	1.00
BH15 (0.7-0.85)	11	15	31	0.85	1.15	14	26	60	0.70	1.30
			1							
				RSD (%)	11			•••••	RSD (%)	21

Location	Total PAHs					Benzo(a)pyrene				
Number	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6) BH12 (0.55-0.7)	<lor <lor< td=""><td><lor <lor< td=""><td>0 0</td><td>1.00 1.00</td><td>1.00 1.00</td><td>0.1 <lor< td=""><td><lor <lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></lor </td></lor<></td></lor<></lor </td></lor<></lor 	<lor <lor< td=""><td>0 0</td><td>1.00 1.00</td><td>1.00 1.00</td><td>0.1 <lor< td=""><td><lor <lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></lor </td></lor<></td></lor<></lor 	0 0	1.00 1.00	1.00 1.00	0.1 <lor< td=""><td><lor <lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></lor </td></lor<>	<lor <lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></lor 	0	1.00	1.00
				RSD (%)	0				RSD (%)	0

Note:

Where only one result is below the limit of reporting the RPDs can not be calculated

Communications Document

PROJECT	Notificati	on of Request la					
	85 - 129	Franklin Street,	Adelaide (Bu	s Station Site)			ADELAIDE TONKIN CONSULTING
JOB NO	2004.042	21	DATE	24/06/04	TIME	11:28	5 COOKE TERRACE
SCNDER	Mr Andre	ew Nunn					WAYVILLE &A 5034 T +61 8 8279 3100
то	EPA						F +61 5 5273 3110 E adalaide@tonkin.com.au
ATTENTION	Mr Mike	Fanning / Ms	Wendy Boyc	:e			
ADDRESS	±						MOUNT GAMBIER
FACSIMILE NO	8204 202	25	PAGES	2			
<u>cc</u>							MOUNT GAMBIER SA 5290
🗆 мемо							PO BOX 1192 MOUNT GAMBIER SA 6291
THESE MATTER	S FOR YOUR					OVAL	T +61 8 8723 5002
	VERY					ECTION	F +61 8 8723 5004 E mtgamblor@tonkin.com.au

Dear Mike / Wendy,

I, Andrew Nunn, a person appointed as an Environmental Auditor (Contaminated Land) by the Environmental Protection Authority under Section 53 of the *Environmental Protection Act 1970 (Vic)*, have been requested to prepare a Site Audit Report for the above site. Details are as follows;

Person requesting Site Audit Report:	Adelaide City Council
Relationship to site:	Owner
Date of request:	8 th June 2004
Site address:	85 – 129 Franklin Street, Adelaide
Municipality:	Adelaide City Council
Title details:	See table attached (Page 2)
Site plan attached:	No – Will Follow Shortly
Estimated completion date:	30 th June 2009

In notifying EPA of this request, I state that I am not aware of any conflict of interest, and I have not had prior involvement in assessment or clean-up works at the site, which would preclude me from preparing a Site Audit Report for the site.

	•			
HANSMIT NO	SENT BY	C DATE	TIME	

NOTE. The lateralism in this passage measage is confidential and may be legally schileged. If the reader of this measage is not the intended resiptent you are hardby realized that any use, distemination, distribution of reproduction of this measage by you or of your insignilion is prohibited. If you have readered this measage is error please relify as tamediately and return the original measage to use.

T & R NOMINEES FTY LTD ACH DO7 DOU DED AS TRUSTLEE FOR T & R UNIT TRUDT ASH \$5 GED \$62 \$31 TRADING AD TONKIN CONCULTING AND JONED TONKIN -MEMBERS AE THE ASSAULTETADO AS AMERICA THES FRICINEFER ALKER ALL AT ALL A

- D CIVIL INFRASTRUCTURE
- LI ENVIRONMENTAL
- D WATER RESOURCES
- D STORMWATER MANAGEMENT
- CI ROAD SAFETY AND TRAFFIC
- D BUILDING SURVEYING
- D ELECTRICAL, MECHANICAL

•



I wish to note that I have discussed with Mike Fanning of SA EPA (17 June 2004) the reasons for the delay in formal notification of my engagement to undertake an audit.

Should you have any queries, please do not hesitate to contact me on 8431 7113.

Yours sincerely, Andrew Nunn

Environmental Auditor (Contaminated Land)

Certificate	Land Title Details	Site Area
of Title		(approx m2)
	Eastern Site of Bowen Street	
226/124	Town Acre 263	1983.80
1639/119	Town Acre 310	2760.50
1663/99	Town Acre 309	83.6
1751/37	Town Acre 311	648.8
1922/48	Town Acre 263	986.26
5060/608	A 1 DP 32560	580.00
5317/61	A 12 DP 546	149.6
5317/62	A 91 FP 166443	348.69
5317/63	A 92 FP166444	271.50
6317/64	A 93 FP 166445	526.90
5317/65	A 91 FP 170401	816.37
	Western Side of Bowen Street	
2023/96	Town Acre 311	260.87
2128/45	Town Acre 311	257.80
2201/187	Town Acre 311	259.70
3479/180	Town Acres 261 & 262	1744.00
3582/78	Town Acre 261	509.7
3582/79	Town Acre 262	490.04
3582/80	Town Acres 261 & 262	1122.90
3841/122	LTRO Plan 546	340.6





CENTRAL WEST PRECINCT

BUS STATION SITE – STAGE 1

30 NOVEMBER 2006

DOC. REF: SG041157 RP01 REVISION 0

FOR

ADELAIDE CITY COUNCIL



SOIL & GROUNDWATER CONSULTING

207 The Parade Norwood SA 5067 • PO Box 3166 Norwood SA 5067 T: + 61 8 8431 7113 • F: + 61 8 8431 7115 ACN 100 220 479 • ABN 62 100 220 479



14851

. .

> Received 8/12/06Doc. No. 05/06/4455File No. 05/1000Response / / Return to To R. Hughes



EXECUTIVE SUMMARY

I, Mr Andrew Nunn of Soil and Groundwater Pty Ltd (S&G), a person appointed by the Victorian Environment Protection Authority ('Vic EPA') under the Environment Protection Act 1970 ('the Act') as an environmental auditor for the purposes of the Act, and endorsed by the South Australian Environment Protection Authority ('SA EPA') under the direction of Special Bulletin No 1 dated 20 October 1995 as an Environmental Auditor in the State of South Australia, having:

- been requested by Mr Matthew Rodda of Adelaide City Council to prepare a Site Audit Report for Stage 1 of the Bus Station Development site as identified by the following Certificates of Title: Volume 5523 Folio 576, Allotment 91; Volume 5317 Folio 62, Allotment 91; Volume 5960 Folio 473, Allotment 12; Volume 5317 Folio 64, Allotment 93; Volume 5317 Folio 63, Allotment 92; Volume 5060, Folio 608, Allotment 1; Volume 5728 Folio 566, Allotment 94; Volume 5833 Folio 247, Allotment 96; Volume 5712 Folio 545, Allotment 97 and Volume 5735 Folio 127, Allotment 93 located between Franklin, Bowen and Grote Streets, Adelaide, South Australia (Refer to Appendix A).
- 2. had regard to, among other things:
 - a. the uses that may be made of the site;
 - b. relevant State legislation;
 - c. documentation regarding the assessment of the site
 - d. guidelines issued by the South Australian Environment Protection Authority, including:
 - SA EPA Special Bulletin No 1 "The Use of Environmental Auditors: Contaminated Land", October 1995;
 - SA EPA, "Guidance Notes to Environmental Auditors for Audits Undertaken in South Australia", 31 March 1999;
 - Planning SA, "Site Contamination", Planning Circular No. 20, December 2001; and
 - SA EPA Environment Protection (Water Quality) Policy, 2003.
- 3. completed a Site Audit Report contained within this document.

HEREBY STATE that I am of the opinion that:

- The condition of the land at the site with respect to possible chemical contamination is suitable for commercial / industrial and open space use consistent with the development plan attached, subject to the following conditions:
 - 1. Soils requiring management measures remain on-site at two locations (Area 1 and Area 2). This report includes a survey plan showing the location of Areas 1 and 2, a copy of which is provided as Figure 9. To restrict exposure of site users to these soils, a Site Management Plan has been prepared for future activities which may expose site users to these soils. The Auditor has reviewed the Site Management Plan, a copy of which is provided as Appendix G of this report. It is the responsibility of the current or future land owners to implement the management conditions relating to the site in accordance with the Site Management Plan.

The following general comments should be considered with respect to future use of the site

- Specialist advice should be sought in determining the geotechnical suitability of any fill material for its intended purpose;
- If excavation or other activities are undertaken generating surplus soils requiring off-site disposal, the waste soils must be managed in accordance with relevant EPA guidelines; and
- Any materials imported to site should comply with the National Environment Protection (Assessment of Site Contamination) Measure, 1999, Environmental Investigation Levels (Interim Urban).

This executive summary forms part of the report "Site Audit Report, Central West Precinct, Bus Station Site - Stage 1" Report No: SG041157 RP01, dated 30 November 2006). Further details regarding the condition of the site may be found in the Site Audit Report.

DATED:

SIGNED:

DECEMBER 2006

Mr Andrew Nunn Environmental Auditor (Contaminated Land)







For a Cortificate of Title issued pursuant to the Real Property Act 1886

CT 5317/65 RT 8246071 15/04/1998

٦.

REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5523 FOLIO 576 *

COST	:	\$16.10	(GST exe	mpt (}	PARENT TITLE	:
REGION	:	GROUND	FLOOR. L	.τ.ο.	- LGHP12	AUTHORITY	:
AGENT	:	GRFL	BOX NO :	000		DATE OF ISSUE	I
SEARCHEI	D	ON : 04	1/12/2006	AT :	15:13:24	EDITION	:

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 91 FILED PLAN 170401 IN THE AREA NAMED ADELAIDE HUNDRED OF ADELAIDE

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

NIL

NOTATIONS

DOCUMENTS AFFECTING THIS TITLE

NIL

REGISTRAR-GENMRAL'S NOTES

PLAN FOR LEASE PURPOSES GP 521/95 WITH NEXT DEALING LODGE CT 5317/65 THIS TITLE ISSUED VIDE 8246071 AMENDMENT TO DIAGRAM VIDE 10378611

END OF TEXT.

Page 1 of 2 The Registrar-General certifies that this Title Register Search displays the records maintained in the Register Book and other notations at the time of searching

Registrar-General

DIAGRAM FOR CERTIFICATE OF TITLE VOLUME 5523 FOLIO 576 SEARCH DATE : 04/12/2006 TIME: 15:13:24



0 4 8 12 16 Metres

Page 2 of 2

1.

CERTIFICATE OF TITLE

REAL PROPERTY ACT, 1886



VOLUME 5317 FOLIO 62 Edition 2 Date Of Issue 05/01/1996 Authority CD 6987000

South Australia

I certify that the registered proprietor is the proprietor of an estate in fee simple (or such other estate or interest as is set forth) in the land within described subject to such encumbrances, liens or other interests set forth in the schedule of endorsements.

REGISTRAR-GENERAL

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 91 FILED PLAN 166443 IN THE AREA NAMED ADELAIDE HUNDRED OF ADELAIDE

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

8003092 LEASE TO GREYHOUND PIONEER PTY. LTD. COMMENCING ON 23.2.1995 AND EXPIRING ON 18.10.2001





Note : Subject to all lawfully existing plans of division PAGE 2 OF 2



REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5960 FOLIO 473

COST :	\$16.10 (GST exempt)
REGION :	GROUND FLOOR, L.T.O LGHP12
AGENT :	GRFL BOX NO : 000
SEARCHED	ON : 04/12/2006 AT : 15:13:26

PARENT TITLE : CT 5317/61 AUTHORITY : N 10378611 DATE OF ISSUE : 21/03/2006 EDITION : 1

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND (ROAD)

ALLOTMENT 12 DEPOSITED PLAN 546 IN THE AREA NAMED ADELAIDE ININDRED OF ADELAIDE

BEING A PUBLIC ROAD

FASEMENTS

_____′

 \mathtt{NIL}

SCHEDULE OF ENDORSEMENTS

NIL

NOTATIONS

_ _ _ _ _ _ _

DOCUMENTS AFFECTING THIS TITLE

REGISTRAR-GENERAL'S NOTES

NIL

END OF TEXT.

Page 1 of 1 The Registrar-General certifies that this Title Register Search displays the records maintained in the Register Book and other notations at the time of searching.

Register-General

CERTIFICATE OF TITLE

REAL PROPERTY ACT, 1886



VOLUME 5317 FOLIO 64 Edition 2 Date Of Issue 05/01/1996 Authority CD 6987000

South Australia

I certify that the registered proprietor is the proprietor of an estate in fee simple (or such other estate or interest as is set forth) in the land within described subject to such encumbrances, liens or other interests set forth in the schedule of endorsements.

REGISTRAR-GENERAL TH AUSTE

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 93 FILED PLAN 166445 IN THE AREA NAMED ADELAIDE HUNDRED OF ADELAIDE

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

8003092 LEASE TO GREYHOUND PIONEER PTY. LTD. COMMENCING ON 23.2.1995 AND EXPIRING ON 18.10.2001 This plan is scanned for Certificate of Title 2762/199



D.P. 32560



Note : Subject to all lawfully existing plans of division PAGE 2 OF 2

CERTIFICATE OF TITLE

REAL PROPERTY ACT. 1886



South Australia

VOLUME 5317 FOLIO 63 **Edition 2** Date Of Issue 05/01/1996

Authority CD 6987000

I certify that the registered proprietor is the proprietor of an estate in fee simple (or such other estate or interest as is set forth) in the land within described subject to such encumbrances, liens or other interests set forth in the schedule of endorsements.

AUSTRE AUSTRE **REGISTRAR-GENERAL**

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 92 FILED PLAN 166444 IN THE AREA NAMED ADELAIDE HUNDRED OF ADELAIDE

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

LEASE TO GREYHOUND PIONEER PTY. LTD. COMMENCING ON 23.2.1995 AND 8003092 EXPIRING ON 18.10.2001

This plan is scanned for Certificate of Title 161/121



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Note : Subject to all lawfully existing plans of division PAGE 2 OF 2



REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5060 FOLIO 608 *

COST : \$16.10 (GST exempt) REGION : GROUND FLOOR, L.T.O. - LGHP12 AUTHORITY : CONVERTED TITLE AGENT : GRFL BOX NO : 000 SEARCHED ON : 04/12/2006 AT : 15:13:29

PARENT TITLE : CT 4391/861 DATE OF ISSUE : 20/01/1992 EDITION : 2

REGISTERED PROPRIETOR IN FEE SIMPLE _____

THE CORPORATION OF THE CITY OF ADELAIDE OF TOWN HALL ADELAIDE SA 5000

DESCRIPTION OF LAND _____

> ALLOTMENT & DEPOSITED PLAN 32560 IN THE AREA NAMED ADELAIDE HUNDRED OF ADELAIDE

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

NIL

NOTATIONS -----

> DOCUMENTS AFFECTING THIS TITLE _____ NTT.

REGISTRAR-GENERAL'S NOTES

NIL

END OF TEXT.

Page 1 of 2 The Registrar-General certifies that this Title Register Search displays the records maintained in the Register Book and other notations at the time of searching.



DIAGRAM FOR CERTIFICATE OF TITLE VOLUME 5060 FOLIO 608 SEARCH DATE : 04/12/2006 TIME: 15:13:29



0 7.5 15 22.5 30 Metres

Page 2 of 2



For a Certificate of Title issued pursuant to the Real Property Act 1886

REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5728 FOLIO 566

COST :	:	\$16.10	(GST exempt)	
REGION :	:	GROUND	FLOOR, L.T.O LGHP12	
AGENT :	:	GRFL	BOX NO : 000	
SEARCHE	כ	ON : 04	/12/2006 AT : 15:13:32	

PARENT TITLE : CT 1751/37 AUTHORITY : CONVERTED TITLE DATE OF ISSUE : 27/01/2000 EDITION : 1

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 94 FILED PLAN 199651 IN THE AREA NAMED ADELAIDE HUNDRED OF ADELAIDE

EASEMENTS

. - - - - -

NIL

SCHEDULE OF MNDORSEMENTS

NTL

NOTATIONS -----

DOCUMENTS AFFECTING THIS TITLE NIL

REGISTRAR-GENERAL'S NOTES

__________ APPROVED FILED PLAN NO UNIQUE IDENTIVIER FX27788

CONVERTED TITLE WITH NEXT DEALING LODGE CT 1751/37

END OF TEXT.

Page 1 of 2 The Registrar-General certifies that this Title Register Search displays the records maintained in the Register Book and other notations at the time of searching.

Registrer-Gonomi (

DIAGRAM FOR CERTIFICATE OF TITLE VOLUME 5728 FOLIO 566

SEARCH DATE: 04/12/2006 TIME: 15:13:32

THIS PLAN IS SCANNED FOR CERTIFICATE OF TITLE 1751/37





NOTE: SUBJECT TO ALL LAWFULLY EXISTING PLANS OF DIVISION

Page 2 of 2



For a Certificate of Title issued pursuant to the Real Property Act 1886

REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5833 FOLIO 247

COST :	\$16.10 (GST exempt)
REGION :	GROUND FLOOR, L.T.O LGHP12
AGENT :	GRFL BOX NO : 000
SEARCHED	ON : 04/12/2006 AT : 15:13:38

PARENT TITLE : CT 226 /124 AUTHORITY : CONVERTED TITLE DATE OF ISSUE : 11/01/2001 EDITION : 1

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 96 FILED PLAN 199653 IN THE AREA NAMED ADELAIDE HUNDRED OF ADELAIDE

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

NIL

NOTATIONS

DOCUMENTS AFFECTING THIS TITLE

NIL

REGISTRAR-GENERAL'S NOTES

APPROVED WILED PLAN NO UNIQUE IDENTIFIER FX27788 CONVERTED TITLE-WITH NEXT DEALING LODGE CT 226/124

END OF TEXT'.

Page 1 of 2 The Registrar-General certifies that this Title Register Search displays the records maintained in the Register Book and other potations at the time of searching

Registrar-Goneral

DIAGRAM FOR CERTIFICATE OF TITLE VOLUME 5833 FOLIO 247

SEARCH DATE : 04/12/2006 TIME: 15:13:38

THIS PLAN IS SCANNED FOR CERTIFICATE OF TITLE 226/124





NOTE: SUBJECT TO ALL LAWFULLY EXISTING PLANS OF DIVISION

Page 2 of 2



For a Cartificate of Title issued pursuant to the Real Property Act 1886

REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5712 FOLIO 545 *
COST: \$16.10 (GST exempt)PARENT TITLE: CT 1922/48REGION : GROUND FLOOR, L.T.O LGHP12AUTHORITY: CONVERTED TITLEAGENT : GRFL BOX NO : 000DATE OF ISSUE: 22/11/1999SEARCHED ON : 04/12/2006 AT : 15:13:44EDITION: 1
REGISTERED PROPRIETOR IN FEE SIMPLE
THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001
DESCRIPTION OF LAND
ALLOTMENT 97 FILED PLAN 199654 IN THE AREA NAMED ADELAIDU HUNDRED OF ADELAIDE
EASEMENTS
NIL
SCHEDULE OF ENDORSEMINTS
NIL
NOTATIONS
DOCUMENTS AN FECTING THIS TITLE
NIL
REGISTRAR GENERAL'S NOTES
APPROVED FILED PLAN NO UNIQUE IDENTIFIER FX27788 CONVERTED TITUE-WITH NEXT DEALING LODGE CT 1922/48

END OF TEXT.

Page 1 of 2 The Registrar-General certifies that this Title Register Search displays the records maintained in the Register Book and other notations at the time of searching



DIAGRAM FOR CERTIFICATE OF TITLE VOLUME 5712 FOLIO 545

SEARCH DATE : 04/12/2006 TIME: 15:13:44

THIS PLAN IS SCANNED FOR CERTIFICATE OF TITLE 1922/48







NOTE: SUBJECT TO ALL LAWFULLY EXISTING PLANS OF DIVISION

Page 2 of 2



LANDS TITLES OFFICE, ADELAIDE

For a Certificate of Title issued pursuant to the Real Property Act 1886

REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5735 FOLIO 127

COST	:	\$16.10 (GST exempt)	
REGION	:	GROUND FLOOR, L.T.O LGHP12	
AGENT	:	GRFL BOX NO : 000	
SEARCHEI	D	ON : 04/12/2006 AT : 15:13:48	

PARENT TITLE : CT 1639/119 AUTHORITY : CONVERTED TITLE DATE OF ISSUE : 17/02/2000 EDITION : 1

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 AUELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 93 FILED PLAN 199650 IN THE AREA NAMED ADELAIDE HUNDRED OF ADELAIDE

EASEMENTS

NTL

SCHUDULE OF ENDORSEMENTS

NIL

NOTATIONS

DOCUMENTS AFFECTING THIS TITLE

REGISTRAR-GENERAL'S NOTES

APPROVED FILED PLAN NO UNIQUE IDENTIFIER FX27788 CONVERTED TITLE-WITH NEXT DEALING LODGE CT 1639/119

END OF TEXT.

Page 1 of 2 The Registrar-General certifies that this Title Register Search displays the records maintained in the Register Book and other notations at the time of searching

Registrar-General

DIAGRAM FOR CERTIFICATE OF TITLE VOLUME 5735 FOLIO 127

TA 263

93

SEARCH DATE: 04/12/2006 TIME: 15:13:48

PT TA

310

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THIS PLAN IS SCANNED FOR CERTIFICATE OF TITLE 1689/119



TA

309

211'6.

DISTANCES ARE IN FEET AND INCHES FOR METRIC CONVERSION 1 FOOT = 0-3048 METRES 1 INCH = 0-0254 METRES

NOTE: SUBJECT TO ALL LAWFULLY EXISTING PLANS OF DIVISION

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535

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Appendix A	Certificates of Title / Development Plan
Appendix B	BC Tonkin and Associates Audit Report (incorporating Rusk PPK Site History Report and Rust PPK Environmental Site Assessment)
Appendix C	Maunsell Soil and Groundwater Investigation Report
Appendix D	Tierra Additional Investigations
Appendix E	Tierra Remediation Report
Appendix F	Groundwater Database Search Results
Appendix G	Tierra Site Management Plan

DOCUMENT INFORMATION

Rev.	Status	Date	Company	Name
0 Final		inal 30 November 2006	Adelaide City Council	Mr Matthew Rodda
			Soil and Groundwater Consulting	File
	Final		Adelaide City Council	Planning Department
			Environment Protection Authority	Ms Rebecca Hughes



1. INTRODUCTION

1.1 Background Information

Mr Andrew Nunn is an appointed Environmental Auditor under Section 53(S) of the Victorian *Environment Protection Act* 1970 and is endorsed by the South Australian Environment Protection Authority ('SA EPA') under the direction of Special Bulletin No 1 dated 20 October 1995 as an Environmental Auditor in the State of South Australia.

Mr Nunn was requested to undertake an environmental audit of the site identified by various Certificates of Title as detailed in Table 1. The site subject to audit is described in the Franklin Street Bus Station Development Boundary Coordinates prepared by Alexander Symonds (Ref: A078106.00) provided as Figure 1.

The site is located between Franklin and Grote Streets in the Adelaide CBD and is known as Stage 1 Bus Station Site of the Central West Precinct development being undertaken by the Adelaide City Council. Stage 1 is currently vacant and the proposed use of the land is for a new bus station development comprising bus parking bays, a passenger terminal, a retail building and a paved plaza area. It is noted that the existing Church of Christ building is currently located adjacent to the Stage 1 site area however, does not form part of the Audit Site. The site subject to audit is provided in Figure 1 and the relevant Certificates of Title and the proposed development plan are provided as Appendix A.

This report details the outcome of the environmental audit of the subject site and relevant details associated with the audit are presented in Table 1.

Category	Details
Name of Auditor	Mr Andrew Nunn
Term of Appointment	Initial Appointment 16 th April 2001 Current appointment to 29 th July 2008
Person and Organisation requesting Audit	Mr Matthew Rodda of Adelaide City Council
Date Environmental Audit Requested	8 June 2004
Site Address	85-107 Franklin Street 2-40 Bowen Street 84-94 Grote Street 102-106 Grote Street
Property Description	Allotment 91, Certificate of Title Volume 5523 Folio 576 Allotment 91, Certificate of Title Volume 5317 Folio 62 Allotment 12, Certificate of Title Volume 5960 Folio 473 Allotment 93, Certificate of Title Volume 5317 Folio 64 Allotment 92, Certificate of Title Volume 5317 Folio 63 Allotment 1, Certificate of Title 5060 Folio 608 Allotment 94, Certificate of Title 5728 Folio 566 Allotment 96, Certificate of Title 5833 Folio 247 Allotment 97, Certificate of Title 5712 Folio 545 Allotment 93, Certificate of Title 5735 Folio 127

Table 1 – Summary of Audit Information


Category	Details
Site Area	Approximately 9,156 m ²
Current Site Zoning	F8 Franklin Street East Precinct
Local Government Authority	Adelaide City Council
Current Site Owner	Adelaide City Council
Current Site Use	Vacant
Completion Date of Audit	30 November 2006
Primary Assessment Consultants	Rust PPK Pty Ltd Maunsell Australia Pty Ltd Tierra Environment Pty Ltd

1.2 Guidance Documents

Based on our understanding of SA EPA requirements regarding the undertaking of Environmental Audits in South Australia, the audit should follow the approach outlined in the National Environment Protection (Assessment of Site Contamination) Measure 1999.

The National Environment Protection Measure (NEPM) for the assessment of the site contamination was issued by the Commonwealth Government under Section 14 of the National Environment Protection Council Act 1994. This Measure is to be implemented by the laws and other arrangements participating jurisdictions consider necessary. Accordingly, the Measure (and its relevant guidelines) is taken into account as necessary when reviewing site assessment information and completing environmental audits.

In addition, a number of other guidelines should also be considered. These include:

- ANZECC/NHMRC, 1992. Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites. Australian and New Zealand Environment and Conservation Council/National Health and Medical Research Council.
- EPA, 1995. The Use of Environmental Auditors: Contaminated Land. Special Bulletin No.1. 20 October 1995.
- EPA, 1999. Guidance Notes to Environmental Auditors for Audits Undertaken in South Australia. 31 March 1999.
- EPA, 2003. Guidance Letter to Environmental Consultants undertaking the Assessment of Site Contamination in SA for a site proposed for a sensitive land use. 3 April 2003.
- EPA, 2003. Letter to all Planning Authorities on Site Contamination. 15 May 2003.
- Planning SA, 2001. Advisory Notice Planning 20 Site Contamination. December 2001
- Standards Australia, 1997. Australian Standard, Guide to the sampling and investigation of potentially contaminated soil (Part 1: Non-volatile and semi-volatile compounds).



- Standards Australia, 1999. Australian Standard, Guide to the sampling and investigation of potentially contaminated soil (Part 2: Volatile substances).
- SA EPA Composite soil sampling: site contamination assessment and management. March 2005.
- ANZECC, 1999. Guidelines for the Assessment of On-site Containment of Contaminated Soil.



2. REVIEW OF ENVIRONMENTAL ASSESSMENT WORK COMPLETED

2.1 Documentation Reviewed

The documents reviewed for the purposes of this audit were as follows:

- Rust PPK Pty Ltd. March 1997. Site History Report for the Franklin Street Bus Station. 85-129 Franklin Street, Adelaide.
- Rust PPK Pty Ltd. June 1997. Environmental Site Assessment. Franklin Street Bus Station and Car Parks.
- BC Tonkin & Associates. July 1997. Site Audit Report. Franklin Street Bus Station and Car Parks. A complete copy of this Audit Report and the Rust PPK Assessment Reports are provided as Appendix B of this report.
- Maunsell Australia Pty Ltd. November 2004. Soil and Groundwater Investigation Central West Precinct. Franklin Street Bus Station and Car Parks. A complete copy of this report is provided as Appendix C of this report.
- Tierra Environment. 26 July 2005. Balfours and Bus Stations Redevelopment. Additional Investigations, Bus Station Site. A complete copy of this report is provided as Appendix D of this report.
- Tierra Environment. 20 September 2006. Central West Precinct, Remediation Report. Bus Station Site – Stage 1. A complete copy of this report is provided as Appendix E of this report.
- Tierra Environment. 16 November 2006. Central West Precinct, Site Management Plan, Bus Station Site, Stage 1 Remediation. A complete copy of this report is provided as Appendix G of this report.

2.2 Site Description

The site subject to audit is irregular in shape and comprises several parcels of land located between Franklin Street and Grote Streets to the east of Bowen Street. The site comprises an area of approximately 9,000 m² and the redevelopment of the site incorporated the relocation of Bowen Street further east of its original location and the removal of all fill materials across the entire surface of the audit site until natural underlying materials were exposed. The existing Church of Christ building is located along Grote Street between the eastern and western portion of the site. The Church is not included as part of the current environmental audit of the site.

The Auditor and his representatives have undertaken numerous inspections of the site over the duration of the assessment and remediation works. The site is currently vacant and all buildings and associated car parking areas have been cleared to expose natural underlying soils.



The site is bounded by Franklin Street to the north, the former Bowen Street to the west, the Church of Christ and Grote Street to the south and commercial properties to the east.

2.3 Former Site Status

The site was previously occupied by the following:

- The Greyhound and McCafferty's Express bus terminals and canopy on the north eastern side of Bowen Street adjoining Franklin Street.
- A single storey house, a private car park, a toilet block and a two storey building and associated car parking facilities. This area of the site located along the south eastern portion of Bowen Street was utilised by the Adelaide City Mission.
- Two public car parks, the Grote Street Car Park and the Franklin Street Car Park comprised the eastern portion of the site.

2.4 Site History Review

A site history review was undertaken by Rust PPK in March 1997 and included a site inspection, a historical title search, a review of the Adelaide City Council archives and an aerial photograph search (between 1949 and 1995). The site history review provided the following general information:

- From 1850 until the early 1900s, the land was generally used for residential purposes and some shops, a bakehouse and a private road.
- In 1900 the eastern side of Bowen Street comprised private premises, comprising a number of residential properties, some vacant land, shops, a bakehouse (off Franklin Street) and the United Disciples Church.
- From the 1920s various small light industries were established on the site which included a garage, workshop, stables, forge, showroom, houses, a plumber, a welder and radio and electrical companies, shops and offices.
- The Corporation of the City of Adelaide had acquired most of the land on the eastern side of Bowen Street by 1972. The land was then cleared and by 1979 the bus terminal (Greyhound Pioneer Australia) and associated car parks had been constructed.
- A new terminal building (McCafferty's Express Coaches) was constructed on Bowen Street between 1989 and 1995, on what was previously either car or bus parking spaces.
- All buildings were demolished and associated car parking areas were cleared in 2006 and the site is currently vacant.



2.5 Potential for Contamination

The site history review identified the following potential sources of contamination as a result of past activities undertaken at the site:

- Polycyclic Aromatic Hydrocarbons (PAH) from the historical use of tarry based bitumen materials and from ash wastes associated with the burning of coal products.
- Organochlorine pesticides associated with the possible spraying of termite control substances underneath former buildings at the site.
- Total petroleum hydrocarbons (TPH) associated with the leakage of fuel and/or oil from parked vehicles.
- Various heavy metals associated with the importation of fill materials or the historical use of the site by various industries including, plumbers, welders and wreckers.

2.6 Geology and Hydrogeology

2.6.1 Geology and Site Soils

The Auditor referred to the Adelaide geological map sheet (1:50,000) prepared by the SA Department of Mines and Energy (1980) and the Soil Association Map of the Adelaide Region (1989) to characterise the regional geology. The site is underlain by Brown Solonized Soils comprising brown sandy to clayey soils with abundant earthy lime and calcrete in subsoil. The Brown Solonized soil layer generally comprises of a thickness up to 3 metres, this is underlain by Hindmarsh Clay which comprise mainly clays with lenses of fluvial sandy, silty, micaceous and gravelly materials.

The soil profile at the site, as identified through the investigation work completed by Rust PPK, Maunsell and Tierra is generally consistent with the regional geology. With the exception of fill and reworked natural materials present to a maximum depth of 1.5 metres below the site surface. Filling was encountered at most locations across the site. The underlying natural soils comprised brown to orange brown clays, light brown to cream sandy silty clay and light green/grey clays to depths of greater than 3.5 metres.

2.6.2 Hydrogeology

The Auditor conducted a search of the Department of Water, Land and Biodiversity Conservation groundwater database to determine the presence of licensed groundwater wells in the vicinity of the site. The search reported the presence of 103 wells within a 0.5 km radius of the site. The results of the groundwater database search are provided as Appendix F of this report.

The PIRSA data suggests that shallow groundwater in the vicinity of the site generally occurs at depths between 12.5 and 21 metres below ground. Standing water levels (SWL) ranged between 2.18 and 20 metres. TDS concentrations were reported to be between 882 and 2,00 mg/L, indicating that the groundwater was likely to be suitable for a variety of uses including potable.



The regional groundwater flow direction is anticipated to be in a westerly direction towards the Gulf St Vincent.

2.6.3 Nearest Surface Water Body

The nearest surface water body is the River Torrens and is located approximately 900 m north at its closest point to the site.



3. SOIL ASSESSMENT

3.1 Potential Land Use

In Victoria, the protected beneficial uses for the specific segments / land uses are outlined in the *State environmental protection policy, Prevention and Management of Contamination of Land* (No. S95, June 2002). In South Australia, the assessment and management of site contamination is generally covered by the *National Environment Protection (Assessment of Site Contamination) Measure* (NEPM, 1999). Based on these documents and with regard to the possible residential development of the site, the potential uses of the site considered in this audit are:

- Maintenance of Ecosystems (modified and highly modified);
- Human Health;
- Buildings and Structures;
- Aesthetics; and
- Production of food and flora.

On the basis of the proposed residential use of the site, the assessment includes the consideration of:

- Ecological impacts with respect to contaminant effects on plants;
- Human health issues associated with the chemical quality of the soils as a result of human contact with the soils or from vapours generated from the soils;
- Aesthetic considerations associated with the physical nature of the residual soils, including
 olfactory and visual impacts and the presence of anthropogenic materials such as building
 rubble and gravel; and
- Concentrations of contaminants (pH and sulphate) which may become corrosive to concrete structures.

3.2 Soil Guidelines

3.2.1 Ecological Screening Guidelines

Certain contaminants, for example heavy metals, are phytotoxic and human health based levels may not afford protection to some species of plants if grown on the site. In order to consider the potential for phytotoxicity, contaminant concentrations have been initially compared to the ecological investigation levels (EILs) presented in *Guideline on Investigation Levels for Soil and Groundwater, National Environment Protection (Assessment of Site Contamination) Measure* (NEPM) (NEPC, 1999).



The EILs provide guidelines for site assessment, as they are typically lower than the human health based guidelines and therefore provide a conservative assessment of the contamination status of the site soils. The Auditor considers that the EILs are appropriate for the assessment of this site.

For analytes for which ecological investigation levels have not been recommended by NEPM (1999), the environmental investigation guidelines presented in *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites*, (ANZECC/NHMRC, 1992) have generally been used.

The guidelines selected for Total Petroleum Hydrocarbons are the soil threshold concentrations for sensitive land use from the NSW EPA *Guidelines for Assessing Service Station Sites* (December, 1994).

Where guidelines are not available in the above publications, various recognised national and international references are used. The ANZECC 1992 guidelines recommend the use of the "Dutch B" guidelines that represent a level at which further consideration or action is required. The Dutch authorities have since adopted a modified series of guidelines (MHSPE, 2000) which incorporate only two values, a Reference or "Target" Value and "Intervention" Value (similar to the former Dutch A and Dutch C guidelines respectively). The average of the Target value and the Intervention value for some analytes is similar to the former B value and can be conveniently used as the investigation threshold. It should be noted that the Dutch values are based on Netherlands environmental and cultural factors and their relevance to Australian conditions has not been tested.

3.2.2 Human Health Guidelines

In 1996, the National Environmental Health Forum (NEHF) published human health-based investigation levels that had been developed for various contaminants and a range of land uses. These guidelines have been adopted as the Health Investigation Levels (HILs) in NEPM (1999). The NEPM includes HILs for standard residential land use (Setting A), high density residential land use (Setting D), public open space (Setting E) and commercial/industrial land use (Setting F).

The site is to be assessed with respect to commercial use for the bus station development and associated retail and open space use for the West Central Plaza area and therefore the appropriate HILs for assessing the contamination status of soil with respect to human health are the HIL Setting 'E' and 'F' values.

Soil pH values have been assessed on the basis of guidance provided in *A Practical Guide* to the *Health Risk Assessment and Management of Contaminated Land in SA*, (SAHC, 1993), which suggests that soil pH values ranging from 5 to 9 pose minimal risk to human health.

3.2.3 Soil Guidelines Summary

The soil guidelines and the order in which have been selected by the Auditor for screening purposes are as follows:



3.2.3.1 Ecological

- The NEPM Ecological Investigation Levels (EILs);
- The ANZECC/NHMRC Environmental Investigation 'B" levels;
- NSW-EPA threshold concentrations for sensitive land use soils
- The Dutch Target Values provided in Annex A to February 2000 Circular by the Ministry of Housing Spatial Planning and Environment, 2000.

3.2.3.2 Human Health

- The NEPM Health Investigation Levels (HILs) for open space use (Setting "E") for the West Central Plaza Area
- The NEPM Health Investigation Levels (HILs) for commercial/industrial use (Setting "F") for the remaining areas of the site.

3.3 Soil Investigation

Field investigations were carried out in various stages as summarised in the following sections of this report. Complete copies of each investigation report are presented in Appendices B, C, D, and E of this report. It is noted that the earlier investigations undertaken by Rust PPK, Maunsell and Tierra incorporated the entire Bus Station Development Site. The following sections provide a summary of the investigations undertaken for the Audit site only. Sampling locations for soil investigations undertaken by Rust PPK, Maunsell and Tierra between 1997 and 2005 are all provided on Figure 2 of this report.

3.3.1 Rust PPK Environmental Site Assessment (June 1997)

As part of the initial assessment of the site, Rust PPK undertook grid based sampling in accessible areas of the site including car parks and garden beds. Twelve soil bores (BH5, BH6, BH9, BH11, BH12, BH13, BH14, BH15, BH16, BH17, BH19 and BH20) were drilled across the site to a maximum depth of 2.3 metres.

A total of twelve soil samples were collected from depths of between 0.55 and 2.0 metres and analysed for a range of contaminants including metals (antimony, arsenic, beryllium, cadmium, cobalt, chromium, copper, mercury, molybdenum, nickel, lead, selenium, tin and/or zinc), polycylic aromatic hydrocarbons (PAH), phenols, cresols, organochlorine pesticides, organophosphate pesticides, total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene and xylene (BTEX), polychlorinated biphenyls (PCB) and a volatile organic compound scan.

The results of the limited assessment indicated that concentrations of copper (450 mg/kg) at one location and zinc (up to 2,000 mg/kg) at two locations exceeded the NEPM EILs. In addition, lead (1,600 mg/kg) at one location exceeded the NEPM E and F HILs for one sampling location. It is



noted that near surface soil samples up to a depth of 0.5 metres were not analysed as part of the assessment undertaken by Rust PPK.

3.3.2 BC Tonkin and Associates Site Audit Report (July 1997)

An environmental auditor, Mr Adrian Hall of BC Tonkin and Associated completed a Site Audit Report for the entire Bus Station site comprising both portions located east and west of Bowen Street, in July 1997. The Site Audit Report was based on the Site History Report prepared by Rust PPK and the Environmental Site Assessment Report also prepared by Rust PPK. The auditor concluded that the audit site (confined to the accessible areas of the site only) was suitable for the continuation of existing uses.

3.3.3 Maunsell Soil and Groundwater Investigation (November 2004)

Maunsell drilled thirteen soil sampling locations (BUS9 to BUS17 and BUS10 to BUS21) also in areas of the site which were readily accessible. However, the purpose of the investigation was to provide a better characterisation of the contamination status of near surface fill materials and underlying natural soils.

A total of twenty soil samples were collected from both near surface fill materials and underlying natural soils and analysed variously for metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, tin and zinc), pH, cyanide, benzene, toluene, ethylbenzene and xylene (BTEX), organochlorine pesticides, polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), phenols, cresols and total petroleum hydrocarbons (TPH).

Concentrations of all contaminants were below the adopted Auditors criteria, where available. with the exception of:

- An elevated copper concentration (690 mg/kg) exceeded the NEPM EIL of 100 mg/kg for a surficial fill sample collected at one location (BUS17-A).
- Total PAH concentrations (113.5 mg/kg) and a benzo(a)pyrene concentration (12 mg/kg) exceeded the NEPM 'E' and NEPM 'F' HILs for a surficial fill sample collected at one location BUS16-A.

3.3.4 Tierra Additional Investigations (July 2005)

In order to address a number of issues raised by the Auditor, Tierra undertook additional investigations at the Bus Station site in July 2005.

Tierra undertook targeted soil sampling in areas of the site previously not investigated as follows:

- One location (BUS 30) underneath the toilet block immediately west of the church and one location (BUS 29) in the vacant area behind this building.
- Two locations (BUS 31 and BUS 43) underneath the two storey building previously occupied by the Adelaide Central Mission.



- Two locations (BUS 38 and BUS 39) underneath McCafferty's Bus Terminal building and five locations (BUS 40, BUS41, BUS42, BUS44 and BUS45) underneath the Greyhound Bus Terminal building.
- Four locations (BUS 22A, BUS23, BUS24 and BUS25) were investigated in the Franklin and Grote car parks in order to confirm the results of previous investigations.

Soil samples were collected from fill and natural soils at all locations. All samples were analysed for metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, tin and zinc), polycyclic aromatic hydrocarbons (PAH), pH, cyanide, organochlorine pesticides, benzene, toluene, ethylbenzene and xylene (BTEX), total petroleum hydrocarbons (TPH), phenols, cresols, polychlorinated biphenyls (PCB) and chlorinated hydrocarbons. Samples BUS22A, BUS23, BUS24 and BUS25 collected from the Grote and Franklin Street car parks were analysed for metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, tin and zinc) and polycyclic aromatic hydrocarbons (PAH).

Concentrations of all contaminants were below the adopted Auditors criteria, where available with the exception of the following:

- Sample (BUS 30-B) collected from fill materials underlying the former toilet block in the south western portion of the site reported concentrations of lead (350 mg/kg) and zinc (750 mg/kg) exceeding the NEPM EILs.
- Concentrations of arsenic (between 93 and 130 mg/kg) and zinc (940 mg/kg) exceeded the NEPM ecological investigation levels for samples of fill material (BUS 31-A, BUS 43-A and BUS 43-B) collected from underneath the two storey building formerly occupied by the Adelaide Central Mission.
- Samples (BUS 40-A, BUS 41-A and BUS 44-B) collected from fill materials underneath the Greyhound bus terminal building reported concentrations of antimony (190 mg/kg), chromium (430 mg/kg), copper (450 mg/kg), lead (480 mg/kg), tin (up to 1,500 mg/kg) and/or zinc (1,400 mg/kg) exceeded the ecological investigation levels at all three locations. In addition, concentrations of lead at sampling locations BUS 40-A (1,700 mg/kg) and BUS 44-B (800 mg/kg) collected from fill materials and BUS 44-C (800 mg/kg) collected from underlying natural soils exceeded the human health investigation levels for open space use (600 mg/kg) and/or commercial/industrial use (1,500 mg/kg).
- Concentrations of copper (up to 450 mg/kg), lead (550 mg/kg) and zinc (up to 2,000 mg/kg) exceeded the NEPM EILs from fill materials collected from sampling location BUS 24-B in the Franklin Street car park. In addition, a concentration of benzo(a)pyrene (11 mg/kg) exceeded the NEPM human health investigation levels for both open space (2 mg/kg) and commercial/industrial use (5 mg/kg).



3.3.5 Ecophyte Ground Penetrating Radar Investigation (July 2005)

Due to the potential presence of underground storage tanks (USTs) associated with some of the historical uses of the site in particularly maintenance garages and workshops, Ecophyte undertook a ground penetrating radar investigation. The investigation incorporated the entire Audit site with the exception of the two storey building formerly occupied by the Adelaide City Mission and immediately surrounding area.

A number of anomalies were identified during the investigation and most of these were found to be associated with infrastructure and utilities present on the site at the time of the investigation. Ecophyte recommended the further investigation of three anomalies present on the car park areas. Tierra investigated these areas further by drilling soil bores. There was no evidence of USTs, stained or odorous soils, therefore it was concluded that USTs were unlikely to have been present on the Audit site.

3.3.6 Remediation and Validation Works

The remediation and validation works undertaken at the site have been reported in the Central West Precinct Remediation Report prepared by Tierra, September 2006 (Appendix E) and discussed in the following sections.

3.3.7 Remedial Works

Two pits were excavated to depths of between 7 and 8 metres in the north western portion of the site on the corner of Franklin and Bowen Streets. The first pit was approximately 30 metres long by 25 metres wide by 6 metres deep. The second pit was located immediately to the south and adjoined the first pit was approximately 25 metres long by 25 metres wide by 8 metres deep. The pits were excavated to provide a re-use area for geotechnically unsuitable and/or contaminated fill materials identified across the surface of the site. Natural clay soils underline both pits to depths of approximately 17 metres below ground surface, therefore providing a significant barrier to potential groundwater contamination. Once the excavation of the pits was completed, the coordinates and relative levels of the base and walls of both pits is provided as Figure 3 of this Audit Report.

All visible fill materials present across the entire surface of the site were excavated to depths of between 0.2 and 1.45 metres or until natural material was encountered with the exception of an area along the eastern boundary of the church allotment where excavation was undertaken to the extent practicable without undermining fences and foundations, therefore fill material remains within a strip of land approximately 0.5 metres of the eastern church property boundary. The fill materials predominantly consisted of sand, clay and silt with smaller quantities of concrete, bricks, tiles and other construction and demolition wastes, timber, plastic, steel, ash and slag also present.



The fill materials were progressively backfilled in layers of between 300 mm to 400 mm. Tierra maintained a re-use fill sample register to document the type of material placed in each layer and the validation samples corresponding to each layer of fill placed in both pits. Approximately 6,850 m³ of fill materials were backfilled into both pits. Once backfilling was complete, the walls and the base of both pits were once again surveyed for future reference. The survey information is provided as Figure 4 of this report. The survey information indicated that backfilling was complete to between 0.8 and 1.2 metres below ground surface. A marker layer was placed over the fill materials contained in the re-use area to provide a visual indicator of where the contaminated materials are located to future users of the site.

Natural clay soils located at depths between 2 and 7 metres were excavated from the two re-use pits and used to provide a capping layer over the backfilled re-use area. Generally between 1.0 and 1.2 metres of clay capping was achieved over both pits, with the exception of a small strip of the northern most pit located adjacent to Bowen Street. This area as provided in Figure 5 of this Audit Report achieved a clay capping thickness of 0.8 m and was considered to be an acceptable buffer zone between the future site users and the underlying contaminated fill materials.

3.3.8 Validation Sampling

3.3.8.1 Excavated Site Surface

A total of twenty validation samples (ISB-1A to ISB20-A) were collected from the excavated surface of the entire site area. All sampling locations are provided in Figure 6 of this report. All validation samples were analysed for metals (arsenic, cadmium, chromium, mercury, nickel, lead and zinc), pH and PAH. In addition, three samples were also analysed for Victorian EPA Screens. Concentrations of all contaminants were reported to be below the NEPM EILs or below the laboratory detection limits therefore suggesting that remediation of the fill materials across the site was successful.

3.3.8.2 Re-use Area

Validation samples were collected from each compacted fill layer at 2 or 3 sampling locations within the two re-use pits. A rectangular sampling grid was used for each of the re-use pits as outlined in Figure 7 of this report. A total of ninety validation samples were collected from 6,850 m3 of backfilled materials. All samples were analysed for metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, tin, vanadium and zinc) and polycyclic aromatic hydrocarbons. In addition, 50% of collected samples were subjected to leachability testing to confirm the potential leachability of contaminants and the suitability of the material for re-use. Approximately 10% of samples were tested for a wide range of screening parameters referred to as a Victorian EPA Screen which comprised metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, tin, vanadium and zinc), pH, benzene, toluene, ethylbenzene, xylene (BTEX), polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbons (TPH), phenols, cresols, cyanide, chlorinated hydrocarbons, organochlorine pesticides, organophosphorus pesticides and polychlorinated biphenyls (PCB).



Concentrations of contaminants within the fill materials used to backfill the re-use pits were below the adopted ecological and human health investigation levels, where available with the exception of the following:

- Concentrations of zinc (up to 280 mg/kg) at two locations and mercury (up to 3 mg/kg) at one location exceeded the ecological investigation levels within the re-use area.
- Concentrations of benzo(a)pyrene (between 2.8 and 5.9 mg/kg) at two locations exceeded the NEPM 'E' and/or NEPM 'F' human health investigation levels within the re-use area.

Therefore, indicating that the majority of soils deposited in the re-use area were not contaminated. The 95% UCL of the arithmetic mean for benzo(a)pyrene were calculated for soils in the re-use area. The 95% UCL was calculated to be 0.704 mg/kg therefore indicating that concentrations of benzo(a)pyrene in soils used to fill the re-use area does not exceed the NEPM 'E' human health investigation level for open space of 2 mg/kg.

Leachability testing of soils used to backfill the re-use pits indicated that leachable concentrations of metals and PAH were low and generally did not exceed laboratory detection limits, therefore indicating that soils were unlikely to present a future risk to groundwater in the re-use portion of the site.

3.3.9 Stockpiled Materials

A total of five stockpiles were generated during the remediation works at the site:

- Stockpile 1 comprised an approximate volume of 700 m3 of gravel fill material which was encountered during excavation works at the site. A total of ten samples were collected of the gravel material and analysed for metals (arsenic, cadmium, chromium, mercury, nickel, lead and zinc), PAH, pH, TPH, BTEX and organochlorine pesticides. In addition, two samples were also analysed for Victorian EPA Screens. Concentrations of all contaminants were below the adopted ecological investigation levels.
- Approximately 600 m3 of gravel fill from Stockpile 1 was re-used on site as subgrade in an area approximately 10 metres wide by 60 metres long located along the north eastern boundary of the site. The remaining 100 m3 of material was transported to a site located at Kalbeeba Road for re-use.
- Approximately 1,200 m3 of gravel fill encountered during site excavations was stockpiled (Stockpile 2) on-site. Twenty seven samples were collected of the gravel materials, of which ten were analysed for metals (arsenic, cadmium, chromium, mercury, nickel, lead and zinc), PAH, pH, TPH, BTEX and organochlorine pesticides, two were analysed for Victorian EPA Screens and fifteen samples were analysed for PAH. Concentrations of all contaminants were below the adopted ecological investigation levels.
- Approximately 600 m3 of this material was re-used on site as subgrade in an area approximately 10 metres wide by 60 metres long located along the north eastern boundary of the site. The remaining 600m3 of material was placed in the re-use area pits.



- Stockpile 3 comprised an approximate volume of 1,250 m3 of gravel fill encountered during site excavations. Twelve sample of the gravel fill material were collected and analysed for metals (arsenic, cadmium, chromium, copper, mercury, nickel, lead and zinc), PAH, pH and organochlorine pesticides. In addition, one sample was analysed for a Victorian EPA Screen. Concentrations of all contaminants were below the adopted ecological investigation levels.
- Approximately 600 m3 of material from Stockpile 3 was re-used on site in an area bounded by Bowen Street, Grote Street and the church allotment. The remaining 650 m3 of material was transported off site to Kalbeeba Road for re-use.
- Approximately 50 m3 of fill material derived from further excavation of the vicinity of the church allotment boundaries was stockpiled on-site following the completion of the re-use pits. Two samples were collected and analysed for metals (antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, tin, vanadium and zinc), PAH, chlorinated hydrocarbons, polychlorinated biphenyls, phenols, cresols and total recoverable hydrocarbons. Concentrations of all contaminants were below the adopted ecological investigation levels. These materials were surplus to site requirements and were taken off site for disposal to Garden Island.
- Stockpile 5 comprised approximately 3,600 m3 of natural clay materials generated during the excavation of the re-use pits. Three samples were collected of the natural materials and analysed for metals (antimony, arsenic, banum, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, tin, vanadium and zinc), PAH, chlorinated hydrocarbons, polychlorinated biphenyls, phenols, cresols and total recoverable hydrocarbons. Concentrations of all contaminants were below the adopted ecological investigation levels. These materials were surplus to site requirements and were taken to a site located in Brompton for re-use.

3.4 Current Status of On-Site Soils

The results of the soil investigation have indicated that soils remaining on-site following the removal of surficial fill materials across the entire surface of the site reported contaminant concentrations for all analytes below the adopted ecological screening criteria with the exception of the following:

Samples collected of the fill materials following placement in the re-use area indicated that concentrations of zinc (up to 280 mg/kg) at two locations and concentrations of mercury (up to 3 mg/kg) at one location exceeded the ecological investigation levels within the re-use area. Leachability testing undertaken for a large number of soil samples representative of the materials placed in the re-use area indicated that leachable concentrations of metals were very low and generally below the laboratory detection limits. Therefore, slightly elevated metal concentrations reported at three locations are unlikely to be mobilised and are not considered to present a risk to groundwater at the site. On the basis that all re-used materials were placed at depths greater than 1.2 metres below ground surface, it is considered unlikely that elevated zinc and mercury concentrations would provide a risk to plant life at the site. In order to maintain the clay capping and



mitigate exposure of plant life to contaminants in the soil, a Site Management Plan has been prepared which restricts the planting of deep rooted plant species in the vicinity of the re-use area.

- Concentrations of benzo(a)pyrene (2.8 mg/kg and 5.9 mg/kg) at two locations within the re-use area exceeded the NEPM 'E' and/or NEPM 'F' human health investigation levels. On the basis that elevated benzo(a)pyrene concentrations were reported at depths greater than 1.2 metres, it is considered highly unlikely that humans at the site will be exposed to reported contamination. In addition, leachable concentrations of PAH were determined to be low, generally below the laboratory detection limits. Therefore, slightly elevated PAH concentrations reported at two locations are unlikely to be mobilised and are not considered to present a risk to groundwater at the site.
- In order to prevent exposure of plants and/or humans to the contaminated soils a Site Management Plan has been prepared which ensures that any excavation and/or maintenance works undertaken in the vicinity of the re-use area at the site are carried out in accordance with appropriate environmental management measures (refer Appendix G of this report).

3.5 Aesthetics of Site Soils

The investigations identified fill material comprising sand, clay and silt with smaller quantities of concrete, bricks, tiles and other construction and demolition wastes, timber, plastic, steel, ash and slag also present. The fill and anthropogenic materials have been placed at depths greater than 1.2 metres in the re-use area of the site, in addition, a small quantity of fill remains within 0.5 metres of the church allotment eastern boundary. The presence of these fill materials are not considered to compromise the aesthetic amenity of the land for the proposed commercial and open space use.

3.6 Adequacy of the Assessor's Investigation Program

The site comprises an area of approximately 9,000 m². For this area, the Australian Standard (AS4482.1) indicates that to detect hot spots of contamination of 25 m diameter with a confidence of 95%, then 20 sample points arranged in a grid over the site are required.

Soil sampling was conducted at twenty validation grid locations across this site. This sampling density met the requirements of the Australian Standard, and is considered sufficient to characterise the contamination status of the soils at the site.

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4. GROUNDWATER ASSESSMENT

4.1 **Protected Environmental Values**

This section considers groundwater issues as required by the SA EPA *Guidance* Notes to *Environmental Auditors for Audits Undertaken in South Australia*, 31 March 1999.

Groundwater in South Australia is assessed in accordance with the *Environment Protection (Water Quality) Policy, 2003.* The policy covers all waters in the State including marine, estuarine and inland (surface and underground) waters. The steps involved in setting the water quality objectives entail:

- Setting the environmental values that are required to be protected;
- Determining water quality characteristics that are important for these values;
- Setting guidelines for each characteristic that adequately protect each environmental value; and
- Choosing the most stringent set of guidelines for the environmental values applicable to each water body.

In line with the *National Water Quality Management Strategy*, the policy recognises that the protected environmental values or uses are:

- Aquatic ecosystem (fresh and marine waters);
- Potable use;
- Recreation and aesthetics (primary contact, secondary contact and aesthetics);
- Agriculture/aquaculture (including irrigation, livestock); and
- Industrial use.

4.2 Water Quality Criteria

Table 1 (Schedule 2) of the *Environment Protection (Water Quality) Policy, 2003* specifies the water quality criteria required to assess whether a protected environmental value has been impacted by contaminants. It is noted that Schedule 2 of the EPP does not contain criteria for total petroleum hydrocarbons. In the absence of specific TPH guidelines, the Dutch Intervention Values (MHSPE, 2000) have been adopted as appropriate groundwater screening levels.



4.3 Groundwater Investigations and Sampling

A total of three groundwater monitoring wells (MW7, MW8 and MW9) were installed across the site by Maunsell in 2004 as follows:

- Well MW7 was located in the central portion of the site to the north of the church;
- Well MW8 was located in the north eastern corner of the site; and
- Well MW9 was located in the south eastern corner of the site.

All wells were adequately screened to monitor the shallow aquifer at the site and reported TDS concentrations between 2,475 mg/L and 3,597 mg/L.

Refer to Figure 8 attached to this Audit Report for locations of all monitoring wells.

Prior to sampling, bores were gauged for depth to groundwater and selected field parameters including, dissolved oxygen, electrical conductivity, redox potential, pH and temperature were recorded.

Following development, groundwater samples were collected from all wells using dedicated disposable bailers.

4.3.1 Standing Water Levels

The depth to groundwater was measured to be between 19.3 and 21.8 metres below the top of the well casing.

The relative groundwater levels indicate that groundwater flows in a north-north-westerly direction consistent with expected regional groundwater flow.

4.3.2 Sampling and Analysis

Groundwater samples were collected from all three wells and analysed for: metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, tin and zinc), pH, cyanide, BTEX, total recoverable hydrocarbons, PAH, PCB, organochlorine pesticides, phenols, cresols and chlorinated hydrocarbons.

4.3.3 Results

The results of groundwater testing have indicated that concentrations of all contaminants were below either the laboratory detection limits and/or the adopted EPP screening criteria with the exception of a slightly elevated selenium concentration (0.007 mg/L) which exceeded the EPP fresh aquatic water quality criterion of 0.005 mg/L for well MW9. All remaining selenium concentrations were reported to be below the adopted screening criterion.



Concentrations of selenium were below laboratory detection limits for all analysed soil samples, therefore indicating that the site is not a source of elevated selenium concentrations in groundwater.

Remaining wells MW7 and MW8 did not report elevated concentrations of selenium, therefore, it is unlikely that elevated selenium concentrations are likely to be associated with an on-site source.

4.4 Assessment of Potential Risks to Protected Environmental Values

An assessment of potential risks to the Protected Environmental Values of groundwater is provided in the following sections.

4.4.1 Potable

TDS concentrations for all wells ranged between 2,475 mg/L and 3,597 mg/L indicating that the groundwater is not suitable for use as potable water without treatment.

4.4.2 Fresh and Marine Aquatic Ecosystem

The nearest freshwater body is the River Torrens located approximately 900 north of the site and may potentially receive groundwater from the site.

It is noted that selenium concentrations in on-site soils were not reported at concentrations exceeding the laboratory detection limits. On this basis it is concluded that the site is not a source of elevated selenium concentrations in groundwater.

In the event that groundwater from the site discharges to the River Torrens, it is considered that over the distance to the River (approximately 900 m), processes such as dilution, dispersion and attenuation on the clayey substrate are likely to reduce metal concentrations to an acceptable level. Therefore it is concluded, that the Environmental Value Fresh Aquatic Ecosystems are unlikely to be impacted by elevated selenium concentration in the groundwater at the site.

4.4.3 Irrigation

Concentrations of all contaminants were below the EPP Irrigation Water Quality Criteria, therefore this use of groundwater is unlikely to be precluded.

4.4.4 Livestock

Concentrations of all contaminants were below the Livestock Water Quality Criteria, therefore, this use of groundwater is also considered unlikely to be precluded.

4.4.5 Industrial Use

Contaminant concentrations are not expected to adversely affect the use of groundwater for industrial watering purposes.



4.5 Conclusion on Groundwater Quality

Groundwater was sampled and tested at three on-site locations. The results of analytical testing of the groundwater indicated that all potential uses of groundwater are unlikely to be precluded by concentrations of contaminants reported for the groundwater at the site.

5. QUALITY CONTROL

Established quality assurance/quality control (QA/QC) procedures were followed throughout the project to assure data quality.

The QA/QC program undertaken as part of the assessment included the following:

- transport of samples under Chain of Custody documentation;
- preservation of samples during transport from the field to the laboratory;
- compliance with sample holding times;
- collection of blind and split duplicate samples;
- collection of rinsate blanks;
- use of NATA accredited laboratories;
- review of results of duplicate and blank samples; and
- review of internal laboratory analysis of matrix spike/matrix spike duplicates, duplicates, blanks and spike recoveries.

5.1 Field Duplicates

In accordance with AS4482.1, at least one blind duplicate sample in twenty primary samples (submitted to the primary laboratory) was collected for analyses through the course of the investigation. A similar sampling density is required for field split duplicates that are to be analysed by an independent laboratory.

The blind duplicates provide a measure of the precision of the primary laboratory, that is, the ability to repeat the result. The field split duplicate provides an independent measure of the accuracy of the primary laboratory.

The assessment of the quality control samples was undertaken using the relative percentage differences (RPDs) method as described in AS4482.1. The RPDs were calculated by dividing the difference between each analyte concentration in a sample and its duplicate, by the average concentration in the two samples. This can be expressed by the following formula

RPD = (X1 - X2) / [(X1 + X2) / 2]

Where: X1 = concentration of analyte in sample;

X2 = concentration of analyte in duplicate.



It should be noted that:

- In instances where samples and/or their corresponding duplicates return concentrations of analytes below method detection limits, quantitative comparison of samples and their duplicates could not be carried out
- Variations in low concentrations of analytes may result in high RPDs that are not necessarily significant when the concentrations are compared against the screening guidelines
- Results of the analysis of duplicate samples are provided in the Appendices of the Rust PPK ESA report, Maunsell Investigation and Tierra Additional Investigations and Remediation Report provided as Appendices B, C, D and E of this report.

5.2 Analytical Laboratories Used

Australian Government Analytical Laboratories (AGAL) was the primary laboratory used for the analysis of soil samples during the Rust PPK investigation. MGT was used as the secondary or QA/QC laboratory.

MGT Environmental Consulting Pty Ltd (MGT) was the primary laboratory used for the analysis of soil samples during the Maunsell investigation. ALS Environmental (ALS) was used as the secondary or QA/QC laboratory.

MGT Environmental Consulting Pty Ltd (MGT) was the primary laboratory used for the analysis of soil samples during the Tierra investigations. Ecowise Environmental was used as the secondary of QA/QC laboratory.

Laboratory Reports are provided in the appendices of the various reports provided as Appendices B to E of this Audit Report. All laboratories are accredited by NATA for the analyses performed. All reports included copies of the associated NATA endorsed laboratory analytical results sheets.

5.3 Results of Soil Blind Duplicate Analyses

5.3.1 Rust PPK Environmental Site Assessment (July 1997)

Two blind duplicate pairs of soil samples {(BH4 and BH4D) and (BH12 and BH12/D)} were collected during the Rust PPK ESA undertaken in July 1997. The sample pairs were analysed variously for metals (arsenic, cadmium, copper, mercury, nickel, lead and zinc) and PAH. All calculated RPD results were within the recommended maximum range (30-50%) indicating good reproducibility of analytical results.

5.3.2 Maunsell Investigation (November 2004)

Four blind duplicate pairs of soil samples {(BUS6-A and BUS6-AA), (BUS7-A and BUS7-AA), (BUS12-A and BUS12-AA) and (BUS20-A and BUS20-AA) were collected during the Maunsell investigation undertaken in November 2004. The sample pairs were analysed for metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, tin and zinc), pH, cyanide, organochlorine pesticides, polycyclic aromatic hydrocarbons (PAH), total recoverable hydrocarbons (TRH), polychlorinated biphenyls (PCB), phenols, cresols, benzene, toluene, ethylbenzene, toluene and xylene (BTEX) and chlorinated hydrocarbons.

A total of forty seven sample pairs were available for assessment and all RPDs were within the recommended maximum range with the exception of:

- Cadmium (75%) for sample pair BUS6-A and BUS6-AA; and
- Lead (56%), zinc (60%) and a number of individual polycyclic aromatic hydrocarbon compounds (between 55 and 120%) for sample pair BUS20-A and BUS20-AA;

All elevated RPD values were attributed to small differences in very low analyte concentrations.

5.3.3 Tierra Additional Investigation (July 2005)

Three blind duplicate pairs of soil samples {(BUS 22-A and BUS 22-D), (BUS 27-A and BUS 27-D) and (BUS 34-A and BUS 34-D) were collected during the additional investigation undertaken by Tierra in July 2005.

The sample pairs were analysed variously for metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, tin and zinc), pH, cyanide, BTEX, organochlorine pesticides, polycyclic aromatic hydrocarbons, polychlorinated biphenyls, phenols, cresols and total recoverable hydrocarbons.

All calculated RPD results were within the recommended maximum range (30 - 50%) with the exception of lead (138%), zinc (115%) and dieldrin (142%) for sample pair BUS 34-A and BUS 34-D. It is noted that all elevated RPD values were attributed to small differences in very low analyte concentrations.

5.3.4 Tierra Remediation Report (September 2006)

A total of nine blind duplicate pairs of soil samples {(1SB1-A and 1SB1-A), (1STF1-A and 1STF1-X), (1STF21A and 1STF21-X), (1STF41-A and 1STF41-X), (1RF1-A and 1RF1-X), (1RF21-A and 1RF21-X), (1RF41-A and 1RF41-X), (1RF61-A and 1RF61-X) and (1RF81-A and 1RF81-X)} were collected by Tierra during their remediation/validation works at the site.

The sample pairs were analysed variously for metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead mercury, molybdenum, nickel, selenium, tin and zinc), benzene,

toluene, ethylbenzene, xylene (BTEX), total recoverable hydrocarbons (TRH), organochlorine pesticides, polycyclic aromatic hydrocarbons, polychlorinated biphenyls and chlorinated hydrocarbons.

A total of 86 sample pairs were available for assessment and all RPDs were within the recommended maximum range with the exception of:

- Zinc (73%) for sample pair 1STF1-A and 1STF1-X
- Arsenic (59%), aldrin (66%) and chlordane (52%) for sample pair 1STF41-A and 1STF41-X
- Aldrin (52%), chlordane (50%) and benzo(f)fluoranthene (66%) for sample pair 1RF1-A and 1RF1-X
- Zinc (56%) and chlordane (66%) for sample pair 1RF21-A and 1RF21-X
- Various individual polycyclic aromatic hydrocarbon compounds (ranging between 161% to 185%) for sample pair 1RF61-A and 1RF61-X
- Lead (77%) for sample pair 1RF81-A and 1RF81-X and various individual polycyclic aromatic hydrocarbon compounds (between 52% and 120%).

Most elevated RPD concentrations were attributed to small differences in very low analyte concentrations, therefore indicating that the overall quality of the data set is reliable.

5.4 Results of Soil Inter-Laboratory Duplicate Analyses

5.4.1 Rust PPK Environmental Site Assessment (July 1997)

Two inter-laboratory duplicate pairs of soil samples {(BH12 and BH12/D) and (BH15 and BH15D)} were collected by Rust PPK as part of the 1997 ESA investigation. The sample pairs were analysed variously for metals (arsenic, cadmium, copper, mercury, nickel, lead and zinc), phenols, TPH, BTEX, PAH and organochlorine pesticides. All calculated RPD results were within the recommended maximum range (30-50%) indicating good reproducibility of analytical results.

5.4.2 Maunsell Investigation (November 2004)

Three pairs of inter-laboratory soil duplicate samples {(BUS7-A and BUS7-AA), (BUS12-A and BUS12-AA) and (BUS20-AA and BUS20-AA)} were collected by Maunsell during the 2004 investigation. The sample pairs were analysed for metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, tin and zinc), pH, cyanide, organochlorine pesticides, polycyclic aromatic hydrocarbons (PAH), total recoverable hydrocarbons (TRH), polychlorinated biphenyls (PCB), phenols, cresols, benzene, toluene, ethylbenzene, toluene and xylene (BTEX) and chlorinated hydrocarbons.

A total of forty one sample pairs were available for assessment and all RPDs were within the recommended maximum range with the exception of:

- Lead (105%) for sample pair BUS12-A and BUS12-AA; and
- Chromium (61%), zinc (68%) and a number of individual polycyclic aromatic hydrocarbon compounds (between 84% and 200%) for sample pair BUS20-A and BUS20-AA.

All elevated RPD values were attributed to small differences in very low analyte concentrations.

5.4.3 Tierra Additional Investigation (July 2005)

Three inter-laboratory soil duplicate samples {(BUS 23-A and BUS23-D), (BUS 30-A and BUS 30-D) and (BUS 43-C and BUS 43-C) were collected by Tierra during the July 2005 Additional Investigation.

The sample pairs were analysed variously for metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, tin and zinc), pH, cyanide, BTEX, organochlorine pesticides, polycyclic aromatic hydrocarbons, polychlorinated biphenyls, phenols, cresols and total recoverable hydrocarbons.

A total of twenty nine sample pairs were available for assessment and all RPDs were within the recommended maximum range with the exception of:

 Copper (58%), lead (139%), mercury (154%), zinc (83%) and several individual polycyclic aromatic hydrocarbon compounds (between 91% and 160%)

All elevated RPD values were attributed to small differences in very low analyte concentrations.

5.4.4 Tierra Remediation Report (September 2006)

A total of 10 inter-laboratory soil duplicate samples {1SB1-A and 1SB1-Y), (1STF-A and 1STF1-Y), (1STF21A and 1STF21-Y), (1STF41-A and 1STF21-Y), (1STN1-A and 1STF21-Y), (1RF1-A and 1RF1-Y), (1RF21-A and 1RF21-Y), (1RF41-A and 1RF41-Y), (1RF61-A and 1RF61-Y) and (1RF81-A and 1RF81-Y)} were collected by Tierra during the remediation/validation works undertaken at the site.

The sample pairs were analysed variously for metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead mercury, molybdenum, nickel, selenium, tin and zinc), benzene, toluene, ethylbenzene, xylene (BTEX), total recoverable hydrocarbons (TRH), organochlorine pesticides, polycyclic aromatic hydrocarbons, polychlorinated biphenyls and chlorinated hydrocarbons.

A total of 104 sample pairs were available for assessment and all RPDs were within the recommended maximum range with the exception of:

- Nickel (75%) for sample pair 1SB1-A and 1SB1-Y (low concentrations)
- Lead (138%) for sample pair 1STF-A and 1STF1-Y (low concentrations)
- Lead (147%) and zinc (141%) for sample pair 1STF41-A and 1STF21-Y (low concentrations)
- Chromium (66%) and lead (53%) for sample pair 1STN1-A and 1STF21-Y (low concentrations)
- Lead (90%), tin (72%), aldrin (61%), benzo(k)fluoranthene (80%) for sample pair 1RF1-A and 1RF1-Y
- Benzo(a)pyrene (66%) for sample pair 1RF21-A and 1RF21-Y (low concentrations)
- Lead (166%) and zinc (157%) for sample pair 1RF41-A and 1RF41-Y
- Lead (72%) and various individual polycyclic aromatic hydrocarbon compounds (between 57% and 160%) for sample pair 1RF61-A and 1RF61-Y
- Mercury (185%) and various individual polycyclic aromatic hydrocarbon compounds (between 52% and 120%) for sample pair 1RF81-A and 1RF81-Y

Most elevated RPD values were attributed to small differences in very low analyte concentrations, therefore indicating that the analytical results are reproducible.

5.5 Groundwater Quality Control

Only one groundwater investigation was undertaken as part of the various assessments of the site. Maunsell installed three groundwater monitoring wells during the November 2004 investigation. It is noted that Maunsell did not collect groundwater blind or inter-laboratory duplicate samples as part of this investigation.

This oversight by Maunsell is unlikely to affect the overall conclusions of the audit because groundwater concentrations for all three wells were low and generally did not exceed laboratory detection limits. These results are consistent with regional expectations given that groundwater was encountered at depths greater than 19 metres and a source of groundwater contamination was not identified on the site or the immediate vicinity of the site.

On this basis, it is concluded that the absence of groundwater quality control samples, whilst not desirable is considered unlikely to affect the conclusions regarding the contamination status of groundwater at the site.



5.6 Rinsate, Field and Trip Blanks

Rinsate, field and trip blank samples were not collected as part of the Rust PPK 1997 and Maunsell 2004 investigations.

One rinsate blank (1R1) was collected during the two phases of work undertaken by Tierra. The samples was analysed for metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead mercury, molybdenum, nickel, selenium, tin and zinc), benzene, toluene, ethylbenzene, xylene (BTEX), total recoverable hydrocarbons (TRH), organochlorine pesticides, polycyclic aromatic hydrocarbons, polychlorinated biphenyls and chlorinated hydrocarbons.

All analytes were not reported at concentrations exceeding the laboratory detection limits.

Whilst this is below a standard typically adopted, the Auditor has reviewed the soil sampling protocols, and based on this and the results provided, it is concluded that the practices employed during the investigation did not contribute to the contamination status of the samples collected during the investigation.

5.7 Internal Laboratory Quality Control

MGT Environmental, AGL, ALS and Ecowise performed internal laboratory quality control, including duplicate analyses, matrix spikes and method blanks.

The internal duplicate analyses performed by the laboratories showed good consistency with all RPDs for the various investigations reported to be generally less than 30%.

Matrix spikes are field samples that are spiked with a known quantity of the recommended compound for that particular analysis. This is conducted to assess the effects of the specific sample matrix (i.e. clay, sand, etc) on the recovery of analytes. Matrix spike recoveries were generally within the acceptable range of 75% to 125%

5.8 Conclusions on QA/QC

The QA/QC measures employed throughout the assessment have enabled the quality of the field sample collection and laboratory analysis procedures to be examined and verified.

It is concluded that although groundwater quality control samples were not collected by Maunsell during the only groundwater investigation undertaken at the site, the absence of these samples is unlikely to affect the conclusions reached with respect to the quality of data collected for groundwater due to the significant depth to groundwater (greater than 19 metres) and the absence of significant soil contamination at the site.

It is concluded that the overall data quality is acceptable and is considered reliable to draw conclusions regarding the environmental condition of the site.



6. CONCLUSIONS

The Auditor has reviewed the environmental investigations of the site located between Franklin, Bowen and Grote Streets in the Adelaide CBD. It is noted that the Audit site comprises an area of approximately 9,000m² and forms a portion (Stage 1) of the larger site referred to as the Central West Precinct development.

Stage 1 is currently vacant and the proposed use of the land is for a new bus station development comprising bus parking bays, a passenger terminal, a retail building and a paved plaza area.

The Auditor understands that the site is to be used for commercial purposes comprising a new bus station development comprising bus parking bays, a passenger terminal, a retail building and an open space paved plaza area. The Audit findings have been considered in the context of this proposed use.

6.1 Site History

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A site history review was undertaken by Rust PPK in March 1997 and included a site inspection, a historical title search, a review of the Adelaide City Council archives and an aerial photograph search (between 1949 and 1995). The site history review provided the following general information:

- From 1850 until the early 1900s, the land was generally used for residential purposes and some shops, a bakehouse and a private road.
- In 1900 the eastern side of Bowen Street comprised private premises, comprising a number of residential properties, some vacant land, shops, a bakehouse (off Franklin Street) and the United Disciples Church.
- From the 1920s various small light industries were established on the site which included a garage, workshop, stables, forge, showroom, houses, a plumber, a welder and radio and electrical companies, shops and offices.
- The Corporation of the City of Adelaide had acquired most of the land on the eastern side of Bowen Street by 1972. The land was then cleared and by 1979 the bus terminal (Greyhound Pioneer Australia) and associated car parks had been constructed.
- A new terminal building (McCafferty's Express Coaches) was constructed on Bowen Street between 1989 and 1995, on what was previously either car or bus parking spaces.
- All buildings were demolished and associated car parking areas were cleared in 2006 and the site is currently vacant.



6.2 Data Quality

The QA/QC activities undertaken by various consultants including Rusk PPK, Maunsell and Tierra provide confidence that the testing of the soils and groundwater are adequately representative of the conditions at the site and enable the conclusions reached herein.

6.3 Remediation Works

Remediation works at the site involved the removal of all surficial fill materials, between depths of 0.2 metres and 1.45 metres or until natural soil was encountered, across the entire surface of the site and the construction of a clay capped soil re-use area for the containment of the fill materials.

6.4 Soil Assessment

Validation samples were collected at twenty locations on a grid basis across the site. Samples were collected from natural underlying soils to and analysed for a broad range of contaminants including Victorian EPA Screens. The soil sampling density for the broader site adopted by Tierra met the requirement stipulated in AS4482.1 – 1997.

6.4.1 Evaluation of Soil Contamination – Ecological

The results of soil testing have shown that soils remaining on-site following remediation works reported contaminant concentrations for analytes below the adopted ecological screening criteria with the exception of the following:

Samples collected of the fill materials placed in the re-use area indicated that concentrations of zinc (up to 280 mg/kg) at two locations and concentrations of mercury (up to 3 mg/kg) at one location exceeded the ecological investigation levels within the re-use area. Leachability testing undertaken for a large number of soil samples representative of the materials placed in the re-use area indicated that leachable concentrations of metals were very low and generally below the laboratory detection limits. Therefore, slightly elevated metal concentrations reported at three locations are unlikely to mobilise and present a risk to groundwater at the site. On the basis that all re-used materials were placed at depths greater than 1.2 metres below ground surface, it is considered unlikely that elevated zinc and mercury concentrations would pose a risk to plant life at the site. In order to maintain the clay capping and mitigate exposure of plant life to contaminants in the soil, a Site Management Plan has been prepared which restricts the planting of deep rooted plant species in the vicinity of the re-use area. In addition, the Site Management Plan includes environmental management measures to ensure that any construction, excavation and/or maintenance works undertaken in the vicinity of the re-use area at the site are carried out in an appropriate manner and maintain the integrity of the clay capping.

6.4.2 Evaluation of Soil Contamination – Human Health

The investigation results indicated that concentrations of contaminants in site soils did not exceed NEPM 'E' HILs for open space or NEPM 'F' HILs for commercial/industrial use with the exception of concentrations of benzo(a)pyrene (2.8 mg/kg and 5.9 mg/kg) at two locations within the constructed



re-use area which exceeded the NEPM 'E' and/or NEPM 'F' human health investigation levels. On the basis that elevated benzo(a)pyrene concentrations were reported at depths greater than 1.2 metres, it is considered highly unlikely that humans at the site will be exposed to reported contamination. In addition, the results of leachability testing carried out for contained soils reported concentrations of PAH generally not exceeding the laboratory detection limits.

However, in order to prevent exposure of plants and/or humans to the contaminated soils a Site Management Plan has been prepared to ensure that any construction, excavation and/or maintenance works undertaken in the vicinity of the re-use area at the site are carried out in an appropriate manner and to maintain the integrity of the clay capping.

6.5 Groundwater Assessment

A total of three groundwater monitoring wells have been installed across the Stage 1 development site.

The results of groundwater testing have indicated that concentrations of all contaminants were below either the laboratory detection limits and/or the adopted EPP screening criteria with the exception of an elevated selenium concentration (0.007 mg/L) which exceeded the EPP potable fresh aquatic water quality criterion of 0.005 mg/L for well MW9. All remaining selenium concentrations were reported to be below the adopted screening criterion.

It is noted that selenium concentrations in on-site soils were not reported at concentrations exceeding the laboratory detection limits. On this basis it is concluded that the site is not a source of elevated selenium concentrations in groundwater.

In the event that groundwater from the site discharges to the River Torrens, it is considered that over the distance to the River (approximately 900 m), processes such as dilution, dispersion and attenuation on the clayey substrate are likely to reduce metal concentrations to an acceptable level. Therefore it is concluded, that the Environmental Value Fresh Aquatic Ecosystems are unlikely to be impacted by elevated selenium concentration in the groundwater at the site.

On the basis of the investigations undertaken at the site, it is concluded that all potential uses of groundwater are unlikely to be precluded by concentrations of contaminants reported for the groundwater at the site.

6.6 Aesthetic Assessment

The investigations identified fill material comprising sand, clay and silt with smaller quantities of concrete, bricks, tiles and other construction and demolition wastes, timber, plastic, steel, ash and slag also present. The fill and anthropogenic materials have been placed at depths greater than 1.2 metres in the constructed re-use area of the site, in addition, a small quantity of fill remains within 0.5 metres of the church allotment eastern boundary. The presence of these fill materials are not considered to compromise the aesthetic amenity of the land for the proposed commercial and open space use.



6.7 Geotechnical Issues

This site audit report does not address the geotechnical issues associated with development of the site. The site owner is therefore advised to seek independent geotechnical advice regarding the suitability of the site for its intended use and the suitability of any placed, backfill materials, or any other matters relevant to the geotechnical stability of the site.

6.8 Summary of Conclusions

In summary, the information provided by various assessment consultants has led the Auditor to the opinion that:

- The condition of the land at the site with respect to possible chemical contamination is suitable for commercial / industrial and open space use consistent with the development plan attached, subject to the following conditions:
 - 1. Soils requiring management measures remain on-site at two locations (Area 1 and Area 2). This report includes a survey plan showing the location of Areas 1 and 2, a copy of which is provided as Figure 9. To restrict exposure of site users to these soils, a Site Management Plan has been prepared for future activities which may expose site users to these soils. The Auditor has reviewed the Site Management Plan, a copy of which is provided as Appendix G of this report. It is the responsibility of the current or future land owners to implement the management conditions relating to the site in accordance with the Site Management Plan.

The following general comments should be considered with respect to future use of the site

- Specialist advice should be sought in determining the geotechnical suitability of any fill material for its intended purpose;
- If excavation or other activities are undertaken generating surplus soils requiring off-site disposal, the waste soils must be managed in accordance with relevant EPA guidelines; and
- Any materials imported to site should comply with the National Environment Protection (Assessment of Site Contamination) Measure, 1999, Environmental Investigation Levels (Interim Urban).

This executive summary forms part of the report "Site Audit Report, Central West Precinct, Bus Station Site - Stage 1" Report No: SG041157 RP01, dated 30 November 2006). Further details regarding the condition of the site may be found in the Site Audit Report.



DATED:

4 DECEMBER 2006

SIGNED:

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Mr Andrew Nunn Environmental Auditor (Contaminated Land)



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FIGURES










FRANKLIN





The time values of commonship of it the two sits in MDLen^2



FIGURE 5 AREA NOT ACHIEVING 1.0 M BACKFILL THICKNESS



Project:	Bus Station Redevelopment	Project No:	AAA 05 002 02	
Principal:	Adelaide City Council	Date:	3/07/2006	1
Contractor:	P.D Excavations	Pian No.	BS0002	
Description:	Base of Excavations Validation S	Sample Locations		ľ

lierro Environment Pty Ltd ABN: 84 111 615 680

71 Belair Road, Kingswood SA 5062 T: 08 8373 2512 F: 08 8373 2515 general@tierra.com.au





Project:	Bus Station Redevelopment	Project No:	AAA 05 002 02
Principal:	Adelaide City Council	Date:	27/06/2006
Contractor:	P.D Excavations	Plan No.	BS0001
Description:	Validation Locations in Reuse Pit		

Terra Environment Pty Ltd ABN: 84 111 615 680

71 Belair Road, Kingswood SA 5062 T: 08 8373 2512 F: 08 8373 2515 general@tierra.com.au

FIGURE 7

VALIDATION OF RE-USE PITS



J:\05\AAA_05_002\02\B\$0001.doc

maunsell



FIGURE 8

CENTRAL WEST PRECINCT FRANKLIN STREET BUS STATION GROUNDWATER MONITORING WELL LOCATIONS AND GROUNDWATER CONTOURS

Cooperant Machael Autorate Pty Ltd 200

MW1

-----25.9 ----R

NOTES

LEGEND

FLOW

OBTAINED ON 6th OCTOBER 2004.

STRUCTURES/BUILDINGS

UNDERCOVER (CANDPY) AREAS

GROUNDWATER MONITORING WELLS **GROUNDWATER CONTDURS (m AHD)**

IMPLIED DIRECTION OF GROUNDWATER

FROM Rust PPK's "Environmental Site Assessment" 1997 AND SHOULD BE CONSIDERED APPROXIMATE. 2.GROUNDWATER CONTDURS BASED DN LEVELS

CENTRAL WEST PRECINCT FRANKLIN STREET BUS STATION 40032004.01.24

APPROXIMATE SCALE 0 7.5 15 22.5 - 30 37.5m





APPENDIX A

CERTIFICATES OF TITLE/DEVELOPMENT PLAN





For a Corlificate of Title issued pursuant to the Real Property Act 1886

REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5523 FOLIO 576

COST :	\$16.10	(GST exempt)
REGION :	GROUND	FLOOR, L.T.O.	- LGHP12
AGENT :	GRFL	BOX NO : 000	
SEARCHED	ON : 04	1/12/2006 AT :	15:13:24

PARENT TITLE : CT 5317/65 AUTHORITY : RT 8246071 DATE OF ISSUE : 15/04/1998 EDITION : 1

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 91 FILED PLAN 170401 IN THE AREA NAMED ADELAIDE HUNDRED OF ADELAIDE

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

NIL

NOTATIONS

DOCUMENTS AFFECTING THIS TITLE

REGISTRAR-CENERAL'S NOTES

PLAN FOR LEASE PURPOSES GP 521/95 WITH NEXT DEALING LODGE CT 5317/65 THIS TITLE ISSUED VIDE 8246071 AMENDMENT TO DIAGRAM VIDE 10378611

END OF TEXT.

Page 1 of 2 The Registrar-General certifies that this Title Register Search displays the records maintained in the Register Book and other notations at the time of searching



DIAGRAM FOR CERTIFICATE OF TITLE VOLUME 5523 FOLIO 576 SEARCH DATE : 04/12/2008 TIME: 15:13:24





CERTIFICATE OF TITLE

REAL PROPERTY ACT, 1886



VOLUME 5317 FOLIO 62 Edition 2 Date Of Issue 05/01/1996

Authority CD 6987000

South Australia

I certify that the registered proprietor is the proprietor of an estate in fee simple (or such other estate or interest as is set forth) in the land within described subject to such encumbrances, liens or other interests set forth in the schedule of endorsements.

REGISTRAR-GENERAL ANA AUSTR

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 91 FILED PLAN 166443 IN THE AREA NAMED ADELAIDE HUNDRED OF ADELAIDE

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

8003092 LEASE TO GREYHOUND PIONEER PTY. LTD. COMMENCING ON 23.2.1995 AND EXPIRING ON 18.10.2001





Note : Subject to all lawfully existing plans of division PAGE 2 OF 2



REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUMU 5960 FOLIO 473

COST ;	\$1.6, 1.0	(GST exempt)	
REGION :	GROUND	FLOOR, L.T.O.	- LGHP12
AGENT :	GRFL	BOX NO: : 000	
SEARCHED	ON : 04	4/12/2006 AT :	15:13:26

PARENT TITLE	:	CT 5317/61
AUTHORITY	:	N 10378611
DATE OF ISSUE	:	21/03/2006
BUTTION	:].

REGISTERED PROPRIETOR. IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND (ROAD)

ALLOTMENT 12 DEPOSITED PLAN 546 IN THE AREA NAMED ADELAIDE ININDRED OF ADELAIDE

BEING A PUBLIC ROAD

FASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

NIL

NOTATIONS

_ _ _ _ _ _

DOCUMENTS AFFECTING THIS TITLE

NIL

REGISTRAR-GENERAL'S NOTES

、 NIL

END OF TEXT.

Page 1 of 1 The Registrar-General certifies that this Title Register Search displays the records maintained in the Register Book and other notations at the time of searching.



CERTIFICATE OF TITLE

REAL PROPERTY ACT, 1886



VOLUME 5317 FOLIO 64 Edition 2 Date Of Issue 05/01/1996

Authority CD 6987000

South Australia

I certify that the registered proprietor is the proprietor of an estate in fee simple (or such other estate or interest as is set forth) in the land within described subject to such encumbrances, liens or other interests set forth in the schedule of endorsements.

REGISTRAR-GENERAL

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 93 FILED PLAN 166445 IN THE AREA NAMED ADELAIDE HUNDRED OF ADELAIDE

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

8003092 LEASE TO GREYHOUND PIONEER PTY. LTD. COMMENCING ON 23.2.1995 AND EXPIRING ON 18.10.2001 This plan is scanned for Certificate of Title 2762/199



D.P. 32560



Note : Subject to all lawfully existing plans of division PAGE 2 OF 2

CERTIFICATE OF TITLE

REAL PROPERTY ACT, 1886



VOLUME 5317 FOLIO 63 Edition 2 Date Of Issue 05/01/1996 Authority CD 6987000

South Australia

I certify that the registered proprietor is the proprietor of an estate in fee simple (or such other estate or interest as is set forth) in the land within described subject to such encumbrances, liens or other interests set forth in the schedule of endorsements.

REGISTRAR-GENERAL (n)

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 92 FILED PLAN 166444 IN THE AREA NAMED ADELAIDE HUNDRED OF ADELAIDE

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

8003092 LEASE TO GREYHOUND PIONEER PTY. LTD. COMMENCING ON 23.2.1995 AND EXPIRING ON 18.10.2001 This plan is scanned for Certificate of Title 161/121



Note : Subject to all lawfully existing plans of division PAGE 2 OF 2



REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5060 FOLIO 608 *

COST :	\$16.10	(GST exempt)	
REGION :	GROUND	FLOOR, L.T.O.	- LGHP12
AGENT :	GRFL	BOX NO : 000	
SEARCHED	ON : 04	/12/2006 AT :	1.5:13:29

PARENT TITLE : CT 4391/861 AUTHORITY : CONVERTED TITLE DATE OF ISSUE : 20/01/1992 EDITION : 2

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF TOWN HALL ADELAIDE SA 5000

DESCRIPTION OF LAND _____

ALLOTMENT I DEPOSITED PLAN 32560 IN THE AREA NAMED ADELAIDE HUNDRED OF ADELAIDE

EASEMENTS

NIL

SCHEDULE OF ENDORSEMENTS

_____ NIL

NCTATIONS ----

DOCUMENTS AFFECTING THIS TITLE _____

NIL

REGISTRAR-GENERAL'S NOTES

ND.

Page 1 of 2 The Registrar-General certifies that this Title Register Search displays the records maintained in the Register Book and other notations at the time of searching.



DIAGRAM FOR CERTIFICATE OF TITLE VOLUME 5060 FOLIO 608 SEARCH DATE : 04/12/2006 TIME: 15:13:29



0 7.5 15 22.5 30 Metres

Page 2 of 2



For a Certificate of Title issued pursuant to the Real Property Act 1886

REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5728 FOLIO 566 *

COST :	:	\$16.10 (GST	exempt)	PARENT TITLE	:	CT 1751/37
REGION :	:	GROUND FLOO	R, L.T.O.	- LGHP12	AUTHORITY	:	CONVERTED TITLE
AGENT :	:	GRFL BOX	NO : 000		DATE OF ISSUE	:	27/01/2000
SEARCHEE	כ	ON : 04/12/	2006 AT :	15:13:32	EDITION	:	1

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 94 FILED PLAN 199651 · IN THE AREA NAMED ADELAIDE HUNDRED OF ADELAIDE

EASEMDNIS

NIL

SCHEDULE OF UNDORSEMENTS

_____......

NT.L

NOTATIONS

DOCUMENTS AFFECTING THIS TITLE NIL

REGISTRAR-GENERAL'S NOTES

APPROVED FILED PLAN NO UNIQUE IDENTIFIER FX27788 CONVERTED TITLE WITH NEXT DEALING LODGE CT 1751/37

END OF TEXT.

Page 1 of 2 The Registrar-General certifies that this Title Register Search displays the records maintained in the Register Book and other notations at the time of searching.

Roghter-Gonomi (

SEARCH DATE: 04/12/2006 TIME: 15:13:32

THIS PLAN IS SCANNED FOR CERTIFICATE OF TITLE 1751/37





NOTE: SUBJECT TO ALL LAWFULLY EXISTING PLANS OF DIVISION

Page 2 of 2



For a Certificate of Title issued pursuant to the Real Property Act 1886

REGISTER SEARCH OF CERTIFICATE OF TITLE * * VOLUME 5833 FOLIO 247 *

COST	:	\$16.10 (GST èxempt)	Ţ	PARENT TITLE	:	CT 226 /124
REGION	:	GROUND FLOOR, L.T.O L	GHP12 7	AUTHORITY	:	CONVERTED TITLE
AGENT	:	GRFL BOX NO : 000	ī	DATE OF ISSUE	:	11/01/2001
SFARCHE	D	ON : 04/12/2005 AT : 15:	13:38 H	EDITION	:	Л.

REGISTERED PROPRIETOR IN FEE SIMPLE

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 96 FILED PLAN 199653 IN THE AREA NAMED ADELAIDE HUNDRED OF ADELAIDE

EASEMENTS

- - - - - - - - -

NTL

SCHEDULE OF ENDORSEMENTS

NIL

NOTATIONS

DOCUMENTS AFFECTING THIS TITLE

 NIL

REGISTRAR-GENERAL'S NOTES

APPROVED FILED PLAN NO UNIQUE IDENTIFIER FX27788 CONVERTED TITLE-WITH NEXT DEALING LODGE CT 226/124

END OF TEXT'.

Page 1 of 2 The Registrar-General certifies that this Title Register Search displays the records maintained in the Register Book and other potations at the time of searching



DIAGRAM FOR CERTIFICATE OF TITLE VOLUME 5833 FOLIO 247

SEARCH DATE : 04/12/2006 TIME: 15:13:38

THIS PLAN IS SCANNED FOR CERTIFICATE OF TITLE 226/124





NOTE: SUBJECT TO ALL LAWFULLY EXISTING PLANS OF DIVISION





REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5712 FOLIO 545

COST : \$16.10 (GST exempt) REGION : GROUND FLOOR, L.T.O. - LGHP12 AUTHORITY : CONVERTED TITLE AGENT : GRFL BOX NO : 000 SEARCHED ON : 04/12/2006 AT : 15:13:44

PARENT TITLE : CT 1922/48 DATE OF ISSUE : 22/11/1999 : 1 EDITION

REGISTERED PROPRIETOR IN FEE SIMPLE ------

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001

DESCRIPTION OF LAND

ALLOTMENT 97 FILED PLAN 199654 IN THE AREA NAMED ADELALDU HUNDRED OF ADELAIDE

EASEMENTS

.

NIL

SCHEDULE OF ENDORSEMENTS

NIL

NOTATIONS

DOCUMENTS AFFECTING THIS TITLE ____

NIL

REGISTRAR GENERAL'S NOTES

APPROVED FILED PLAN NO UNIQUE IDENTIFIER FX27788 CONVERTED TITLE-WITH NEXT DEALING LODGE CT 1922/48

END OF TEXT.

Page 1 of 2 The Registrar-General certifies that this Title Register Search displays the records maintained in the Register Book and other notations at the time of searching



SEARCH DATE : 04/12/2006 TIME: 15:13:44

THIS PLAN IS SCANNED FOR CERTIFICATE OF TITLE 1922/48







NOTE: SUBJECT TO ALL LAWFULLY EXISTING PLANS OF DIVISION

Page 2 of 2



For a Certificate of Title issued pursuant to the Real Property Act 1886

REGISTER SEARCH OF CERTIFICATE OF TITLE * VOLUME 5735 FOLIO 127

COST :	:	\$16.10	(GST exempt)
REGION :	:	GROUND	FLOOR, L.T.O LGHP12
AGENT :	:	GRFL	BOX NO : 000
SEARCHEI)	ON : 04	/12/2006 AT : 15:13:48

PARENT TITLE : CT 1639/119 AUTHORITY : CONVERTED TITLE DATE OF ISSUE : 17/02/2000 EDITION : 1

REGISTERED PROPRIETOR IN FEE SIMPLE ------

THE CORPORATION OF THE CITY OF ADELAIDE OF GPO BOX 2252 ADELAIDE SA 5001.

DESCRIPTION OF LAND

_____ ALLOTMENT 93 FILED PLAN 199650 IN THE AREA NAMED ADELAIDE HUNDRED OF ADELAIDE

EASEMENTS

.

NIL

SCHEDULE OF ENDORSEMENTS

______ • .

NIL

NOTATIONS

DOCUMENTS AFFECTING THIS TITLE

NIL

REGISTRAR-GENERAL'S NOTES --------

APPROVED FILED PLAN NO UNIQUE IDENTIFIER FX27788 CONVERTED TITLE-WITH NEXT DEALING LODGE CT 1639/119

END OF TEXT.

Page 1 of 2 The Registrar-General certifies that this Title Register Search displays the records maintained in the Register Book and other notations at the time of searching



DIAGRAM FOR CERTIFICATE OF TITLE VOLUME 5735 FOLIO 127

SEARCH DATE: 04/12/2006 TIME: 15:13:48

THIS PLAN IS SCANNED FOR CERTIFICATE OF TITLE 1639/119





NOTE: SUBJECT TO ALL LAWFULLY EXISTING PLANS OF DIVISION

Page 2 of 2

APPENDICES B – G (ON CD)

5.5

APPENDIX B – BC TONKIN AUDIT REPORT (JULY 1997) INCLUDING RUST PPK SITE HISTORY REPORT (MARCH 1997) & RUST PPK ESA (JULY 1997) APPENDIX C – MAUNSELL SOIL & GROUNDWATER INVESTIGATION (NOVEMBER 2004) APPENDIX D – TIERRA ADDITIONAL INVESTIGATIONS (JULY 2005) APPENDIX E – TIERRA REMEDIATION REPORT (SEPTEMBER 2006) APPENDIX F - GROUNDWATER DATABASE SEARCH RESULTS APPENDIX G – TIERRA SITE MANAGEMENT PLAN (NOVEMBER 2006)

SOIL & GROUNDWATER





Communications Document

PROJECT	Notification of Request to 85 – 129 Franklin Street,	Prepare a Site Adelaide (Bus	e Audit Report s Station Site)			ADELAIDE TONKIN CONSULTING
JOB NO	2004.0421	DATE	24/06/04	TIME	11:28	5 COOKE TERRACE
SENDER	Mr Andrew Nunn	96 				T +61 8 8273 3100
то	EPA					F +61 8 8273 3110
ATTENTION	Mr Mike Fanning / Ms	Wendy Boyc	e			đ adəlalde@tonkin.com.au
ADDRESS						MOUNT GAMBIER
FACSIMILE NO	8204 2025	PAGES	2			JONES TONKIN
cc						1 KRUMMEL STREET MOUNT GAMBIER SA 5290
			TRANSMITTAL			PO BOX 1192 MOUNT GAMBIER SA 5291
THESE MATTER					OVAL	T +61 8 8723 5002
					ECTION	F +61 8 8723 5004 E mtgamblor@tonkin.com.au

Dear Mike / Wendy,

I, Andrew Nunn, a person appointed as an Environmental Auditor (Contaminated Land) by the Environmental Protection Authority under Section 53 of the Environmental Protection Act 1970 (Vic), have been requested to prepare a Site Audit Report for the above site. Details are as follows;

Person requesting Site Audit Report:	Adelaide City Council
Relationship to site:	Owner
Date of request:	8 th June 2004
Site address:	85 – 129 Franklin Street, Adelaide
Municipality:	Adelaide City Council
Title details:	See table attached (Page 2)
Site plan attached:	No Will Follow Shortly
Estimated completion date:	30 th June 2009

In notifying EPA of this request, I state that I am not aware of any conflict of interest, and I have not had prior involvement in assessment or clean-up works at the site, which would preclude me from preparing a Site Audit Report for the site.

IRANSMIT NO	SENT BY	DATE	TIME
		A stand for the second stand stand	

NOTE. The Information in this lacsimile message is confidential and may be legally privilaged. If the reader of this mossegn is not the infonded recipioni you are hareby nalified that any use, dissemination, distribution or reproduction of this message by you or at your instigation is prohibited. If you have received this message in error please notify us invnediately and return the original message to us.

T & R NOMINEES PTY LTD ACH 807 808 608 A3 TRUSTEE FOR T & R UNIT TRUST ADN \$8 638 962 961 TRADING AD TONKIN GONCULTING AND JONED TONKIN EDG OF THE ASSOCIATION OF CONSULTING ENGINEERS ALIGTRALIA

CIVIL INFRASTRUCTURE

- WATER RESOURCES
- D STORMWATER MANAGEMENT
- C ROAD SAFETY AND TRAFFIC
- D BUILDING SURVEYING
- D ELECTRICAL, MECHANICAL

LI ENVIRONMENTAL



I wish to note that I have discussed with Mike Fanning of SA EPA (17 June 2004) the reasons for the delay in formal notification of my engagement to undertake an audit.

Should you have any queries, please do not hesitate to contact me on 8431 7113.

Yours sincerely, Andrew Nunn

ĺ

Andrew Nunn Environmental Auditor (Contaminated Land)

Certificate	Land Title Details	Site Area		
of Title		(approx m2)		
Eastern Site of Bowen Street				
226/124	Town Acre 203	1983,80		
1639/119	Town Acre 310	2760.50		
1663/99	Town Acre 309	83.6		
1751/37	Town Acre 311	648.8		
1922/48	Town Acre 263	986.26		
5060/608	A 1 DP 32560	580.00		
5317/61	A 12 DP 546	149.6		
5317/62	A 91 FP 166443	348.69		
5317/63	A 92 FP166444	271.50		
5317/64	A 93 FP 166445	526.90		
5317/65	A 91 FP 170401	816.37		
Western Side of Bowen Street				
2023/96	Town Acre 311	260.67		
2128/45	Town Acre 311	257.80		
2201/187	Town Acre 311	259.70		
3479/180	Town Acres 261 & 262	1744.00		
3582/78	Town Acre 261	509.7		
3582/79	Town Acre 262	490.04		
3582/80	Town Acres 261 & 262	1122.90		
3841/122	LTRO Plan 546	340.6		

Received 8/09/09

DM .



85 - 107 FRANKLIN STREET, ADELAIDE - FORMER BUS STATION SITE

Name Of Auditor	Andrew Nunn	
Name of Auditor's Company or Business	Soil and Groundwater Consulting	
EPA Reference	14295	
Name of Audit Site	Former Franklin Street Bus Station site	
Address of Audit Site	85-107 Franklin Street, Adelaide	
Name, Business Address and Position of Person who Terminated the Audit:	Mr Andrew Nunn Environmental Auditor 207 The Parade, Norwood	
Certificates of Title	Stage 1 – Site Audit Review was completed for this site in October 2006 Stage 2 Certificate of Titles Volume 5557 Folio 418, FP 181238 Allotment 396 Volume 5557 Folio 419, DP 546 Allotment 3 Volume 5810 Folio 890, DP 546 Allotment 5 Volume 5557 Folio 419, DP 546 Allotment 2 Volume 5810 Folio 890, DP 546 Allotment 6 Volume 5557 Folio 420, DP 546 Allotment 6 Volume 5557 Folio 420, DP 546 Allotment 1 Volume 5704 Folio 698, FP 199648 Allotment 91 Volume 5692 Folio 9, FP 199649 Allotment 92 Volume 5688 Folio 796, FP 199652 Allotment 95 Volume 5843 Folio 256, RP 6347, Allotment A	
Authority of Person who Terminated the Audit	Auditor	
Date Audit Terminated	30 June 2009	
Reasons for Termination	In accordance with the requirements of the <i>Environment</i> <i>Protection (Site Contamination) Regulations 2008,</i> this audit which was commenced under the Victorian Audit system is being terminated to facilitate transfer of the Audit to the SA Audit system on 1 st July 2009.	



Notification by auditor after commencement of audit

EPA

South Australia

AUTHORITY

SITE CONTAMINATION AUDIT SYSTEM NOTIFICATION BY AUDITOR AFTER COMMENCEMENT OF AUDIT

INSTRUCTIONS

Section 103Z(1) of the Environment Protection Act 1993 (the Act), requires that:

103Z–Requirements relating to site contamination audits

(1) A site contamination auditor must, within 14 days after the commencement of a site CEN contamination audit for which the auditor is the responsible auditor, notify the Authority in writing of the person who commissioned the audit and the location of the tand to which the audit ENVIRONMENT PROTECTION is to relate.

Penalty: Division 5 fine.

As required under section 103Z(3), a notification under subsection (1) must be in the form prescribed in Schedule 4, Part 1 of the Environment Protection (Site Contamination) Regulations 2008 (the Regulations).

The form, Notification by auditor after commencement of audit, must be completed by the 'responsible auditor' under the Act and the Regulations. This is the auditor who personally carried out or directly supervised the work involved in the audit.

Please ensure that all sections of the form are completed, requested information and attachments (where necessary) are provided and labelled as indicated.

Please do not modify the form and do not write within the areas for EPA USE ONLY.

Commencement of audit forms must be sent to:

Manager, Site Contamination Branch **Environment Protection Authority GPO Box 2607** Adelaide SA 5001

For any enquiries or questions relating to the site contamination audit system, contact the EPA Site Contamination Branch on:

Telephone: (08) 8204 2004

Email: <epainfo@epa.sa.gov.au>

16 1 2009	
05/13314	-
DAMELLE MERCORPULA	

EPA GENI Reference >117 KC (EPA use only)

NOTIFICATION BY AUDITOR AFTER COMMENCEMENT OF AUDIT (under section 103Z of the *Environment Protection Act 1993*)

SECTION A: AUDITOR DETAILS	
Name of auditor*:	Andrew Nunn
* This form must be completed by the 'responsible auditor' under the Act and Regulations. This is the auditor who personally carried out or directly supervised the work involved in the audit.	
Auditor's accreditation number:	2009019
Term of auditor's accreditation:	1 July 2009 to 1 July 2012
Name of auditor's company or business:	Soil and Groundwater Consulting
Auditor's project reference:	SG041157
SECTION B: AUDIT SITE DETAILS	
Name of audit site [<i>if applicable</i>]:	Franklin Street Bus Station Stage 2
Address of audit site:	Franklin Street, Adelaide
Name of council for area in which audit site is situated [<i>if within council area</i>]:	Adelaide City Council
Provide the following particulars** relating to the relevant land and the audit site:	
** If insufficient space, details may be annexed to this form	
 certificates of title of all the relevant land and an indication of whether the audit site comprises all or part only of the land shown on or described in the certificates of title 	Stage 2 Certificate of Titles Volume 5557 Folio 418, FP 181238 Allotment 396 Volume 5557 Folio 419, DP 546 Allotment 3 Volume 5810 Folio 890, DP 546 Allotment 5 Volume 5557 Folio 419, DP 546 Allotment 5 Volume 5557 Folio 419, DP 546 Allotment 2 Volume 5557 Folio 419, DP 546 Allotment 2 Volume 5557 Folio 419, DP 546 Allotment 4 Volume 5557 Folio 420, DP 546 Allotment 6 Volume 5557 Folio 420, DP 546 Allotment 1 Volume 5704 Folio 698, FP 199648 Allotment 91 Volume 5692 Folio 9, FP 199649 Allotment 92 Volume 5688 Folio 796, FP 199652 Allotment 95 Volume 5843 Folio 256, RP 6347, Allotment A
 sufficient details to identify the location of the land, including section or allotment numbers, area and hundred and AMG co-ordinates (GDA 94, UTM 53 and 54) 	E: 280312.38, N: 6132331.32
- audit plans indicating the location and extent of the audit site (which must comply with the guidelines issued by the EPA from time to time)	Please refer to attached plan.
Name of owner of audit site:	Corporation of The City of Adelaide
Name of occupier of audit site:	Partially occupied by various commercial uses

SECTION C: AUDIT DETAILS		
Name, business address and position of person who commissioned audit:	Alan Faunt, Consultant, Adelaide City Council, 25 Pirie Street, ADELAIDE, SA, 5000	
Indicate authority of person who	EPA Yes 🗌 No 🖂	
commissioned audit:	Owner Yes 🖂 No 🗔	
	Occupier Yes 🗌 No 🖂	
	Developer Yes 🗌 No 🔀	
	Other [please specify]	
Indicate reasons for audit [indicate all	Required under the Development Act 1993	
reasons]:	Yes 🖂 No 🗌	
	Required under the Environment Protection Act 1993	
	Yes 🗌 No 🖂	
	Other [please specify]	
If audit is required under the <i>Environment</i> <i>Protection Act 1993</i> , provide EPA reference number:	N/A	
Indicate audit purposes [<i>indicate all purposes</i>]:	Determining the nature and extent of any site contamination present or remaining on or below the surface of the site.	
	Yes 🖂 No 🗌	
	Determining the suitability of the site for a sensitive use or another use or range of uses.	
	Yes 🛛 No 🗌	
	Determining what remediation is or remains necessary for a specified use or range of uses.	
	Yes 🖂 No 🗌	
	[NB: an audit under the Development Act 1993 may be required for all of the above purposes.]	
Date of commencement of audit:	1st July 2009	
Estimated date of completion of audit:	31 st December 2010	

If this audit is one of a series of audits to be undertaken in relation to the audit site, indicate the total number of audits proposed to be undertaken (if known) and the completion or estimated completion dates for those audits (if known)**:

** If insufficient space, details may be annexed to this form.

1

3

4

Indicate:

Proposed site use:	Residential
Current site use, or, if currently unoccupied, most recent site use:	Former Bus Station
Notification by auditor after commencement of audit

If audit is required for development consent under the Development Act 1993 indicate:

relevant planning authority:	Development Assessment Commission
development application number [if known]:	N/A
site zoning:	Mixed Use Zone

DECLARATION

I am not aware of any conflict of interest within the meaning of section 103X of the Environment Protection Act 1993 that would preclude me from undertaking this audit.

To the best of my knowledge, all information provided in this form is current and correct at the time of signing and dating.

Signed: September 2009. 15 Dated:

[auditor must personally sign the form]

This notification must be lodged with the EPA.

Details of this notification will be recorded in the public register kept by the EPA under section 109 of the Environment Protection Act 1993.





500Z/01/0Z

A September 2004

SITE CONTAMINATION AUDIT SYSTEM NOTIFICATION BY AUDITOR AFTER TERMINATION (BEFORE COMPLETION) OF AUDIT



INSTRUCTIONS

Section 103Z(2) of the Environment Protection Act 1993 (the Act), requires that:

103Z-Requirements relating to site contamination audits

(2) A site contamination auditor must, within 14 days after the termination before completion of a site contamination audit for which the auditor was the responsible auditor, notify the Authority in writing of the termination and the reasons for the termination.

Penalty: Division 5 fine.

Regulation 66 of the Environment Protection Regulations 2009 (the Regulations) requires that:

66-Notifications by auditors after commencement or termination of audit (section 103Z(3))

For the purposes of section 103Z(3) of the Act-

(b) a notification by a site contamination auditor of the termination before completion of a site contamination audit for which the auditor is or was the responsible auditor must be in the form set out in Schedule 3 clause 7.

The form, *Notification by auditor after termination (before completion) of audit,* must be completed by the 'responsible auditor' under the Act and the Regulations. This is the auditor who personally carried out or directly supervised the work involved in the audit.

Please ensure that all sections of the form are completed, requested information and attachments (where necessary) are provided and labelled as indicated.

Please provide the current Certificate of Title information relevant to the audit termination as an annexure to the form.

Please do not modify the form and do not write within the areas for EPA USE ONLY.

Termination of audit forms must be sent to:

Manager, Site Contamination Branch Environment Protection Authority GPO Box 2607 Adelaide SA 5001

Forms can also be emailed in pdf format to the Manager and your allocated EPA coordinator.

For any enquiries or questions relating to the site contamination audit system, contact the EPA Site Contamination Branch on:

Telephone: (08) 8204 2004

Email: < EPASiteContam@epa.sa.gov.au>

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Notification by auditor after termination (before completion) of audit

EPA GENI Reference

(EPA use only)

SECTION A: AUDITOR DETAILS	
Name of auditor*:	Andrew Nunn
Auditor's accreditation number:	2009019
Name of auditor's company or business:	Soil and Groundwater Consulting
SECTION B: AUDIT SITE DETAILS	
EPA reference:	60117
Name of audit site [if applicable]:	Franklin Street Bus Station Stage 2
Address of audit site:	Franklin St, Adelaide
SECTION C: AUDIT TERMINATION DETAI	LS
Name, postal address and position of person who terminated audit:	Alan Faunt, Consultant, Adelaide City Council, 25 Pirie Street, ADELAIDE, SA, 5000
Indicate authority of person who terminated audit:	EPA Yes No Owner Yes No Occupier Yes No Developer Yes No Auditor Yes No Other<[please specify]
Date audit terminated:	30/04/2012
Reasons for termination**; * If insufficient space, details may be innexed to this form,	Site Contamination Audit Report terminated as part of rationalization of audits by the Auditor and the surrender of his accreditation. Works have not progressed on Stage 2 and proponent will engage an auditor once the project is re-initiated

NOTIFICATION BY AUDITOR AFTER TERMINATION (BEFORE COMPLETION) OF AUDIT (under section 1037 of the Environment Prote

DECLARATION

To the best of my knowledge, all information provided in this form is current and correct at the time of signing and dating.

Signed*:

Dated: 30/04/2012

" This form must be completed and signed by the 'responsible auditor', being, under the Environment Protection Act 1993 and the Environment Protection Regulations 2009, the auditor who personally carried out or directly supervised the work involved in the audit.

This notification must be lodged with the EPA.

Details of this notification will be recorded in the public register kept by the EPA under section 109 of the Environment Protection Act 1993.

NOTIFICATION BY AUDITOR AFTER TERMINATION (BEFORE COMPLETION) OF AUDIT Attachment - Certificate of Title Details.

Certificate	Land Title Details	
of Title		
5557/418	A396 FP 181238	
5557/419	A 3 DP 546	
5810/890	A 5 DP 546	
5557/419	A200546	- Kepeated
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5557/420	A 1 DP 546	
5704/698	A 91 FP 199648	
5692/9	A 92 FP 199649	_
5688/796	A 95 FP 199652	
5843/256	A A RP 6347	-



Corporation of the City of Adelaide

FRANKLIN STREET BUS STATION AND CAR PARKS

SITE AUDIT REPORT

Report No. 97.0307/1

31 July 1997

BC TONKIN & ASSOCIATES Consulting Engineers 55 Queen Street ADELAIDE SA 5000

ACN 007 860 586

Telephone:(08) 8223 5583Facsimile:(08) 8223 5237Email:reception@bctonkin.com.au

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Corporation of the City of Adelaide Franklin Street Bus Station and Car Parks Site Audit Report

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APPENDICES

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A. Rust PPK Pty Ltd, 1997, Site History Report for the Franklin Street Bus Station, Located at 85-129 Franklin Street, Adelaide, for the Corporation of the City of Adelaide, 6 March 1997

B. Rust PPK Pty Ltd, 1997, Environmental Site Assessment, Franklin Street Bus Station and Car Parks, for the Corporation of the City of Adelaide, 30 June 1997

1. SUMMARY INFORMATION

This audit report has been prepared for the Franklin Street Bus Station and Car Parks, located at 85-129 Franklin Street, Adelaide (see Location Plan, Figure 1.1). The report has been prepared in accordance with guidelines provided in the South Australian Environment Protection Authority (EPA) Special Bulletin No. 1, 20 October 1995, *The Use of Environmental Auditors: Contaminated Land*, and the Victorian Environment Protection Authority (VicEPA) Guidelines for Environmental Auditors Contaminated Land, Issue of Certificates of Environmental Audit, WH 91/14, May 1992.

The Site Audit Report is based on site conditions at the time of issue of the report. The environmental auditor cannot be responsible for future activities on the site, or off site impacts, which may result in subsequent contamination of the site.

The purpose of the Site Audit Report is to present the auditor's opinion on the environmental condition of the site.

Summary information is set out as follows:

• Name of auditor

Mr Adrian Hall of BC Tonkin & Associates

• Date of appointment as an Accredited Environmental Auditor under the Environment Protection Authority Act, 1970, Victoria

7 January 1997

Name of person making a request for a Site Audit Report -

Mr Brian Fitzpatrick, Corporation of the City of Adelaide

• Address of the site being audited

85-129 Franklin Street, Adelaide



Lands Title Information

Allotment details are as follows:

Eastern Side of Bowen Street

Certificate of Title	Part Town Acre/Plan No	Area (m ²)
Volume 226, Folio 124	Town Acre 263	1983.80
Volume 1639, Folio 119	Town Acre 310	2760.50
Volume 1663, Folio 99	Town Acre 309	83.60
Volume 1751, Folio 37	Town Acre 311	648.80
Volume 1922, Folio 48	• Town Acre 263	986.26
Volume 5060, Folio 608	Allotment 1 in DP 32560	580.00
Volume 5317, Folio 61	Allotment 12 in DP 546	149.60
Volume 5317. Folio 62	Allotment 91 in FP 166443	348.69
Volume 5317, Folio 63	Allotment 92 in FP 166444	271.50
Volume 5317 Folio 64	Allotment 93 in FP 166445	526.90
Volume 5317, Folio 65	Allotment 91 in FP 170401	816.37
	TOTAL	9156.02

Western Side of Bowen Street

Certificate of Title	Part Town Acre/Plan No	Area (m ²)
Volume 2023, Folio 96 Volume 2128, Folio 45 Volume 2201, Folio 187 Volume 3479, Folio 180 Volume 3582, Folio 78 Volume 3582, Folio 79 Volume 3582, Folio 80 Volume 3841, Folio 122	Town Acre 311 Town Acre 311 Town Acre 311 Town Acres 261 & 262 Town Acre 261 Town Acre 262 Town Acres 261 & 262 LTRO Plan 546	260.67 257.80 259.70 1744.00 509.70 490.04 1122.90 340.60

TOTAL 4985.41

• Land Use Zoning

The site is part of the F8 Franklin Street East Precinct

Names of current site owner and occupier

The Corporation of the City of Adelaide

Corporation of the City of Adelaide Franklin Street Bus Station and Car Parks Site Audit Report, No. 97.0307/1, 31 July 1997

والمعجود وأتراف المرا

Documentation reviewed

Rust PPK Pty Ltd, 1997, Site History Report for the Franklin Street Bus Station, Located at 85-129 Franklin Street, Adelaide, for the Corporation of the City of Adelaide, 6 March 1997

Rust PPK Pty Ltd, 1997, Environmental Site Assessment, Franklin Street Bus Station and Car Parks, Adelaide, for the Corporation of the City of Adelaide, 30 June 1997

Corporation of the City of Adelaide Franklin Street Bus Station and Car Parks Site Audit Report, No. 97.0307/1, 31 July 1997

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2. INTRODUCTION

Mr Adrian Hall of BC Tonkin & Associates has been appointed by the Corporation of the City of Adelaide to act as an environmental auditor for the Franklin Street Bus Station and Car Parks.

The site is described on the current Certificates of Titles as listed above. The current Certificates of Title show the site to be owned by the Corporation of the City of Adelaide.

The site contains the following features

Eastern Side of Bowen Street

- the Greyhound and McCafferty's Express bus terminals and canopy, on the north eastern side of Bowen Street (referred to collectively as 'Bus Depot 1')
- a single storey house, a private car park, a toilet block and a two storey building and adjacent car park, all utilised by the Adelaide Central Mission, on the eastern side of Bowen Street, in the south of the site (referred to collectively as '104 Grote Street')
- two bitumen sealed public car parks in the east of the site, owned and operated by the Corporation of the City of Adelaide (referred to as the Grote Street Car Park and the Franklin Street Car Park, respectively)

Western Side of Bowen Street

- the Premier Stateline bus terminal, canopy and private car park on the north west of the site (referred to collectively as 'Bus Depot 2')
- the Coachfreight parcel collection and drop off point, including storage shed, on the west of the site
- a bitumen sealed private car park in the south west of the site

A Site Plan, including sampling locations, is given in Figure 2.1.

The extent of the audit is also shown on Figure 2.1. It should be noted that as no soil testing was undertaken under the canopies, or under the floor slabs of the buildings, the extent of this audit has necessarily been confined to the open space areas of the site, with a total areal extent of approximately 0.98 hectares.

The site is surrounded by the following properties

- Dreamland Furniture and a disused warehouse to the east
- light industrial facilities to the west
- Franklin Street to the north
- Andrews Street, the Grote Street Church of Christ and Grote Street to the south.



Further background information on the Franklin Street Bus Station and Car Parks site is contained in the Site History Report prepared by Rust PPK. A copy of the document is provided in Appendix A.

Rust PPK Pty Ltd was commissioned by the Corporation of the City of Adelaide to undertake a comprehensive environmental assessment of the Franklin Street Bus Station and Car Parks site. The results of this work have been reported in the following document:

Rust PPK Pty Ltd, 1997, Environmental Site Assessment, Franklin Street Bus Station and Car Parks, Adelaide, for the Corporation of the City of Adelaide, 30 June 1997

A copy of the above document is provided in Appendix B. The assessment report should be read in conjunction with this audit.

The role of BC Tonkin & Associates in the audit of this site involved

- inspections of the site
- liaison with Rust PPK during their investigations
- assessment of the information provided in the above report.

No additional fieldwork was conducted by BC Tonkin & Associates during this audit.

3. SUMMARY OF ENVIRONMENTAL SITE ASSESSMENT

3.1 Background Studies

3.1.1 Site Identification and Description

This section of the assessment carried out by Rust PPK consisted of the following components

- site identification
- site description
- site ownership
- site topography
- local soil types
- local and regional groundwater.

Site identification and ownership have been described in Section 2.

The Rust PPK report provides comment on site topography and local soil types.

Comments on soil types and groundwater are provided in Section 3.1.3.

3.1.2 Site History

The site history section of the assessment incorporates the following elements

- historical overview
- summary of potential site contamination issues.

According to the site history prepared by Rust PPK

- from 1850 until the early 1900s the site was used generally for residential purposes, but there were also a number of commercial premises, including a garage, forge, workshop, bakehouse, and a private road
- from the 1920s a number of small light industries were established on the site; these included a factory, garages, forges, stables, printing works, workshops, shops and offices
- during the 1960s a large proportion of the residential land in the western part of the site had been cleared, and was used as an open lot car park
- by 1972 the Corporation of the City of Adelaide had acquired most of the land comprising the site, except for 104 Grote Street; the land was then cleared, and by 1979 the majority of the existing bus terminals and car parks had been constructed
- the residences on the 104 Grote Street site were acquired by the Corporation of the City of Adelaide in the early 1990s, and are currently used by the Adelaide Central Mission; the

front part of the building at 104 Grote Street has been condemned by the Council due to problems with rust and cracking

• between 1989 and 1995, a new terminal building was constructed on the eastern side of Bowen Street, on what was previously either car or bus parking space.

3.1.3 Geology and Hydrogeology

Support

The Rust PPK report suggests that the soil profile at the site can be expected to include in the order of 1.0 m of surface fill, consisting of various reworked soils and building rubble. Underlying this the profile is likely to resemble a Brown Solonised Soil Type BS classification. Such profiles consist of brown sandy to clayey soils with abundant earthy lime and calcrete in the subsoil. Such soils vary from a thin layer to up to 3 m thick, and the layer overlies Hindmarsh Clay.

MESA records indicate regional standing groundwater levels at depths ranging from approximately 6 m to up to 40 m. No groundwater was encountered during the on-site drilling programme to a maximum depth of 2.3 m.

3.1.4 Potential Site Contamination Issues

Based on information obtained from the Site History investigation, Rust PPK considered that the following potential contamination may be present on site as a result of past on-site and adjacent activities

- Polycyclic Aromatic Hydrocarbon (PAH) contamination from the tar based subbase materials that may have been used beneath bitumen in the past, and from possible waste products associated with coal fires or furnaces
- Organochlorine Pesticide (OCP) contamination from the possible use of white ant treatments beneath former buildings
- possible petroleum contamination from the leakage of fuel or oil from vehicles
- possible heavy metal contamination from activities associated with a plumbing business, forging, oxy-welding, radio and electrical companies, wrecking and auto-mechanics or printing works, all of which existed on the site in the past.

3.2 Site Investigations

3.2.1 Soil Sampling

Rust PPK's sampling locations were based on a nominal grid across the site, and comprised 20 boreholes (refer to Figure 2.1). Sampling locations were agreed on site between Rust PPK and the auditor.

In general, 3 - 4 soil samples were collected from the top 1.0 m of the soil core, with an additional 1 - 3 samples recovered between 1.0 m and 2.0 m, and 1 sample below 2.0 m if the

borehole was drilled past 2.0 m. The specific sample depths were however dependent on the soil profile at each location.

3.2.2 Soil Conditions Encountered

Rust PPK reported that the soil conditions encountered during drilling could be summarised as follows

fill materials

- surface layer of yellow silty sand with some gravel overlying dark brown silty clays to depths ranging from 0.5 m to 1.2 m
- brick fragments and cinders in 13 out of the 20 boreholes, and fragments of vesicular slag were identified in one of the boreholes

natural sediments

- calcareous silty clays with some calcareous gravel to about 2.0 m
- at some boreholes the soil became greenish brown at around 2.0 m as it became Hindmarsh Clay.

Environmental soil monitoring borelogs are presented in Appendix D of the Rust PPK report. A site plan showing the approximate area of fill materials containing ash, cinders and/or slag is contained in Appendix E of the Rust PPK report.

3.2.3 Laboratory Analysis Programme

A total of 22 soil samples was submitted to the primary laboratory (AGAL) for analysis. 2 inter-laboratory duplicates were sent to the secondary laboratory (MGT) for analysis.

The samples were analysed for a range of chemical analytes, including

- pH
- heavy metals
- polycyclic aromatic hydrocarbons (PAHs)
- organochlorine pesticides (OCPs)
- total petroleum hydrocarbons (TPH)
- monocyclic aromatic hydrocarbons (BTEX)
- polychlorinated biphenyls (PCBs), phenols, chlorinated hydrocarbons, cyanide, fluoride.

Table 3.1 shows the full range of soil samples taken from each borehole, and the chemical analytes for each sample analysed.

In particular, 2 field duplicate samples and the 2 inter-laboratory duplicate samples were analysed for the full Victorian EPA screen.

The primary laboratory was Australian Government Analytical Laboratories (AGAL).

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Summary of Sampling & Analysis, FRANKLIN.XI.S. 21/7'97

The secondary laboratory was MGT Environmental Consulting Pty Ltd (MGT).

Both laboratories are NATA certified for all the nominated soil analyses.

3.2.4 Field Observations and Headspace Analysis

Rust PPK have advised that during the drilling and sampling programme, headspace testing was undertaken on soil from various depths at the majority of the boreholes drilled. A second set of between 2 and 5 samples was collected from each borehole, and transferred to labelled, resealable plastic bags. These samples were then left for approximately 20 minutes before the headspace analysis was undertaken, to determine the presence of volatile organic hydrocarbons, using a photoionisation detector (PID).

Due to operational difficulties with the PID during the sampling programme, PID readings were not taken at every borehole.

Rust PPK advised that the concentrations of VOCs detected by the PID were generally quite low (< 20 ppm); however, where the concentrations detected were elevated (e.g. > 50 ppm), the soil sample from around that depth was analysed for TPH/BTEX.

No visible or olfactory evidence of hydrocarbon contamination was recorded within the surface or subsurface soils at any of the boreholes.

3.2.5 Assessment Criteria

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For the purpose of assessing potential long term human health risks, Rust PPK adopted the SAHC (1993) Health Investigation Levels as the initial investigation levels.

For the purpose of assessing potential environmental risks, Rust PPK adopted the ANZECC/NH&MRC (1992) Environmental Investigation Levels as the initial investigation levels.

As a preliminary aid in the evaluation of site specific health based risk analysis, the SAHC (1996) Proposed Health Based Soil Guidelines were used as reference criteria.

For the purpose of the preliminary contamination assessment, the criteria nominated within SAHC (1993) and ANZECC/NH&MRC (1992) were referenced as the primary assessment criteria.

For the purpose of the preliminary health risk assessment, the SAHC (1996) Proposed Health Based Soil Guidelines Exposure Settings D (residential with restricted soil access) and F (commercial/industrial) were used as the reference criteria.

In the case of analytes not covered by the nominated criteria, the Dutch Investigation and Intervention values were referenced. The former Dutch C levels and the NSW EPA Guidelines for Assessing Service Station Sites were used as guidelines for TPH/BTEX.

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Tabla 3.2 Laboratory Rasults : Soll - pH, Heavy Matals, PAHs

								0110	01111	70	V	BH5	RH6	BH7	BH8	- AHR	I NIHR				
					Bc Sample D Sample D	sentole No Sample No epth (mh) apth (max) Soll Type QA/QC	8H1 80 700 FILL	8F12 1800 2000 FiLL	600 1000 FILL	450 600 FILL	450 600 Fill	800 1000 Silty Clay	650 750 71LL	400 500 FILL \$	800 1000 3illy Clay \$	2000 2100 Silty Ctay	700 850 Silty Clay	800 1000 Silty Clay	550 700 FILL	550 700 FILL ILD	
Contaminants (mg/kg)	Detection Limit (ing/kg)	ANZECC/ NHMRC ⁽¹⁾	ASSes ANZECC/ NHMRC ⁽¹⁾	SAHC SAHC HIL a	Sriteria: NEHF ¹⁰ D	NEHIF (3) F						-		******	****					****	
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Table 1, Proposed Health Investigation Levels (ANZECCR41hAPC, 1982).
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pH, metals, PAHS, FRANKLIN XIS, 217797

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Table 3.2 Laboratory Rasults : Soll - pH, Heevy Matels, PAHs

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					-	Soll Type DA/OC	FILL	LR FL	FILL	Silly Clay	Silly Clay ILD	FILL	FILL	FILL	LILL	LILL	BH4/D 7	BH13/D 7	LR
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pH, metals, PAHs, FTANKLIN.XIS, 21/7/97

BC Tonkin and Associates

3.2.9 Findings and Conclusions

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Based on the laboratory results, and field observations, the findings of the environmental site assessment were reported by Rust PPK to be as follows (refer to the Executive Summary of the Rust PPK report):

"The assessment program undertaken during May 1997 has identified elevated concentrations of heavy metals (lead, zinc, and copper) in excess of the ANZECC environmental and/or the SAHC health based guidelines within the fill materials recovered from:

- the driveway of the Coachfreight parcel collection and drop off point to the west of Bowen Street (BH4, lead and zinc only);
- the north east corner of the Grote Street public car park (BH14); and
- the centre of the car park adjacent the storage building at 104 Grote Street used by the Adelaide Central Mission (BH20, zinc only).

"An elevated PAH (benzo(a)pyrene) concentration in excess of the SAHC health based guidelines, was identified within the fill materials in the car park adjacent the storage building at 104 Grote Street (BH20). Elevated Total fluoride concentrations were identified within the surficial fill materials recovered from the north eastern corner of the Franklin Street Car Park and the south eastern corner of the Grote Street Car Park. These elevated levels of heavy metals, PAHs and fluoride are considered to be associated with fragments of ash, cinders and/or slag which were observed within the sub-surface soil profile within these locations.

"Fragments of ash, cinders and/or slag were identified in thirteen out of the twenty sampling locations at the site and although elevated PAH, heavy metal and fluoride concentrations were not reported at all of these locations, it is considered that the relatively low proportion of the materials within the overall soil matrix may be resulting in a dilution effect on the analyte levels within the overall matrix. This therefore indicates the potential for high concentrations of localised (hotspot) PAH contaminants within the fill materials in boreholes BH4 and BH18 located on the western side of Bowen Street, and in all of the boreholes located on the eastern side of Bowen Street with the exception of boreholes BH9 and BH11. The fill materials containing ash and cinder fragments were generally identified to depths ranging from 0.5 m to 0.7 m across the site.

"The surficial fill materials and the underlying natural soil were identified as being moderately alkaline, with soil pH at all locations reported above the ANZECC environmental guidelines.

"The presence of moderately alkaline surface and sub-surface soils in conjunction with the natural tight clay profile and the apparent containment of any contaminants within the ash, cinder and/or slag fragments identified, indicates that the impacted fill materials are likely to pose negligible long term environmental risks to the underlying soils and groundwater.

"As an aid in the identification of potential health based risks, all contaminant levels were also compared to the proposed health based soil guidelines (Langley et al 1996 - Exposure Settings D and F) for restricted residential (with limited soil access) and commercial/industrial land uses. The lead concentration reported in the fill materials recovered from the north eastern corner of the Grote Street Car Park was in excess of both landuse exposure scenarios. The concentrations of all analytes reported from the remaining sampling locations were below the prescribed levels for both land uses."

3.2.10 Recommendations ...

Surface i

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The recommendations arising from the environmental site assessment are presented by Rust PPK as follows (refer to Section 5 of the Rust PPK report):

Bus Depot 1 (Greyhound and McCaffertys), Grote Street and Franklin Street Car Parks

"In accordance with the continued use of these areas for commercial purposes, the results and findings of the assessment program have identified no requirements for any subsequent site characterisation or remedial works within these areas. This recommendation is with the exception of a site specific risk assessment required to address the elevated concentration of lead identified within the north eastern corner of the Grote Street Car Park. From a preliminary risk assessment perspective it is considered that the concentration and likely nature of the lead identified will not pose a limiting factor for the continued current usage of the site providing the bitumen surfaces are maintained and managed appropriately.

"If these areas of the site are to be developed for a more sensitive landuse, then further site characterisation is recommended, the extent of which will be dependent on the future landuse, due to the presence of ash and cinders within the fill materials at nine out of the eleven sampling locations in these areas. If this land is to be redeveloped to a landuse of the same or similar sensitivity (for example commercial or restricted residential with no access to underlying soil) then it is recommended that validation of any excavated soil be carried out in order to determine the required disposal method. Disposal as low-level contaminated waste may be necessary due to the potential for contamination to be present within the ash and cinders identified in these areas. It is also recommended that appropriate health and safety precautions are taken during any possible future on-site earthworks, in order to protect workers and adjoining sites from exposure to potentially contaminated soils.

104 Grote Street

"The investigation program has identified no requirements for any subsequent site characterisation or remedial works within this area (which includes the house, private car park, storage building and adjacent car park) provided the current uses are maintained. If this portion of the site is to be developed for a more sensitive landuse (for example residential), it is recommended that more extensive site characterisation is carried out prior to the redevelopment. This is due to the presence of ash and cinders within the fill materials recovered from the two boreholes in this area, and so

that the soil can be further characterised in those areas not covered in this investigation. Similarly to the other areas of the site, if this land is to be redeveloped to a landuse of the same or similar sensitivity then validation of any excavated soil is recommended prior to disposal of the excavated soil, and the appropriate health and safety precautions should be taken during any excavation.

Coachfreight and adjacent car park

Ten and the second seco

Timesial Tore "If the current use of the land in this area is to be maintained, there are no requirements for remedial works in this area of the site. This is contingent upon the adequate maintenance and management of the bitumen surfaces. If this portion of the site is to be developed for a more sensitive landuse (for example residential), then further site characterisation is recommended prior to the redevelopment, the extent of which will be dependent on the future landuse, due to the presence of ash and cinders within the fill materials recovered from the two boreholes in this area. If this land is to be redeveloped to a landuse of the same or similar sensitivity then validation of any excavated soil is recommended prior to disposal of the excavated soil, and the appropriate health and safety precautions should be taken during any excavation (as described previously).

Bus Depot 2 (Premier Stateline)

"No contamination was identified in this area (which includes the bus parking area and the car park adjacent the terminal building) and so no remedial works or further site characterisation works are required provided the site use remains as at present. If this portion of the site is to be developed for a more sensitive landuse (for example residential), then further site characterisation is recommended prior to the redevelopment, the extent of which will be dependent on the future landuse, in order to further characterise the soil in those areas not covered in this investigation."

Corporation of the City of Adelaide Franklin Street Bus Station and Car Parks Site Audit Report, No. 97.0307/1, 31 July 1997

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4. AUDITOR REVIEW OF ENVIRONMENTAL SITE ASSESSMENT

4.1 General

In order to assess whether the environmental consultant's report is satisfactory, the auditor has to determine whether

- the site history adequately defines the potential contaminants
- the sample density and testing frequency gives a representative picture of site conditions
- the selection of analytes adequately represents the potential contamination
- the selection of acceptance criteria is appropriate.

In determining the condition of the site, the auditor has to give consideration to defining the beneficial uses of the site. This includes issues relating to

- the health and wellbeing of humans, on or off the site
- environmental impacts to flora and fauna
- impacts of soil contamination on surface water and groundwater.

The EPA has indicated that the Site Audit Report should provide a concluding statement incorporating one of the following:

- the condition of the site is such that the site is suitable for unrestricted use
- the condition of the site is such that it is suitable only for certain stated uses; any conditions pertaining to the use of the site must be specified
- the condition of the site presents an unacceptable health and/or environmental risk, and is not suitable for any use unless remediated.

4.2 Background Studies

The background studies conducted by Rust PPK as part of the environmental assessment of the site were assessed by the auditor as being adequate to determine the potential for site contamination.

4.3 Sampling Frequency

A total of 20 soil boreholes was drilled to up to 2.3 m depth. This is equivalent to an average nominal grid spacing of about 22 m across the site.

The overall sampling frequency (i.e. the borehole spacing and the selection of samples) is considered by the auditor to be acceptable.

4.4 Laboratory Analysis Programme

The analytical requirements for the assessment were determined by Rust PPK in consultation with the auditor, and were based on an understanding of previous site activities and associated potential contaminants, together with the requirements of the Victorian EPA guidelines to provide a general screen for inorganic and organic compounds for a representative number of samples.

The analytical parameters are considered by the auditor to be sufficient to adequately characterise the level of contamination on the site.

4.5 Assessment Criteria

Selection of site specific assessment criteria can include the adoption of published criteria from regulatory authorities and from overseas publications, or the conduct of human health and ecological risk assessments.

For this environmental site assessment, Rust PPK adopted the SAHC (1993) Health Investigation Levels and the ANZECC/NH&MRC (1992) Environmental Investigation Levels, for assessing potential long term human health risks, and environmental risks, respectively. For the purpose of site specific health based risk analysis, the SAHC (1996) Proposed Health Based Soil Guidelines Exposure Settings D (residential with restricted soil access) and F (commercial/industrial) were used as reference criteria. In the case of analytes not covered by the nominated criteria, the Dutch Investigation and Intervention (Swartjes FA et al, 1993) values were referenced. The former Dutch C (ANZEC/NH&MRC, 1990), levels and the NSW EPA (1994) Guidelines for Assessing Service Station Sites were used as guidelines for TPH/BTEX.

The ANZECC/NH&MRC (1992) Environmental Investigation Levels are based on threshold levels for phytotoxicity and uptake of contaminants which may result in impairment of plant growth or reproduction, or unacceptable residue levels. These levels represent conservative values that protect the most sensitive receptor in the environment (i.e. plant life).

The proposed new Dutch Investigation and Intervention Levels are based on an integration of ecotoxicological and human-toxicological intervention values. These have not yet been adopted in Australia.

The former Dutch B and C criteria were developed for the protection of groundwater, which is the main source of potable water in the Netherlands.

The SAHC (1996) Proposed Health Based Soil Guidelines Exposure Setting D apply to residential developments with minimal opportunities for soil access, e.g. high rise apartments and flats. A 70 year exposure period has been assumed, except for those contaminants for which exposures over a much shorter period during childhood are critical.

The SAHC (1996) Proposed Health Based Soil Guidelines Exposure Setting F apply to commercial/industrial developments including shops, offices, factories and industrial sites. A 30 year exposure period has been assumed.

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Given the nature and the findings of the environmental site assessment, and the proposed redevelopment strategy, adoption of the above assessment criteria is considered by the auditor to be appropriate.

4.6 Quality Assurance/Quality Control (QA/QC)

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The QA/QC procedures undertaken for this assessment are documented in the Rust PPK report.

The quality assurance procedures adopted by Rust PPK included

- use of appropriate field sampling protocols
- use of appropriate sample containers, and sample preservation procedures (e.g. use of chilled esky) during transportation to the laboratory
- use of chain of custody forms, signed by the receiving laboratory
- laboratory quality control tests, including a field duplicate, an inter-laboratory duplicate, surrogate recoveries and replicate analyses
- quality assurance testing of a sample of rinse water.

The auditor was satisfied that these procedures were correctly implemented.

The laboratory analysis programme included the analysis of 4 field duplicates and 8 laboratory replicates.

The RPD was greater than 30% for the inter-laboratory duplicate results for copper and zinc. The RSD was also greater than 30% for copper. The Rust PPK report comments that the extraction methods used by the primary and the secondary laboratories were identical, and the analysis methods were compatible (ICP-AES/Flame Atomic Absorption Spectrometry). Therefore it was most likely that the difference in values for the inter-laboratory duplicates would be due to the heterogeneous nature of the soil, and the consequent difficulty in obtaining a true field duplicate sample. This explanation is accepted by the auditor.

One of the RPDs was greater than 20% for the laboratory replicate results for lead. The Rust PPK report comments that this could also be due to the heterogeneous nature of the soil, and the difficulty in obtaining two replicate samples from the soil sample in the laboratory. High RPDs can also be due to the relatively low quantities of analytes detected. This explanation is accepted by the auditor. The RSDs were within the accepted criteria for all of the replicates.

4.7 Findings and Recommendations

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The detailed findings and recommendations presented by Rust PPK in their Environmental Site Assessment Report are endorsed by the auditor.

There was no background sampling or testing carried out. However, given the nature and the findings of the environmental site assessment, the absence of background data was not considered to pose a problem.

Groundwater was not intersected at the site to a depth of 2.3 m. While no leachability testing was conducted as part of this assessment, the alkaline nature and generally low permeability of the soils underlying the site should preclude leaching of contaminants.

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5. CONCLUSIONS

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A Site Audit Report has been prepared by Mr Adrian Hall of BC Tonkin & Associates for the Franklin Street Bus Station and Car Parks, Adelaide, for the Corporation of the City of Adelaide. An Environmental Site Assessment was performed by Rust PPK Pty Ltd.

As no soil testing was undertaken under the canopies, or under the floor slabs of the buildings, the extent of this audit has necessarily been confined to the open space areas of the site, with a total areal extent of approximately 0.98 hectares, as shown in Figure 2.1.

In the opinion of the auditor, the investigations have satisfactorily defined the nature and extent of contamination at the site.

The conclusions of this Site Audit Report are set out as follows:

- 1. The assessment program undertaken during May 1997 has identified elevated concentrations of heavy metals (lead, zinc, and copper) in excess of the ANZECC environmental and/or the SAHC health based guidelines within the fill materials recovered from:
- the driveway of the Coachfreight parcel collection and drop off point to the west of Bowen Street (BH4, lead and zinc only)
- the north east corner of the Grote Street public car park (BH14)
- the centre of the car park adjacent the storage building at 104 Grote Street used by the Adelaide Central Mission (BH20, zinc only).
- 2. An elevated PAH (benzo(a)pyrene) concentration in excess of the SAHC health based guidelines, was identified within the fill materials in the car park adjacent the storage building at 104 Grote Street (BH20). Elevated Total fluoride concentrations were identified within the surficial fill materials recovered from the north eastern corner of the Franklin Street Car Park and the south eastern corner of the Grote Street Car Park. These elevated levels of heavy metals, PAHs and fluoride are considered to be associated with fragments of ash, cinders and/or slag which were observed within the sub-surface soil profile within these locations.
- 3. Fragments of ash, cinders and/or slag were identified in thirteen out of the twenty sampling locations at the site and although elevated PAH, heavy metal and fluoride concentrations were not reported at all of these locations, it is considered that the relatively low proportion of the materials within the overall soil matrix may be resulting in a dilution effect on the analyte levels within the overall matrix. This therefore indicates the potential for high concentrations of localised (hotspot) PAH contaminants within the fill materials in boreholes BH4 and BH18 located on the western side of Bowen Street, and in all of the boreholes located on the eastern side of Bowen Street with the exception of boreholes BH9 and BH11. The fill materials containing ash and cinder fragments were generally identified to depths ranging from 0.5 m to 0.7 m across the site.
- 4. The surficial fill materials and the underlying natural soil were identified as being moderately alkaline, with soil pH at all locations reported above the ANZECC

environmental guidelines. The presence of moderately alkaline surface and sub-surface soils in conjunction with the natural tight clay profile and the apparent containment of any contaminants within the ash, cinder and/or slag fragments identified, indicates that the impacted fill materials are likely to pose negligible long term environmental risks to the underlying soils and groundwater.

5. As an aid in the identification of potential health based risks, all contaminant levels were also compared to the proposed health based soil guidelines (Langley et al 1996 - Exposure Settings D and F) for restricted residential (with limited soil access) and commercial/industrial land uses. The lead concentration reported in the fill materials recovered from the north eastern corner of the Grote Street Car Park was in excess of both landuse exposure scenarios. The concentrations of all analytes reported from the remaining sampling locations were below the prescribed levels for both land uses.

On the basis of the above conclusions, the auditor's considerations regarding the condition of the open space areas of the site are set out separately for the following four zones:

- Zone A Bus Depot 1 (Greyhound and McCaffertys), Grote Street and Franklin Street Car Parks
- Zone B 104 Grote Street

******* ***

- Zone C Coachfreight and Adjacent Car Park
- Zone D Bus Depot 2 (Premier Stateline).

Zone A - Bus Depot 1 (Greyhound and McCaffertys), Grote Street and Franklin Street Car Parks

The auditor considers that this zone is suitable for continued existing use provided that the conditions as specified below are satisfied:

- 1. Generally, the findings of the assessment program have identified no requirements for any subsequent site characterisation or remedial works within this zone.
- 2. The exception is that a site specific risk assessment is required to address the elevated concentration of lead identified within the north eastern corner of the Grote Street Car Park. From a preliminary risk assessment perspective it is considered that the concentration and likely nature of the lead identified will not pose a limiting factor for the continued current usage of this area providing the bitumen surfaces are maintained and managed appropriately.

If this zone is to be developed for a more sensitive landuse, then further site characterisation is required, the extent of which will be dependent on the future land use, due to the presence of ash and cinders within the fill materials.

If this zone is to be redeveloped to a land use of the same or similar sensitivity (for example commercial or restricted residential with no access to underlying soil), then

- 1. It is required that validation of any excavated soil be carried out in order to determine the required disposal method. Disposal as low-level contaminated waste may be necessary due to the potential for contamination to be present within the ash and cinders identified in this zone.
- 2. It is also required that appropriate health and safety precautions are taken during any possible future on-site earthworks, in order to protect workers and adjoining sites from exposure to potentially contaminated soils.

Zone B - 104 Grote Street

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The auditor considers that this zone is suitable for continued existing use with no requirements for any subsequent site characterisation or remedial works.

If this zone is to be developed for a more sensitive landuse (for example residential), then it is required that more extensive site characterisation is carried out prior to the redevelopment. This is due to the presence of ash and cinders within the fill materials in this zone.

If this zone is to be redeveloped to a land use of the same or similar sensitivity (for example commercial or restricted residential with no access to underlying soil), then

- 1. It is required that validation of any excavated soil be carried out in order to determine the required disposal method. Disposal as low-level contaminated waste may be necessary due to the potential for contamination to be present within the ash and cinders identified in this zone.
- 2. It is also required that appropriate health and safety precautions are taken during any possible future on-site earthworks, in order to protect workers and adjoining sites from exposure to potentially contaminated soils.

Zone C - Coachfreight and Adjacent Car Park

The auditor considers that this zone is suitable for continued existing use with no requirements for any subsequent site characterisation or remedial works. This is contingent upon the adequate maintenance and management of the bitumen surfaces.

If this zone is to be developed for a more sensitive landuse (for example residential), it is required that more extensive site characterisation is carried out prior to the redevelopment. This is due to the presence of ash and cinders within the fill materials in this zone.

If this zone is to be redeveloped to a land use of the same or similar sensitivity (for example commercial or restricted residential with no access to underlying soil), then

- 1. It is required that validation of any excavated soil be carried out in order to determine the required disposal method. Disposal as low-level contaminated waste may be necessary due to the potential for contamination to be present within the ash and cinders identified in this zone.
- 2. It is also required that appropriate health and safety precautions are taken during any possible future on-site earthworks, in order to protect workers and adjoining sites from exposure to potentially contaminated soils.

Zone D - Bus Depot 2 (Premier Stateline)

The auditor considers that this zone is suitable for continued existing use with no requirements for any subsequent site characterisation or remedial works.

If this zone is to be developed for a more sensitive landuse (for example residential), it is required that more extensive site characterisation is carried out prior to the redevelopment, the extent of which will be dependent on the future landuse.

It is also a requirement of this audit that the auditor be kept informed of the progress of any site redevelopment activities, and that opportunity be given to the auditor to ensure that the above conditions are adhered to.

If any part of the site is redeveloped, then a report, containing evidence by way of checks and test surveys that the above requirements have been met, is to be submitted to the auditor for approval.

Signed:

A.M.D. Kall

AMD Hall, MIE Aust Chartered Professional Engineer Associate Director Environmental Auditor (Contaminated Land)

BC TONKIN & ASSOCIATES

Date: 1 August 1997

6. **REFERENCES**

- ANZEC/NH&MRC (1990), Draft Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites, Australia and New Zealand Environment Council (ANZECC), National Health and Medical Research Council (NH&MRC), June 1990.
- ANZECC/NH&MRC (1992), Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites, Australian and New Zealand Environment and Conservation Council and National Health and Medical Research Council.

NSW EPA (1994) Guidelines for Assessing Service Station Sites, December 1994.

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- SAHC (1993) A Practical Guide to the Health Risk Assessment and Management of Contaminated Land in SA, Public and Environmental Health Service, January 1993.
- Swartjes FA and van den Berg R (1993), Remediation of Contaminated Soil and Groundwater: Proposals for Criteria and Priority Setting.
APPENDIX A

Rust PPK Pty Ltd, 1997, Site History Report for the Franklin Street Bus Station, Located at 85-129 Franklin Street, Adelaide, for the Corporation of the City of Adelaide, 6 March 1997

Corporation of the City of Adelaide Franklin Street Bus Station and Car Parks Site Audit Report, No. 97.0307/1, 31 July 1997

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APPENDIX A

Rust PPK Pty Ltd, 1997, Site History Report for the Franklin Street Bus Station, Located at 85-129 Franklin Street, Adelaide, for the Corporation of the City of Adelaide, 6 March 1997

Corporation of the City of Adelaide Franklin Street Bus Station and Car Parks Site Audit Report, No. 97.0307/1, 31 July 1997

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Site History Report for the Franklin Street **Bus Station**, Located at 85-129 Franklin Street, Adelaide

The Corporation of the City of Adelaide

Rust PPK Pty Ltd

11 March 1997 27J062A 97/143

100 North Terrace Environment & Infrastructure Adelaide SA 5000 PO Box 398 Adelaide SA 5001 Australia Telephone: (61 8) 8405 4300 Facsimile: (61 8) 8212 4686

A NATA Certified Quality Company

Our Reference 2735/2905/27J062A

1 July 1997

Mr Brian Fitzpatrick The Corporation of the City of Adelaide GPO Box 2252 ADELAIDE SA 5001

Dear Sir

Site History Report for the Franklin Street Car Park

We are pleased to provide the Draft Site History report for the Franklin Street Bus Station. Potential contamination issues have been identified and we have made recommendations accordingly. If you have any queries regarding the content of this report, or would like to engage our services in carrying out the recommendations, please contact the undersigned.

Yours faithfully

John Iddles Senior Environmental Consultant Rust PPK Pty Ltd

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Executive Summary

Rust PPK Pty Ltd was commissioned by The Corporation of the City of Adelaide, to investigate and report on potential site contamination, environmental and other related issues arising from historical and current site activities on a 0.5 hectare section of land on the western side of Bowen Street, and a 0.9 hectare section of land on the eastern side of Bowen Street, Adelaide. The purpose of this report is to identify potential contaminants in the soil and other environmental issues.

Site Description

The site currently contains the following features:

- the Premier Stateline bus terminal and canopy on the north-west of the site;
- the Coachfreight parcel collection and drop off point (including storage shed) in the west of the site;
- *a bitumen-sealed private car park in the south-west of the site;*
- the Greyhound and McCafferty's Express bus terminals and canopy on the north-east of Bowen Street;
- a single storey house, a private car park, a toilet block and a two-storey building occupied by the Adelaide Central Mission on the south-east of Bowen Street; and
- two bitumen sealed public car parks in the east of the site owned and operated by The Corporation of the City of Adelaide.

Historic Overview

- From 1850 until the early 1900s the site was used generally for residential purposes, but there were also a number of commercial premises, a garage, forge, workshop, bakehouse, and a private road.
- From the 1920s a number of small light industries were established on the site. These included a factory, garages, forges, stables, printing works, workshops, shops and offices. Some of the occupants included the Franklin Wrecking Co, J.W. Turner, a plumber, Oxywelders Ltd, the O'Donnell Brothers Ltd, and a number of radio and electrical companies.
- During the 1960's a large proportion of the residential land in the western part of the site had been cleared and was used as an open lot car park by Dimet Corrosion Prevention Pty Ltd and I. and M. Jedynak.
- The Corporation of the City of Adelaide had acquired most of the land comprising the site by 1972, excepting the land contained in Certificates of Title 5060/608 and 1751/37. The land was then cleared and by 1979 the majority of the existing bus terminals and car parks had been constructed.
- The residences on land contained in Certificates of Title 5060/608 and 1751/37 were acquired by The Corporation of the City of Adelaide in the early 1990s, and are currently used by the Adelaide Central Mission to store furniture. The front part of the building at 104 Grote Street has been condemned by the Council due to problems with rust and cracking.
- Between 1989 and 1995, a new terminal building was constructed on the eastern side of Bowen Street, on what was previously either car or bus parking space.

Potential Contamination Associated with Previous Land Uses

- Polycyclic aromatic hydrocarbons (PAHs) may be potential contaminants from residential land uses where coal and ashes may have been disposed of on-site.
- Benzoyl peroxide, polycyclic aromatic hydrocarbons (PAHs) (due to the disposal of coal and ashes on-site) and hydrocarbons (due to the storage of fuels on-site) are potential contaminants associated with bakeries, and therefore may be present in the north-eastern part of the site.
- J.W. Turner operated a plumbing business in the north-east of the site. A range of contaminants are associated with plumbing supplies and their usage, including acids, solvents, lead, silver, zinc and arsenic.
- Two forges were established on the site at various times. Potential contaminants that may have been generated by their operation include a broad range of metals and heavy metals, solvents, cyanides, phenols, phosphorous, halogenated compounds, polychlorinated biphenyls (PCBs), hydrocarbons, monocyclic aromatic hydrocarbons (MAHs) and polycyclic aromatic hydrocarbons (PAHs).
- An oxy-welding company was established in a warehouse in the north-east of the site, and remained in operation for at least 10 years. Similar contaminants would have been generated by the welding processes, as in the forge, however specific contaminants may include chromium, fluorides, nitrogen, thorium, titanium, vanadium, zinc and benzene.
- A number of radio and electrical companies occupied a warehouse in the south-eastern part of the site. Potential contaminants from these businesses may include metals, PCBs, MAHs, halogenated compounds, boron, chlorinated naphthalenes, chlorodiphenyls, phthalates and hydrocarbons.
- A wrecking company and two garages have also been in operation on the site. Contaminants associated with these businesses include petroleum hydrocarbons, a range of heavy metals including lead, volatile organic compounds, degreasing solvents, anti-freeze compounds, PCBs, asbestos, MAHs and other organic compounds. Underground fuel storage tanks may possibly have been used to store the fuels. It could not be ascertained whether these have ever existed on the site.
- Printing works may have caused contamination with heavy metals (in particular chromium, magnesium, and zinc), other metals (particularly silver), alkalis, inorganic acids, petroleum hydrocarbons, solvents, MAHs, halogenated compounds, ethyl acetate, ethanol, and isopropanol.
- Dimet Corrosion Pty Ltd also owned some land in the north-west of the site, however the aerial photographs did not indicate any structures on the site at that time. If corrosion inhibitors were used or manufactured on the site then the potential contaminants may include heavy metals (including Boron associated with Borax), other metals (including tin, lead, copper, and zinc), and amines, phosphates and nitrates.

There were also various leases on some of the properties to occupants whose business could not be ascertained, therefore there may be contaminants present in addition to those already mentioned above.

Potential Contamination Associated with Current Land Uses

- There may be polycyclic aromatic hydrocarbons (PAHs) in the soil underlying the bitumen due to tar based sub-base materials used in the past.
- Hydrocarbon spillages and leaks from cars and buses may have leached through the bitumen into the soil strata where there are cracks in the bitumen surface.
- Power switchboards in a number of the terminal buildings may contain asbestos.
- A rubber conveyor belt in the Coachfreight storage shed may contain asbestos.
- Asbestos may exist in the building materials of the old houses on the eastern side of Bowen Street that are currently used by The Adelaide Central Mission.
- White ant treatments may have used on the soil beneath the buildings and on surfaces prior to sealing with bitumen. Potential contaminants associated with this may include, organochlorine pesticides (OCPs), organophosphate pesticides (OPPs) and heavy metals such as arsenic.

1. Introduction

Rust PPK Pty Ltd was commissioned by The Corporation of the City of Adelaide, to investigate and report on potential site contamination, environmental and other related issues arising from historical and current site activities at The Franklin Street Bus Station, some residential properties and two associated public car park sites. The site is divided into two irregularly shaped parcels of land located on the eastern and western sides of Bowen Street. The section to the east of Bowen Street has an area of approximately 0.9 hectares and incorporates 85-107 Franklin Street, 2-40 Bowen Street, 84-94 Grote Street, 102-106 Grote Street, and an access road from Rowlands Place. The section to the west of Bowen Street has an area of approximately 0.5 hectares, and incorporates 111-129 Franklin Street, 4-8 Andrew Street, and 1-29 Bowen Street, Adelaide.

97/143Site History Report for the Franklin Street Bus Station27J062ALocated at 85-129 Franklin Street, Adelaide

The Corporation of the City of Adelaide

2. Background Information

2.1 Site Identification

The subject site comprises two irregularly shaped parcels of land to the east and west of Bowen Street. Each of these parcels comprises a number of allotments which are described under different Certificates of Title, as listed in Table 2.1 and Table 2.2 below.

The Locality Plan for the site is contained in Appendix A, and the site plans showing the current layout of the site are contained in Appendix B.

The total area of the site is approximately 1.41 hectares.

Certificate of Title Reference	Land Description	Area (m ²)
226/124	Town Acre 263	1983.80
1639/119	Town Acre 310	2760.50
1663/99	Town Acre 309	83.60
1751/37	Town Acre 311	648.80
1922/48	Town Acre 263	986.26
5060/608	Allotment 1 in DP 32560	580.00
5317/61	Allotment 12 in DP546	149.60
5317/62	Allotment . 91 in FP166443	348.69
5317/63	Allotment 92 in FP166444	271.50
5317/64	Allotment 93 in FP166445	526.90
5317/65	Allotment 91 in FP170401	816.37
TOTAL		9156.02

 Table 2.1

 Allotment Details for the Eastern Side of Bowen Street

Table 2.2Allotment Details for the Western Side of Bowen Street

Certificate of Title Reference	Land Description	Area (m ²)
2023/96	Town Acre 311	260.67
2128/45	Town Acre 311	257.80
2201/187	Town Acre 311	259.70
3479/180	Town Acres 261 & 262	1744.00
3582/78	Town Acre 261	509.70
3582/79	Town Acre 262	490.04
3582/80	Town Acres 261 & 262	1122.90
3841/122	LTRO Plan 546	340.60
TOTAL		4985.41

2.2 Ownership

The current Certificates of Title show the site to be owned by The Corporation of the City of Adelaide.

2.3 Party Responsible for Assessment

The Corporation of the City of Adelaide GPO Box 2252 ADELAIDE SA 5001.

2.4 Environmental Consultant

Rust PPK Pty Ltd 100 North Terrace Adelaide SA 5000.

2.5 **Proposed Land Use**

At the time of the report, the proposed land use was unknown.

2.6 Operator of Site

There are currently a number of passenger and freight transport operators on the site. These include Premier Stateline, Coachfreight, Greyhound Pioneer Australia, McCafferty's Express Coaches, as well as The Adelaide Central Mission. The Corporation of the City of Adelaide also operates two public car parks on the site.

3. Site History

3.1 Site Location

The site is divided into two irregularly shaped parcels of land located on the eastern and western sides of Bowen Street. The street addresses for the section to the east of Bowen Street includes 85-107 Franklin Street, 2-40 Bowen Street, 84-94 Grote Street, 102-106 Grote Street, and an access road from Rowlands Place. The section to the west of Bowen Street has an area of approximately 0.5 hectares, and incorporates 111-129 Franklin Street, 4-8 Andrew Street, and 1-29 Bowen Street, Adelaide.

To the east, the site is bordered by the Dreamland Furniture store on Grote Street, and a disused warehouse on Franklin Street. Some light industrial facilities exist to the west of the site, such as the Jaguar Daimler Service Centre on Andrew Street. The Grote Street Church of Christ, and the accompanying church hall divide the south-eastern part of the site into two portions. These latter two buildings are included on the Register of the City of Adelaide Heritage Items.

The Corporation of the City of Adelaide have advised that the site is part of the F8 Franklin Street East Precinct. Any proposed development must comply with the zoning regulations specified by the Council which apply to this area. These regulations, which are contained within Appendix C, specify the desired and non-complying land uses. Desired uses include general offices, consulting rooms, cafes, shops, ancillary retail services, licensed premises, leisure studios, showrooms, passenger terminals and minor transport depots.

3.2 Site History of Land East of Bowen Street

3.2.1 History of Ownership

The following tables summarise the land ownership on the eastern side of Bowen Street from the early 1900's to the present, as documented in Certificates of Title which are held at the Land Titles Office.

Date	Ownership	CT Reference
15/3/1935	Goode Durrant and Company Limited, of Grenfell Street, Adelaide.	1639/119 (Current)
22/2/1935	Company name change to Goode Durrant and Murray Limited.	
27/7/1938	Portion leased to A.Z. Radio Pty Ltd, for 5 years. Lease number 1269127.	
28/11/1947	Leased to National Radio Corporation Ltd for 3 years. Lease number 1521372.	
7/2/1955	Portion leased to Servex Electrical Company Pty Ltd for 5 years. Lease number 1874445.	1639/119

Table 3.1History of Ownership - Part Town Acre 310, Grote Street

Date	Ownership	CT Reference
23/12/1957	Name change to Goode Durrant and Murray (Consolidated) Ltd of 45	1639/119 (Contd)
	Grenfell Street, Adelaide.	
12/5/1964	Goode Durrant and Murray (Australia) Limited of Durrant house,	
	Cheswell Street, London.	
29/10/1968	The Corporation of the City of Adelaide.	

Table 3.2History of Ownership - Part Town Acre 263, Off Rowlands Place

Date	Ownership	CT Reference
	This title is for a right of way from Rowlands Place to the land contained in Certificate of Title 1639/119.	1663/99 (Current)
	Leases and transfers as for 1639/119, above.	
29/10/1968	The Corporation of the City of Adelaide.	

Table 3.3History of Ownership - Part Town Acre 263, Franklin Street

Date	Ownership	CT Reference
3/1/1947	John William Turner, Plumber, of 85 Franklin Street, Adelaide.	1922/48 (Current)
21/11/1946	Abraham Silk and Hyman Silk, Merchants, of Queen Victoria	
	Markets, Melbourne.	
24/6/1947	Portion of land leased to J.W. Turner.	
1/10/1962	Death of Hyman Silk.	
16/2/1970	The Corporation of the City of Adelaide.	

Table 3.4History of Ownership - Part Town Acre 263, Franklin Street

Date	Ownership	CT Reference
18/5/1876	Albert Ogilvie Laffer and Henry Laffer, Drapers, of Adelaide. Various leases (no occupations given) until 10/9/1938.	226/124 (Current)
10/9/1938	Lease to O'Donnell Brothers Ltd.	
14/8/1948	Death of last owner.	
6/4/1970	Caveat lodged over the land by O'Donnell Brothers Pty Ltd (No 3091291).	
23/5/1972	Transfer of land, subject to the above caveat, to The Corporation of the City of Adelaide.	

Date	Ownership	CT Reference
19/7/1944	Trustees:	1833/140
	-E.H. Bakewell, pastoralist;	
	-A.F. Gray, out of business; and	
	-Sir W. Goodman, General Manager of Tramways Trust	
29/6/1944	Vested in Gray, Goodman and L.Walter (co-director)	
5/9/1958	As trustees of an Estate:	2608/122
	-L.W. Walter, co-director;	
	-H.Pickering, chartered accountant; and	
	-Executor Trustee and Agency Co of SA Ltd.	
15/2/1968	The Corporation of the City of Adelaide.	
15/2/1968	The Corporation of the City of Adelaide	5317/65
		(current)

Table 3.5History of Ownership - Part Town Acre 262, Allotment 4(corner of Franklin Street and Bowen Street)

Table 3.6 History of Ownership - Part Town Acre 262, Allotment 12 (Private Road)

Date	Ownership	CT Reference
7/11/1871	James Smith, Daniel Kekwick and George Shaw, Gentlemen of Adelaide.	160/22
	Various transfers of potions of land.	
	In DP546, this road was redesignated as allotment 12.	·
20/1/1972	Private road closed (announced in the Gazette of this date).	
18/10/1989	Private Road acquired by the Corporation of the City of Adelaide.	
12/2/1990	The Corporation of the City of Adelaide	4353/276
	The Corporation of the City of Adelaide	5317/61
	· · · · · · · · · · · · · · · · · · ·	(current)

Table 3.7

History of Ownership - Part Town Acres 262 and 263

Date	Ownership	CT Reference
23/9/1880	Alfred Simpson and Alfred Muller Simpson, Manufacturers.	343/35
11/5/1892	Alfred Muller Simpson and Violet Laura Simpson, his wife.	0 10.00
16/7/1913	Alfred Muller Simpson, manufacturer (as above).	
19/3/1936	Alfred Allen Simpson, Frederick Neighbour Simpson, Alfred Moxon Simpson (manufacturer).	
5/2/1957	Alfred Moxon Simpson, Thomas Bridge Simpson, David Owen Crompton.	
12/1/1960	Portion of lot sold to Auriga Limited (Certificate of Title 2762/199, which is now Certificate of Title 5317/64, refer below). Remaining portion changed to Certificate of Title 2762/200, now Certificate of Title 5317/62.	
6/6/1960 16/1/1968	Auriga Limited of 47 Waymouth Street, Adelaide. The Corporation of the City of Adelaide.	2762/199

Ownership	CT Reference	
The Corporation of the City of Adelaide.	5317/64 (Current)	
-A.M. Simpson, manufacturer, of Pirie Street, Adelaide	2762/200	
-T.B. Simpson, merchant, of Pirie Street, Adelaide	(from 343/35)	
-D.O. Crompton of 149 Barton Terrace, North Adelaide, Medical		
Practitioner.		
The Corporation of the City of Adelaide		
The Corporation of the City of Adelaide.	5317/62 (Current)	
	Ownership The Corporation of the City of Adelaide. -A.M. Simpson, manufacturer, of Pirie Street, Adelaide -T.B. Simpson, merchant, of Pirie Street, Adelaide -D.O. Crompton of 149 Barton Terrace, North Adelaide, Medical Practitioner. The Corporation of the City of Adelaide The Corporation of the City of Adelaide.	

Table 3.8 History of Ownership - Part Town Acre 262

Date	Ownership	CT Reference	
8/1/1872	William Bloor of Adelaide, Cooper	161/121	
28/9/1896	After W. Bloor's death, transfer to M.Bloor (widow), C. Bloor (spinster), and E. Hague (storekeeper of Truro).		
22/1/1903	C.Bloor, M. A. Bloor, and S. Bloor, all spinsters of Park Street, Unley.		
12/12/1907	The Church of Christ, Grote Street, Adelaide Incorporated.		
21/4/1970	The Corporation of the City of Adelaide.		
-	The Corporation of the City of Adelaide	5317/63	

Table 3.9History of Ownership - Part Town Acre 310, Allotment 1

Date	Ownership	CT Reference
11/12/1888	William Bloor of Adelaide, Cooper	94/119
28/9/1896	After W. Bloor's death, transfer to M.Bloor (widow), C. Bloor (spinster), and E. Hague (storekeeper).	
22/1/1903	C.Bloor, M. Bloor, and S. Bloor, all spinsters of Park Street, Unley.	
12/12/1907	The Church of Christ, Grote Street, Adelaide Incorporated.	
	This is a small 8 foot wide strip of land at the southern end of the main block (Certificate of Title 94/119).	1751/38
6/6/1940	The Church of Christ, Grote Street, Adelaide Incorporated .	
	This Certificate of Title includes previous Certificate of Titles 1751/38 and 94/119.	4391/861
20/11/1991	The Church of Christ, Grote Street, Adelaide Incorporated.	
	The Corporation of the City of Adelaide	5060/608
		(current)

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Date	Ownership	CT Reference	
6/6/1940	May E.A. Leditschke of 9 South Terrace, Adelaide, married woman.	1751/37 (Current Title, from original title 134/49)	
19/3/1970	The Churches of Christ Evangelistic Union Incorporated, of 189		
	Gawler Place, Adelaide.		
30/9/1988	The Corporation of the City of Adelaide	i	
30/9/1988	Leased to The Churches of Christ Evangelistic Union Incorporated		
	for 2 years from 30/9/1988. Lease Number 6611267.		

Table 3.10History of Ownership - Part Town Acre 311, Allotment 1

3.2.2 Adelaide City Council Archives

The Assessment Books at the Adelaide City Council Archives were reviewed on the basis of the relevant Town Acre reference, to provide an indication of the occupation, ownership and use of the properties on the eastern side of Bowen Street in 1850, 1900, 1922, 1934, 1939 and 1949. This information correlates well with that provided by the review of the Certificate of Titles as summarised in Section 3.2 above.

- In 1850, the site was being established as a residential area, with some existing houses, a few houses in the construction phase, and some vacant land.
- In 1900 the eastern side of Bowen Street contained a number of houses, some vacant land, a few shops, a bakehouse (off Franklin Street) and the United Disciples Church. These premises were all owned by various Adelaide residents.
- The land use had not changed significantly by 1922, however a number of families owned significant portions of the land, for example the Simpson family owned two houses, two shops and some vacant land. The family retained ownership of the houses, shops and vacant land on Bowen Street at least until 1949. The shop on Bowen Street was occupied by the Franklin Wrecking Co. in 1949, and a marine store and shed had been built on the vacant land (also on Bowen Street) by that year.
- In 1922 Albert and Henry Laffer owned the following which were leased out to various tenants; workshop, stables, forge, showroom, shop, offices, a house and some vacant land. There was no longer evidence of the forge and stables in 1934, however the Laffer's retained ownership of the offices, workshops, showroom, house and yard until 1949.
- In 1922, the Church of Christ, Grote Street, Adelaide Incorporated owned a church, a school, a house at 22 Bowen Street, a trap (a term used in the assessment books), a shed and some vacant land on Bowen Street. By 1934, the Church had built some additional buildings on the land that they owned. At this point in time in addition to the structures listed above, the Union owned two houses at 24 and 26 Bowen Street, printing offices and works, a yard and some sheds, and offices and rooms which were leased out to various occupants at least up until 1949.

- By 1934, Goode, Durrant and Co Ltd owned a warehouse on Grote Street. The warehouse was unoccupied in 1934, and was leased out to the National Radio Corporation Ltd in 1939. The Education Department were also using some of the offices in the building in 1949.
- The Grays Estate (Bakewell, Gray and Goodman) owned a garage, workshop and offices at 101-111 Franklin Street at least from 1934 to 1949.
- J.W. Turner had acquired a house, workshop and offices by 1934. Oxy-welders Ltd occupied part of the workshop at least from 1934 until 1949. Turner himself occupied the remainder of the workshop for at least the same period. Ownership of this property had been transferred to A. and H. Silks by 1949, however the occupants remained unchanged.

3.2.3 Aerial Photographs

Aerial photographs of the site were examined from 1949 and thereafter at ten year intervals. The most recent photograph available was also examined. The features noted in each photograph for the section of the site to the east of Bowen Street are detailed below.

1949

This photograph was difficult to discern, however the layout of the buildings seemed to adhere approximately to the boundaries set by the current Certificates of Title. In some cases fences were visible along the allotment boundaries.

There was clearly a large warehouse type building in the south-east corner of the site. In the south west corner there were a number of smaller buildings, and possibly some small private parking lots, and vacant land.

There were a number of buildings ranging in size from small buildings (possibly houses) to warehouses, across the northern part of the site. Especially distinct was a large warehouse in the north-west corner. There was also some vacant space around the northern part of the site which appeared to be used as a car park.

1959

The layout of the site in this photograph was very similar to the photograph taken in 1949, however the images were much more distinct.

1968

There were only a few changes to the layout of the site from the earlier photographs. There was a small change in some of the fencelines in the south-western part of the site, and a car park in the central part of the site (accessed from Bowen Street) appeared to have been bitumenised.

1979

The entire site has been completely restructured. The current bus terminals and car parks were clearly visible.

1989

As above.

1995

A new terminal building had been constructed just off Bowen Street, on the current Certificate of Title 5317/63. This area was previously used as either car or bus parking space.

Aerial photographs examined are listed in Table 3.11 below:

Photo No	Survey No	Scale	Month	Year
661	5001	1:20000	26/9/95	1995
190	4091	1:20000	6/9/89	1989
19	2408	1:16000	19/3/79	1979
0151	1126	1:15800	15/11/68	1968
9396	326	1:16000	3/1/59	1959
106	7	1:15840	18/1/49	1949

Table 3.11List of the aerial photographs examined

3.2.4 Historical Overview

The following information summarises the knowledge gleaned from the Certificate of Titles, the Assessment Books at the Adelaide City Council Archives, and the aerial photographs, for the section of the site located to the east of Bowen Street.

- From 1850 up until the early 1900s, the land was used generally for residential purposes, with a few shops, and a bakehouse, and a private road.
- In 1900 the eastern side of Bowen Street was generally used as private premises, containing a number of houses, some vacant land, a few shops, a bakehouse (off Franklin Street) and the United Disciples Church. These premises were all owned by various Adelaide residents.
- The land use had not changed significantly by 1922, however a number of families had begun to own significant portions of the land, these are discussed further below.
- The property in the north-western corner of the site, which appeared to be a large warehouse in the early photographs, included a garage, workshop and offices. This property was transferred between a number trustees from 1934 to 1968, when it was transferred to The Corporation of the City of Adelaide.
- From 1880, the Simpson family owned property in the northern part of the site, including two houses, two shops and some land. The shop on Bowen Street was occupied by the Franklin Wrecking Co. in 1949, and a marine store and shed had been built on the vacant land (also on Bowen Street) by that year. The family retained ownership of most of the land on Franklin Street until 1966, when it was transferred to The Corporation of the City of Adelaide, however the land on Bowen

Street was sold to Auriga Ltd in 1960, and then transferred to The Corporation of the City of Adelaide in 1968.

In 1876 Albert and Henry Laffer, drapers, owned some land in the north-central part of the site. By 1922 this land included the following which were leased out to various tenants; workshop, stables, forge, showroom, shop, offices, a house and some vacant land. There was no longer evidence of the forge and stables in 1934, however the Laffers retained ownership of the offices, workshops, showroom, house and yard until 1949. The O'Donnell Brothers Ltd were leased the property, from 1938 until the death of the last owner in 1948. They lodged a caveat over the land in 1970, and in 1972, ownership was transferred to The Corporation of the City of Adelaide.

- J.W. Turner, a plumber, had acquired a house, workshop and offices in the north-east corner of the site by 1934. Oxy-welders Ltd occupied part of the workshop at least from 1934 until 1949. Turner himself occupied the remainder of the workshop for at least the same period. Ownership of this property was transferred to A. and H. Silks in 1946, however the occupants remained unchanged. This land was then handed over to The Corporation of the City of Adelaide in 1970.
- The Bloor family owned a house and some vacant land on Bowen Street from 1872 until 1907 when it was transferred to the Church of Christ, Grote Street, Adelaide Incorporated. By 1934 the church owned three houses (at 22, 24 and 26 Bowen Street), printing works, a yard and sheds, and various offices and rooms which were leased out to various occupants at least up until 1949. In 1940 Mrs M.A. Leditschke owned a house on the corner of Bowen and Grote Streets which was also transferred to The Churches of Christ Evangelistic Union Incorporated in 1970. By 1991, Certificates of Title 5060/608, 5317/63 and 1751/37 had been transferred to The Corporation of the City of Adelaide. These allotments are currently occupied by The Adelaide Central Mission and used to store furniture. The building at 104 Grote Street has recently been condemned by the Council due to cracking and rust problems, and is therefore disused.
- By 1934, Goode, Durrant and Co Ltd owned a factory in the south-east of the site on Grote Street which was later expanded to include some offices and a warehouse. The factory was unoccupied in 1934, however from 1938 to approximately 1960, a number of radio and electrical companies occupied the warehouse. The Education Department were also using some of the offices in the building in 1949. This land was then handed over to The Corporation of the City of Adelaide in 1968.
- The Corporation of the City of Adelaide had acquired most of the land on the eastern side of Bowen Street by 1972, excepting Certificates of Title 5060/608 and 1751/37. The land was then cleared and by 1979 the existing bus terminal (which is currently occupied by Greyhound Pioneer Australia) and car parks had been constructed.
- Between 1989 and 1995, a new terminal building was constructed on Bowen Street, on what was previously either car or bus parking space. This building is currently occupied by McCafferty's Express Coaches.

Date	Ownership	CT Reference	
	This Certificate of Title refers to Lots 1,2,3,5 and 6 of Town Acres	249/169	
	261 and 262.		
10/5/1877	Andrew Tennant, Gentleman of Adelaide.		
19/7/1913	Death of A. Tennant.		
10/8/1919	-John Tennant, Sheep Farmer		
	-Frederick Augustus Tennant, of Adelaide, Solicitor		
	-John Tennant Love, of Adelaide, Stock Salesman		
21/11/1937	F.A. Tennant died.		
13/7/1938	J.Tennant, J.Tennant Love, Andrew Tennant		
3/5/1940	-Richard George Hawker of Bungaree, Clare	249/169 (Old)	
	-Andrew Tennant of Stony Gap, Pastoralist.		
24/2/1967	lzydor Jedynak and Maria Jedynak purchased lots 5 and 6, which		
	then became Certificate of Title 3479/180.		
7/3/1967	Tennant Industries Pty Ltd retain ownership of Lots 1,2 and 3, which		
	then became Certificate of Title 3479/181.		
3/4/1967	Tennant Industries Pty Ltd own Lots 1, 2 and 3 of Town Acres 261 and 262	3479/181	
16/8/1968	Dimet Corrosion Prevention Pty Ltd purchased Lot 1, which then		
	became Certificate of Title 3582/78 (refer below).		
16/8/1968	Ownership of Lots 2 and 3 is divided amongst several stakeholders:		
	-Dimet Corrosion Prevention Pty Ltd (3/9)		
	-Oak Pty Ltd (3/9)		
	-Clive Langdon Bonython (1/9)		
	-Richard Martin Bonython (1/9)		
	-James Langdon Bonython (1/9)		
	This then became Certificate of Title 3582/79 and 3582/80, refer		
	below.		
1/3/1971	Dimet Corrosion Pty Ltd of Cawley Rd, Brooklyn, Victoria.	3582/78 (Current)	
1/3/1971	The Corporation of the City of Adelaide.		
1/3/1971	Transfer from the Dimet Corrosion Pty Ltd, Oak Pty Ltd, and C.L,	3582/79	
	R.M. and J.L. Bonython to the Corporation of the City of Adelaide.	(Current)	
1/3/1971	Transfer from the Dimet Corrosion Pty Ltd, Oak Pty Ltd, and C.L,	3582/80	
	R.M. and J.L. Bonython to the Corporation of the City of Adelaide.		

 Table 3.15

 History of Ownership - Part Town Acre 261 and 262, Franklin Street

3.3.2 Adelaide City Council Archives

The Assessment Books at the Adelaide City Council Archives were reviewed on the basis of the relevant Town Acre reference, to provide an indication of the occupation, ownership and use of the properties in 1850, 1900, 1922, 1934, 1939 and 1949. This data correlates well with that provided by the review of the Certificate of Titles as summarised in Section 3.6 above.

- In 1850, the site was being established as a residential area, with some existing houses, a few houses in the construction phase, and some vacant land.
- In 1900, the western side of Bowen Street was basically used as a residential area.
- The land use had not changed significantly by 1922, however a number of families had begun to own significant portions of the land. The Tennant Estate owned several houses on Bowen Street, Franklin Street and Little Bowen Street (a private road

1979

The entire site has been completely restructured. The current bus terminals and car parks were clearly visible.

1989

The layout of the site has not changed since the previous photograph.

1995

The layout of the site has not changed since the photograph taken 1979.

Aerial photographs examined are listed in Table 3.16 below:

Photo No	Survey No	Scale	Month	Year
661	5001	1:20000	26/9/95	1995
190	4091	1:20000	6/9/89	1989
19	2408	1:16000	19/3/79	1979
0151	1126	1:15800	15/11/68	1968
9396	326	1:16000	3/1/59	1959
106	7	1:15840	18/1/49	1949

Table 3.16List of the Aerial Photographs Examined

3.3.4 Historical Overview

The following information summarises the knowledge gleaned from the Certificate of Titles, the Assessment Books at the Adelaide City Council Archives, and the aerial photographs, for the section of the site located to the west of Bowen Street.

- From 1850 up until the late 1960s, the land was used for residential purposes, with the exception of a garage owned by J.E. Bateup, and a forge and workshop operated by R.H. Halliday, both on Andrew Street.
- During the 1960's a large proportion of the residential land in the western part of the site had been cleared and was used as an open lot car park, as is evident in the aerial photograph taken in 1968. This change probably corresponded with the transfer of land from the Tennant Estate to J. and M. Jedynak in 1967, and to Dimet Corrosion Pty Ltd, Oak Pty Ltd, and C.L., R.M., and J.L. Bonython in 1968.
- By 1971, The Corporation of the City of Adelaide had acquired the entire site to the west of Bowen Street. The site was then cleared to allow for the construction of the current bus terminals, which were identifiable on the aerial photograph taken in 1979.
- There have been no significant changes of the layout of the allotment since the construction of the bus terminals was completed.

3.4 Information Sources

- (a) Mapland Department of Environment and Natural Resources, Land and Geographic Information Group, 282 Richmond Road, Netley. Aerial photographs were viewed.
- (b) Lands Titles Office, 25 Pirie Street. History of Ownership was researched.
- (c) Adelaide City Council Archives, Topham Mall off 55 Currie and 56 Waymouth Streets, Adelaide. Assessment Books were viewed to provide an indication of the occupation, ownership and use of properties.
- (d) The Corporation of the City of Adelaide, Planning Department. Information with respect to site zoning provided by Greg Vincent.
- (e) The Corporation of the City of Adelaide, Environmental Health Department. Information with respect to environmental health issues provided by Murray Phillips.
- (f) Sue Park. The Adelaide Central Mission Inc.
- (g) South Australian Health Commission:
 - Publication "Identification and Assessment of Contaminated Land Improving Site History Appraisal" by JW Edwards, M Van Alphen and A Langley, Contaminated Sites Monograph Series, No 3, 1994.
- (h) The RPS Group plc (1994). The RPS Manual. Published by the RPS Group (UK).
- (i) Shineblecker C.L. (1992) "Handbook of Environmental Contaminants: A Guide for Site Assessment". Lewis Publications, Michigan, America.

4. Site Inspection

4.1 Topography

The site was flat.

4.2 Local Soil Types and Groundwater

Published information and previous experience in the area suggests that the soil profile at the site can be expected to include in the order of 1.0m of surface fill, consisting of various reworked soils and building rubble. Underneath this, the natural soil profile is likely to resemble a Brown Solonised Soil type BS classification.

The natural profile can be expected to include a thin calcareous silt containing silts, sands and gravels overlying stiff plastic clay (Keswick Clay). Slickensided fissures are likely to be encountered within the Keswick Clay.

Borelogs for the surrounding area have been obtained from the Department of Mines and Energy and have been included in Appendix D.

References:

- Department of Mines, (1974) Soil Association Map of the Adelaide Region. Bulletin 46.
- Sheard M.J., and Bowman G.M. (1996) Soils, stratigraphy and engineering geology of near surface materials of the Adelaide Plains. Report Book 94/9.

4.3 General Observations - East of Bowen Street

The site, which was inspected on the 25th of February 1997, consisted of the McCafferty's Express Coaches and Greyhound Pioneer Australia bus terminals, 2 public car parks, a house, a private car park, a toilet block, and a two-storey building.

There were two public car parks operated by The Corporation of the City of Adelaide, on the eastern part of the site. The northern car park was accessed from Franklin Street, whilst the southern car park was accessed from Grote Street. Both car parks had a bitumen seal that was in a reasonable condition, with the exception of a few potholes, and heave around the trees which were dispersed throughout the site. The trees themselves, however, looked quite healthy. There appeared to be a number of underground services, including power in the vicinity of the car park. An old paint drum had been left in the northern car park next to a ticket vending machine. The Greyhound Pioneer Australia bus terminal was located in the north western corner of this section of the site, and consisted of a two-storey building, and an attached canopy structure for the parking of passenger buses. The building housed a sales counter, booking office, waiting room and toilets on the ground floor, and a number of offices on the first floor. It was also noted that all cleaning and fuelling of coaches occurred off-site at Mile End. The attached canopy ran north-south, connecting the McCafferty's and Greyhound terminal buildings.

The McCafferty's terminal building contained similar features to the Greyhound Building, however it was only single storey.

The canopy was directly accessible from Bowen Street along it's entire length, and was sealed with a bitumen surface. The bitumen appeared to be in good condition, however there were a few small patches which had been replaced. All of the stormwater runoff from this area ran directly into the drains on Bowen Street.

There are two buildings on the south-western part of the site that are currently only used for storage purposes by the Adelaide Central Mission Incorporated. The building on the corner of Grote and Bowen Streets was a two-storey building with a single storey extension to the north. There was also a garage north of the building, and a small private car park west of the building. The car park was accessible from both streets, was lined with trees and bitumen sealed. There had been some illegal dumping of rubbish at the corner of the building.

Just north of the two-storey building was a fenced area containing public toilets and a private car park. There was a large pothole in the bitumen surface of the car park. An old brick wall along the rear of the lot provided evidence of a building which had previously existed on the site.

At 22 Bowen Street, between the private car park and McCafferty's bus terminal, was a small single storey dwelling which was boarded up and could not be accessed. This building is also occupied by the Adelaide Central Mission Incorporated, and is understood to only be used for storage purposes.

4.4 General Observations - West of Bowen Street

The site, which was inspected on the 25th of February 1997, consisted of a private car park, and the Coachfreight and Premier Stateline bus terminals.

The private car park was on the corners of Andrew and Bowen Streets. It was an open lot car park with a bitumen surface that was cracked in places but was otherwise in reasonable condition. The site was basically flat and any stormwater drainage would run into drainage pits in the kerb at the roadside. There was also an access road which ran parallel to Bowen Street from Andrew Street, to the Coachfreight parcel pick up point.

Coachfreight operated from a single storey office and storage shed off Bowen Street, on current Certificate of Title 3479/80. The floor in the shed was completely sealed with bitumen which was in good condition. No chemicals or fuels were stored on the site at the time of inspection, excepting some disinfectants and cleaning agents that were used by the cleaner. These chemicals were kept in a locked cage on a sealed bitumen floor. A conveyor belt ran along the length of the shed and into the office to convey heavy parcels from the storage point to the collection point. The motor and gear box which operated the belt was located at it's western end. The equipment was very greasy, and there were a few stains on the bitumen beneath it. It was also noted that a section of the bitumen floor had been replaced here.

To the north of the site was the Premier Stateline Bus Terminal. This comprised a two storey building at the eastern end of the site, an attached canopy structure which provided some shelter for the parking of passenger buses, and an open lot car park to the north of the canopy. The building housed the sales counter, a waiting room, cafe and public toilets on the first floor, and offices on the second floor. There was also a power unit on the ground floor. A cement swale guided any stormwater runoff from the site (which could possibly be contaminated with oil or fuels) into a stormwater drain at the western end of the canopy. The car park was also sealed with bitumen which seemed to be of a reasonable quality.

The central portion of this site was used as a roadway to allow access to the buses from Bowen Street. This area was completely covered with a bitumen seal. There were two large Collex waste disposal bins, two 44 gallon drums and one 45 Litre drum located at the western end of the site, next to a stormwater drain. The drums contained unknown substances. • •: .

5. Summary of Potential Contamination Issues

5.1 Potential Contamination Issues Associated with Previous Uses of the Site

Over the past 70 years a number of industries existed on the site which may have the potential to cause significant site contamination. The potential risk of contamination caused by the various land uses have been outlined below:

- Polycyclic aromatic hydrocarbons (PAHs) may be potential contaminants from residential land uses where coal and ashes may have been disposed of on-site.
- Benzoyl peroxide, polycyclic aromatic hydrocarbons (PAHs) (due to the disposal of coal and ashes on-site) and hydrocarbons (due to the storage of fuels on-site) are potential contaminants associated with bakeries, and therefore may be present in the north-eastern part of the site.
- J.W. Turner operated a plumbing business in the north-east of the site. A range of contaminants are associated with plumbing supplies and their usage, including acids, solvents, lead, silver, zinc and arsenic.
- Two forges were established on the site at various times. Potential contaminants that may have been generated by their operation include a broad range of metals and heavy metals, solvents, cyanides, phenols, phosphorous, halogenated compounds, polychlorinated biphenyls (PCBs), hydrocarbons, monocyclic aromatic hydrocarbons (MAHs) and polycyclic aromatic hydrocarbons (PAHs).
- An oxy-welding company was established in a warehouse in the north-east of the site, and remained in operation for at least 10 years. Similar contaminants would have been generated by the welding processes, as in the forge, however specific contaminants may include chromium, fluorides, nitrogen, thorium, titanium, vanadium, zinc and benzene.
- A number of radio and electrical companies occupied a warehouse in the southeastern part of the site. Potential contaminants from these businesses may include metals, PCBs, MAHs, halogenated compounds, boron, chlorinated naphthalenes, chlorodiphenyls, phthalates and hydrocarbons.
- A wrecking company and two garages have also been in operation on the site. Contaminants associated with these businesses include petroleum hydrocarbons, a range of heavy metals including lead, volatile organic compounds, degreasing solvents, anti-freeze compounds, PCBs, asbestos, MAHs and other organic compounds. Underground fuel storage tanks may possibly have been used to store the fuels. It could not be ascertained whether these have ever existed on the site.
- Printing works may have caused contamination with heavy metals (in particular chromium, magnesium, and zinc), other metals (particularly silver), alkalis, inorganic acids, petroleum hydrocarbons, solvents, MAHs, halogenated compounds, ethyl acetate, ethanol, and isopropanol.
- Dimet Corrosion Pty Ltd also owned some land in the north-west of the site, however the aerial photographs did not indicate any structures on the site at that time. If corrosion inhibitors were used or manufactured on the site then the potential contaminants may include heavy metals (including Boron associated with Borax),

:: --------- other metals (including tin, lead, copper, and zinc), and amines, phosphates and nitrates.

There were also various leases on some of the properties to occupants whose business could not be ascertained, therefore there may be contaminants present in addition to those already mentioned above.

5.2 Potential Contamination Issues Associated with the Current Use of the Site

The site currently contains a number of car parks, houses and bus terminals.

- If the bitumen was laid in the car park more than 15 years ago, the soil underlying the bitumen may contain some residues of polycyclic aromatic hydrocarbons (PAHs) due to tar based sub-base materials used in the past.
- The parking of the cars and buses has lead to some hydrocarbon staining of the bitumen surfaces. If the bitumen was cracked there is potential for these contaminants to be washed in the soil strata below. In addition, the contaminants may have been washed directly into the stormwater system.
- At the western end of Bowen Street there were a number of waste bins and large drums containing hydrocarbons located on a sealed surface next to a stormwater drain. Any leakage from either the drums or the waste bins would be washed directly into the stormwater system whenever it rains.
- Power switchboards were noted in a number of the terminal buildings. The switchboards may contain asbestos.
- There was a conveyor belt which ran the length of the Coachfreight storage shed. The rubber belt used to operate this system may potentially contain asbestos.
- Cleaning disinfectants were stored in a locked cage on a sealed floor in the Coachfreight storage shed. If a spillage did occur, there is potential for seepage directly into the stormwater drainage system.
- Asbestos may have been used in the building materials of the old houses on the eastern side of Bowen Street that are currently used by The Adelaide Central Mission.
- White Ant Treatments may have been used on the soil beneath the buildings and on the surfaces prior to sealing. Potential contaminants associated with this may include arsenic, organochlorine pesticides (OCPs), or organophosphate pesticides (OPPs).

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6. Recommendations

The site history investigation has highlighted a number of past activities that have been undertaken at the site. It is likely that contaminants are present on site however given the current site use those do not present an immediate concern.

If future plans for the site include redevelopment to a more sensitive land use (ie residential housing), it is recommended that further soul samples are taken from within those areas identified as potentially being contaminated and analysed to determine if these areas of the site contain significant levels of contamination.

7. Statement of Limitations

This report has been prepared by the Consultant with all reasonable skill, care and diligence in accordance with the terms of agreement with the Client, and taking account of the human and other resources utilised by agreement with the Client.

The data in the report was derived by applying the methodology described in subsequent sections of this report. To the best of the Consultant's knowledge, the information contained in the report is accurate at the date of issue. However there should be a recognition of the limitations of the site environmental assessment process. These are referred to, for example in Section 4 of ASTM Practice E 1527-94. Clause 4.5 states the following:

No environmental site assessment can wholly eliminate uncertainty regarding the potential for recognised environmental conditions in connection with a property. This site assessment is intended to reduce, but not eliminate, uncertainty regarding the potential for recognised environmental conditions in connection with a property, and both practices recognise limits of time and cost.

It should also be recognised that site conditions, including contaminant extent and concentrations, can change with time. This may be particularly relevant if the report is used after a protracted delay, such that further investigation of the site may be necessary.

In preparing this report, the Consultant has relied on and presumed accurate certain information provided by the Client or third parties. Unless otherwise stated in the report, the Consultant has not attempted to verify the accuracy or completeness of any such information.

The consultant has prepared this report for the Client in accordance with generally accepted consulting practice and the Consultant's Terms of Business. No other warranty, express or implied, is made as to the professional advice included in this report. The Consultant disclaims any responsibility in respect of any matters outside the scope of the terms of agreement with the Client.

This report has not been prepared for use by parties other than the Client. It may or may not contain sufficient information for purposes of other parties or for other uses. The Consultant accepts no responsibility to third parties to whom this report, or any part thereof, is made known.

A third party relies upon the report at its own risk.

In accordance with standard practice, the assessment carried out is site specific. Consequently, the assessment does not address environmental liabilities which may or may not pertain to other properties either currently or previously owned or operated by the Client or other off-site environmental liabilities.

Appendix A

Location Map

RUST PPK Pty Ltd



Map courtesy of Universal Press

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Location Map

Appendix B

Site Plan





APPENDIX B

Rust PPK Pty Ltd, 1997,

Rust PPK Pty Ltd, 1997, Environmental Site Assessment, Franklin Street Bus Station and Car Parks, Adelaide, for the Corporation of the City of Adelaide, 30 June 1997

Corporation of the City of Adelaide Franklin Street Bus Station and Car Parks Site Audit Report, No. 97.0307/1, 31 July 1997



Photo 9: The carpark at the eastern edge of the site (looking east from the Greyhound terminal).



Photo 10: The private car park on Bowen Street with the remains of an old wall along the rear of the site (looking east from Bowen Street).


Photo 7: The Greyhound terminal and attached canopy for bus parking (looking north-west).



Photo 8: The carpark at the eastern edge of the site (looking east from the Greyhound terminal)



Photo 5: The large drums containing waste oils near the stormwater drainage pit at the western edge of the site.



Photo 6: The Collex waste collection bins next to the stormwater drainage pit at the western edge of the site.





Photo 3: The Coachfreight storage shed, with the conveyor belt along the rear wall (looking south).



Photo 4: The Premier Stateline passenger terminal, and attached canopy for bus parking (looking west across Bowen Street).

Appendix C

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Current Zoning Regulations

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Adelaide (Clty) 12 December 1996

FRANKLIN STREET EAST PRECINCT FB

The Franklin Street East Precinct should develop as a high quality low to medium intensity office area with a range of retail, ancillary retail and support activities at ground floor level. High-density with a range of voting accommodation is also appropriate. The substantial redevelopment residential and this within the Precinct should be used to establish a new commercial character in the area, complemented by the upgrading of the public environment.

The Precinct should remain highly accessible for both local and through traffic. Pedestrian links to the Central Market Precinct and the Western Core Precinct should be maintained and improved to provide for increasing numbers of pedestrians.

The primary activity in the Precinct should be general offices supported by ground floor retailing. The redevelopment of a comprehensive bus terminal and supporting facilities is appropriate in the Precinct. The Morphett Street frontage should accommodate offices and showroom activities. showrooms will be considered elsewhere in the Precinct on their merits. Residential and visitor accommodation may also be appropriate at higher densities.

Public parking stations are non-complying on Franklin and Morphett Street frontages, but elsewhere will be considered on merit.

Desired Uses

general offices, consulting rooms cafes shops licensed premises ancillary retail services lelsure studios showrooms (on Morphett Street frontages) passenger terminals, minor transport depots

Non-complying and Other Uses - indicated in Use Chart F.

BUILT-FORM

Density

Basic plot ratio: 2.4

Maximum plot ratio: 3.0

Bonus plot ratio of up to 0.6 can be achieved by the following means:

by purchase of transferable floor area from a Local Heritage Item or an Item of City

- (a)Heritage:
- for the provision of dwellings, multiple dwellings, institutional care, residential care accommodation, visitor accommodation or any combination of the above where the bonus floor area is equal to the floor area used exclusively for these purposes; (b)

for the provision of a child care centre and associated open space where the bonus floor area is equal to the area used exclusively for this purpose; and (c)

for the provision of a required notamined link on Tewn Asres 263 and 210 as indicated on Precinct Map F8. (The amount of floor area which may be achieved from the awarding of this bonus is equivalent to the site area devoted to the pedestrian link and multiplied by a factor of 2.0) (d) multiplied by a factor of 2.0).







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FRECINCT HAP F.8 FRANKLIN STREET EAST

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Adelaide (City) 12 December 1996

Height, Scale and Siting

The built-form in the Precinct should effect a transition from the higher intensity and scale of the Western Core to the lower scale of the Central Market Precinct.

Accordingly, the maximum building height in the Precinct is 21 metres or six storeys. Buildings on Franklin Street should achieve a minimum of two storays. Front and side boundary set-backs should be minimal to Franklin and Morphett Streets, and be in accordance with the prevailing siting pattern in order to produce a largely continuous built-form wall along these major street frontages. On minor streets front and side set-backs may be varied to provide landscaped frontages to buildings.

Townscape Context

Development should relate well to neighbouring buildings and contribute to the development of a cohesive townscape. New buildings should respect the traditional scale, massing and architectural detail of the Franklin Hotel and adjacent buildings.

Heritade

Within the Franklin Street East Precinct the following Items are included on the Register of City of Adelaide Heritage Items contained in Schedule 4 to these Principles:

- Workshop, 25 Eliza Street; Item 0981
- Young Street Chambers (former Printing House), 25 to 29 Young Street and 26-30. Item 97 Eliza Street:
- Offices (former Houses), 82 to 86 Franklin Street; Item 98
- Church of Christ and Church Hall, rear of 96 to 100 Grote Street (part in F9 Item 99 Precinct);
- Hotel Franklin, 88 to 92 Franklin Street; Item 100
- Har Majesty's Theatre, 54 to 58 Grote Street (part in F9 Precinct). Item 101

The location of the above buildings contained within the Items Is indicated on Precinct Map F8.

ENVIRONMENT AND AMENITY

Public Environment and Pedestrian Shelter

A high level of pedestrian amenity should be achieved in the public environment of the Precinct with large growing street-trees on the major streets and attractive paving where appropriate. Where footpath widths and existing or proposed street tree-planting allow, development may provide verandahs, awnings or balconies for pedestrian shelter.

Design of the public environment should contribute to the safety and security of pedestrians.

On-site Landscaped Open Space

On-site landscaped open space is not required, but the provision of landscaped pedestrian spaces such as arcades, malls and small pocket parks on pedestrian links is desirable.

Signs

The provision of signs should be in accordance with Principle 37 and Sign Chart F.

A variety of well-designed signs may be permitted in the Precinct. Illumination of signs and buildings is appropriate, providing there is no adverse impact on residential premises.

Within the indicated sign levels the following signs are appropriate:

- above canopy level flat wall signs (at parapet height), vertical projecting signs; (a)
- fascia signs, flat wall signs, horizontal projecting signs; canopy level (b)

Adelaide (City) 12 December 1996

- (c) below canopy level business plates, flat wall signs, horizontal projecting signs, under canopy signs; and
- (d) ground level low free-standing signs.

Within the indicated sign levels the following signs are non-complying.

- (a) roof level all signs; and
- (b) ground level pylon signs.

All other signs and the animation of signs will be considered on their individual merits, but third party advertising is non-complying.

MOVEMENT

Pedestrians

Existing through-site and on-street pedestrian links should be maintained and developed on Town Acres 241, 242, 263, 265, 308 and 310.

A new pedestrian link is required between Grote and Franklin Streets to run from Young Street to Moonta or California Streets through Town Acre 263 and 310 as shown on Precinct Map F8.

The pedestrian route along Bentham Street and Pitt Street should be developed as a key route linking the railway station with the Central Market. Pedestrian safety and security should also be improved along Young Street.

Vehicle Access and Servicing

Provision for vehicle access and servicing should be in accordance with Principles 44, 46 and 50.

Parking

Provision for car parking should be in accordance with Principles 48, 50, 52 and 53.

Appendix D

Borelogs from the Surrounding Area



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	01	1'	Fill. Sandy loam and rubble.
	1	2	Fill. Fairly soft brownish limey clay with some greenish-grey clay with red and yellow mottling.
	2	4	Dark brown limey clay loam with some rubble, (true
			topsoil) grading to light brown limey and sandy
			clay with abundant grit and travertine fragments
	I.	<u> </u>	Slightly mottled.
~	4	Ö	Light brown limey clay and slight greenish-grey
ך			becoming ungenigh-grow cley with brown and
			ycllow-brown mottling. Quite firm and puggy.
	6	8	Mainly greenish-grey slightly silty clay with
			slight yellow-brown (ochrecus) and brown mott-
			ling. Some small patches of red iron staining.
	g		Some gritty fragments. Stiff and puggy.
	5	10	witches of reddish wateris] and leages wellow-
7			brown ochreous mottling. Some brown mottling.
نمه			Numerous small grit and travertine fragments.
			Some blobs of black organic matter. Stiff and
			puggy.
	10	20	Greenish-grey silty clay, but mottling mainly yell
			patches. Leas gritty, no travertine fragments.
			Some moderately large patches. heas gritty, no
	. [travertine fragments. Some moderately large
)			patches of brownish-black organic material.
7			Stiff and puggy.
	20	20	brown mottling and some brown and yellow-brown
			patches. Stiff to very stiff.
	26	38	Greenish-grey slightly silty clay with yellow-brow
			and brown mottling, reddieh mottling only very
			slight,
	32	39	Red-brown very sandy clay with small blobs of
			Breaminn-grey yellow-brown and brown clay.
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D cpth From	Depth To	Nature of Strata
0*	2'	Brown sandy fill. Numerous rock fragments.
2	4	Dark brown limey clay (True topsoil). Mottled light brown. Somewhat silty but with numerous
		gritty fragments of quartz, travertine etc becoming more light brown with depth. Fairly
. 4.	6.	sort and pliable. Light brown limey clay with abundant gritty
		travertine fragments etc.
) • 6	8	Light brown limey clay with some green-grey and slight red-brown mottling. Contains the usual gritty travertine, gtz. some black organic
	· • · ·	matter and whitish limey patches. Moderately stif
8	. 10	Mainly green-grey silty clay, with brown, yellow- brown and alight red mottling. Thence as above.
10	14	Ditto but limey patches absent whilst reddish- brown iron staining more common. Very firm.
14	20	Mainly green-grey very stiff puggy silty clay. Slight brownish mottling. Some red and yellow iron oxide patches in varying amount. Some gritty
		fragments.
20 . 	22	Ditto i.e. green-grey, but with excessive reddish patches and lesser yellow-brown patches. Again
	21	Very stiff and puggy.
22 0h	26	Ditto - Reddieb-dlaw mana abundant
	 	form harder kernels in otherwise. very. stiff
) ₂₆	33	Ditto i.e. green-grey silty clay. mottled mainly
		light red-brown, some yello w-brown and slight
		reddiah. Very stiff and puggy with kernels of
		even harder clay. Some gritty particles stc.
· ·		Abundant dark organic material at about 32ft.
20	. 4⁄	of well churned light red-brown clayey sand.
-		Autorous gribby particies.
·		Klare Film Ro
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L4 1111 Ģ 5 022 174 Light green-grey and sad SANGY CLAY (CL) | I vary stiff, nee SC) [cave-in fion fill, patros anghega 28.2 Light gran-gray BILIY CLAY (CH) (vary till', motiled with yealow) [green-grey. multhed with yellow! LLEVITON JOL 2 FEET ASFALT FAVENENI Dath Derna Stilde CLAT (CL) (1210, 2012/00, 2012/01, 2016) (1210, 2012/01, 2016/01, 2016) 50% Assibuted SILIY CLAY (CH) (fish) (actifity gray) 1.1.1.1.1.1.1 (grafing heam yellow) CASING DEPTH 31 FCT CASING DEPTH 39 FCCT CASING DEPTH 39 FCCT Ξ. [nolet sone] (1331 Stav) 0 BORING 1 . . 2 -. 1.1 . 1 . 1 . 1. 1 : . LO ELLA 1/10/91 5-10/9-5-11/9-REIVEL 5-10/9-5-24/6" 16/10-5 11 - 5 \$ \$/62=5 PTH LINA 5 - 23 1 - 42 Ľ¢¥ **TLAU** 2 -2 : 101 110 101 26 21.5 Haras S P) I OH 23.6 2.8.2 1.10 32.5 1.1 17.0 25.4 37.4 19.2 1.10 13.5 1.15 19.4 26.8 1.00 24.9 1.15 1440 1500 2900 0220 2450 200 1001 1 500 1000 21.5 21.2 20.2 1.00 31.6 And Long 19.0 24.1 1.00 TINC 101 1930 25.30 QUIC 0440 4300 700 5220 Del Co 1614 ŝ 55 5 5 2 5 5 5 5 -..... -1 10 SHATKAGC . U.S. L)NEAR 1 . Ĩ 2 i .



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Appendix E

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Aerial Photographs









Appendix F

Photographs



Photo 1: The Private Carpark on Andrew Street and the entrance driveway into Coachfreight (looking north).



Photo 2: The Coachfreight storage shed (and bus shelter), looking west, across Bowen Street.

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APPENDIX B

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Rust PPK Pty Ltd, 1997,

Environmental Site Assessment, Franklin Street Bus Station and Car Parks, Adelaide, for the Corporation of the City of Adelaide, 30 June 1997

Corporation of the City of Adelaide Franklin Street Bus Station and Car Parks Site Audit Report, No. 97.0307/1, 31 July 1997

Environmental Site Assessment Franklin Street Bus Station and Car Parks

The Corporation of The City of Adelaide

Rust PPK Pty Ltd Environment & Infrastructure

30 June 1997 27J097A 97-459.DOC 101 Pirie Street Adelaide SA 5000 PO Box 398 Adelaide SA 5001 Australia Telephone: (61 8) 8405 4300 Facsimile: (61 8) 8405 4301

A NATA Certified Quality Company



Rust PPK Pty Ltd ACN 058 381 507

101 Pirie Street Adelaide, South Australia GPO Box 398, Adelaide SA 5001 Australia Telephone (08) 8405 4300 Int Tel +61 8 8405 4300 Facsimile (08) 8405 4301 Email ppkadel@ozemail.com.au

Our Reference 2706/2916/27J097A

30 June 1997

The Corporation of The City of Adelaide Town Hall Adelaide GPO Box 2252 South Australia 5001

Attention: Mr Brian Fitzpatrick

Dear Brian

Environmental Site Assessment Franklin Street Bus Station and Car Parks

Rust PPK is pleased to submit two (2) copies of the above assessment report for your consideration.

The findings of the assessment program have identified no requirements for remedial works at the site in accordance with the continued long term use of the site for commercial purposes. Recommendations have been made with regard to the potential redevelopment of various parts of the site for either similar commercial landuses or for restricted residential purposes (with no access to underlying soil), and also for more sensitive landuses (such as unrestricted residential) where there maybe potential access to underlying soil. It is understood that the recommendations are subject to approval by the appointed environmental auditor, Adrian Hall.

I trust that I have interpreted your requirements correctly. If you have any queries or questions relating to the above report or the assessment program, please do not hesitate to call me on (08) 8405 4300 or 0414 245353.

Yours faithfully

M: DATA RT 97.419 DAX

Stuart P Taylor Team Leader, Environmental Assessment and Remediation Rust PPK Pty Ltd

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Appendices

- Appendix A Site Location Plan
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Executive Summary

Rust PPK Pty Ltd (Rust PPK) was commissioned by The Corporation of the City of Adelaide (The Corporation) to undertake a preliminary environmental assessment of the Franklin Street Bus Station and several surrounding car park sites. The entire subject site which includes the bus station and car parks is located at 85-129 Franklin Street however the site is divided into two sections on the eastern and western sides of Bowen Street.

The environmental assessment program follows a site history investigation undertaken by Rust PPK in March 1997 (Rust PPK doc no 97/143).

The objectives of the environmental assessment program were to investigate and report on any potential soil and groundwater contamination resulting from past site activities, prior to the possible future redevelopment of various parts of the site.

In order to achieve these objectives Rust PPK undertook a comprehensive desktop study and on-site investigation comprising targeted soil investigations and detailed laboratory analysis.

The assessment program undertaken during May 1997 has identified elevated concentrations of heavy metals (lead, zinc, and copper) in excess of the ANZECC environmental and/or the SAHC health based guidelines within the fill materials recovered from:

- the driveway of the Coachfreight parcel collection and drop off point to the west of Bowen Street (BH4, lead and zinc only);
- the north east corner of the Grote Street public car park (BH14); and
- the centre of the car park adjacent the storage building at 104 Grote Street used by the Adelaide Central Mission (BH20, zinc only).

An elevated PAH (benzo(a)pyrene) concentration in excess of the SAHC health based guidelines, was identified within the fill materials in the car park adjacent the storage building at 104 Grote Street (BH20). Elevated Total fluoride concentrations were identified within the surficial fill materials recovered from the north eastern corner of the Franklin Street Car Park and the south eastern corner of the Grote Street Car Park. These elevated levels of heavy metals, PAHs and fluoride are considered to be associated with fragments of ash, cinders and/or slag which were observed within the sub-surface soil profile within these locations.

Fragments of ash, cinders and/or slag were identified in thirteen out of the twenty sampling locations at the site and although elevated PAH, heavy metal and fluoride concentrations were not reported at all of these locations, it is considered that the relatively low proportion of the materials within the overall soil matrix may be resulting in a dilution effect on the analyte levels within the overall matrix. This therefore indicates the potential for high concentrations of localised (hotspot) PAH contaminants within the fill materials in boreholes BH4 and BH18 located on the western side of Bowen Street, and in all of the boreholes located on the eastern side of Bowen Street with the exception of boreholes BH9 and BH11. The fill materials containing ash and cinder fragments were generally identified to depths ranging from 0.5 m to 0.7 m across the site.

The surficial fill materials and the underlying natural soil were identified as being moderately alkaline, with soil pH at all locations reported above the ANZECC environmental guidelines.

The presence of moderately alkaline surface and sub-surface soils in conjunction with the natural tight clay profile and the apparent containment of any containinants within the ash, cinder and/or slag fragments identified, indicates that the impacted fill materials are likely to pose negligible long term environmental risks to the underlying soils and groundwater.

As an aid in the identification of potential health based risks, all contaminant levels were also compared to the proposed health based soil guidelines (Langley et al 1996 - Exposure Settings D and F) for restricted residential (with limited soil access) and commercial/industrial landuses. The lead concentration reported in the fill materials recovered from the north eastern corner of the Grote Street Car Park was in excess of both landuse exposure scenarios. The concentrations of all analytes reported from the remaining sampling locations were below the prescribed levels for both landuses.

In accordance with the continued use of all site areas for current commercial purposes, the results and findings of the assessment program have identified no requirements for any subsequent site characterisation or remedial works at the site. The only possible exception is the need for a site specific risk assessment to address the elevated concentration of lead identified within the north eastern corner of the Grote Street Car Park. From a preliminary risk assessment perspective it is considered that the concentration and likely nature of the elevated lead level identified will not pose a limiting factor for the continued current usage of the site providing the bitumen surfaces are maintained and managed appropriately.

If any part of the site is to be developed for a more sensitive landuse, then further site characterisation is recommended, the extent of which will be dependent on the future landuse. This is necessary in order to further characterise the soil in those areas of the site which were not investigated, particularly due to the presence of ash and cinders within the fill materials at thirteen out of the twenty sampling locations on-site. If any part of the site, with the exception of the Premier Stateline Terminal, is to be redeveloped to a landuse of the same or similar sensitivity (for example commercial or restricted residential with no access to underlying soil) then it is recommended that charcterisation of any excavated soil be carried out in order to determine off-site disposal options. Disposal as low-level contaminated waste may be necessary due to the potential for contamination to be present within the ash and cinders identified in many areas of the site. It is also recommended that appropriate health and safety precautions are taken during any possible future on-site earthworks, in order to protect workers and adjoining sites from exposure to potentially contaminated soils.

1. Introduction

Rust PPK Pty Ltd (Rust PPK) was commissioned by The Corporation of the City of Adelaide (The Corporation) to undertake a preliminary environmental assessment of the Franklin Street Bus Station and several surrounding car park sites. The entire subject site which includes the bus station and car parks is located at 85-129 Franklin Street however the site is divided into two sections on the eastern and western sides of Bowen Street.

The environmental assessment program follows a site history investigation undertaken by Rust PPK in March 1997 (Rust PPK doc no 97/143)

The objectives of the environmental assessment program were to investigate and report on any potential soil and groundwater contamination resulting from past site activities, prior to the possible future redevelopment of various parts of the site.

In order to achieve these objectives Rust PPK undertook a detailed desktop study and onsite investigation comprising:

- review of historical site usage;
- review of local soil and groundwater;
- drilling and sampling of twenty (20) soil bores;
- laboratory analysis of selected soil samples for a full range of chemical parameters characteristic of suspected potential contaminants resulting from previous on-site and adjacent site activities; and
- review and assessment of soil contaminant levels in accordance with the proposed future landuse.

The scope of works undertaken was in general accordance with the proposed work plan provided to The Corporation in April 1997 (Rust PPK document no. 97-219) and was subject to discussion and approval by The Corporation appointed Environmental Auditor, Mr Adrian Hall (BC Tonkin & Associates).

This report details the results and findings of the assessment program including a summary of available site history, assessment methodology and recommendations for limited site remediation and future site management.

2. Site Identification and Description

2.1 Site Identification

The subject site comprises two irregularly shaped parcels of land to the east and west of Bowen Street. Each of these parcels comprises a number of allotments which are described under different Certificates of Title, as listed in Table 2.1 and Table 2.2 below.

The total area of the site is approximately 1.41 hectares.

The site is located at 85-129 Franklin Street, Adelaide, and has an approximate total area of 1.41 hectares. The Corporation have advised that the site is part of the F8 Franklin Street East Precinct. Any proposed development must comply with the zoning regulations specified by the council which apply to this area. These regulations specify the desired and non-complying land uses and specify that any development should be used to establish a new commercial character in the area, complemented by the upgrading of the public environment.

			Ta	ble 2.1			
Allotment	Details	for	the	Eastern	Side of	Bowen	Street

Certificate of Title Reference	Land Description	Area (m ²)
226/124	Town Acre 263	1983.80
1639/119	Town Acre 310	2760.50
1663/99	Town Acre 309	83.60
1751/37	Town Acre 311	648.80
1922/48	Town Acre 263	986.26
5060/608	Allotment 1 in DP 32560	580.00
5317/61	Allotment 12 in DP546	149.60
5317/62	Allotment 91 in FP166443	348.69
5317/63	Allotment 92 in FP166444	271.50
5317/64	Allotment 93 in FP166445	526.90
5317/65	Allotment 91 in FP170401	816.37
TOTAL		9156.02

Table 2.2Allotment Details for the Western Side of Bowen Street*

Certificate of Title Reference	Land Description	Area (m ²)
2023/96	Town Acre 311	260.67
2128/45	Town Acre 311	257.80
2201/187	Town Acre 311	259.70
3479/180	Town Acres 261 & 262	1744.00
3582/78	Town Acre 261	509.70
3582/79	Town Acre 262	490.04
3582/80	Town Acres 261 & 262	1122.90
3841/122	LTRO Plan 546	340.60
TOTAL		4985.41

97-459.DOC Environmental Site Assessment Franklin Street 27J097A Bus Station and Car Parks

The site is surrounded by the following properties:

- Dreamland Furniture and a disused warehouse to the east;
- light industrial facilities to the west;
- Franklin Street to the north; and
- Andrews Street, the Grote Street Church of Christ and Grote Street to the south.

A location map for the site is presented in Appendix A.

2.2 Site Description

The site currently contains the following features:

- the Premier Stateline bus terminal, canopy and private car park on the north-west of the site (collectively referred to as Bus Depot 2);
- the Coachfreight parcel collection and drop off point (including storage shed) in the west of the site;-
- a bitumen-sealed private car park in the south-west of the site;
- the Greyhound and McCafferty's Express bus terminals and canopy on the north-eastern side of Bowen Street (collectively referred to as Bus Depot 1);
- a single storey house, a private car park, a toilet block and a two-storey building and adjacent car park all utilised by the Adelaide Central Mission on the eastern side of Bowen Street, in the south of the site (collectively referred to as 104 Grote Street); and
- two bitumen sealed public car parks in the east of the site owned and operated by The Corporation of the City of Adelaide (referred to as the Grote Street Car Park and the Franklin Street Car Park).

2.3 Site Ownership

The current Certificates of Title show the site to be owned by The Corporation of the City of Adelaide.

2.4 Site Topography

The site is situated on a flat parcel of land and is surrounded by similarly flat parcels of land.

2.5 Local Soil Types

Published information and previous experience in the area suggests that the natural soil profile at this site can be expected to include in the order of 1.0m of surface fill, consisting of various reworked soils and building rubble. Underlying this the profile is likely to resemble a Brown Solonized Soil type BS classification. Type BS soil profiles consist of brown sandy to clayey

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soils with abundant earthy lime and calcrete in the subsoil. Type BS soils are alkaline and often contain significant amounts of soluble salts. Over most of the city area, Type BS soils vary from a thin layer up to three metres thick and the layer overlies Hindmarsh Clay. Surface absorption in Type BS soils is rapid due to the highly permeable profile and as such external drainage is slight.

2.6 Local and Regional Groundwater

Department of Mines and Energy (MESA) records indicate regional standing groundwater levels at depths ranging from approximately 6 to 40 metres (refer Appendix B).

No groundwater was intersected during the on-site drilling program to a maximum depth of 2.3 m.
3. Site History

3.1 Historical Overview

The following information summarises the information obtained from Certificates of Title, Assessment Books in the Adelaide City Council Archives, the Sands and McDougall Directories of South Australia and historical aerial photographs of the site, all of which was documented in more detail in the Site History Report prepared by Rust PPK in March 1997:

- From 1850 until the early 1900s the site was used generally for residential purposes, but there were also a number of commercial premises including a garage, forge, workshop. bakehouse, and a private road.
- From the 1920s a number of small light industries were established on the site. These included a factory, garages, forges, stables, printing works, workshops, shops and offices. Some of the occupants included the Franklin Wrecking Co, J.W. Turner, a plumber, Oxy-welders Ltd, the O'Donnell Brothers Ltd, and a number of radio and electrical companies.
- During the 1960's a large proportion of the residential land in the western part of the site had been cleared and was used as an open lot car park by Dimet Corrosion Prevention Pty Ltd and I. and M. Jedynak.
- The Corporation of the City of Adelaide had acquired most of the land comprising the site by 1972, excepting the land contained in Certificates of Title 5060/608 and 1751/37 (the land referred to as 104 Grote Street). The land was then cleared and by 1979 the majority of the existing bus terminals and car parks had been constructed.
- The residences on land contained in Certificates of Title 5060/608 and 1751/37 were acquired by The Corporation of the City of Adelaide in the early 1990s, and are currently used by the Adelaide Central Mission. The front part of the building at 104 Grote Street has been condemned by the Council due to problems with rust and cracking.
- Between 1989 and 1995, a new terminal building was constructed on the eastern side of Bowen Street, on what was previously either car or bus parking space.

3.2 Summary of Potential Site Contamination Issues

Based on the historical information obtained from the Site History Investigation, it is considered that the following potential contamination may be present on site as a result of past on-site and adjacent site activities:

- Polycyclic Aromatic Hydrocarbon (PAH) contamination from the tar-based sub-base materials that have been used beneath bitumen in the past;
- PAH contamination from possible waste products associated with coal fires or furnaces which may have been used on the site in the past;
- Organochlorine Pesticide (OCP) contamination from the possible use of white ant treatments beneath buildings that have existed on-site;

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- possible petroleum hydrocarbon (TPH) contamination from leakage of fuel or oil from vehicles; and
- possible heavy metal contamination from activities associated with a plumbing business, forging, oxy-welding, radio and electrical companies, wrecking and auto-mechanics or printing works, all of which existed on the site in the past.

4. Soil Assessment program

4.1 Assessment Rationale

The assessment program was undertaken in general accordance with the proposed scope of works provided to The Corporation in April 1997 (Rust PPK document no. 97-219).

In designing the soil assessment program, reference was drawn from the following sources:

- the Australian and New Zealand Guidelines for the Assessment and management of Contaminated Sites" (ANZECC 1994);
- the guidelines prepared by the South Australian Health Commission in the publication "A Practical Guide to the Health Risk Assessment and Management of Contaminated Land in South Australia" (1993); and
- site history information.

The soil sampling program targeted only the open space areas of the site. The approximate open space area of the site is 0.98 hectares therefore in accordance with the Draft Australian Standard for the Sampling of Soils, the minimum number of sampling points recommended for a site with an area of 0.9 hectares is 20 points. The soil assessment program therefore incorporated twenty (20) soil monitoring bores targeted within the open and accessible areas of the site.

The location of all soil sampling boreholes were discussed with and approved by the appointed auditor, Adrian Hall and the approximate location of the soil monitoring bores are presented in Appendix C.

Drilling and sampling of the soil boreholes was undertaken between 20 - 22 of May 1997. Soil boring was undertaken using stainless steel push tubes, driven by a pneumatic hammer, to a maximum depth of 2.3 m. Soil cores were extracted from the push tubes directly onto clean plastic core trays for logging and collection of soil samples by the Rust PPK field investigator. Soil samples were recovered directly from core trays and transferred to prechilled 250 ml glass jars and sealed with teflon lined metal lids. Collected samples were immediately labelled and transferred to a chilled esky for storage.

On completion of field activities all samples were checked for labelling consistency against the field sampling record. Samples were then packed into eskies with fresh ice bricks and sealed for transport to the nominated laboratory for storage and analysis. Chain of Custody forms were completed and accompanied the samples to the laboratory.

To reduce any cross-contamination of soil samples all push tubes were decontaminated and cleaned using a pressurised spray gun prior to the drilling of all soil bores. An equipment rinsate (ER) was taken on one push tube in every ten (10) boreholes, a procedure which involves rinsing the tube with de-ionised water into a sample bottle which can then be sent to the laboratory for analysis to ensure that the tubes were washed correctly.

A field duplicate sample was recovered from a particular depth at each borehole in addition to the primary sample for that depth. Selected field duplicates were analysed along with the primary sample in order to monitor the precision and accuracy of the laboratory analysis and the distribution of contaminants within the soil profile.

4.2 Ground Conditions Encountered

The generalised soil types encountered during drilling are summarised as follows:

- Fill Materials: generally consisted of a surface layer of yellow silty sand with some gravel overlying dark brown silty clays to depths ranging from 0.5 m to 1.2 m. Brick fragments and cinders were identified in 13 out of the 20 boreholes and fragments of vesicular slag were identified in one of the boreholes.
- Natural Sediments: calcareous silty clays with some calcareous gravel ranging from creamy brown mottled brown to orange brown mottled creamy brown to a depth of approximately 2.0 m. At some boreholes the soil became greenish brown at around 2.0 m as it became Hindmarsh clay.

The fill materials which showed visual evidence of contamination are detailed as follows:

BH4: Some ash and cinders and very occasional vesicular slag fragments from 0.7 - 1.0m.

- BH5: Occasional ash and cinders from 0.7-0.8 m.
- BH6 : Occasional ash and cinders from 0.65-0.75 m.
- BH10: Occasional ash and cinders from 0.65-0.7 m.
- BH12: Very occasional ash and cinders from 0.55-0.7 m.
- BH13: Occasional surface bitumen fragments from 0.035-0.15 m, some ash and cinders from 0.6-0.9 m,
- BH14: Occasional ash and cinders from 0.15-0.7 m.
- BH15: Occasional ash and cinders from 0.55-0.7 m.
- BH16: Occasional ash and cinders from 0.3-0.6 m.
- BH17: Occasional ash and cinders from 0.65-0.7 m.
- BH18: Occasional ash and cinders from 0.4-0.5 m.
- BH19: Occasional ash and cinders from 0.6-0.7 m.
- BH20: Very occasional ash and cinders from 0.015-0.2 m, occasional ash and cinders from 0.35-0.55 m

Environmental soil monitoring borelogs are presented in Appendix D and a site plan showing the approximate area of fill materials containing ash, cinders and/or slag is contained in Appendix E.

4.3 Sampling Depths and Analytes

In general 3 to 4 soil samples were collected from the first metre of the soil core, with an additional 1 to 3 samples recovered between 1.0 m and 2.0 m, and then one sample was taken below 2.0 m, if the borehole was drilled past 2.0 m. The sampling generally included between 2 and 5 soil samples from the fill materials depending on the depth of fill. The specific sample depths were dependent on the soil profile at each location.

Selected soil samples were analysed for a range of chemical analytes including:

- Organochlorine Pesticides (OCPs);
- Heavy Metals arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), mercury (Hg), and zinc (Zn);
- Total Petroleum Hydrocarbons (TPHs);
- Benzene, Toluene, Ethyl Benzene and Xylene (BTEX);
- Polycyclic Aromatic Hydrocarbons (PAHs); and
- ∎ pH.

Four soil samples were also analysed for the full Victorian EPA Chemical Suite which generally consists of a selection (or all) of the following analytes:

- Heavy Metals As, Be, Cd, Co, Cr, Cu, Hg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Zn;
- Organochlorine Pesticides (OCPs);
- Total Petroleum Hydrocarbons (TPHs);
- Benzene, Toluene, Ethyl Benzene and Xylene (BTEX);
- Poly Aromatic Hydrocarbons (PAHs);
- Poly Chlorinated Biphenyls (PCBs);
- Chlorinated Hydrocarbons;
- Cyanide;
- Fluoride; and
- Phenols.

The four samples which were analysed for the full Victorian EPA screen were all field duplicates. Two of the duplicates were labelled as blind duplicates (the borehole number and depth was not indicated) and analysed by the primary laboratory along with the original samples in order to provide an intra-laboratory comparison between the results. The other field duplicates were analysed by the secondary laboratory while the original samples were analysed by the primary laboratory comparison. These analyses were undertaken as a quality control measure.

Two Equipment Rinsates (ER1 and ER2) was also analysed for PAHs, heavy metals and OCPs.

4.3.1 Rationale for Analyte Selection

Metals (As, Be, Cd, Co, Cr, Cu, Hg, Mn, Mo, Ni, Pb, Sb, Se, Sn, Zn)

Analysis for the nominated range of heavy metals was undertaken to target metallic species which may have been present within any fill materials on-site. Heavy metals could be present on-site from activities associated with many of the businesses which existed on-site in the past. The metals selected are in accordance with the suite of metals recommended within the Victorian EPA Screen and have the potential for posing health and/or environmental concerns if significant elevated levels are identified.

pH

Analysis for pH was undertaken on the majority of the samples as it is a measure of the relative acidity or alkalinity of the soil. The soil pH provides valuable information relating to the potential for leachate generation and solubility of certain metallic and non metallic analytes.

TPH/BTEX

TPH and BTEX analyses were undertaken as a measure of potential petroleum hydrocarbon residues within the soil profile. The potential for on-site petroleum hydrocarbon impacted soils was identified from the possibility of leakage of fuel and oil from cars in those areas that are used as an open bitumen car park.

PAHs

Analysis for PAHs was undertaken due to the possibility that tar-based materials were used beneath the bitumen car park and also due to the possibility that wastes associated with coal, coke or fuel oil fires or furnaces may be present on-site. PAHs typically result from the incomplete combustion and partial pyrolysis of petroleum hydrocarbon products (ie. fuel oils, coke and coal). Some PAH compounds, particularly Benzo(a)pyrene are known human carcinogens, whilst other PAHs including Benzo(a)anthracene and Dibenz(a,h)anthracene are suspected human carcinogens.

OCPs

Analysis for OCPs was carried out due to the possibility of residual contamination from the use of white ant treatments beneath or around any of the residences or other buildings that existed on the site in the past. OCPs have the potential to pose significant health risks for future occupiers of the site as the more residual OCPs such as Dieldrin, Heptachlor and DDT have a predicted environmental persistence time of 5-15 years.

Victorian EPA Screen

Analysis of selected soil samples for the Victorian EPA screen was undertaken in accordance with the requirements of the independently appointed Environmental Auditor. The range of analytes contained within the Vic EPA screen provide a broad chemical characterisation of the site targeted towards a wide range of common industrial and commercial pollutants.

4.4 Laboratory Analysis Program

The primary laboratory soil analyses were conducted by:

Australian Government Analytical Laboratories (AGAL) 51-65 Clarke Street South Melbourne, Victoria.

AGAL laboratories are NATA certified for all of the nominated soil analyses.

Two duplicate samples were sent to a secondary laboratory as a Quality Control (QC) measure. The inter-laboratory QC duplicate analysis was conducted by:

MGT Environmental Consulting Pty Ltd 3 Kingston Town Close Oakleigh, Victoria.

MGT are also NATA certified for all of the nominated soil analyses.

4.5 Soil Assessment Criteria

In order to assess the level and significance of any potential contaminants detected through analytical laboratory testing it is usual to reference established environmental investigation levels and/or human health threshold exposure levels.

For the purpose of assessing potential long term human health risks, the South Australian Health Commission (SAHC) Investigation Levels as specified within the publication "A Practical Guide to the Health Risk Assessment and Management of Contaminated Land in SA" (SAHC January 1993), are referenced as the adopted initial investigation levels.

For the purpose of assessing potential environmental risks, the Environmental Investigation Levels specified in the Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites (ANZECC/NH&MRC 1992) are referenced as the adopted initial investigation levels. The ANZECC Environmental investigation guidelines are primarily based on threshold levels for phytotoxicity and surface water receptors and are derived to protect the most sensitive receptor likely to be placed at risk and to reflect a level at which there is no observed effect on that receptor.

The SAHC (health) and the ANZECC (environmental) Investigation Levels do not necessarily represent an immediate action level if exceeded during the course of the initial investigation, however, they indicate contaminant levels which need to be assessed further through risk analysis to determine the relative level and significance of the contaminant concentrations on a site specific basis.

As a preliminary aid in the evaluation of site specific health based risk analysis, the Proposed Health Based Soil Guidelines (Langley et al 1996) as presented in the Health Risk Assessment and Management of Contaminated Sites - Contaminated Sites Monograph Series No. 5, 1996 are used as reference criteria. The Langley Criteria incorporate health based soil guidelines for a range of potential exposure settings including:

Exposure setting A	- 'standard' residential;
Exposure setting B	 'restricted' residential with substantial vegetable garden (limits on poultry meat intake);
Exposure setting C	- 'restricted' residential with substantial vegetable garden (exclusions on poultry meat intake);
Exposure setting D	 residential with restricted soil access (includes medium to high density residential);
Exposure setting E	 parks, recreational open space and playing fields: includes secondary schools;
Exposure setting F	- commercial/industrial sites.

For the purpose of the preliminary contamination assessment the assessment criteria nominated within the SAHC Health Based Guidelines and the ANZECC Environmental Investigation levels will be referenced as the primary assessment criteria. For the purpose of the preliminary health risk assessment reference will be drawn from the Langley Criteria for restricted residential landuse with limited soil access and commercial/industrial landuse (Langley et al 1996 - Exposure Settings D and F) in order to provide information regarding the health risk associated with the site depending on the potential future landuse.

In the case of analytes not covered by the nominated guidelines the Dutch Investigation and Intervention values will be referenced and the former Dutch C levels and the NSW EPA Guidelines for Assessing Service Station Sites will be used as the guidelines for TPH/BTEX.

4.6 Soil Contamination Assessment

Assessment Criteria for comparison with soil analytical results is contained in Appendix G and laboratory results from the nominated soil analyses are presented in tabulated form in Appendix H. Full certified laboratory results are presented in Appendix I. Refer to Appendix C for the sampling location plan.

Heavy Metals

Elevated levels of zinc (280 mg/kg, 2000 mg/kg and 410 mg/kg) in excess of the ANZECC Environmental Investigation level (200 mg/kg), were reported within the fill materials (0-0.7 m) at boreholes BH4, BH14 and BH20. At borehole BH14, located in the north eastern corner of the Grote Street Car Park, the zinc concentration was also above the SAHC Health Based Investigation level of 500 mg/kg. From a preliminary human health risk assessment perspective the zinc concentrations identified at these locations were well below the proposed health based soil guidelines for both restricted residential landuse (limited soil access) and commercial/industrial landuse (Langley et al 1996, Exposure settings D and F) of 28000 mg/kg and 35000 mg/kg.

Elevated **lead** concentrations (670 mg/kg and 1600 mg/kg) in excess of the ANZECC Environmental Investigation level and the SAHC Health Based Investigation level, both of which have a level of 300 mg/kg, were reported within the fill materials (0-0.7 m) recovered from boreholes BH4 and BH14. The lead concentration from BH14 was also in excess of the proposed health based soil guidelines for both restricted residential landuse and commercial/industrial landuse (Langley et al 1996, Exposure Settings D and F) of 1200 mg/kg and 1500 mg/kg respectively.

An elevated **copper** concentration of 450 mg/kg which is in excess of the ANZECC Environmental Investigation level (60 mg/kg) and the SAHC Health Based Investigation level (100 mg/kg) was reported within the fill materials (0.55-0.7 m) recovered from borehole BH14 located in the north eastern corner of the Grote Street Car Park. The concentration reported was however well below the proposed health based soil guidelines for both restricted residential landuse (limited soil access) and commercial/industrial landuse (Langley et al 1996, Exposure settings D and F) of 4000 mg/kg and 5000 mg/kg.

Analysis for heavy metals was undertaken on eight natural soil samples across the site and the concentrations were all well below the relevant assessment criteria.

The concentrations of heavy metals were below the referenced acceptance criteria for the remainder of the boreholes however fragments of ash and cinders were identified in all of the boreholes located on the eastern side of Bowen Street with the exception of boreholes BH9 and BH11, and in boreholes BH4 and BH18 located on the western side of Bowen Street therefore there is the potential for localised or 'hotspot' heavy metal contamination at all of these locations.

Polycyclic Aromatic Hydrocarbons (PAHs)

An elevated Benzo(a)pyrene level of 1.7 mg/kg which is in excess of the SAHC Health Based Investigation level of 1 mg/kg, was reported within the surficial fill materials (0.05-0.2 m) recovered from borehole BH20 located in the Adelaide Central Mission Car Park on the corner of Bowen Street and Grote Street. Ash and cinders were identified in the fill materials, which extended to 0.55 m, at this location. The Total PAH concentration at this location was 15 mg/kg which is not above the SAHC Health Based Investigation level 20 mg/kg, however the presence of the ash and cinder fragments indicates the potential for localised or 'hotspot' PAH contamination at this location.

Although the concentrations of Total PAH and benzo(a)pyrene were below the acceptance criteria for the remainder of the boreholes, fragments of ash and cinders were identified in boreholes BH4 and BH18 located on the western side of Bowen Street and in all of the boreholes located on the eastern side of Bowen Street with the exception of boreholes BH9 and BH11. There is therefore the potential for localised or 'hotspot' PAH contamination at these locations.

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Laboratory analysis reported soil pH levels ranging from 8.8 to 11.0 which is indicative of moderately alkaline soils. The analysis reported that all of the eighteen samples analysed for pH were found to exceed the ANZECC Environmental Investigation criteria which recommends an upper pH of 8, with sixteen out of the eighteen samples also exceeding the SAHC health based investigation criteria which recommends an upper pH of 9. The range of pH values reported in the fill materials were found to be very similar to those reported in the underlying natural soils.

Organochlorine Pesticides (OCPs) and Organophospate Pesticides (OPPs)

All soil samples analysed for OCPs reported concentrations below the respective laboratory detection limits and consequently well below the nominated intervention criteria.

Total Petroleum Hydrocarbons (TPHs) and Mono Aromatic Hydrocarbons (BTEX)

All soil samples analysed for TPH and BTEX compounds reported concentrations below the respective laboratory detection limits and consequently well below the nominated intervention criteria.

Victorian EPA Screen

The four samples that was analysed for a Victorian EPA Screen (BH4, BH13, BH12/D and BH15/D) reported concentrations of Polychlorinated Biphenyls (PCBs), phenol and chlorinated hydrocarbons below the laboratory detection limits. The samples from boreholes BH12 and BH15 were also analysed for cyanide and cresols and the concentrations reported were below the laboratory detection limits.

Elevated levels of fluoride of 260 mg/kg and 190 mg/kg were reported in the fill materials (0.55-0.85 m) recovered from boreholes BH12 and BH15, located in the north eastern corner of the Franklin Street Car Park and the south eastern corner of the Grote Street Car Park, respectively. The levels were below the Dutch intervention level of 2000 mg/kg. It is likely that the fluoride is associated with the ash and cinders, which were identified at both locations.

Equipment Rinsate

The equipment rinsate which was from the push tube used in BH8, was analysed for PAHs, metals and OCPs. The laboratory results reported all PAHs, OCPs and metals below the respective laboratory detection limits and hence below the specific environmental and health based guidelines for these analytes.

4.7 Data Validation Report

All analytical data for soil was assessed to ensure validation. Results of internal laboratory Quality Control (QC) for soils are included within the laboratory reports in Appendix I. This includes results of surrogate recoveries and replicate analysis carried out as part of the laboratory QC program. Tabulated results of all of laboratory replicate analysis and field duplicate analysis is contained in Appendix J.

The precision of the results for each analyte for both the laboratory replicate and field duplicate samples was determined by calculating the Relative Percentage Difference (RPD) between a replicates and duplicates. This was calculated a follows:

$$RPD = \frac{(Concentration 1 - Concentration 2) \times 100}{(Concentration 1 + Concentration 2) \div 2}$$

The acceptance criteria for laboratory replicates is generally set at an RPD of 20%, with an RPD of 30% used for field duplicates. This criteria is based on Rust PPK quality assurance (QA) protocols, which were developed with regard to the US EPA regulations. The %RPD values for the laboratory replicate and field duplicates are contained in Appendix K.

In order to obtain a measure of overall precision, a relative standard deviation (%RSD) was determined for each analyte. This involved normalising each sample result and the corresponding replicate/duplicate results and then calculating the standard deviation of the complete set of normalised values for that analyte. This relative standard deviation is calculated as a percentage and is included in Appendix K. For soil sampling programs an RSD below 30% is considered satisfactory.

The laboratory analysis program included the analysis of four field duplicates and eight laboratory replicates. The RPD was greater than 30% for the inter-laboratory duplicate results for copper and zinc. The extraction methods used by the primary and the secondary laboratory are identical and the analytical methods are compatible (ICP-AES/Flame Atomic Absorption Spectrometry) and therefore the difference between the inter-laboratory duplicate results would most likely be due to the heterogeneous nature of soil and the consequent difficulty in obtaining a 'true' duplicate sample in the field.

One of the RPDs was greater than 20% for the laboratory replicate results for lead and this could also be due to the hetergeneous nature of soil and the difficulty in obtaining two replicate samples from the soil sample in the laboratory. The RSDs were within the accepted criteria for all of the replicates as shown in Appendix K.

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5. Conclusions

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The investigation program undertaken during May 1997 has identified elevated concentrations of heavy metals (lead, zinc, and copper) in excess of the ANZECC environmental and/or the SAHC health based guidelines within the fill materials recovered from:

- the driveway of the Coachfreight parcel collection and drop off point to the west of Bowen Street (BH4, lead and zinc only);
- the north east corner of the Grote Street public car park (BH14); and
- the centre of the car park adjacent the storage building at 104 Grote Street used by the Adelaide Central Mission (BH20, zinc only).

The concentrations of heavy metals were reported to depths ranging from 0.2 m to 0.7 m.

An elevated PAH (benzo(a)pyrene) concentration in excess of the SAHC health based guidelines, was identified within the fill materials in the car park adjacent the storage building at 104 Grote Street to a maximum depth of 0.85 m. Elevated Total fluoride concentrations were also identified within the surficial fill materials recovered from the north eastern corner of the Franklin Street Car Park and the south eastern corner of the Grote Street Car Park.

These elevated levels of heavy metals, PAHs and fluoride are considered to be associated with fragments of ash, cinders and/or slag which were observed within the sub-surface soil profile within these locations. The presence of these ash, cinders and/or slag is indicative of former waste products such as coke, coal and potential fuel oil wastes which may result from the incomplete combustion of petroleum hydrocarbon products (which may occur in domestic fires or furnaces for example). The ash, cinders and/or slag may also be waste products resulting from former forging operations which occurred at the site from around the 1920s to the 1970s.

Fragments of ash, cinders and/or slag were identified in boreholes BH4 and BH18 located on the western side of Bowen Street, and in all of the boreholes located on the eastern side of Bowen Street with the exception of boreholes BH9 and BH11. Due to the fragmented nature and uneven distribution of the ash, cinders and/or slag within the fill materials, the concentrations of contaminants that have been reported may not necessarily be indicative of the level of potential contamination in the soil. In addition to this, the relatively low proportion of the ash, cinders and/or slag within the overall soil matrix may be resulting in a dilution effect on the contaminant levels within the overall matrix. There is therefore the potential for high concentrations of localised (hotspot) PAH, heavy metal and/or fluoride contaminants within the fill materials at all of the locations where the ash, cinders and/or slag were observed. The fill materials containing ash and cinder fragments were generally identified to depths ranging from 0.5 m to 0.7 m across the site.

Heavy metal concentrations from eight of the soil samples recovered from the natural underlying soils reported concentration levels below both the ANZECC and SAHC

investigation levels. From an environmental perspective it is considered that the presence of moderately alkaline surface and subsurface soils will act to minimise the potential for heavy metal leachate generation and infiltration by acting to favour the complexing of the ions within the clay matrix.

As a preliminary health risk assessment, the concentrations of all analytes were also compared to the proposed health based soil guidelines (Langley et al 1996) for restricted residential landuse and commercial/industrial landuse (Exposure Settings D and F). The preliminary risk assessment identifies the lead concentration reported in the fill materials recovered from the north eastern corner of the Grote Street Car Park (BH14) in excess of both landuse exposure scenarios. The concentrations of all analytes reported from the remaining sampling locations were below the prescribed levels for restricted residential and commercial/industrial landuses.

The presence of moderately alkaline surface and sub-surface soils in conjunction with the natural tight clay profile and the apparent containment of any contaminants within the ash, cinder and/or slag fragments identified, indicates that the impacted fill materials are likely to pose negligible long term environmental risks to the underlying soils and groundwater.

6. Recommendations

Bus Depot 1 (Greyhound and McCaffertys), Grote Street and Franklin Street Car Parks

In accordance with the continued use of these areas for commercial purposes, the results and findings of the assessment program have identified no requirements for any subsequent site characterisation or remedial works within these areas. This recommendation is with the exception of a site specific risk assessment required to address the elevated concentration of lead identified within the north eastern corner of the Grote Street Car Park. From a preliminary risk assessment perspective it is considered that the concentration and likely nature of the lead identified will not pose a limiting factor for the continued current usage of the site providing the bitumen surfaces are maintained and managed appropriately.

If these areas of the site are to be developed for a more sensitive landuse, then further site characterisation is recommended, the extent of which will be dependent on the future landuse, due to the presence of ash and cinders within the fill materials at nine out of the eleven sampling locations in these areas. If this land is to be redeveloped to a landuse of the same or similar sensitivity (for example commercial or restricted residential with no access to underlying soil) then it is recommended that validation of any excavated soil be carried out in order to determine the required disposal method. Disposal as low-level contaminated waste may be necessary due to the potential for contamination to be present within the ash and cinders identified in these areas. It is also recommended that appropriate health and safety precautions are taken during any possible future on-site earthworks, in order to protect workers and adjoining sites from exposure to potentially contaminated soils.

104 Grote Street

The investigation program has identified no requirements for any subsequent site characterisation or remedial works within this area (which includes the house, private car park, storage building and adjacent car park) provided the current uses are maintained. If this portion of the site is to be developed for a more sensitive landuse (for example residential), it is recommended that more extensive site characteristion is carried out prior to the redevelopment. This is due to the presence of ash and cinders within the fill materials recovered from the two boreholes in this area, and so that the soil can be further characterised in those areas not covered in this investigation. Similarly to the other areas of the site, if this land is to be redeveloped to a landuse of the same or similar sensitivity then validation of any excavated soil is recommended prior to disposal of the excavated soil, and the appropriate health and safety precautions should be taken during any excavation.

Coachfreight and adjacent car park

If the current use of the land in this area is to be maintained, there are no requirements for remedial works in this area of the site. This is contingent upon the adequate maintenance and management of the bitumen surfaces. If this portion of the site is to be developed for a more sensitive landuse (for example residential), then further site characterisation is

recommended prior to the redevelopment, the extent of which will be dependent on the future landuse, due to the presence of ash and cinders within the fill materials recovered from the two boreholes in this area. If this land is to be redeveloped to a landuse of the same or similar sensitivity then validation of any excavated soil is recommended prior to disposal of the excavated soil, and the appropriate health and safety precautions should be taken during any excavation (as described previously).

Bus Depot 2 (Premier Stateline)

No contamination was identified in this area (which includes the bus parking area and the car park adjacent the terminal building) and so no remedial works or further site characterisation works are required provided the site use remains as at present. If this portion of the site is to be developed for a more sensitive landuse (for example residential). then further site characterisation is recommended prior to the redevelopment, the extent of which will be dependent on the future landuse, in order to further characterise the soil in those areas not covered in this investigation.

7. Statement of Limitations

This report has been prepared by the consultant with all reasonable skill, care and diligence in accordance with the terms of agreement with the client, and taking into account the human and other resources utilised by agreement with the client.

The data in this report was derived by applying the methodology described in previous sections of this report. To the best of the consultant's knowledge, the information contained in the report is accurate at the date of issue. However, there should be a recognition of the limitations of the environmental site assessment process. These are referred to, for example, in Section 4 of ASTM Practice E 1527-94. Clause 4.5 states the following:

No environmental site assessment can wholly eliminate uncertainty regarding the potential for recognised environmental conditions in connection with a property. This site assessment is intended to reduce, but not eliminate, uncertainty regarding the potential for recognised environmental conditions in connection with a property, and both parties recognise limits of time and cost.

It should also be recognised that site conditions, including the extent of contamination and contaminant concentrations, can change with time. This may be particularly relevant if the report is used after a protracted delay, such that further investigation of the site may be necessary.

In preparing this report, the consultant has relied upon, and presumed accurate, certain information provided by the client or third parties. Unless otherwise stated in the report, the consultant has not attempted to verify the accuracy or completeness of any such information.

The consultant has prepared this report for the client in accordance with generally accepted consulting practice and the consultant's terms of business. No other warranty, express or implied, is made as to the professional advice included in this report. The consultant disclaims any responsibility in respect of any matters outside the scope of the terms of agreement with the client.

This report has not been prepared for use by parties other than the client. It may or may not contain sufficient information for the purposes of other parties or for other uses. The consultant accepts no responsibility to third parties to whom this report, or any part thereof, is made known.

A third party relies upon the report at its own risk.

In accordance with standard practice, the assessment carried out is site specific. Consequently, the assessment does not address environmental liabilities which may or may not pertain to other properties either currently or previously owned or operated by the client, or to other off-site environmental liabilities.

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Appendix A

Site Location Plan



Appendix B

Department of Mines and Energy Groundwater Data



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Appendix C

2

Location of Soil Sampling Points



Appendix D

Soil Borelogs

Environmental Field Sampling Record



Project: Franklin Street Bus Station

Job No: 27J097A

Date:	20/5/97	Time:	11:15 am	Location No:	BH1
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Coordinates (AMG): N E

Reduced Level (mAHD)

Soil Classification and Description of Each Visible Soil Profile

(m)	Sample No	Soil Description		Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.06		BITUMEN.				
0.06- 0.5	0.06-0.3 0.4-0.5	FILL. Sand, off-white/yellow becoming yello to medium gravel.	ow, some fine	0		
0.5-1.0	0.8-1.0	Silty CLAY. Orange brown.		0		
1.0-2.1	1.4-1.55 2.0-2.1/D	Silty CLAY. Creamy brown, mottled off-wh becoming more clayey with depth.	ite and brown,	0		
	-					
				-		
					-	
Logge	l by: JRH	s	Sampled by: JRH	1		
Field C	lassification		Comments			
0 N 1 S	o obvious conta light visual conta	mination mination and/or slight odour				
2 V	isual contaminal	ion and/or odour				

Environmental Field Sampling Record



Project: Franklin Street Bus Station

Job No: 27J097A

 Date:
 20/5/97
 Time:
 12:00 pm
 Location No:
 BH2

Coordinates (AMG): N E Reduced Level (mAHD)

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description		Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.055		BITUMEN.				
0.055- 0.7	0.1-0.3/D 0.4-0.5	FILL. Sand, off-white/yellow becoming ye to coarse gravel.	ellow, some fine	0		
0.7- 1.55	0.8-1.0 1.35-1.5	Silty Sandy CLAY. Orangey/brown, becc (less sandy) and calcareous with depth.	oming more silty	0		
1.55- 2.0	1.8-2.0	Silty CLAY. Grey brown mottled off-white calcareous.	e and brown,	0		
	-					
				*		
Logged	l by: JRH		Sampled by: JRH	4		
Field C	lassification		Comments			
0 No 1 Si 2 Vi 3 G	o obvious contam ight visual contam sual contaminatio ross visual contar	ination nination and/or slight odour n and/or odour nination and/or strong odour		:		

Project:	Franklin Street Bus S	tation				Job No:	27J097A
Date:	20/5/97	Time:	12:40 pm	Location No:	BH3		-
Coordina	tes (AMG): N E			Reduced Leve	l (mAHD)		

Soil Classification and Description of Each Visible Soil Profile

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Depth (m)	Sample No	Soil Description		_Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.055		BITUMEN.				
0.055- 0.65	0.1-0.3/D 0.4-0.5	FILL. Sand, yellow, some fine to coarse	gravel.	0		
0.65- 1.2	0.8-1.0	Silty CLAY. Greyish green, mottled brow (calcareous nodules).	n and off-white	0		
1.2-2.1	1.4-1.55 2.0-2.1	Sitty CLAY. Greyish green, mottled red a yellow. (Hindmarsh clay).	and mustard	O		
					-	
	-					-
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					-	
				-	-	
Logge	d by: JRH		Sampled by: JR	H	1	
Field (Classification		Comments			
	lo obvious contan Slight visual contan /isual contaminati	nination nination and/or slight odour on and/or odour				
3 (Gross visual conta	mination and/or strong odour				



Project: Franklin Street Bus Station

Job No: 27J097A

Date: 20/5/97

Time:

1:10 pm

Location No: BH4

Coordinates (AMG): N E

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Reduced Level (mAHD)

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description		Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.25		BITUMEN.				-
0.025- 0.4	0.1-0.3	FILL. Sand, yellow, some fine to coarse	gravel.	0	-	
0.4-1.0	0.45-0.6/D 0.8-1.0	FILL. Sandy clay, dark brown, occasiona gravel, occasional fine to medium orange some fine to coarse black ash and cinder brown calcareous nodules, very occasior medium silvery black, vesicular slag fragn occasional medium china fragments.	al fine to medium e brick fragments, rs, some creamy nal fine to nents, very	1		
1.0-1.6	1.55-1.7	Silty CLAY. Creamy brown, mottled brov	vn, calcareous.	0		
1.6-2.1	2.0-2.1	Silty CLAY. Greyish green, mottled creat brown, and yellow brown, some grey/bla towards bottom.	ny brown and ck mottling	0		
				-		
Logged	by: JRH	1	Sampled by: JRH	1		
Field CI	assification		Comments			
0 No 1 Sli 2 Vis 3 Gr	o obvious contami ght visual contam sual contamination ross visual contam	nation ination and/or slight odour n and/or odour nination and/or strong odour				



Project: Franklin Street Bus Station

Job No: 27J097A

Date:

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2:00 pm Loca

Location No: BH5

Coordinates (AMG): N E

20/5/97

Reduced Level (mAHD)

Soil Classification and Description of Each Visible Soil Profile

Time:

Depth (m)	Sample No	Soil Description		Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.4		BITUMEN.				
0.04- 0.7	0.1-0.3 0.4-0.5/D	FILL. Sand, yellow, some fine to medium	gravel.	0		
0.7- 0.85	0.7-0.8	FILL. Sandy clay, dark brown, occasional ash/cinders, occasional fine to medium or fragments, occasional fine gravel.	fine black ange brick	1		
0.85- 1.3	0.8-1.0	Silty CLAY. Orangey brown, mottled crea	my brown.	0		
1.3-2.1	1.35-1.5 1.7-1.8 2.0-2.1	Sitty CLAY. Greyish brown, mottled off-wi (calcareous).	hite and brown	0		
				-		
			• •			
Logge	ed by: JRH		Sampled by: JF	RH		
Field	Classification		Comments			
	No obvious conta Slight visual conta Visual contaminat Gross visual conta	nination mination and/or slight odour ion and/or odour amination and/or strong odour				

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Date:

Project:	Franklin Street Bus Station

Job No: 27J097A

Coordinates (AMG): N E

20/5/97

Location No: BH6

Reduce

2:40 pm

Reduced Level (mAHD)

Soil Classification and Description of Each Visible Soil Profile

Time:

Depth (m)	Sample No	Soil Description		Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.05		BITUMEN.				
0.05- 0.65	0.1-0.3 0.4-0.5	FILL. Sand, yellow, some fine to medium	ı gravel.	0		
0.65- 0.75	0.65-0.75	FILL. Sandy clay, dark brown, some fine gravel, occasional fine to medium orange occasional fine to medium black ash/cind	to medium brick fragments, lers.	1		
0.75- 1.2	1.0-1.2/D	Silty CLAY. Creamy brown mottled brow	'n.	0		
1.2-1.8	1.7-1.8	Hindmarsh CLAY. Greyish green, mottle and reddy brown.	d brown, yellow	0		
		.*		-		
Logged	by: JRH	· ·	Sampled by: JRH	,	<u>.</u>	1
Field Cl	assification		Comments			
0 No 1 Sli 2 Vi 3 Gi	o obvious contami ight visual contam sual contaminatio ross visual contan	ination ination and/or slight odour n and/or odour nination and/or strong odour				

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Environmental	Field	Sampling	Record
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Project:	Franklin Street Bus Station						27J097A
Date:	20/5/97	Time:	3:30 pm	Location No:	BH7		
Coordinates (AMG): N E Reduced Level (mAHD)							 
Soil Classification and Description of Each Visible Soil Profile							an An an Anna An Anna

1	Depth (m)	Sample No	Soil Description		Field Class.	Headspace Vapour (ppm)	Analytes Selected
	0-0.07		•				
ł	0.07- 0.8	0.1-0.3 0.4-0.5	FILL. Silty sand, yellow, some powered g some fine to coarse gravel.	reen siltstone,	0		
	0.8- 1.35	0.8-1.0	Silty CLAY. Orangey brown.		0		
	1.35- 2.0	1.35-1.5/D 1.8-2.0	Silty CLAY. Creamy brown, mottled brow calcareous.	vn and off-white,	0		
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	Logged	i by: JRH		Sampled by: JRH	4		
r -	Field C	lassification		Comments			
nee		o obvious contai	nination mination and/or slight odour				
	2 V	isual contaminat	on and/or odour				
	3 G	iross visual conta	mination and/or strong odour	<u>l</u>			

# **Environmental Field Sampling Record**

BH8

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## Project: Franklin Street Bus Station

Coordinates (AMG): N E

Job No: 27J097A

 Date:
 20/5/97
 Time:
 4:00 pm

Reduced Level (mAHD)

Location No:

## Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	Fiel Clas	d Headspace s. Vapour (ppm)	Analytes Selected
0-0.10		BITUMEN.			
0.1-0.5	0.1-0.3 0.4-0.5/D	FILL. Silty sand, yellow (creamy brown), occ to medium gravel.	casional fine 0		
0.5-1.8	0.8-1.0 1.35-1.55	Silty CLAY. Creamy brown mottled brown.	0		
1.8-2.0	1.8-2.0	Silty CLAY. Off-white, some fine limestone g perched water table).	gravel (moist - 0		
Logged	d by: JRH	S	ampled by: JRH		
Field Classification         0       No obvious contamination         1       Slight visual contamination and/or slight odour         2       Visual contamination and/or odour         3       Gross visual contamination and/or strong odour		omments			

## Project: Franklin Street Bus Station

Job No: 27J097A

Date: 21/5/97

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Location No: BH9

Coordinates (AMG): N E

Reduced Level (mAHD)

Soil Classification and Description of Each Visible Soil Profile

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Time:

9:30 am

Depth (m)	Sample No	Soil Description		Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.45		BITUMEN.				
0.045- 0.9	0.1-0.3 0.35-0.5	FILL. Silty sand, yellow, fine to coarse gra to coarse gravel.	ins, some fine	0	(0.3-0.4) 4.3	
0.9-2.1	0.7-0.9/D 1.3-1.45 2.0-2.1	Silty CLAY. Creamy brown, mottled brown	n, calcareous.	0	(0.6-0.7) 5.3 (1.5-1.6) 6.8	
				-		
				<b>6</b> 1-		
Logge	ed by: JRH		Sampled by: JR	н		
Field 0 1 2 3	Logged by: JRH         Field Classification         0       No obvious contamination         1       Slight visual contamination and/or slight odour         2       Visual contamination and/or odour         3       Grace visual contamination and/or strong odour		Comments			

# Environmental Field Sampling Record



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## Project: Franklin Street Bus Station

Job No: 27J097A

Coordinates (AMG): N E

Reduced Level (mAHD)

## Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description		Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.45		BITUMEN.				
0.045- 0.65	0.1-0.3 0.35-0.5	FILL. Silty sand, yellow, fine to coarse g to coarse gravel.	rains, some fine	0	(0.55-0.65) 4.5	
0.65- 0.7		FILL. Silty clay, dark brown, occasional ash/cinders, occasional fine orange brick occasional fine gravel.	fine black k fragments,	1		
0.7- 0.85	0.7-0.85/D	Silty CLAY. Orangey brown mottled creater occasional fine yellow roots, occasional brown roots.	amy brown, fine to medium	0	(0.75-0.85) 10.5	
0.85- 2.0	1.0-1.2 1.4-1.55 1.8-2.0	Silty CLAY. Creamy brown mottled brow occasional fine black spots,, very occasi calcareous.	vn and off-white, onal fine roots,	0	(1.2-1.3) 8.0	
				-		
				-	-	
Logged	by: JRH		Sampled by: JRH	ł		
Field Classification O No obvious contamination Slight visual contamination and/or slight odour Visual contamination and/or odour Create visual contamination and/or odour			Comments			



Project:	Franklin Street Bus S	Station				Job No: 27J097A
Date:	22/5/97	Time:	11:00 am	Location No:	BH11	

Coordinates (AMG): N E

Reduced Level (mAHD)

## Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description		Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.03		BITUMEN.				
0.03- 0.7	0.1-0.3 0.35-0.5/D	FILL. Silty sand, yellow, fine to coarse gr to coarse gravel, some silty clay pockets	rains, some fine (orangey brown).	0	(0.3-0.4) 11.2	
0.7 <b>-</b> 1.0	0.8-1.0	Silty CLAY. Orangey brown, mottled cre calcareous, occasional fine to medium ro	amy brown, oots.	0	(0.65-0.75) 11.9	
1.0-2.0	1.3-1.45 1.8-2.0	Silty CLAY. Creamy brown, mottled off-v calcareous, very occasional fine to coars	vhite and brown e brown roots.	0	(1.6-1.7) 27.9	
	-					
			· ·			
				-	-	
Logged	by: JRH		Sampled by: JRH	1		
Field C	lassification		Comments			
0 No 1 SI	o obvious contami ight visual contam	ination ination and/or slight odour				
2 Vi 3 G	sual contaminatio ross visual contan	n and/or odour nination and/or strong odour				

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# Environmental Field Sampling Record

BH12



## Project: Franklin Street Bus Station

Job No: 27J097A

 Date:
 22/5/97
 Time:
 9:00 am

. .. ..

Location No:

Coordinates (AMG): N E

Reduced Level (mAHD)

## Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description	_ Fie Cla	eld ass.	Headspace Vapour (ppm)	Analytes Selected
0-0.03		BITUMEN.				
0.03- 0.45	0.15-0.3	FILL. Silty sand, yellow, fine to coarse sand, coarse gravel.	some fine to	0	(0.4-0.5) 66.7	
0.45- 0.55		FILL. Silty sand, brown and yellow, occasion pockets, dark brown, fine to medium gravel.	al silty clay C	0		
0.55- 0.7	0.55-0.7/D	FILL. Silty clay, dark brown, very occasional ash/cinders.	fine black 1	1		
0.7-1.0	0.85-1.0	Silty CLAY. Orangey brown, calcareous, mo and brown.	ttled off-white C	0	(0.7-0.8) 25.8	
1.0-2.0	1.55-1.7 1.85-2.0	Silty CLAY. Creamy brown, mottled off-white very occasional large roots, becoming greeny mottled off-white and brown.	e and brown, C 7 brown	0	(1.7-1.8) 49.3	
				•	•	
Logged	by: JRH	Sar	npled by: JRH	_		
Field Cla	assification	Cor	nments			
<ul> <li>Field Classification</li> <li>No obvious contamination</li> <li>Slight visual contamination and/or slight odour</li> <li>Visual contamination and/or odour</li> <li>Gross visual contamination and/or strong odour</li> </ul>		nation ination and/or slight odour n and/or odour ination and/or strong odour				
	211	1.2				
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NINON	ment & In	frastruc	ture			

Project:	Franklin Street Bus S	Station				Job No: 27J097A
Date:	22/5/97	Time:	11:45 am	Location No:	BH13	
Coordina	tes (AMG): N E			Reduced Leve	l (mAHD)	
Soil Class	sification and Descri	ption of E	ach Visible S	oil Profile		

Depth (m)	Sample No	Soil Description		Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.35		BITUMEN.				
0.035- 0.15	0.05-0.15 0.2-0.35	FILL. Silty sand, yellow, fine to coarse g bitumen fragments from surface, some f gravel.	rains, occasional ine to coarse	0		
0.15- 0.6	0.35-0.5	FILL. Silty sand, grey/brown, some fine	to coarse gravel.	0	(0.5-0.6) 6.0	
0.6-0.9	0.7-0.9/D	FILL. Silty clay, dark brown, some fine to some fine to medium roots, some fine to ash/cinders and orange brick fragments	o medium gravel, medium black from 0.7-0.8 m.	1		
0.9-2.0	1.35-1.5 1.8-2.0	Silty CLAY. Creamy brown mottled off-v calcareous.	vhite and brown,	0	(1.0-1.2) 8.2 (1.2-1.8) 6.9	
				_		
Logged	by: JRH	· · · · · · · · · · · · · · · · · · ·	Sampled by: JRH		J _{anne} ,	4 <u></u>
Field Cl 0 No 1 Sl 2 Vi	assification o obvious contami ght visual contam sual contaminatio	ination ination and/or slight odour n and/or odour	Comments			

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Environme	nt & Infra	struct	ure

Project:	Franklin Str	eet	Bus S	tation				Job No: 27J097A
Date:	22/5/97			Time:	12:30 pm	Location No:	BH14	
Coordina	tes (AMG):	N	Е			Reduced Leve	l (mAHD)	

#### Soil Classification and Description of Each Visible Soil Profile

المبتج ومستعديات وتراري المناصب وستصبغ وستصبغ والرابا

Depth (m)	Sample No	Soil Description		Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.035		BITUMEN.				
0.035- 0.15	0.05-0.15	FILL. Silty sand, yellow, fine to coarse gr to coarse gravel.	ains, some fine	0		
0.15- 0.70	0.15-0.3 0.55-0.7	FILL. Silty sand, grey/brown, some fine to occasional silty clay pockets with fine blac and occasional fine to medium orange bl	o coarse gravel, ck ash/cinders ick fragments.	1		
0.70- 1.2	0.7-0.85 1.0-1.2	FILL. Silty clay. Some fine to medium of fragments, some fine to medium gravel, s calcareous limestone fragments.	range brick some off-white	0	(0.8-1.0) 9.3	
1.2-2.0	1.85-2.0/D	Silty CLAY. Creamy brown mottled off-w calcareous.	hite and brown,	0	(1.3-1.4) 16.6	
				-		
				-		
Logged	l <b>by:</b> JRH		Sampled by: JR	-	1	
Field Cl	lassification		Comments			
0 No 1 Sli 2 Vi 3 Gi	o obvious contam ight visual contam sual contaminatio ross visual contan	ination nination and/or slight odour n and/or odour nination and/or strong odour				

BH15



Date:

#### Project: Franklin Street Bus Station

Coordinates (AMG): N E

Job No: 27J097A

22/5/97 **Time:** 1:00 pm

Reduced Level (mAHD)

Location No:

#### Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description		. Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.055		BITUMEN.				
0.05 <b>5-</b> 0.55	0.1 <b>5</b> -0.3 0.3-0.5	FILL. Silty sand, yellow, fine to coarse gr to coarse gravel.	ains, some fine	0	(0.3-0.4) 6.6	
0.55- 0.7		FILL. Silty clay, dark brown mottled off-w brown, occasional fine to medium black a occasion fine orange brick fragments, oc medium roots, some off-white pockets.	hite and orangey ash/cinders, casional fine to	1	(0.55-0 <b>.65</b> ) 10.7	
0.7-1.1	0.7-0.85/D	Silty clay, orangey brown (disturbed natu	ral soil?).	0	(0.8-0.9) 9.2	
1.1-2.1	1.5-1.6 2.0-2.1	Silty CLAY. Creamy brown, mottled brow	vn and off-white.	0	(1.6-1.7) 13.0	
Logged	I by: JRH		Sampled by: JR			
Field C 0 No 1 SI 2 Vi 3 G	lassification o obvious contam ight visual contam sual contaminatio ross visual contar	ination nination and/or slight odour n and/or odour nination and/or strong odour	Comments			





#### Project: Franklin Street Bus Station

Job No: 27J097A

Date: 22/5/97	
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Location No: BH17

Coordinates (AMG): N

Reduced Level (mAHD)

#### Soil Classification and Description of Each Visible Soil Profile

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Time:

2:50 pm

Depth (m)	Sample No	Soil Description		Field Class.	Headspace Vapour (ppm)	Analytes Selected
-0.075		BITUMEN.				
).075- ).65	0.1-0.3 0.35-0.5/D	FILL. Silty sand, yellow, fine to coarse gra to coarse gravel.	ins, some fine	0	(0.3-0.4) 6.9	
).75- ).7		FILL. Silty clay, dark brown, occasional fir ash/cinders, occasional fine to medium ora fragments, occasional fine to medium grav	ie black ange brick rel.	1		
0.7-1.0	0.8-1.0	Silty CLAY. Orangey brown mottled brown coarse limestone gravel.	n, occasional	0	(0.7-0.8) 7.3	
1.0-2.0	1.8-2.0	Sitty CLAY. Creamy brown mottled brown calcareous, becoming greenish brown wit	and off-white, h depth.	0	(1.4-1.5) 12.5	
						- -
				-		
				-		
Logge	d by: JRH		Sampled by: JR	Н		
Field C	Classification		Comments			
0 N 1 S 2 V	lo obvious contar Slight visual conta Visual contaminat	nination mination and/or slight odour on and/or odour				

## Environmental Field Sampling Record

BH18



Coordinates (AMG): N

Date:

## Project: Franklin Street Bus Station

Job No: 27J097A

22/5/97 **Time:** 

Ε

Reduced Level (mAHD)

.

Location No:

3:45 pm

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description		Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.055	<u> </u>	BITUMEN.				
0.055- 0.15	0.05-0.15	FILL. Gravelly sand, fine to coarse gravel, t	prowny yellow.	0		
0.15- 0.4	0.15-0.3	FILL. Silty sand, yellow, fine to coarse grain to coarse gravel.	ns, some fine	0		
0.4-0.5	0.4-0.5	FILL. Silty clay, dark brown, occasional fine ash/cinders, occasional fine orange brick fr occasional fine to medium gravel.	e black agments,	1		
0.5-1.6	0.8-1.0 1.45-1.6	Silty CLAY. Orangey brown mottled off-wh	ite and brown.	0	(0.75-0.85) 25.7 (1.0-1.2) 9.0	
1.6-2.3	2.15-2.3	Silty CLAY. Creamy brown, mottled brown becoming greeny brown mottled off-white a depth.	and off-white, and brown with	0	(1.6-1.7) 130	
				-		
Logge	d by: JRH		Sampled by: JR	۲H		
Field (	Classification		Comments			
0 N 1 S 2 N	lo obvious contar Slight visual conta Visual contaminat Gross visual conta	nination mination and/or slight odour ion and/or odour amination and/or strong odour				

Project:	Franklin Street Bus S	Station				<b>Job No: 27J097</b> A
Date:	22/5/97	Time:	10:00 am	Location No:	BH19	
Coordina	tes (AMG): N E			Reduced Leve	l (mAHD)	•

Soil Classification and Description of Each Visible Soil Profile

<ul> <li>BITUMEN.</li> <li>FILL. Silty sand, yellowy brown, fine to some fine to coarse gravel.</li> <li>FILL. Silty sand, brown and yellow, fine occasional fine to coarse gravel, occasio orange brick fragments.</li> <li>FILL. Silty clay, dark brown, very occas ash/cinders, occasional fine orange brick Silty clay, brown (disturbed natural soil?</li> <li>Silty CLAY. Orangey brown, mottled of calcareous, occasional fine to coarse lin fragments.</li> <li>Silty CLAY. Creamy brown mottled bro calcareous.</li> </ul>	coarse sand, e to coarse sand, ional fine to coarse sional fine black ck fragments. ?). ff-white and brown, mestone own and off-white,	0 0 1 0 0	(0.3-0.4) 10.5 (0.7-0.8) 201	
<ul> <li>FILL. Silty sand, yellowy brown, fine to some fine to coarse gravel.</li> <li>FILL. Silty sand, brown and yellow, fine occasional fine to coarse gravel, occasio orange brick fragments.</li> <li>FILL. Silty clay, dark brown, very occas ash/cinders, occasional fine orange brick Silty clay, brown (disturbed natural soil?</li> <li>Silty CLAY. Orangey brown, mottled of calcareous, occasional fine to coarse lin fragments.</li> <li>Silty CLAY. Creamy brown mottled bro calcareous.</li> </ul>	coarse sand, e to coarse sand, ional fine to coarse sional fine black ck fragments. ?). ff-white and brown, mestone own and off-white,	0 0 1 0 0	(0.3-0.4) 10.5 (0.7-0.8) 201	
<ul> <li>FILL. Silty sand, brown and yellow, fine occasional fine to coarse gravel, occasio orange brick fragments.</li> <li>FILL. Silty clay, dark brown, very occas ash/cinders, occasional fine orange brick Silty clay, brown (disturbed natural soil?</li> <li>Silty CLAY. Orangey brown, mottled of calcareous, occasional fine to coarse lin fragments.</li> <li>Silty CLAY. Creamy brown mottled bro calcareous.</li> </ul>	e to coarse sand, ional fine to coarse sional fine black ck fragments. ?). ff-white and brown, mestone own and off-white,	0 0 1 0 0	(0.7-0.8) 201	
FILL. Silty clay, dark brown, very occas ash/cinders, occasional fine orange brid Silty clay, brown (disturbed natural soil? Silty CLAY. Orangey brown, mottled of calcareous, occasional fine to coarse lin fragments. Silty CLAY. Creamy brown mottled bro calcareous.	sional fine black ck fragments. ?). ff-white and brown, mestone own and off-white,	1 0 0	(0.7-0.8) 201	
Silty clay, brown (disturbed natural soil? Silty CLAY. Orangey brown, mottled of calcareous, occasional fine to coarse lin fragments. Silty CLAY. Creamy brown mottled bro calcareous.	?). ff-white and brown, mestone own and off-white,	0	(0.7-0.8) 201	
Silty CLAY. Orangey brown, mottled of calcareous, occasional fine to coarse lin fragments. Silty CLAY. Creamy brown mottled bro calcareous.	ff-white and brown, mestone own and off-white,	0		
Silty CLAY. Creamy brown mottled bro calcareous.	own and off-white,	1		
4		0	(1.6-1.7) 195	
		-		
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	Sampled by: JF	кн		
on	Comments			
contamination contamination and/or slight odour mination and/or odour				
	on contamination contamination and/or slight odour nination and/or odour contamination and/or strong odour	Sampled by: JF on Comments contamination contamination and/or slight odour nination and/or odour contamination and/or strong odour	Sampled by: JRH       on       contamination       contamination and/or slight odour       mination and/or strong odour	Sampled by: JRH Son Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments Comments C

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Date:

#### Project: Franklin Street Bus Station

Job No: 27J097A

22/5/97 **Time:** 10:40 am

Location No: BH20

Coordinates (AMG): N E

Reduced Level (mAHD)

Soil Classification and Description of Each Visible Soil Profile

Depth (m)	Sample No	Soil Description		Field Class.	Headspace Vapour (ppm)	Analytes Selected
0-0.015		BITUMEN.				
0.015- 0.2	0.05-0.2	FILL. Silty clay, brown, occasional fine to m occasional fine orange brick fragments, very fine black ash/cinders.	edium gravel, v occasional	1		
0.2- 0.35	0.2-0.35	FILL. Silty sand, grey/brown, some fine to c occasional fine orange brock fragments.	coarse gravel,	0	• •	
0.35- 0.55	0.45-0.55/D	FILL. Silty clay, dark brown, very occasiona brick fragments, occasional fine black ash/c	l fine orange inders.	1.	(0.5-0.6) 99.0	
0.55- 1.1	0.85-1.0	Silty CLAY. Orangey brown, mottled off-wh calcareous, occasional fine limestone grave	ite and brown, I.	0	(1.0-1.2) 33	
1.1-2.0	1.8-1.95	Silty CLAY. Creamy brown mottled off-whit calcareous.	e and brown,	0	(1.7-1.8) 25.4	
				-		
Logged	l by: JRH	. s	ampled by: JRH	1		
Field C	lassification	c	omments			
0 No 1 SI 2 Vi 3 G	o obvious contam ight visual contan isual contaminatic ross visual contar	ination nation and/or slight odour n and/or odour nination and/or strong odour				• •

# Appendix E

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Interpolated Area of Potentially Impacted Soils



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# Appendix F

## Chain of Custody Forms

	-5 days lane Hewitt 08) 8405 4301	08) 8405 4300	Stuart Taylor Stuart Taylor	YES	11 H 12	и, на, Ра, 2л				Comments																	Page tof 2
Results Due	Turmaround Time 3 Fax Results To Fax Number	Phone Number	Project Manager Invoice To	Samples on Ice:		Metais. As, Cd, Cr, C				Sampler Initials	JRH	JRH	JRH	JRH	JRH	JRH	HAL	JRH	JRH	JRH	JRH	JRH	JRH	JRH	JRH	JRH	
	Environment & Infrastructure	Rust PPK Job Nµmber	27J097A	celved by terla Wayne.	ACAL UC			Analytes	۲ ۲ ۲ ۲ ۲ ۲ ۲ ۲	ntainer etals AHs AHs AHs AHs AHs		250ml S <4°C X A V V V V V V V V V V V V V V V V V V	250ml S <4°C	250ml S <4°C	250ml S <4°C	250ml S <41			250mi S <4°C					250ml 5 54 C	250inl S 44.0 v v v v v	250ml 5 <4 C A A A A A A A A A A A A A A A A A A	
	larke St, Sth Melbourne. 35 1777		Hand Kis Station	ewitt		PK Ply Ltd, Adelaide	allowed also			Location /	Sample ID Depth	BH1 0.06-0.3	BH1 0.4-0.5	BH1 0.8-1.0	BH1 1.4-1.55	P:11 2.0-2.1	BH1 2.0-2.1	BH2 0.1-0.3	BH2 0.4-0.0	BH2 0.0-1.0	BH2 1.35-1.5	BH2 1.9-2 0	BH3 0.1-0.3	BH3 0.1-0.3	BH3 0.4-0.5	BH3 0.8-1.0	B+I3 1.4-1.55
607 607	Lab Name AGAL Address C 5 r-65 C Phone Number (03) 968		Upb Location Frank in 1	Rellnquished By Jane H	Date 22/5/97	Company Rust PI	Signature		 	··	Sampled Time	20/5/97 11:15	20/5/97 11:15	20/5/97 11:15	20/5/97 11:15	20/5/97 11:15	20/5/97 11:15	20/5/97 12:00	20/5/97 12:00	20/5/97 12:00	20/5/97 12:00	20/5/97 12:00	20/5/97 12:40	20/5/97 12:40	20/5/97 12:40	20/5/97 12:40	20/5/97 12:40

Please fax back a signed copy when samples are recieved at the laboratory.

days le Hewilt ) 8405 4300 ) 8405 4300 Juli Taylor Lart Taylor	ss Hg, Pb, Zn		Comments	-												Page 30f8 ⁻ 4
ssults Due ssults Due arraround Time 3-5 ar Number (08 hone Number (08 hone Number Stu roject Manager Stu voice To Stu	Samples on tco: YE Metals: As, Cd, Cr, Cu,		Sampler Intitais	JRH	JRH	JRH	HAL	JRH	JRH	JRH	JRH	HUR	JRH		Hal	
Durne. Durne. Rust PPK Job Number Rust PPK Job Number 27JG97A	Received by Re-la Manuel Date Date 23-05-97 de Comrany AGAL VIC Signature (U)	Analytes	Dontainer Size Begin Aedium (s/w) Preservative PHAs PHAs PHAs PHAs PHAs PHAs PHAs PHAs	1.0-1.2 250ml S <4°C	1.2.1.2 250ml S <4°C	1.7-1.8 250ml S <4°C	0.1-0.3 250ml S <4°C X X & G 79	0.8-1.0 250ml S <4°C	1.35-1.5 250ml S <4 ^o C	1.8-2.0 250ml 3 54°C 1.0.3 250ml S 54°C	0.4-0.5 250nil S <4°C	0.4-0.6 250ml S <4'C X X / 8LC	0.8-1.0 <u>250ml</u> S <4°C <u>1.35-1.55</u> 250ml S <4°C	- 1.8-2.0 250ml S <4°C	0.1-0.3 250ml S <4°C	opy when samples are recieved at the laboratory.
GAL 1965 Clarke St, Stli Melbo 03) 9085 1777 11 in Street B	Jane Hewitt 2215197 Rust PPK Ply Ltd, Adelai TTL Mccu-TA		(] Samula []	Sampre in	BH6/D	BHG	BH7 BH7	BH7	81-17	BH7	BHB	B1-18/D	BH8 BH8	BHB	BI 19	x back a signed c
Lab Name Address Phone Number	Relinquished By Date Company Signature		Date	Sampled Time	· 20/5/97 2:40	20/5/97 2:40	20/5/97 3:30	20/5/97 3:30	20/5/97 3:30	20/5/97 3:30	20/5/97 4:00 20/5/97 4:00	20/5/07 4:00	20/5/97 4:00	20/5/97 4:00	21/5/97 9:30	21/5/97 9:30 Please fa)

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Results Due     3-5 days       Turnaround Time     3-5 days       Fax Number     Jane Hewitt       Fax Number     (08) 8405 4301       Phone Number     (08) 8405 4300       Project Manager     Stuart Taylor       Invoice To     Stuart Taylor       Metals: As, Cd, Cr, Cu, Hg, Pb, Zn       Metals: As, Cd, Cr, Cu, Hg, Pb, Zn       JRH       JRH	JRH     JRH       · JRH     - JRH       JRH     Please composite before analysing       JRH     Please composite before analysing
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# Appendix G

Assessment Criteria for Analytical Results

# Assessment Criteria for Comparison with Soil Analytical Results Metals, pH and PAH

All criteria expressed in mg/kg (ppm)

Analyte		Assess	ment Criteria									
	ANZECC	SAHC	Langley (D)	Langley (F)								
Metals:	an an an an an an an an an an an an an a											
Arsenic	20	100	400	500								
Bervllium			80	100								
Cadmium	3	20	80	100								
Cobalt		- -										
Chromium	50		`									
Copper	60	100	4000	5000								
Mercury	1	2	· 60	75								
Manganese	500		6000	7500								
Molybdenum												
Nickel	60		2400	3000								
Lead	300	300	1200	1500								
Antimony	20		. 200									
Salanium	<i>i</i> V											
Tin	50											
Zinc	200	500	28000	35000								
nH	8	9	2000-									
Polycyclic Aromatic		_										
Hydrocarbons (PAH):												
Naphthalene	5											
Acenaphthylene												
Acenaphthene												
Fluorene	10											
Phenanthrene	10											
Anthracene	10											
Fluoranthrene	10											
Pyrene												
Benz(a)anthracene												
Chrysene												
Benzo(b)fluoranthene and												
Benzo(k)fluoranthrene												
Benzo(a)pyrene		1	4	5								
Indeno(1,2,3-cd)pyrene												
Dibenz(a,h)anthracene												
Benzo(g,h,i)pe <b>ry</b> lene												
		~~	~~	. 400								
Iotal PAH		20	08	100								
ANZECC	Environmental Guidelines (1992)											
SAHC	South Australian Health Commission health based Guidelines (19											
Langley (D)	Proposed F	ealth Base										
	(Langley et	al 1990, EX	cposure Setting									
Langley (F)	Proposed F		u Soli Guideline	E - commoroir								
	(Langley et	ai 1990, C	chosnie semud	commerce								

# Assessment Criteria for Comparison with Soil Analytical Results OCPs and PCBs

All results expressed in mg/kg (ppm)

ANZECC SAHC Langley (D) Langley (F) Organochlorine Pesticides: HCB Dichloran Total BHC Lindane Heptachlor Epoxide Total Chlordane (ocy, cis, 200 250 trans, chlordene, nonachlor) Total endosulphan Aldrin 0.2 40 50 Dieldrin 0.2 40 50 Endrin Total Dicofol op-DDE, pp-DDE op-DDD, pp-DDD op DDT pp-DDT 800 1000 Methoxychlor Total OCPs Polychlorinated Biphenyls (PCB's): A1016 A1221 A1232
Organochlorine         Pesticides:         HCB         Dichloran         Total BHC         Lindane         Heptachlor       40         Heptachlor Epoxide         Total Chlordane (ocy, cis,       200         Total Chlordane (ocy, cis,       200         Total Chlordane (ocy, cis,       200         Total Chlordane (ocy, cis,       200         Total endosulphan       40         Aldrin       40       50         Dieldrin       0.2       40       50         Endrin Total       Dicofol       50         op-DDE, pp-DDE       op-DDD       50         op-DDD pp-DDD       800       1000         Methoxychlor       800       1000         Total OCPs       7       7         Polychlorinated       8       8         Biphenyls (PCB's):       A       1016         A1221       A       1232
Pesticides: HCB
HCB Dichloran Total BHC Lindane Heptachlor Epoxide Total Chlordane (ocy, cis, 200 250 trans, chlordene, nonachlor) Total endosulphan Aldrin 40 50 Dieldrin 0.2 40 50 Endrin Total Dicofol op-DDE, pp-DDE op-DDD pp-DDD op DDT pp-DDT 800 1000 Methoxychlor Total OCPs Polychlorinated Biphenyls (PCB's): A1016 A1221 A1232
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### Assessment Criteria for Comparison with Soil Analytical Results BTEX, TPH, Phenols, Fluoride, Cyanide, Cresols

All results expressed in mg/kg (ppm)

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Analyta		an and Friedministry according	٨٥٥	ocement Crit	oria		11.0
milalyte	ANZECC	SAHC	Langlev (D)	l anglev (F)	Dutch	NSW FPA	Dutch C
BTEX:							
Benzene	1				1	0.5	
Toluene	•				130	3	
Ethyl Benzene			<b>`</b>		50	5	
Xvlene			2 -		25	5	
<i>Y</i> tylene						-	
Total BTEX							
Total Petroleum					and is a nin () - 14 (11(1)) shakan n		•
Hydrocarbons (TPH):							
C ₆ -C ₉						65	800
C ₁₀ -C ₁₄			•				
C ₁₅ -C ₂₈						1000	5000
$C_{29}-C_{36}$							
	•						
Total TPH		-					
Phenols:						•	
Phenol			34000	42500			
3-Methylphenol							
2-Methylphenol							
4-Methylphenol							
2-Ethylphenol							
4-Ethylphenol							
2,4-Dimehtylphenol							
2,3,5-Trimethylphenol							
4-Nitrophenol		•				•	
Cresols					5	1	
Fluoride					2000		
Cyanide		250	2000	2500			
ANZECC	Environme	ental Guid	elines (1992)		Cuideling	aa (1002)	
SAHC	South Aus	tralian He		on nealth based	Guideline	55 (1993)	
Langley (D)	Proposed		Ised Soll Guide	lines ing D., restricts	d resident	ial)	
	(Langley e	ital 1990,	Exposure Set	ing D - resincie		udi)	
Langley (F)	Proposed	Health Ba	ased Soil Guide	lines		terie ()	
	(Langley e	et al 1996.	Exposure Sett	ing commen	ciai/indusi	(nai)	
Dutch	Dutch Inte	rvention (	Intena (1994)			Canaantination	for
NSW EPA	Guidelines	s for Asse	ssing Service S	station Sites - I	nresnoid	Concentrations	5 101
	sensitive I	and use (	soils) (1994)		-		
Dutch C	Dutch C C	riteria					

# Appendix H

Tabulated Soil Analysis Results

All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH4/D*	BH5	BH6	BH7	RUQ	DUO
Sample Depth	Reporting	0.45-0.6	0.8-1.0	0 65-0 75	0.4-0.5	0.8-1.0	2024
Metals:		an an an an an an an an an an an an an a				0.0-1.0	2.0-2.1
Arsenic	5			5.6	<i or<="" td=""><td>10</td><td>0.2</td></i>	10	0.2
Cadmium	1	·		<1 OR	- <lor< td=""><td></td><td>9.3</td></lor<>		9.3
Cobalt	1	÷,		2011	-2017	-LOK	SLOR
Chromium (total)	2	· .		22	13	17	16
Copper	2			24	4.6	9	5.5
Mercury	0.5			<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Nickel	1				2011	LOIN	LOK
Lead	5			45	<lor< td=""><td>53</td><td>53</td></lor<>	53	53
Selenium	5				LOIN	0.0	0.0
Zinc	2			69	17	15	14
Manganese	10		·	00		10	14
Beryllium	1						
Molybdenum	5					1 H	
Antimony	5						
Tin	2						
рН ·	0.1		9.5 ^{1,2}	9.4 ^{1,2}	9.8 ^{1,2}	10 ^{1,2}	
Polycyclic Aromatic							
Hydrocarbons (PAH):							
Naphthalene	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Acenaphthylene	0.1	<lor< td=""><td><lor< td=""><td>0.1</td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>0.1</td><td></td><td></td><td></td></lor<>	0.1			
Acenaphthene	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Fluorene	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Phenanthrene	0.1	<lor< td=""><td><lor< td=""><td>0.2</td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>0.2</td><td></td><td></td><td></td></lor<>	0.2			
Anthracene	0.1	<lor< td=""><td><lor< td=""><td>0.1</td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>0.1</td><td></td><td></td><td></td></lor<>	0.1			
Fluoranthrene	0.1	<lor< td=""><td><lor< td=""><td>0.9</td><td>-</td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>0.9</td><td>-</td><td></td><td></td></lor<>	0.9	-		
Pyrene	0.1	<lor< td=""><td><lor< td=""><td>0.9</td><td></td><td>1</td><td></td></lor<></td></lor<>	<lor< td=""><td>0.9</td><td></td><td>1</td><td></td></lor<>	0.9		1	
Benz(a)anthracene	0.1	<lor< td=""><td><lor< td=""><td>0.5</td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>0.5</td><td></td><td></td><td></td></lor<>	0.5			
Chrysene	0.1	<lor< td=""><td><lor< td=""><td>0.4</td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>0.4</td><td></td><td></td><td></td></lor<>	0.4			
Benzo(b)fluoranthene an	0.1	<lor< td=""><td><lor< td=""><td>0.4</td><td></td><td></td><td>-</td></lor<></td></lor<>	<lor< td=""><td>0.4</td><td></td><td></td><td>-</td></lor<>	0.4			-
Benzo(k)fluoranthrene	0.1	<lor< td=""><td><lor< td=""><td>0.4</td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>0.4</td><td></td><td></td><td></td></lor<>	0.4			
Benzo(a)pyrene	0.1	<lor< td=""><td><lor< td=""><td>0.6</td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>0.6</td><td></td><td></td><td></td></lor<>	0.6			
Indeno(1,2,3-cd)pyrene	0.1	<lor< td=""><td><lor< td=""><td>0.4</td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>0.4</td><td></td><td></td><td></td></lor<>	0.4			
Dibenz(a,h)anthracene	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Benzo(g,h,i)perylene	0.1	<lor< td=""><td><lor< td=""><td>0.4</td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>0.4</td><td></td><td></td><td></td></lor<>	0.4			
Total PAH	1.6	<lor< td=""><td><lor< td=""><td>5.3</td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>5.3</td><td></td><td></td><td></td></lor<>	5.3			

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

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LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

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² denotes greater than the SAHC health based guidelines

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⁴ denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting F)

#### All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH1	BH2	BH3	BH4	BH4*	BH4/D
Sample Depth	Reporting	0.06-0.3	1.8-2.0	0.8-1.0	0.45-0.6	0.45-0.6	0 45-0 6
Metals:			•				
Arsenic	5	- <lor< td=""><td>9.4</td><td>7.4</td><td>7:6</td><td>7.5</td><td>8.5</td></lor<>	9.4	7.4	7:6	7.5	8.5
Cadmium	1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Cobalt	1	`.			8 -	7.6	2010
Chromium (total)	2	9.2	29	31	31	29	26
Copper	2	9.5	7	7.3	32	29	34
Mercury	0.5	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td>1.6 ¹</td></lor<></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td>1.6 ¹</td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""><td>1.6 ¹</td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td>1.6 ¹</td></lor<></td></lor<>	<lor< td=""><td>1.6 ¹</td></lor<>	1.6 ¹
Nickel	1		•		15	14	
Lead	5	<lor< td=""><td>7.5</td><td>10</td><td>446^{1,2}</td><td>670 ^{1,2}</td><td>440^{1,2}</td></lor<>	7.5	10	446 ^{1,2}	670 ^{1,2}	440 ^{1,2}
Selenium	5				<lor< td=""><td><lor< td=""><td></td></lor<></td></lor<>	<lor< td=""><td></td></lor<>	
Zinc	2	8.7	19	21	280 ¹	270 ¹	270 ¹
Manganese	10		•		200		
Beryllium	1				1.2	1.2	
Molybdenum	5				<lor< td=""><td><lor< td=""><td></td></lor<></td></lor<>	<lor< td=""><td></td></lor<>	
Antimony	5				<lor< td=""><td><lor< td=""><td></td></lor<></td></lor<>	<lor< td=""><td></td></lor<>	
Tin	2				28	26	
pH ·	0.1	9.5 ^{1,2}		9.5 ^{1,2}			9.2 ^{1,2}
Polycyclic Aromatic							
Hydrocarbons (PAH):							
Naphthalene	0.1				<lor< td=""><td></td><td><lor< td=""></lor<></td></lor<>		<lor< td=""></lor<>
Acenaphthylene	0.1				<lor< td=""><td></td><td><lor< td=""></lor<></td></lor<>		<lor< td=""></lor<>
Acenaphthene	0.1				<lor< td=""><td></td><td><lor< td=""></lor<></td></lor<>		<lor< td=""></lor<>
Fluorene	0.1				<lor< td=""><td></td><td><lor< td=""></lor<></td></lor<>		<lor< td=""></lor<>
Phenanthrene	0.1				<lor< td=""><td></td><td><lor< td=""></lor<></td></lor<>		<lor< td=""></lor<>
Anthracene	0.1				<lor< td=""><td>-</td><td><lor< td=""></lor<></td></lor<>	-	<lor< td=""></lor<>
Fluoranthrene	0.1				0.1		<lor< td=""></lor<>
Pyrene	0.1				0.1	1	<lor< td=""></lor<>
Benz(a)anthracene	0.1				<lor< td=""><td></td><td><lor< td=""></lor<></td></lor<>		<lor< td=""></lor<>
Chrysene	0.1				<lor< td=""><td></td><td><lor< td=""></lor<></td></lor<>		<lor< td=""></lor<>
Benzo(b)fluoranthene an	0.1				0.1		<lor< td=""></lor<>
Benzo(k)fluoranthrene	0.1				<lor< td=""><td></td><td><lor< td=""></lor<></td></lor<>		<lor< td=""></lor<>
Benzo(a)pyrene	0.1				0.1		<lor< td=""></lor<>
Indeno(1,2,3-cd)pyrene	0.1				<lor< td=""><td></td><td><lor< td=""></lor<></td></lor<>		<lor< td=""></lor<>
Dibenz(a,h)anthracene	0.1				<lor< td=""><td></td><td><lor< td=""></lor<></td></lor<>		<lor< td=""></lor<>
Benzo(g,h,i)perylene	0.1				<lor< td=""><td></td><td><lor< td=""></lor<></td></lor<>		<lor< td=""></lor<>
Total PAH	1.6	1			<lor< td=""><td></td><td><lor< td=""></lor<></td></lor<>		<lor< td=""></lor<>

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory) * indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

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#### All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH10	BH11	BH11*	BH12	BH12/D	BH12/D*
Sample Depth	Reporting	0.7-0.85	0.8-1.0	0.8-1.0	0.55-0.7	0.55-0.7	0.55-0.7
Metals:		an an an an an Arlan an Arlan an Arland an Arland an Arland an Arland an Arland an Arland an Arland an Arland a	*****		illa pinini pining ang pang kanalan ang pang pang kanalan kanalan kanalan kanalan kanalan kanalan kanalan kana		
Arsenic	5	5	8.9	9.8	<lor< td=""><td>2.8</td><td>2.8</td></lor<>	2.8	2.8
Cadmium	1	<lor< td=""><td><lor< td=""><td><lor< td=""><td>- <lor< td=""><td>&lt;0.5</td><td>&lt;0.5</td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td>- <lor< td=""><td>&lt;0.5</td><td>&lt;0.5</td></lor<></td></lor<></td></lor<>	<lor< td=""><td>- <lor< td=""><td>&lt;0.5</td><td>&lt;0.5</td></lor<></td></lor<>	- <lor< td=""><td>&lt;0.5</td><td>&lt;0.5</td></lor<>	<0.5	<0.5
Cobalt	1	N			-	8.5	8.5
Chromium (total)	2	46	11	12	29	28	26
Copper	2	18	5.7	6	10	14	14
Mercury	0.5	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td></lor<></td></lor<>	<lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td></lor<>	<0.1	<0.1
Nickel	1	:	÷			14	12
Lead	5	13	<lor< td=""><td><lor< td=""><td>11</td><td>14</td><td>15</td></lor<></td></lor<>	<lor< td=""><td>11</td><td>14</td><td>15</td></lor<>	11	14	15
Selenium	5					<0.5	<0.5
Zinc	2	30	9.8	10	17	28	32
Manganese	10					220	210
Beryllium	1					<2	<2
Molybdenum	5					<10	<10
Antimony	5					<10	<10
Tin	2					<10	<10
pH -	0.1	8.8 '	9.3 ^{1,2}		9.2 ^{1,2}		
Polycyclic Aromatic							
Hydrocarbons (PAH):							
Naphthalene	0.1				<lor< td=""><td>&lt;0.1</td><td></td></lor<>	<0.1	
Acenaphthylene	0.1				<lor< td=""><td>&lt;0.1</td><td></td></lor<>	<0.1	
Acenaphthene	0.1				<lor< td=""><td>&lt;0.1</td><td></td></lor<>	<0.1	
Fluorene	0.1				<lor< td=""><td>&lt;0.1</td><td></td></lor<>	<0.1	
Phenanthrene	0.1				<lor< td=""><td>&lt;0.1</td><td></td></lor<>	<0.1	
Anthracene	0.1				<lor< td=""><td>&lt;0.1</td><td></td></lor<>	<0.1	
Fluoranthrene	0.1				<lor< td=""><td>&lt;0.1</td><td></td></lor<>	<0.1	
Pyrene	0.1				<lor< td=""><td>&lt; &lt; 0.1</td><td></td></lor<>	< < 0.1	
Benz(a)anthracene	0.1				<lok< td=""><td>&lt;0.1</td><td></td></lok<>	<0.1	
Chrysene	0.1				<lok< td=""><td>&lt;0.1</td><td></td></lok<>	<0.1	
Benzo(b)fluoranthene an	0.1					<0.1	
Benzo(k)fluoranthrene	0.1				<lok< td=""><td>&lt;0.1</td><td></td></lok<>	<0.1	
Benzo(a)pyrene	0.1				<lor< td=""><td>&lt;0.1</td><td></td></lor<>	<0.1	
Indeno(1,2,3-cd)pyrene	0.1				<lok< td=""><td>&lt;0.1</td><td></td></lok<>	<0.1	
Dibenz(a,h)anthracene	0.1				<lor< td=""><td>&lt;0.1</td><td></td></lor<>	<0.1	
Benzo(g,h,i)perylene	0.1				<lok< td=""><td>&lt;0.1</td><td></td></lok<>	<0.1	
Total PAH	1.6				<lor< td=""><td></td><td></td></lor<>		

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory) * indicates laboratory replicate

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#### All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH13	BH13*	BH13/D	BH13/D*	BH14	BH15
Sample Depth	Reporting	0.7-0.9	0.7-0.9	0.7-0.9	0.7-0.9	0.55-0.7	0.7-0.85
Metals:		(Manadarik generalization and an an an an an an an an an an an an an	Miller Miller Andre Definistion for a subfigue	*****	n an an an an an an an an an an an an an	*************	
Arsenic	5	5.1	<lor< td=""><td><lor< td=""><td>5</td><td>19</td><td><lor< td=""></lor<></td></lor<></td></lor<>	<lor< td=""><td>5</td><td>19</td><td><lor< td=""></lor<></td></lor<>	5	19	<lor< td=""></lor<>
Cadmium	1	<l`or< td=""><td><lor< td=""><td><lor< td=""><td>-<lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<></td></lor<></td></l`or<>	<lor< td=""><td><lor< td=""><td>-<lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td>-<lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	- <lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Cobalt	1	7.Ż	8.1		-		
Chromium (total)	2	29	29	33	34	18	26
Copper	2	16	16	17	17	450 ^{1,2}	9.9
Mercury	0.5	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Nickel	1	15	້ 15				
Lead	5	43	36	39	34	1600 ^{1,2,3,4}	11
Selenium	5	<lor< td=""><td><lor< td=""><td></td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td><td></td></lor<>				
Zinc	2	32	°, 32	32	32	2000 ^{1,2}	14
Manganese	10	260	270				
Beryllium	1		1.2	1.1			
Molybdenum	5		<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Antimony	5		<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Tin	2		2.6	2.8			
pH ·	0.1			8.9 ¹		<b>11</b> ^{1,2}	9.3 ^{1,2}
Polycyclic Aromatic							
Hydrocarbons (PAH):							
Naphthalene	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<>			<lor< td=""><td></td></lor<>	
Acenaphthylene	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<>			<lor< td=""><td></td></lor<>	
Acenaphthene	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<>			<lor< td=""><td></td></lor<>	
Fluorene	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<>			<lor< td=""><td></td></lor<>	
Phenanthrene	0.1	<lor< td=""><td>0.2</td><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<>	0.2			<lor< td=""><td></td></lor<>	
Anthracene	0.1	<lor< td=""><td>0.1</td><td></td><td>-</td><td><lor< td=""><td></td></lor<></td></lor<>	0.1		-	<lor< td=""><td></td></lor<>	
Fluoranthrene	0.1	0.1	0.3			0.2	
Pyrene	0.1	0.1	0.2			0.2	
Benz(a)anthracene	0.1	<lor< td=""><td>0.2</td><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<>	0.2			<lor< td=""><td></td></lor<>	
Chrysene	0.1	<lor< td=""><td>0.1</td><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<>	0.1			<lor< td=""><td></td></lor<>	
Benzo(b)fluoranthene an	0.1	0.1	0.1			0.1	
Benzo(k)fluoranthrene	0.1	<lor< td=""><td>0.1</td><td></td><td></td><td>0.1</td><td></td></lor<>	0.1			0.1	
Benzo(a)pyrene	0.1	<lor< td=""><td>0.1</td><td></td><td></td><td>0.1</td><td></td></lor<>	0.1			0.1	
Indeno(1,2,3-cd)pyrene	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<>			<lor< td=""><td></td></lor<>	
Dibenz(a,h)anthracene	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<>			<lor< td=""><td></td></lor<>	
Benzo(g,h,i)perylene	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<>			<lor< td=""><td></td></lor<>	
Total PAH	1.6	<lor< td=""><td>1.4</td><td>•</td><td></td><td><lor< td=""><td></td></lor<></td></lor<>	1.4	•		<lor< td=""><td></td></lor<>	

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

******

¹ denotes greater than the ANZECC environmental guidelines

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⁴ denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting F)

#### All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH15/D	BH15/D*	BH16	BH17	BH18	BH18*
Sample Depth	Reporting	0.7-0.85	0.7-0.85	0.4-0.5	0.8-1.0	0.4-0.5	0.4-0.5
Metals:							
Arsenic	5	2.8		9.5	11		
Cadmium	1	<0.5		<lor< td=""><td>- <lor< td=""><td></td><td></td></lor<></td></lor<>	- <lor< td=""><td></td><td></td></lor<>		
Cobalt	1	9.4					
Chromium (total)	2	28		29	13		
Copper	2	16		10	7.3		
Mercury	0.5	<0.1		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Nickel	1	11	:				
Lead	5	15		- 11	<lor< td=""><td></td><td></td></lor<>		
Selenium	5	<0.5					
Zinc	2	26		21	11		
Manganese	10	260	-				
Beryllium	1	<2					
Molybdenum	5	<10					
Antimony	5	<10					
Tin	2	<10					
рН	0.1			9.7 ^{1,2}	9.8 ^{1,2}	9.4 ^{1,2}	9.4 ^{1,2}
Polycyclic Aromatic			*				· · · · · · · · · · · · · · · · · · ·
Hydrocarbons (PAH):					-		
Naphthalene	0.1	<0.1	<0.1	<lor< td=""><td></td><td><lor< td=""><td></td></lor<></td></lor<>		<lor< td=""><td></td></lor<>	
Acenaphthylene	0.1	<0.1	<0.1	<lor< td=""><td></td><td><lor< td=""><td></td></lor<></td></lor<>		<lor< td=""><td></td></lor<>	
Acenaphthene	0.1	<0.1	<0.1	<lor< td=""><td></td><td><lor< td=""><td></td></lor<></td></lor<>		<lor< td=""><td></td></lor<>	
Fluorene	0.1	<0.1	<0.1	<lor< td=""><td></td><td><lor< td=""><td></td></lor<></td></lor<>		<lor< td=""><td></td></lor<>	
Phenanthrene	0.1	· <0.1	<0.1	<lor< td=""><td></td><td><lor< td=""><td></td></lor<></td></lor<>		<lor< td=""><td></td></lor<>	
Anthracene	0.1	<0.1	<0.1	<lor< td=""><td>•</td><td><lor< td=""><td></td></lor<></td></lor<>	•	<lor< td=""><td></td></lor<>	
Fluoranthrene	0.1	<0.1	<0.1	<lor< td=""><td></td><td><lor< td=""><td></td></lor<></td></lor<>		<lor< td=""><td></td></lor<>	
Pyrene	0.1	<0.1	<0.1	<lor< td=""><td></td><td><lor< td=""><td></td></lor<></td></lor<>		<lor< td=""><td></td></lor<>	
Benz(a)anthracene	0.1	<0.1	<0.1	<lor< td=""><td></td><td><lor< td=""><td></td></lor<></td></lor<>		<lor< td=""><td></td></lor<>	
Chrysene	0.1	<0.1	<0.1	<lor< td=""><td></td><td><lor< td=""><td></td></lor<></td></lor<>		<lor< td=""><td></td></lor<>	
Benzo(b)fluoranthene an	0.1	<0.1	<0.1	<lor< td=""><td></td><td><lor< td=""><td></td></lor<></td></lor<>		<lor< td=""><td></td></lor<>	
Benzo(k)fluoranthrene	0.1	<0.1	<0.1	<lor< td=""><td></td><td><lor< td=""><td></td></lor<></td></lor<>		<lor< td=""><td></td></lor<>	
Benzo(a)pyrene	0.1	<0.1	<0.1	<lor< td=""><td></td><td><lor< td=""><td></td></lor<></td></lor<>		<lor< td=""><td></td></lor<>	
Diboor(1,2,3-cd)pyrene	U.1	<0.1	<0.1	<lok< td=""><td></td><td></td><td></td></lok<>			
	0.1	<0.1	<0.1				
benzo(g,n,i)peryiene	<b>U</b> . j	<0.1	<u.1< td=""><td><lok< td=""><td></td><td><lok< td=""><td></td></lok<></td></lok<></td></u.1<>	<lok< td=""><td></td><td><lok< td=""><td></td></lok<></td></lok<>		<lok< td=""><td></td></lok<>	
Total PAH	1.6			<lor< td=""><td></td><td><lor< td=""><td></td></lor<></td></lor<>		<lor< td=""><td></td></lor<>	

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#### Analytical Results - Soil OCPs and OPPs

#### All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH4	BH13	BH13*	BH12/D	BH15/D	BH15/D*
Sample Depth	Reporting	0.45-0.6	0.7-0.9	0.7-0.9	0.55-0.7	0.7-0.85	0.7-0.85
Organochlorine Pesticides:							
НСВ	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Dichloran	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Total BHC	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Lindane .	0.05	` <lor< td=""><td><lor< td=""><td><lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td><td>&lt;0.01</td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td><td>&lt;0.01</td></lor<></td></lor<>	<lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td><td>&lt;0.01</td></lor<>	<0.1	<0.1	<0.01
Heptachlor	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Heptachlor Epoxide	0.05	-LOR	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Total Chlordane (ocy, cis,	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
trans, chlordene, nonachlor)		•					
Total endosulphan	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Aldrin	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td><td>&lt;0.01</td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td><td>&lt;0.01</td></lor<></td></lor<>	<lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td><td>&lt;0.01</td></lor<>	<0.1	<0.1	<0.01
Dieldrin	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td><td>&lt;0.01</td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td><td>&lt;0.01</td></lor<></td></lor<>	<lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td><td>&lt;0.01</td></lor<>	<0.1	<0.1	<0.01
Endrin Total	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td><td>&lt;0.01</td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td><td>&lt;0.01</td></lor<></td></lor<>	<lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td><td>&lt;0.01</td></lor<>	<0.1	<0.1	<0.01
Dicofol	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
op-DDE, pp-DDE	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td><td>&lt;0.01</td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td><td>&lt;0.01</td></lor<></td></lor<>	<lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td><td>&lt;0.01</td></lor<>	<0.1	<0.1	<0.01
op-DDD pp-DDD	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td><td>&lt;0.01</td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td><td>&lt;0.01</td></lor<></td></lor<>	<lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td><td>&lt;0.01</td></lor<>	<0.1	<0.1	<0.01
op DDT pp-DDT	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td><td>&lt;0.01</td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td><td>&lt;0.01</td></lor<></td></lor<>	<lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td><td>&lt;0.01</td></lor<>	<0.1	<0.1	<0.01
Methoxychlor	0.05	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Total OCPs	0.2	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Organophosphate Pesticides:							
Dichlorvos	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Mevinphos	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td>-</td><td>•</td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td>-</td><td>•</td><td></td></lor<></td></lor<>	<lor< td=""><td>-</td><td>•</td><td></td></lor<>	-	•	
Diazinon	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td>.*</td><td></td><td>·</td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td>.*</td><td></td><td>·</td></lor<></td></lor<>	<lor< td=""><td>.*</td><td></td><td>·</td></lor<>	.*		·
Chlorpyrifos-Methyl	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Fenchlorvos	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Parathion-methyl	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Chlorpyriphos	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Malathion	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Fenitrothion	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Parathion	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Chlorfenvinphos	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Bromophos-Ethyl	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Tetrachlorvinphos	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Ethion	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			
Total OPPs	0.2	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td></lor<>			

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

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* indicates laboratory replicate

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المعلم المسلم مسلم مراجع مريد المراجع

#### Analytical Results BTEX, TPH, Phenols, Fluoride, Cyanide, Cresols, PCBs All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH4	BH4*	BH12/D	BH12/D*	BH13	BH13*
·	Reporting	0.45-0.6	0.45-0.6	0.55-0.7	0.55-0.7	0.7-0.9	0.7-0.9
BTEX:							
Benzene	0.5	<lor< td=""><td><lor< td=""><td>&lt;0.01</td><td>&lt;0.01</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td>&lt;0.01</td><td>&lt;0.01</td><td><lor< td=""><td></td></lor<></td></lor<>	<0.01	<0.01	<lor< td=""><td></td></lor<>	
Toluene	0.5	- <lor< td=""><td><lor< td=""><td>&lt;0.01</td><td>&lt;0.01</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td>&lt;0.01</td><td>&lt;0.01</td><td><lor< td=""><td></td></lor<></td></lor<>	<0.01	<0.01	<lor< td=""><td></td></lor<>	
Ethyl Benzene	0.5	<lor< td=""><td><lor< td=""><td>&lt;0.01</td><td>&lt;0.01</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td>&lt;0.01</td><td>&lt;0.01</td><td><lor< td=""><td></td></lor<></td></lor<>	<0.01	<0.01	<lor< td=""><td></td></lor<>	
Xylene	1	<lor< td=""><td><lor< td=""><td>&lt;0.01</td><td>&lt;0.01</td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td>&lt;0.01</td><td>&lt;0.01</td><td><lor< td=""><td></td></lor<></td></lor<>	<0.01	<0.01	<lor< td=""><td></td></lor<>	
Total BTEX	2	<lor< td=""><td><lor< td=""><td>&lt;0.01</td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td>&lt;0.01</td><td></td><td><lor< td=""><td></td></lor<></td></lor<>	<0.01		<lor< td=""><td></td></lor<>	
Total Petroleum							
Hydrocarbons (TPH):							
C ₆ -C ₉	25	<lor< td=""><td><lor< td=""><td>&lt;20</td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td>&lt;20</td><td></td><td><lor< td=""><td></td></lor<></td></lor<>	<20		<lor< td=""><td></td></lor<>	
C ₁₀ -C ₁₄	25	<lor< td=""><td><lor< td=""><td>&lt;50</td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td>&lt;50</td><td></td><td><lor< td=""><td></td></lor<></td></lor<>	<50		<lor< td=""><td></td></lor<>	
C ₁₅ -C ₂₈	25	<lor< td=""><td><lor< td=""><td>&lt;100</td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td>&lt;100</td><td></td><td><lor< td=""><td></td></lor<></td></lor<>	<100		<lor< td=""><td></td></lor<>	
C ₂₉ -C ₃₆	25	<lor< td=""><td><lor< td=""><td>&lt;100</td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td>&lt;100</td><td></td><td><lor< td=""><td></td></lor<></td></lor<>	<100		<lor< td=""><td></td></lor<>	
Total TPH	100	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td></td></lor<></td></lor<>			<lor< td=""><td></td></lor<>	
Phenois				<u> </u>			
Phenol	0.1	<lor< td=""><td><lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	<0.1	<0.1	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
3-Methylphenol	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>			<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
2-Methylphenol	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>			<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
2-Ethylphenol	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>			<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
2,4-Dimehtylphenol	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>			<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
2,3,5-Trimethylphenol	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>			<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
4-Nitrophenol	0.1	<lor< td=""><td><lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>			<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Cresols				<0.1	<0.1	,	
Fluoride				260	-		
Cyanide				<5			
Polychlorinated						÷	
Biphenyls (PCBs)							
A1016	0.2	<lor< td=""><td></td><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>				<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
A1221	0.2	<lor< td=""><td></td><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>				<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
A1232	0.2	<lor< td=""><td></td><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>				<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
A1242	0.2	<lor< td=""><td></td><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>				<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
A1248	0.2	<lor< td=""><td></td><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>				<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
A1254	0.2	<lor< td=""><td></td><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>				<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
A1260	0.2	<lor< td=""><td></td><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>				<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
A1262	0.2	<lor< td=""><td></td><td></td><td>-</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>			-	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Total Aroclors	1	<lor< td=""><td></td><td></td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>				<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory) * indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

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#### Analytical Results Volatile Organic Scan

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## All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH4	BH13
Sample Depth	Reporting	0.45-0.6	0.7-0.9
Monocyclic Aromatic			Managara (Alicologica) and a subsection
Hydrocarbons		-	
Benzene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Toluene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Ethylbenzene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
m.p-xylene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
o-xylene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Styrene	1.0	<lor `<="" td=""><td><lor< td=""></lor<></td></lor>	<lor< td=""></lor<>
Isopropylbenzene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
n-propylbenzene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
1,3,5-Trimethylbenzene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
tert-Butylbenzene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
1,2,4-Trimethylbenzene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
sec-Butylbenzene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
n-Butylbenzene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
<b>—</b>			
Fumigants			
2,2-Dichloropropane	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
1,2-Dichloropropane	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
1,2-dibromoethane	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Halogenated Aliphatic			
Hydrocarbons:			
Dichlorofluoromethane	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Chloromethane	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Vinyl Chloride	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Bromomethane	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Chlorethane	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Trichlorofluoromethane	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
1,1-Dichloroethene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Methylene Chloride	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
trans-1,2-Dichloroethene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
1,1-Dichloroethane	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
cis-1,2-Dichloroethene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Bromochloromethane	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
1,1,1-Trichloroethane	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Carbon Tetrachloride	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
1.1-Dichloropropene	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
1,2-Dichloroethane	1.0	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory * indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

# Appendix I

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Street

Certified Laboratory Results

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#### **REPORT OF ANALYSIS**

Report No. 97/18543.doc Page 1/12

Client:	RE-ISSUE OF REPORT Rust PPK
	_ GPO Box 398 ADELAIDE SA 5001 -
Attention:	Stuart Taylor/Jane Hewitt
Sample Description:	Soil/Water - Project No27J097A
	Franklin Street Bus Station
Lab Registration Nos:	V97/18543 to V97/18566
Date Received:	23rd May 1997

Samples submitted to AGAL have been analysed as received. The information below is provided as part of our commitment to the quality of the analytical results. Please contact the undersigned for any further details relating to this Report.

#### Methods of Analysis:

• BTEX & TPH $(C_{\varsigma}-C_{\varsigma})$	AGAL(Vic) Method VL234 (Purge & Trap GC/MS)
• TPH (C ₁₀ -C ₃₆ ) - Soil	AGAL(Vic) Method VL228 (GC/FID)
• VOC's	AGAL(Vic) Method VL234 (Purge & Trap GC/MS)
<ul> <li>PAH's - Soil/Water</li> </ul>	AGAL(Vic) Method VL221/222 (GC/MS)
<ul> <li>Metals - Soil/Water</li> </ul>	AGAL(Vic) Method VL239/250 (ICP/MS/AES)
<ul> <li>OC/OP pesticides/PCB's - Soil/Water</li> </ul>	AGAL(Vic) Method VL206/207 (GC determination)
<ul> <li>Phenols - Soil</li> </ul>	AGAL(Vic) Method VL210 (HPLC determination)
• pH	AGAL(Vic) Method VL271 (Using APHA 4500B)

#### Quality Assurance:

The QA procedures conducted with the analyses include -

- Analysis of reagent blanks
- Analysis of recoveries
- Analysis of samples in duplicate

Results obtained for recoveries of selected analytes were as follows:

Analyte	Soil	Water
Toluene-d8	95%	-
TPH	91%	. <del>.</del>
Phenanthrene	87%	106%
Dieldrin	84%	103%
3-Methyl phenol	81%	-
Lead	85%	101%
Zinc	78%	99%
Zinc	78%	99%

#### **Results of Analysis:**

Analytical results on samples as received appear on the following page(s). All results are based on using one technique for each test. Soil results are reported on a dry weight basis.

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**Barrie Magor** B.Sc.(Hons), Grad.Dip.App.Sci., MRACI (Organics Analyses)

Date: 18-6-97

Roger Cromie Dip.App.Sci., Grad.Dip.App.Sci., MRACI (Metals Analyses)

Anthony Crane

B.App.Sci. (Inorganies Analyses)

File : h:\word\reports\1997\18593.doc

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Austrolian Government Analyticol Loborotories 51 - 65 Clorke Street South Melbourne VIC 3205



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## **REPORT OF ANALYSIS**

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Client Reference No:			BHA DIII0
			(0.45-0.6) $(0.7,0.0)$
Lab Registration No:	Units	LOR	V97/18546 V97/18555
Dichlorodifluoromethane	mg/kg	1.0	
Chloromethane	mg/kg	1.0	
Vinyl chloride	mg/kg	1.0.	
Bromomethane	mg/kg	1.0	
Chloroethane	mg/kg	1.0	
Trichlorofluoromethane	mg/kg	1.0	
1,1-Dichloroethene	mg/kg	1.0	
Methylene chloride	mg/kg	1.0	
trans-1,2-Dichloroethene	mg/kg	1.0	
1,1-Dichloroethane	mg/kg	1.0	
2,2-Dichloropropane	mg/kg	1.0	
cis-1,2-Dichloroethene	mg/kg	1.0	<1.0 <1.0
Bromochloromethane	mg/kg	1.0	
Chloroform	mg/kg	1.0	
1,1,1-Trichloroethane	mg/kg	1.0	<10 <10
Carbon tetrachloride	mg/kg	1.0	<1.0 <1.0
1,1-Dichloropropene	mg/kg	1.0	<1.0 <1.0
Benzene	mg/kg	1.0	<1.0 <1.0
1,2-Dichloroethane	mg/kg	1.0	<1.0 <1.0
Trichloroethene	mg/kg	1.0	<1.0 <1.0
1,2-Dichloropropane	mg/kg	1.0	<1.0 <1.0
Dibromomethane	mg/kg	1.0	<1.0 <1.0
Bromodichloromethane	mg/kg	1.0	<1.0 <1.0
cis-1,3-dichloropropene	mg/kg	1.0	<1.0 <1.0
Toluene	mg/kg	1.0	<1.0 <1.0
trans-1,3-dichloropropene	mg/kg	1.0	<1.0 <1.0
1,1,2-Trichloroethane	mg/kg	1.0	<1.0 <1.0
Tetrachloroethene	mg/kg	1.0	<1.0 <1.0
1,3-Dichloropropane	mg/kg	1.0	<10 <10
Dibromochloromethane	mg/kg	1.0	<1.0 <1.0

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## **REPORT OF ANALYSIS**

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Client Reference No:			BH4	BH5	BH6	BH12	RF	<del>T</del> 13
			(0.45-0.6)	(0.8-1.0)	(0.65 - 0.75)	(0.55-0.7)	(0.7	-0.9)
Lab Registration No:	Units	LOR	V97/18546	V97/18547	V97/18548	V97/18554	V97/	18555
PAH's:		•						
Naphthalene	mg/kg	0.1	<0.1	< 0.1	<01	<01	-01	-01
Acenaphthylene	mg/kg	0.1	<0.1	< 0.1	0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	0.1	<0.1	< 0.1	< 0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	0.1	, <0.1	<0.1	0.2	<0.1	<0.1	02
Anthracene	mg/kg	0.1	<0.1	< 0.1	0.1	<01	<0.1	0.1
Fluoranthene	mg/kg	0.1	0.1	<0.1	0.9	<0.1	0 1	0.3
Pyrene	mg/kg	0.1	0.1	<0.1	0.9	<0.1	0.1	0.2
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	0.5	< 0.1	< 0.1	0.2
Chrysene	mg/kg	0.1	<0.1	<0.1	0.4	< 0.1	< 0.1	0.1
Benzo(b)fluoranthene	mg/kg	0.1	0.1	<0.1	0.4	< 0.1	0.1	0.1
Benzo(k)fluoranthene	mg/kg	0.1	<0.1	<0.1	0.4	< 0.1	< 0.1	0.1
Benzo(a)pyrene	mg/kg	0.1	0.1	<0.1	0.6	< 0.1	< 0.1	0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	<0.1	0.4	< 0.1	< 0.1	<0.1
Dibenz(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	< 0.1	< 0.1	< 0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	0.4	< 0.1	< 0.1	<0.1
Total PAH's (as above)	mg/kg	1.6	<1.6	<1.6	5.3	<1.6	<1.6	1.4

Client Reference No:			BH14	<b>BH</b> 16	BH18	BH19	BH20	BI	02
			(0.55-0.7)	(0.4-0.5)	(0.4-0.5)	(0.55 - 0.7)	(0.05-0.2)		-
Lab Registration No:	Units	LOR	V97/18556	V97/18558	<b>V97/18560</b>	V97/18561	V97/18562	V97/1	18563
PAH's:									
Naphthalene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	< 0.1	<0.1
Acenaphthylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.3	< 0.1	< 0.1
Acenaphthene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	< 0.1	< 0.1
Fluorene	mg/kg	0.1	<0.1	< 0.1	< 0.1	<0.1	<0.1	< 0.1	< 0.1
Phenanthrene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.3	< 0.1	< 0.1
Anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.2	< 0.1	< 0.1
Fluoranthene	mg/kg	0.1	0.2	<0.1	< 0.1	<0.1	2.1	< 0.1	<0.1
Pyrene	mg/kg	0.1	0.2	<0.1	<0.1	<0.1	2.2	< 0.1	< 0.1
Benzo(a)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	1.3	<0.1	< 0.1
Chrysene	mg/kg	0.1	<0.1	<0.1	< 0.1	<0.1	1.3	< 0.1	<0.1
Benzo(b)fluoranthene	mg/kg	0.1	0.1	<0.1	<0.1	<0.1	1.3	<0.1	<0.1
Benzo(k)fluoranthene	mg/kg	0.1	0.1	<0.1	<0.1	<0.1	1.5	<0.1	< 0.1
Benzo(a)pyrene	mg/kg	0.1	0.1	<0.1	< 0.1	<0.1	1.7	<0.1	< 0.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.1	<0.1	< 0.1	< 0.1	<0.1	1.3	< 0.1	< 0.1
Dibenz(ah)anthracene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	0.3	<0.1	< 0.1
Benzo(ghi)perylene	mg/kg	0.1	<0.1	<0.1	<0.1	<0.1	1.3	< 0.1	<0.1
Total PAH's (as above)	mg/kg	1.6	<1.6	<1.6	<1.6	<1.6	15	<1.6	<1.6
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### **REPORT OF ANALYSIS**

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BH7

(0.4-0.5)V97/18549

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**BH14** (0.55-0.7)V97/18556 11

Client Reference No:				BH4 (0.45-0.6)	BH13 (0.7-0.9)	
Lab Registration No:	Units	LOR		V97/18546	V97/18555	
PCB's (as Aroclors):	·	•	1			
A1016	mg/kg	0.2		< 0.2	<0.2 <0.2	
A1221	mg/kg	0.2.		< 0.2	<0.2 <0.2	
A1232	mg/kg	0.2		< 0.2	<0.2 <0.2	
A1242	mg/kg	0.2		< 0.2	<0.2 <0.2	
A1248	mg/kg	0.2		< 0.2	< 0.2 < 0.2	
A1254	mg/kg	0.2		< 0.2	< 0.2 < 0.2	
A1260	mg/kg	0.2		< 0.2	<0.2 <0.2	
Total PCB's	mg/kg	1.0	1	<1.0	<1.0 <1.0	
Client Reference No:			BH1 (0.06-0.3)	BH3 (0.8-1.0)	BH5 (0.8-1.0)	B (0.65
Lab Registration No:	Units	LOR	V97/18543	V9718545	V97/18547	V97/
pH .	-	0.1	9.5	9.5	9.5	9
		·	······································			
Client Reference No:			BH8	BH10	BH11	BI
-			(0.8-1.0)	(0.7-0.85)	(0.8-1.0)	(0.55
Lab Registration No:	Units	LOR	V97/18550	V97/18552	V97/18553	<b>V97/</b>
nH	-	0 1	10	88	93	Q

Client Reference No:			BH15	BH16	BH17	BH18	BH19
			(0.7-0.85)	(0.4-0.5)	(0.8-1.0)	(0.4-0.5)	(0.55-0.7)
Lab Registration No:	Units	LOR	V97/18557	V97/18558	V97/18559	V97/18560	V97/18561
pH	-	0.1	9.3	9.7	9.8	9.4 9.4	9.1
L			L				
			·				
Client Reference No:			BH20	BD2	BD6		
			(0.05-0.2)				
Lab Registration No:	Units	LOR	V97/18562	V97/18563	V97/18564		
pH		0.1	9.5	9.2	8.9		
-			1				

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An ISO 9001 Quality Systems Certified Organisation

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## **REPORT OF ANALYSIS**

Report No. 97/18543.doc Page 9/12

<u>Results for water</u>

Client Reference No:		· · · · · · · · · · · · · · · · · · ·	FR1 FR9
Lab Registration No:	Unitš	LOR	V97/18565 V97/18566
OC Pesticides:		· ·	
HCB	μg/L	0.05	<0.05 - <0.05
Dichloran	μg/L	0.05	<0.05 <0.05
BHC $(\alpha,\beta,\delta)$	μg/L	0.05	<0.05 <0.05
Lindane (y-BHC)	μg/L	0.05	<0.05 <0.05
Heptachlor	μg/L	0.05	<0.05 <0.05
Heptachlor Epoxide	μg/L	0.05	<0.05 <0.05
Chlordane (total)	μg/L	0.05	<0.05 <0.05
Endosulphan (total)	μg/L	0.05	<0.05 <0.05
Aldrin	μg/L	0.05	<0.05 <0.05
Dieldrin	μg/L	0.05	<0.05 <0.05
Endrin (total)	μg/L	0.05	<0.05 <0.05
Dicofol	μg/L	0.05	<0.05 <0.05
DDT's (total)	μg/L	0.05	<0.05 <0.05
Methoxychlor	μg/L	0.05	<0.05 <0.05
Total OC's (as above)	µg/L	0.2	<0.2 <0.2
L			

Client Reference No:		[	ER1 ER2
Lab Registration No:	Units	LOR	V97/18565 V97/18566
PAH's:			
Naphthalene	μg/L	0.1	<0.1 <0.1
Acenaphthylene	µg/L	0.1	<0.1 <0.1
Acenaphthene	µg/L	0.1	<0.1 <0.1
Fluorene	µg/L	0.1	<0.1 <0.1
Phenanthrene	µg/L	0.1	<0.1 <0.1
Anthracene	µg/L	0.1	<0.1 <0.1
Fluoranthene	μg/L	0.1	<0.1 <0.1
Pyrene	μg/L	0.1	<0.1 <0.1
Benzo(a)anthracene	μg/L	0.1	<0.1 <0.1
Chrysene	µg/L	0.1	<0.1 <0.1
Benzo(b)fluoranthene	μg/L	0.1	<0.1 <0.1
Benzo(k)fluoranthene	μg/L	0.1	<0.1 <0.1
Benzo(a)pyrene	μg/L	0.1	<0.1 <0.1
Indeno(1,2,3-cd)pyrene	μg/L	0.1	<0.1 <0.1
Dibenz(ah)anthracene	μg/L	0.1	<0.1 <0.1
Benzo(ghi)perylene	μg/L	0.1	<0.1 <0.1
Total PAH's (as above)	μg/L	1.0	<1.0 <1.0
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An ISO 9001 Quality: Systems Certified Organisation

## **REPORT OF ANALYSIS**

Report No. 97/18543.doc Page 11/12

Client:	Rust PPK GPO Box 398 ADELAIDE SA 5001 -
Attention:	Stuart Taylor/Jane Hewitt
Sample Description:	Soil/Water - Project No27J097A -
	Franklin Street Bus Station
Lab Registration Nos:	V97/18543 to V97/18566
Date Received:	23rd May 1997

Samples submitted to AGAL have been analysed as received. The information below is provided as part of our commitment to the quality of the analytical results. Please contact the undersigned for any further details relating to this Report.

#### Methods of Analysis:

• Metals - Soil

AGAL(Vic) Method VL239 (ICP/MS/AES)

#### **Quality Assurance:**

The QA procedures conducted with the analyses include -

- Analysis of reagent blanks
- Analysis of recoveries
- Analysis of samples in duplicate

Results obtained for recoveries of selected analytes were as follows: Analyte Soil

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Beryllium	98%
Mercury	106%
Antimony	89%

#### **Results of Analysis:**

Analytical results on samples as received appear on the following page(s). All results are based on using one technique for each test. Soil results are reported on a dry weight basis. This report shall not be reproduced except in full.

٤. Roger Cromie Dip.App.Sci., Grad.Dip.App.Sci., MRACI (Metals Analyses)

Date:

File : h:\word\reports\1997\18543.doc
		nvironmenta	al Consulting	Pty. Ltd.	-
RUST PPK Pty. Ltd. 101 Pirie Street		Postal	3 Kingston Town Close, Oakleig Address: P.O. Box 276, Oakleig 1	Victoria, 3166, Australia 1, Victoria, 3166, Australia 2162/0018: (03) 9564 7195 Fax: (03) 9564 7190	
Adelaide South Australia 5001 Site : FRANKLIN ST BUS	STATION 27J097A				
	CHLORINATED HYDRO	CARBONS US EPA	SW486 METHOD 80	10 & 8080.	
Sample	BH12/D	BH15/D	BH15/D Dup	Method Blank	
Lab. No.	MY1968	MY1969	MY1969D		
Benzyl chloride	<0.01	<0.01	<0.01	<0.001	
2-Chloronaphthalene	<0.01	<0.01	<0.01	<0.001	
1,2-Dichlorobenzene	<0.01	. <0.01	<0.01	<0.001	
1,3-Dichlorobenzene	<0.01	<0.01	<0.01	<0.001	-
1,4-Dichlorobenzene	<0.01	<0.01	<0.01	<0.001	
Hexachlorobenzene	<0.01	<0.01	<0.01	<0.001 /	
Hexachlorobutadiene	<0.01	<0.01	<0.01	<0.001	
Hexachlorocyclopentadiene	<0.01	<0.01	<0.01	<0.001	
Hexachloroethane	<0.01	<0.01	<0.01	<0.001	
Tetrachlorobenzenes	<0.01	<0.01	<0.01	<0.001	
1,2,4-Trichlorobenzene	<0.01	<0.01	<0.01	<0.001	
Results in ppm (soils mg/kg	dry, waters mg/l). Extra	L ction MGT 300A	l soils, USEPA 39	1	
Jate rereived 23/05/97	- Date Denomted 10/06	/07			
	Date Reputted 10/05				
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t with its terms of registration. This					

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RUST PPK Pty. Ltd. 101 Pirie Street Adelaide		3 K Poshi Ad	Ingston Town Close, Oaldelgh, V dress: P.O. Box 276, Oaldelgh, V Teil	Victoria, 3166, Australia Victoria, 3156, Australia Sphone: (03) 9564 7055 Fax: (03) 9564 7190		
Souch Australia 2001 Site : FRANKLIN ST BUS ST	ATION 27J097A					
MISCELLANE	OUS ANALYSES. METHODS	US EPA SW846 OR	APHA STANDARD	METHODS 19TH ED	. 1995.	
Sample	BH12/D	BH15/D				
Lab. No.	MY1968	MY1969				-
Fluoride (Total)	260	190				
	-					
				~		
				-		
					-	
Results in ppm (soils mg/kg dry	y, waters mg/l.) .					
Date received 23/05/97	Date Reported 10/06	2/97				
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Report No. 119376

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RUST PPK Pty. Ltd. 101 Pirie Street		Postal Ac	ldress: P.O. Box 276, Oakleigi T	i, Victoria, 3166, Australia elephone: (03) 9564 7055 Fax: (03) 9564 7190		
Adelaide South Australia 5001 Site : FRANKLIN ST BUS STATION	27J097A					
MAH ' B	AROMATIC VOLATI	LE ORGANICS US	EPA SW846 METH(	)DS 8020&5030.		
Sample	BH12/D	BH12/D Dup	BH15/D	Method Blank	Spike % Recov	
Lab. No.	MY1968	MY1968D	MY1969			
Benzene	<0.01	<0.01	<0.01	<0.001	112%	
Toluene	<0.01	<0.01	<0.01	<0.001	106%	
Ethyl Benzene	<0.01	<0.01	<0.01	<0.001	1048	
Xylenes	<0.01	<0.01	<0.01	<0.001	108%	
				••		
				· · · · · · · · · · · · · · · · · · ·		
Results in ppm (soils mg/kg dry, wat	ers mg/l).					ž.
Date received 23/05/97 Date	e Reported 10/06	/97				

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Report No. 119376

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Environmental Consulting Pty. Ltd. ^{3 Kingsten Town Goae, Oakleigh, Victoria, 3166, Australia}

Autor

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Environmental Consulting Pty. Ltd.

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3 Kingston Town Close, Oakleigh, Victoria, 3166, Australia Postal Address: P.O. Box 276, Oakleigh, Victoria, 3166, Australia Telephone: (03) 9564 7055 Fax: (03) 9564 7190

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RUST PPK PCY. LCG.	lui firte acteec Dàclaide	South Australia 5001	Site : FRANKLIN ST BUS

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POLYNUCLEAR A	AROMATIC HYDROCA	RBONS US EPA S	SW846 METHOD 831	0 (HPLC) & 8100 (	30).	
Sample	BH12/D	BH15/D	BH15/D Dup	Method Blank	Spike % Recov	
Lab. No.	MY1968	MY1969	MY1969D			
Naphthalene	<0.1	<0.1	<0.1	<0.001	1	
Acenaphthylene	<0.1	<0.1	<0.1	<0.001	1	
Acenaphthene	<0.1	<0.1	<0.1	<0.001	ł	-
Fluorene	<0.1	<0.1	<0.1	<0.001	ı	
Phenanthrene	<0.1	<0.1	<0.1	<0.001	1	
Anthracene	<0.1	<0.1	<0.1	<0.001	a	
Fluoranthrene	<0.1	<0.1	<0.1	<0.001	806	
Pyrene	<0.1	<0.1	<0.1	<0.001	92%	
Benzo (a) anthracene	<0.1	<0.1	<0.1	<0.001	ł	
Chrysene	<0.1	<0.1	<0.1	<0.001	I	
Benzo (b) fluoranthene	<0.1	<0.1	<0.1	<0.001	I	
Benzo(k)fluoranthene	<0.1	<0.1	<0.1	<0.001	ł	
Benzo (a) pyrene	<0.1	<0.1	<0.1	<0.001	. 96%	
Dibenzo (a, h) anthracene	<0.1	<0.1	<0.1	<0.001	e	
Benzo(g,h,i)perylene	<0.1	<0.1	<0.1	<0.001	1	
Indeno(1,2,3-cd)pyrene	<0.1	<0.1	<0.1	<0.001	2	
Results in ppm (soils mg/kg dry, wate	<u> </u> ers mg/l). Extra	L ction MGT 300A	l soils, USEPA 35	10 waters.		

Date received 23/05/97

Date Reported 10/06/97



Report No. 119376

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		vironmental	Consulting	Pty. Ltd.	<i>т</i> .	
RUST PPK Pty. Ltd. 101 Pirie Street Adelaide South Australia 5001 Site : FRANKLIN ST BUS STATION 2	27J097A	3 Kli Postal Add	ngston Town Close, Oakleigh, Iress: P.O. Box 276, Oakleigh, Tel	Victoria, 3166, Australia Victoria, 3166, Australia ephone: (03) 9564 7055 Fax: (03) 9564 7190		
PHENOLS & CRE	SOLS - HPLC- JRN	L. CHROM 464 (19	89) 405-410, G	C- US EPA SW846	3040	
Sample	BH12/D	BH12/D Dup	BH15/D	Method Blank		
Lab. No.	MY1968	MY1968D	MY1969			
Phenol ·	<0.1	<0.1	<0.1	<0.01		
Cresols (Total)	<0.1	<0.1	<0.1	<0.01		
		•				
				~		
				<b>6</b>		
Results in ppm (soils mg/kg dry, wate	l ers mg/l). Extra	L ction MGT 300A	l soils, USEPA 35	l 510 waters.		
Date received 23/05/97 Date	s Reported 10/06					

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Report No. 119376

Page 9 of 10



ng Pty. Ltd.	eign, Victoria, 3166, Australia eign, Victoria, 3166, Australia Telephone: (03) 9564 7190 Fax: (03) 9564 7190		irot Limit e measurement exceeds the C.L. repeat the analysis. If the repeat is within the C.L. nue analyses If it exceeds the C.L. discontinue analyses and correct the problem	r <u>aing Limit</u> o out of three successive points exceed the W.L. analyse another sample. If the next pount is than the W.L. continue analyses, if the next point exceeds the W.L. discontinue analyses correct the problem.	bariicular care needs to be taken with some soil sgmplés with regard to sample ogeneity, especially with regard to 'organics' analyses. Statistical analysis may mducate a dien exists when in fact the problem is really only sample homogeneuty	<u>stovery of known additions.</u>	recovery of known additions is used to verify the absence of matrix effects and absence of references. Recovery from standards is used to verify method performance. Recuvery data ampared against acceptance eriteria published in Standards Methods for Examination of ier and Waste water, or appropriate U.S. EPA Methods.	ccoveries fall outside acceptance criteria, analyses should be discontinued and the problem isted.	<u>Analysis of Reascut Blanks</u>	agent blanks are used to monitor purity of reagents apputue overant processor. Unusual of out uf agent blanks are run as a matter of course with bach batch for analysis. Unusual of out uf 'noiny' results for blanks are investigated and corrective action taken before analysis of any ch is completed.			2 dia	G. Black.	
ttal Consultir	3 Kingston Town Close, Oakl Istni Address: P.O. Box 276, Oakl	•	<u>Cont</u> If one contri	War If two is tes	4 Annah Annah	2.13	The inter var		<u>3.0</u>	Res Res the bat		· · · · · · · · · · · · · · · · · · ·	•		•.
			<u>NTROL RESULTS</u> <u>5T RESULTS</u> d by monitoring a number of	% with each batch of	lysed by means of a range chart id nonnalised by dividing by	hod can be developed. The mean		· · ·	ned as	-		d compared with the above comparison of the data ) is respectively , the fullowing	•		· · · ·
grander ingeneration			LTO ASSESS OUALITY COI AND RELLABILITY OF TES tability of results is accomplished	ireates run at a munimum of 3 % s. Spikes run at a munimum of 3 un with each batch of samples	ומונר סך כסערגכ מוש לאים מושי א מווכר סך כסערגכ מוש לאים מושי א מעוקובמנה שמור וג מכורוווווויט מי	sults. thered control data for each incl	ζ = (ΣR ₁ )	aumber of observations normalised range	ic standard deviation) is determining $a = a + b + a + a + b$		с R + 25 ₁ I R + 35 ₁ R + 35 ₁	chi duphicate parr is calculated and ed entrer graphically or by visual 95 % and 90 % confidence fevel hese statistical parameters		 - - -	
			CRITERIA USED YALIDITY / The continuing validity and relic factors	<ol> <li>Analysis of duplicates. Dupli 2. Recovery of known additious samples</li> <li>Analysis of reagent blanks n</li> </ol>	ł <u>Analysis of Duplicates</u> Duplicates are analysed as a ni tyne system. The range for eacl	the average of the duplicate res Once enough data has been gal.	2.	where $n = n$ and $R_i = n$	and the variance (square of the	, 1he control criteria thus becor	Average range Warning Limit Control Limit	The normalised range for each criteria. (This can be achieved Since the limits are based on ¹ actions are taken, based on th			
Survey Startes Starts Starts Starts Starts				·											N.N

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The Laboratory is repetitioned by the publication

# Appendix J

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Arword

Support

Tabulated Results of Replicate and Duplicate Analysis

# Analytical Results - Laboratory Replicates Metals, pH and PAH

# All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH4	BH4*	BH4/D	BH4/D*	BH11	BH11*
Sample Depth	Reporting	0.45-0.6	0.45-0.6	0.45-0.6	0.45-0.6	0.8-1.0	0.8-1.0
Metals:	-						
Arsenic	5	7.6	7.5	8.5		8.9	9.8
Cadmium	1	<lor< td=""><td><lor< td=""><td><lor< td=""><td>_</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td>_</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td>_</td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	_	<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Cobalt	1	`8	7.6		-		
Chromium (total)	2	31	29	26	-	11	12
Copper	2	32	29	34		5.7	6
Mercury	0.5	<lor< td=""><td><lor< td=""><td>1.6¹</td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td>1.6¹</td><td></td><td><lor< td=""><td><lor< td=""></lor<></td></lor<></td></lor<>	1.6 ¹		<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Nickel	1	15 [•]	14 ·				
Lead	5	446 ^{1,2}	670 ^{1,2}	440 ^{1,2}		<lor< td=""><td><lor< td=""></lor<></td></lor<>	<lor< td=""></lor<>
Selenium	5	<lor< td=""><td><lor< td=""><td></td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td><td></td></lor<>				
Zinc	2	280 ¹	270 ¹	270 ¹		9.8	10
Manganese	10	200	•				
Beryllium	1	1.2	1.2				
Molybdenum	5	<lor< td=""><td><lor< td=""><td></td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td><td></td></lor<>				
Antimony	5	<lor< td=""><td><lor< td=""><td></td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td><td></td></lor<>				
Tin	2	28	26				
pH	0.1			9.2 1.2		9.3 ',2	
Polycyclic Aromatic							
Hydrocarbons (PAH):							
Naphthalene	0.1	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Acenaphthylene	0.1	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Acenaphthene	0.1	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Fluorene	0.1	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Phenanthrene	0.1	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Anthracene	0.1	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Fluoranthrene	0.1	0.1		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Pyrene	0.1	0.1		<lor< td=""><td><lor< td=""><td>* :</td><td></td></lor<></td></lor<>	<lor< td=""><td>* :</td><td></td></lor<>	* :	
Benz(a)anthracene	0.1	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Chrysene	0.1	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Benzo(b)fluoranthene and	0.1	0.1		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Benzo(k)fluoranthrene	0.1	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Benzo(a)pyrene	0.1	0.1		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Indeno(1,2,3-cd)pyrene	0.1	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Dibenz(a,h)anthracene	0.1	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Benzo(g,h,i)perylene	0.1	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Total PAH	1	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory)

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

¹ denotes greater than the ANZECC environmental guidelines

² denotes greater than the SAHC health based guidelines

³ denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting D)

⁴ denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting F)

# Analytical Results - Laboratory Replicates Metals, pH and PAH

# All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH15/D	BH15/D*	BH18	BH18*
Sample Depth	Reporting	0.7-0.85	0.7-0.85	0.4-0.5	0.4-0.5
Metals:					
Arsenic	5				
Cadmium	1	•.		-	
Cobalt	1				
Chromium (total)	2				
Copper	2				
Mercury	0.5				
Nickel	1	۰.			
Lead	5				
Selenium	5				
Zinc	2				
Manganese	10		÷		
Beryllium	1				
Molybdenum	5				
Antimony	5				
Tin	2				
рН	0.1			9.4 1.2	9.4 ',2
Polycyclic Aromatic					
Hydrocarbons (PAH):					
Naphthalene	0.1	<0.1	<0.1		
Acenaphthylene	0.1	<0.1	<0.1		
Acenaphthene	0.1	<0.1	<0.1		
Fluorene	0.1	<0.1	<0.1		
Phenanthrene	0.1	<0.1	<0.1		
Anthracene	0.1	<0.1	<0.1		
Fluoranthrene	0.1	<0.1	<0.1		-
Pyrene	0.1	<0.1	<0.1		
Benz(a)anthracene	0.1	<0.1	<0.1		
Chrysene	0.1	<0.1	<0.1		
Benzo(b)fluoranthene and	0.1	<0.1	<0.1		
Benzo(k)fluoranthrene	0.1	<0.1	<0.1		
Benzo(a)pyrene	0.1	<0.1	<0.1		
Indeno(1,2,3-cd)pyrene	0.1	<0.1	<0.1		
Dibenz(a,h)anthracene	0.1	<0.1	<0.1		
Benzo(g,h,i)perylene Total PAH	0.1 1	<0.1	<0.1		

7D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory

* indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

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³ denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting D)

⁴ denotes greater than Proposed Health Based Soil Guidelines (Langley et al 1996 - Exposure Setting F)

Contractor and the second statement

# Analytical Results - Laboratory Replicates BTEX, TPH, Phenols, Cresols,

All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH4	BH4*	BH13	BH13*	BH12/D	BH12/D*
Sample Depth	Reporting	0.45-0.6	0.45-0.6	0.7-0.9	0.7-0.9	0.55-0.7	0.55-0.7
BTEX:							
Benzene	0.5 "	_ <lor< td=""><td><lor< td=""><td></td><td></td><td>&lt;0.01</td><td>&lt;0.01</td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td>&lt;0.01</td><td>&lt;0.01</td></lor<>			<0.01	<0.01
Toluene	0.5	<lor< td=""><td><lor< td=""><td></td><td>-</td><td>&lt;0.01</td><td>&lt;0.01</td></lor<></td></lor<>	<lor< td=""><td></td><td>-</td><td>&lt;0.01</td><td>&lt;0.01</td></lor<>		-	<0.01	<0.01
Ethyl Benzene	0.5	<lor< td=""><td><lor< td=""><td></td><td>-</td><td>&lt;0.01</td><td>&lt;0.01</td></lor<></td></lor<>	<lor< td=""><td></td><td>-</td><td>&lt;0.01</td><td>&lt;0.01</td></lor<>		-	<0.01	<0.01
Xylene	1	<lqr< td=""><td><lor< td=""><td></td><td></td><td>&lt;0.01</td><td>&lt;0.01</td></lor<></td></lqr<>	<lor< td=""><td></td><td></td><td>&lt;0.01</td><td>&lt;0.01</td></lor<>			<0.01	<0.01
Total BTEX	2	<lor< td=""><td><lor< td=""><td>, </td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>, </td><td></td><td></td><td></td></lor<>	, 			
Total Petroleum		۰,					
Hydrocarbons (TPH):							
C ₆ -C ₉	25	<lor< td=""><td><lor< td=""><td></td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td><td></td></lor<>				
C ₁₀ -C ₁₄	25	<lor< td=""><td>.<lor< td=""><td></td><td></td><td></td><td></td></lor<></td></lor<>	. <lor< td=""><td></td><td></td><td></td><td></td></lor<>				
C ₁₅ -C ₂₈	25	<lor< td=""><td>· <lor< td=""><td></td><td></td><td></td><td></td></lor<></td></lor<>	· <lor< td=""><td></td><td></td><td></td><td></td></lor<>				
C ₂₉ -C ₃₆	25	<lor< td=""><td><lor< td=""><td></td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td><td></td></lor<>				
Total TPH	100	<lor< td=""><td><lor< td=""><td></td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td><td></td><td></td></lor<>				
Cresols						<0.1	<0.1
Phenols							
Phenol	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td></lor<></td></lor<>	<lor< td=""><td>&lt;0.1</td><td>&lt;0.1</td></lor<>	<0.1	<0.1
3-Methylphenol	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
2-Methylphenol	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
2-Ethylphenol	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
2,4-Dimehtylphenol	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
2,3,5-Trimethylphenol	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
4-Nitrophenol	0.1	<lor< td=""><td><lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>	<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Polychlorinated							
Biphenyls (PCBs)					-		
A1016	0.2	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
A1221	0.2	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
A1232	0.2	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
A1242	0.2	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
A1248	0.2	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
A1254	0.2	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
A1260	0.2	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
A1262	0.2	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		
Total Aroclors	1	<lor< td=""><td></td><td><lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<></td></lor<>		<lor< td=""><td><lor< td=""><td></td><td></td></lor<></td></lor<>	<lor< td=""><td></td><td></td></lor<>		

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory) * indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

# Analytical Results - Laboratory Replicates Volatile Organic Scan

# All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH15/D	RH4E/D*
Sample Depth	Reporting	0.7-0.85	0.7-0.85
Trichloroethene	1.0	0.1 0.00	0.1-0.00
Dibromomethane	- 1.0		
cis-1,3-dichloropropene	1.0`		
trans-1,3-dichloropropene	1.0		
1,1,2-Trichloroethane	1.0		
Tetrachloroethene	1.0		
1,3-Dichloropropane	1.0		
1,1,1,2-Tetrachloroethane	1.0	٠	
1,1,2,2-Tetrachloroethane	1.0		
1,2,3-Trichloropropane	1.0		
4-Isopropyltoluene	1.0	•.	
1,2-Dibromo-3-chloropropane	1.0		
Hexachlorobutadiene	1.0	<0.1	<0.1
Hexachloroethane		<0.1	<0.1
Hexachlorocyclopentadiene		<0.1	<0.1
Halogenated Aromatic			
Hydrocarbons	1.0		
1,2,3-Trichlorobenzene	1.0		
1,2,4-Trichlorobenzene	1.0	<0.1	<0.1
1,2-Dichlorobenzene	1.0	<0.1	<0.1
1,4-Dichlorobenzene	1.0	<0.1	<0.1
1,3-Dichlorobenzene	1.0	<0.1	<0.1
2-Chlorotoluene	1.0		
4-Chlorotoluene	1.0		
Bromobenzene	1.0		
Chlorobenzene		<0.1	<0.1
2-Choronapthalene		<0.1	<0.1
hexachlorobenzene		<0.1	<0.1
tetrachlorobenzene	1.0	<0.1	<0.1
	1.0		0.1
Trihalomethanes	1.0		
(Volatiles)	1.0		
Chloroform	1.0		
Dibromochloromethane	1.0		
Bromodichloromethane			
Bromoform	-		
Nonhthelese			
Naphthalene		l	

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory) * indicates laboratory replicate

LOR applies to the primary laboratory only. LORs for the secondary laboratory are as specified.

'Second

# Analytical Results - Soil Duplicates Metals, pH and PAH

# All results expressed in mg/kg (ppm)

Borehole Number	Limit Of	BH15	BH15/D
Sample Depth	Reporting	0.7-0.85	0.7-0.85
Metals:			
Arsenic	5 -	<lor< td=""><td>2.8</td></lor<>	2.8
Cadmium	1	<lor< td=""><td>&lt; 0.5</td></lor<>	< 0.5
Cobalt	1	Ň	9.4
Chromium (total)	1	26	28
Copper	2	9.9	16
Mercury	2	<lor< td=""><td>&lt;0.1</td></lor<>	<0.1
Nickel	0.5		11
Lead	10	11	15
Selenium	5		<0.5
Zinc	1	14	26
Manganese	5		260
Beryllium	5		<2
Molybdenum	5		<10
Antimony	2		<10
Tin	2		<10
pH .	0.1	9.3 ^{1,2}	
Polycyclic Aromatic			
Hydrocarbons (PAH):	-		
Naphthalene	0.1		<0.1
Acenaphthylene	0.1		<0.1
Acenaphthene	0.1		<0.1
Fluorene	0.1		<0.1
Phenanthrene	0.1		<0.1
Anthracene	0.1		<0.1
Fluoranthrene	0.1		<0.1
Pyrene	0.1		<0.1
Benz(a)anthracene	0.1		<0.1
Chrysene	0.1		<0.1
Benzo(b)fluoranthene and	0.1		<0.1
Benzo(k)fluoranthrene	0.1		<0.1
Benzo(a)pyrene	0.1		<0.1
Indeno(1,2,3-cd)pyrene	0.1		<0.1
Dibenz(a,h)anthracene	0.1		<0.1
Benzo(g,h,i)perylene	0.1		<0.1
Total PAH	1		

Total PAH

/D indicates field duplicate (BH12/D and BH15/D are inter-laboratory, BH4/D and BH13/D are intra-laboratory) * indicates laboratory replicate

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# Appendix K

Data Validation

# Franklin Street Bus Station

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Summary of Quality Control Laboratory Replicates

Location			Arsenic			1		Cadmium		
Number	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm Val	Name Dur
					1	1			i Norm, Vai.	Norm. Dup.
BH4 (0.45-0.6)	7.6	7.5	1	1.01	0.99	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<>	0	1.00	1.00
BH11 (0.8-1.0)	8.9	9.8	10	0.95	1.05	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<>	0	1.00	1.00
BH12/D (0.55-0.7)	2.8	2.8	0	1.00	1.00	<lor< td=""><td></td><td>0</td><td>1.00</td><td>1.00</td></lor<>		0	1.00	1.00
BH13 (0.7-0.9)	5.1	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td><lor< td=""><td></td><td></td><td>1.00</td><td>1.00</td></lor<></td></lor<>	0	1.00	1.00	<lor< td=""><td></td><td></td><td>1.00</td><td>1.00</td></lor<>			1.00	1.00
BH13/D (0.7-0.9)	<lor< td=""><td>5.0</td><td>0</td><td>1.00</td><td>1.00</td><td><lor< td=""><td>&lt;1 OR</td><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<>	5.0	0	1.00	1.00	<lor< td=""><td>&lt;1 OR</td><td>0</td><td>1.00</td><td>1.00</td></lor<>	<1 OR	0	1.00	1.00
	•					2011	12011		1.00	1.00
				RSD (%)	2			I	RSD (%)	0
			••		*******		ومستعبر بقيار المحادة فأبالا المح			
Location		1	Chromiun	ŀ.			-	Copper		
Number	Actual	Duplicate	RPD (%)	Norm, Val.	Norm. Dup.	Actual	Duplicate-	RPD (%)	Norm, Val.	Norm. Dup.
		20	_							
BH4 (0.45-0.6)	31	29	1	1.03	0.97	32	29	10	1.05	0.95
BHII (0.8-1.0)	11	12	9	0.96	1.04	6	6	5	0.97	1.03
BH12/D (0.55-0.7)	28	26	/	1.04	0.96	14	14	0	1.00	1.00
BH13 (0.7-0.9)	29	29	0	1.00	1.00	16	16	0	1.00	1.00
BH13/D (0.7-0.9)	33	34	3	0.99	1.01	17	17	0	1.00	1.00
		· ·		DSD (9/)						
				KSD (%)	<u> </u>				RSD (%)	3
Location			Lead		i	······································		NT at at		
Number	Actual	Duplicate	RPD (%)	Norm, Val.	Norm Duo	Actual	Duplicate	PPD (%)	Norm Viel	New Dec
			····				Dupnoaic	KID (76)	ivorm. v al	Norm. Dup.
BH4 (0.45-0.6)	446	670	40	0.80	1.20	15	14	7	1.03	0.97
BH11 (0.8-1.0)	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td></td><td></td><td></td><td></td><td></td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td></td><td></td><td></td><td></td><td></td></lor<>	0	1.00	1.00					
BH12/D (0.55-0.7)	14	15	. 7	0.97	1.03	14	12	15	1.08	0.92
BH13 (0.7-0.9)	43	36	18	1.09	0.91	15	15	0	1.00	1.00
BH13/D (0.7-0.9)	39	34	14	1.07	0.93					
		·····		RSD (%)	11				RSD (%)	5
Logation			Manager							
Number	Actual	Duelicate	RPD (%)	Norm Val	No- Due	A		Zinc		
		- o upinouic		indini. Val.	i Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6)	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td>280</td><td>770</td><td>4</td><td>1.02</td><td>0.08</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td>280</td><td>770</td><td>4</td><td>1.02</td><td>0.08</td></lor<>	0	1.00	1.00	280	770	4	1.02	0.08
BH11 (0.8-1.0)	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td>9.8</td><td>10</td><td>,</td><td>0.99</td><td>1.01</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td>9.8</td><td>10</td><td>,</td><td>0.99</td><td>1.01</td></lor<>	0	1.00	1.00	9.8	10	,	0.99	1.01
BH12/D (0.55-0.7)	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td>28</td><td>32</td><td>13</td><td>0.93</td><td>1.07</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td>28</td><td>32</td><td>13</td><td>0.93</td><td>1.07</td></lor<>	0	1.00	1.00	28	32	13	0.93	1.07
BH13 (0.7-0.9)	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td>32</td><td>32</td><td>0</td><td>1.00</td><td>1.07</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td>32</td><td>32</td><td>0</td><td>1.00</td><td>1.07</td></lor<>	0	1.00	1.00	32	32	0	1.00	1.07
BH13/D (0.7-0.9)	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td>32</td><td>32</td><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td><td>32</td><td>32</td><td>0</td><td>1.00</td><td>1.00</td></lor<>	0	1.00	1.00	32	32	0	1.00	1.00
			·····							
				RSD (%)	0				RSD (%)	3
										d
Location			Cobalt					Selenium		
Number	Actual	Duolicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
	1									
BH4 (0.45-0.6)	8.0	7.6	5	1.03	0.97	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<>	0	1.00	1.00
BH12/D (0.55-0.7)	8.5	8.5	0	1.00	1.00	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<>	0	1.00	1.00
BH13 (0.7-0.9)	7.7	8.1	5	0.97	1.03	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<>	0	1.00	1.00
		****		RSD (%)	2				RSD (%)	0
									·····	
Location			Manganes	e				Bervllium		
Number	Actual	Duolicate	RPD (%)	Norm Val.	Norm, Dup.	Actual	Duplicate	RPD (%)	Norm. Val	Norm. Dun
								<u></u>		
BH4 (0.45-0.6)						1.2	1.2	0	1.00	1.00
BH12/D (0.55-0.7)	220	210	5	1.02	0.98	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<>	0	1.00	1.00
BH13 (0.7-0.9)	260	270	4	0.98	1.02	1.1	1.2	9	0.96	1.00
									0.00	1.04
	t			RSD (%)			f	<u> </u>		<u>1</u>
	1			1000 (70)	4	1			630 (%)	,

### Franklin Street Bus Station

Summary of Quality Control Field Duplicates

Location			Arsenic					Cadmium		
Number	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm, Val.	Norm, Dup
BH4 (0.45-0.6) BH12 (0.55-0.7) BH13 (0.7-0.9) BH15 (0.7-0.85)	7.6 <lor 5.1 <lor< th=""><th>8.5 2.8 <lor 2.8</lor </th><th>11</th><th>0.94</th><th>1.06</th><th><lor <lor <lor <lor< th=""><th><lor <lor <lor <lor< th=""><th>0 0 0 0</th><th>1.00 1.00 1.00 1.00</th><th>1.00 1.00 1.00 1.00</th></lor<></lor </lor </lor </th></lor<></lor </lor </lor </th></lor<></lor 	8.5 2.8 <lor 2.8</lor 	11	0.94	1.06	<lor <lor <lor <lor< th=""><th><lor <lor <lor <lor< th=""><th>0 0 0 0</th><th>1.00 1.00 1.00 1.00</th><th>1.00 1.00 1.00 1.00</th></lor<></lor </lor </lor </th></lor<></lor </lor </lor 	<lor <lor <lor <lor< th=""><th>0 0 0 0</th><th>1.00 1.00 1.00 1.00</th><th>1.00 1.00 1.00 1.00</th></lor<></lor </lor </lor 	0 0 0 0	1.00 1.00 1.00 1.00	1.00 1.00 1.00 1.00
				RSD (%)	8				RSD (%)	0

Location			Chromiun	1			-	Copper		
Number	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6) BH12 (0.55-0.7) BH13 (0.7-0.9) BH15 (0.7-0.85)	31 29 29 26	26 28 33 28	18 4 13 7	1.09 1.02 0.94 0.96	0.91 0.98 1.06 1.04	32 10 16 9.9	34 14 17 16	6 33 6 47	0.97 0.83 0.97 0.76	1.03 1.17 1.03 1.24
				RSD (%)	6				RSD (%)	16

Location			Mercury		
Number	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
				[	
BH4 (0.45-0.6)	<lor< td=""><td>1.6</td><td>0</td><td>1.00</td><td>1.00</td></lor<>	1.6	0	1.00	1.00
BH12 (0.55-0.7)	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<>	0	1.00	1.00
BH13 (0.7-0.9)	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<>	0	1.00	1.00
BH15 (0.7-0.85)	<lor< td=""><td><lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></td></lor<>	<lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<>	0	1.00	1.00
				RSD (%)	0

Location			Lead					Zinc		
Number	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
		*								
BH4 (0.45-0.6)	446	440 🗄	1	1.01	0.99	280	270	4	1.02	0.98
BH12 (0.55-0.7)	11	14	24	0.88	1.12	17	28	49	0.76	1,24
BH13 (0.7-0.9)	43	39	10	1.05	0.95	32	32	0	1.00	1.00
BH15 (0.7-0.85)	11	15	31	0.85	1.15	14	26	60	<b>0.7</b> 0	1.30
		<u>                                     </u>	***********					Ŷ		
	I			RSD (%)	11				RSD (%)	21

Location		~	Fotal PAH	s			Be	nzo(a)pvr	ene	
Number	Actual	Duolicate	RPD (%)	Norm. Val.	Norm. Dup.	Actual	Duplicate	RPD (%)	Norm. Val.	Norm. Dup.
BH4 (0.45-0.6) BH12 (0.55-0.7)	<lor <lor< td=""><td><lor <lor< td=""><td>0 0</td><td>1.00 1.00</td><td>1.00 1.00</td><td>0.1 <lor< td=""><td><lor <lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></lor </td></lor<></td></lor<></lor </td></lor<></lor 	<lor <lor< td=""><td>0 0</td><td>1.00 1.00</td><td>1.00 1.00</td><td>0.1 <lor< td=""><td><lor <lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></lor </td></lor<></td></lor<></lor 	0 0	1.00 1.00	1.00 1.00	0.1 <lor< td=""><td><lor <lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></lor </td></lor<>	<lor <lor< td=""><td>0</td><td>1.00</td><td>1.00</td></lor<></lor 	0	1.00	1.00
				RSD (%)	0		******		RSD (%)	0

Note:

Where only one result is below the limit of reporting the RPDs can not be calculated



# Soil and Groundwater Investigation Central West Precinct

Franklin Street Bus Station Laboratory Reports

**Adelaide City Council** 

November 2004





# **Central West Precinct**

Prepared for Adelaide City Council

Prepared by

### Maunsell Australia Pty Ltd

Level 6, 100 Pirie Street Adelaide SA 5000 Australia ABN 20 093 846 925

Tel +61 8 8236 2222 Fax +61 8 8232 0396 adelaide@maunsell.com

### November 2004

40032004.00

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### This document is:

Franklin Street Bus Station Laboratory Reports

### This document accompanies:

Soil and Groundwater Investigation Central West Precinct Franklin Street Bus Station and Car Parks

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# Environmental Consulting Pty. Ltd.

3 KingstonTown Close, Oakleigh, Victoria, 3166, Australia Postal Address P.O. Box 276 Oakleigh Victoria, 3166, Australia Telephone (03) 9564 7055 Fax (03) 9564 7190 Email: mgt@mgtenv.com.au

CLIENT :-	Maunsell Australi Level 6/100 Pirie ( Adelaide	a Pty Ltd. Street
SITE	South Australia 50 FRANKLIN ST 40	0032004.00
DATE RECEIVED :-		20/08/04
DATE EXTRACTED (	JR PREPARED :-	20/08/04 - 21/08/04
DATE REPORTED :-		23/09/04
QA/QC DETAILS :-	The QA/QC for t	these samples is detailed in this report no 174918
	A total of 38 dupl	licate, 18 matrix spike % recovery and 11 method blank
	analyses or sets	of analyses were carried out on this batch of samples.
	All QA/QC result:	s for duplicates, matrix spike % recoveries, method blanks
	and known QC s	tandards were within the set acceptable criteria.
FINAL REPORT :-	The results in th	his report supersede any previously corresponded results.



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Maunsell Australia Pty Ltd.

Level 6/100 Pirie Street

South Australia 5000

Adelaide

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Site : FRANKLIN ST 40032004.00

CHI ORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

·	CULUNINAILLU					
	RIS1-A	Dup BUS1-A	BUS1-B	BUS2-A	BUS2-B	BUS3-A
Sample	4-1000			ALI2000#Soil	AU3091#Soil	AU3092#Soil
Lab. No. / Sample matrix	AU3088#Soil	AU3088D#201	AU3008#301			
	<0.2	<0.2	<0.2	<0.2	<0.2	20.2
Benzyl chloride	i 0 /	<0.0	<0.2	<0.2	<0.2	<0.2
1,2-Dichlorobenzene	50.Z	4.0		< U 2	<0.2	<0.2
1, 3-Dichlorobenzene	<0.2	\$0.Z	4.0 V		<0.2	<0.2
1,4-Dichlorobenzene	<0.2	<0.2	<ul> <li><ul> <li><ul> <li><ul> <li><ul> <li><ul> <li><ul></ul></li></ul></li></ul></li></ul></li></ul></li></ul></li></ul>	-0.0E	-0.05	<0.05
Hexachlorobenzene	<0.05	<0.05	c0.0>	c0.02		
	<0.05	<0.05	<0.05	<0.05	cn.u>	0.02
Hexacriorobutaviere	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorocyclopentagiene	-0.00 0.01	10 OF	<0.05	<0.05	<0.05	<0.05
Hexachloroethane	cn.u>	20.02	0.0	/0.0F	<0.05	<0.05
1 3 5-Trichlorobenzene	<0.05	¢0.0>	cn.u>	20.04		
	<0.05	<0.05	<0.05	<0.05	cn.u>	co.02
1,2,4-1 ncnioi obenzene			<0.05	<0.05	<0.05	<0.05
a, a-Dichlorotoluene	c0.0>	0.00	/0.0F	<0.05	<0.05	<0.05
1,2,3-Trichlorobenzene	<0.05	cn.u>	20.07	0.00 A DE	/0.05	<0.05
a a a-Trichlorotoluene	<0.05	<0.05	cn.u>	CD-D-		
	<0.05	<0.05	<0.05	<0.05	c0.0>	CO.0>
1, Z, 3, 9- I GII ACTIOI ODGI IZGI IG	10 DF	<0.05	<0.05	<0.05	<0.05	<0.05
1,2,4,5-Tetrachlorobenzene	c0.0>	20.02	0.05	70 OF	<0.05	<0.05
1,2,3,4-Tetrachlorobenzene	<0.05	GU.U>	60.05	00.00		
Results in ppm (soils mg/kg dry, waters mg/l). Extract	tion MGT 300A soils, I	JSEPA 3510 waters.				

Date received 20/08/04

Maunsell Australia Pty Ltd. Level 6/100 Pirie Street

South Australia 5000

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Site : FRANKLIN ST 40032004.00

CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	BUS4-A	BUS5-A	BUS6-A	BUS6-AA	BUS6-B	BUS7-A
Lab. No. / Sample matrix	AU3093#Soil	AU3094#Soil	AU3095#Soil	AU3096#Soil	AU3097#Soil	AU3098#Soil
Benzvl chloride	<0.2	<0.5	<0.2	<0.2	<0.2	<0.5
1 2-Dichlorobenzene	<0.2	<0.5	<0.2	<0.2	<0.2	<0.5
1 3-Dichlorobenzene	<0.2	<0.5	<0.2	<0.2	<0.2	<0.5
1 4-Dichlorobenzene	<0.2	<0.5	<0.2	<0.2	<0.2	<0.5
Hexachlorobenzene	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
Hexachlorobutadiene	<0.05	<0.5	<0.05	<0.05	<0.05	<0.5
Hexachlorocyclopentadiene	<0.05	<0.5	<0.05	<0.05	<0.05	<0.5
Hexachloroethane	<0.05	<0.5	<0.05	<0.05	<0.05	<0.5
1.3.5-Trichlorobenzene	<0.05	<0.5	<0.05	<0.05	<0.05	<0.5
1.2.4-Trichlorobenzene	<0.05	<0.5	<0.05	<0.05	<0.05	<0.5
a a-Dichlorotoluene	<0.05	<0.5	<0.05	<0.05	<0.05	<0.5
1.2.3-Trichlorobenzene	<0.05	<0.5	<0.05	<0.05	<0.05	<0.5
a.a.Trichlorotoluene	<0.05	<0.5	<0.05	<0.05	<0.05	<0.5
1.2.3.5-Tetrachlorobenzene	<0.05	<0.5	<0.05	<0.05	<0.05	<0.5
1,2,4,5-Tetrachlorobenzene	<0.05	<0.5	<0.05	<0.05	<0.05	<0.5
1,2,3,4-Tetrachlorobenzene	<0.05	<0.5	<0.05	<0.05	<0.05	<0.5
Results in ppm (soils mg/kg dry, waters mg/l). Extract	tion MGT 300A soils, U	SEPA 3510 waters.				

Date received 20/08/04

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Maunsell Australia Pty Ltd. Level 6/100 Pirie Street Adelaide South Australia 5000

Site : FRANKLIN ST 40032004.00

CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	BUS7-AA	BUS7-B	Dup BUS7-B	BUS7-C	BUS8-A	BUS9-A
Lab. No. / Sample matrix	AU3099#Soil	AU3100#Soil	AU3100D#Soil	AU3101#Soil	AU3102#Soil	AU3103#Soil
Renzvi chloride	<0.5	<0.2	<0.2	<0.1	<0.2	<0.2
1 2-Dichlorohanzane	<0.5	<0.2	<0.2	<0.1	<0.2	<0.2
1,2 Dichlorobenzene 1 3-Dichlorobenzene	<0.5	<0.2	<0.2	<0.1	<0.2	<0.2
1,0 digmentation	<0.5	<0.2	<0.2	<0.1	<0.2	<0.2
Hexachlorobenzene	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05
Hexachlorobutadiene	<0.5	<0.05	<0.05	<0.1	<0.05	<0.05
Hexachlorocyclonentadiene	<0.5	<0.05	<0.05	<0.1	<0.05	<0.05
Hexachloroethane	<0.5	<0.05	<0.05	<0.1	<0.05	<0.05
1 3 5-Trichlorobenzene	<0.5	<0.05	<0.05	<0.1	<0.05	<0.05
1.0.4 Trichlorohenzene	<0.5	<0.05	<0.05	<0.1	<0.05	<0.05
a a_Dicklorotolijane	<0.5	<0.05	<0.05	<0.1	<0.05	<0.05
a, a Distriction benzana 1 0 3. Trichlorohenzene	<0.5	<0.05	<0.05	<0.1	<0.05	<0.05
1,2,0-1100000000000000000000000000000000	<0.5	<0.05	<0.05	<0.1	<0.05	<0.05
a,a,a-municorocoacio 1 2 3 6. Tatrachlorohanzene	<0.5	<0.05	<0.05	<0.1	<0.05	<0.05
1,2,0,0-1 citadi inologori zono 4.0.4.6. Tetrachlorohenzene	<0.5	<0.05	<0.05	<0.1	<0.05	<0.05
1.2.3.4.Tetrachlorobenzene	<0.5	<0.05	<0.05	<0.1	<0.05	<0.05
Results in ppm (soils mg/kg dry, waters mg/l). Extract	ion MGT 300A soils, U	SEPA 3510 Waters.				

Date received 20/08/04

Maunsell Australia Pty Ltd. Level 6/100 Pirie Street

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Site : FRANKLIN ST 40032004.00

CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

						RIIS17-B
	BUS10-A	BUS10-B	BUS11-A	BUS12-A		
Sampile	1:-040.040	ALI3105#Soil	AI 13106#Soil	AU3107#Soil	AU3108#Soil	AU3109#Soil
Lab. No. / Sample matrix	AUSTU4#Soll			<0.5	<0.2	<0.2
Benzvl chloride	<0.2	<0.1	×0.4	р L	C 0 1	<0.2
	<0.2	<0.1	<0.2	C.U>	4.04	
1,2-Dichlorobenzene		<01	<0.2	<0.5	<0.2	<0.2
1,3-Dichlorobenzene	<ul> <li>-U.2</li> <li>-</li> </ul>		<0.2	<0.5	<0.2	<0.2
1,4-Dichlorobenzene	<0.2		10.F	<0.1	<0.05	<0.05
Hexachlorobenzene	<0.05	<u.1< td=""><td>20.07</td><td></td><td>&lt;0.05</td><td>&lt;0.05</td></u.1<>	20.07		<0.05	<0.05
uovachiorobi itadiene	<0.05	<0.1	c0.0>	2.02	0.00	<0.05
	<0.05	<0.1	<0.05	<0.2	cu.u>	0.0
Hexachlorocyclopentadiene	0.00	- C \	<0.05	<0.2	<0.05	<0.05
Hexachloroethane	c0.0>		0.00	C U 2	<0.05	<0.05
1.3.5-Trichlorobenzene	<0.05	<0.1	\$0.00	4.07	<0.05	<0.05
4 0 A_Trichlorohenzene	<0.05	<0.1	cn.u>	20.2		70.05
1,2,4-11,0,10,000,120,00	<0.05	<0.1	<0.05	<0.2	cn.u>	00.07
a,a-Dichlorotoluene	20.0	<01	<0.05	<0.2	<0.05	<0.05
1,2,3-Trichlorobenzene	20.02		<0.05	<0.2	<0.05	<0.05
a,a,a-Trichlorotoluene	c0.0>	-0.	0.00	<0.2	<0.05	<0.05
1 2 3 5-Tetrachlorobenzene	<0.05	<0.1	en:n>	4.0	10 0E	<0.05
4 0 4 E Totrochorohanzana	<0.05	<0.1	<0.05	<0.2	-0.00	0.05
	<0.05	<0.1	<0.05	<0.2	c0.0>	cn.u~
1,2,3,4-1 etrachioroberizerie						
V 1	tion MGT 300A soils. L	JSEPA 3510 waters.				

Results in ppm (soils mg/kg dry, waters mg/l). Extraction

Date received 20/08/04

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Site : FRANKLIN ST 40032004.00

CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	BUS13-A	BUS13-B	BUS14-A	Dup BUS14-A	BUS15-A	BUS15-B
Lab. No. / Sample matrix	AU3110#Soil	AU3111#Soil	AU3112#Soil	AU3112D#Soil	AU3113#Soil	AU3114#Soil
Benzvl chloride	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
1 2-Dichlorobenzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
1 3-Dichlorobenzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
1 4-Dichlorobenzene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Hexachlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobutadiene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorocyclopentadiene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachloroethane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1.3.5-Trichlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1 2 4-Trichlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
a a-Dichlorotoluene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1 2 3-Trichlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
a a - Trichlorotoluene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1 2 3 5-Tetrachlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1.2.4.5-Tetrachlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
1,2,3,4-Tetrachlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Results in ppm (soils mg/kg dry, waters mg/l). Extracti	ion MGT 300A soils, U	l SEPA 3510 waters.				

Date received 20/08/04

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> CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B Site : FRANKLIN ST 40032004.00

		•	DI 1017_B	BUS19-A	BUS20-A	BUS20-AA
	BUS16-A	BUS1/-A	a-1100a			A1104004001
arduras	10047F#001	ALI3116#Soil	AU3117#Soil	AU3118#Soil	AU3119#Soll	AUS120#301
Lab. No. / Sample matrix	AU3112#30II			<0.2	<0.2	<0.2
Benzyl chloride	<0.2	<0.2	50.2 2	4.0	<0.2	<0.2
	<0.2	<0.2	<0.2	\$U.2	1.0	
1,2-Dichlorobenzene	1.0	ر می ا	<0.2	<0.2	<0.2	2.0>
1,3-Dichlorobenzene	<0.2	2.0	C 02	<0.2	<0.2	<0.2
1 4-Dichlorobenzene	<0.2	<0.2		<0.05	<0.05	<0.05
u ovochlorohenzene	<0.1	<0.0>	20.02	0.05 10 0F	<0.05	<0.05
	<0.1	<0.05	¢0.0>	0.02	20.02	<0.05
Hexachlorobutagiene		<0.05	<0.05	<0.05	cn.u>	00.07
Hexachlorocyclopentadiene	<0.1	-0.00 2.00	10 OF	<0.05	<0.05	<0.05
Hevachloroethane	<0.1	c0.0>	-0.02		<0.05	<0.05
	<0.1	<0.05	GU.U>	co.04		
1,3,5-Trichlorobenzene		70 D.F	<0.05	<0.05	<0.05	c0.0>
1.2.4-Trichlorobenzene		0.07 100	~0.05	<0.05	<0.05	<0.05
a a-Dichlorotoluene	<0.1	GU.U>	0.00	<0.05	<0.05	<0.05
4.2.3-Trichlorobenzene	<0.1	<0.05	<0.U5	20.00 20.05	<0.05	<0.05
	<0.1	<0.05	cn.u>	0.00	<0.05	<0.05
a,a,a-111011010101010	<01	<0.05	<0.05	cn.u>	00.07	
1,2,3,5-Tetrachlorobenzene		<0.05	<0.05	<0.05	<0.05	cn.u>
1,2,4,5-Tetrachlorobenzene	<ul> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li>- 0.1</li> <li></li></ul>	20.00 20.05	<0.05	<0.05	<0.05	<0.05
1 2 3.4-Tetrachlorobenzene	1.0	00.04				
		ISEDA 3610 Waters				

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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Date Reported 23/09/04

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Maunsell Australia Pty Ltd. Level 6/100 Pirie Street Adelaide South Australia 5000

Site : FRANKLIN ST 40032004.00 CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	BUS20-B	BUS21-A	BUS22-A	BUS22-B	BUS6-C	Spike % Recov
Lab. No. / Sample matrix	AU3121#Soil	AU3122#Soil	AU3123#Soil	AU3124#Soil	AU3219#Soil	AU3124S#Soil
Benzvl chloride	<0.2	<0.2	<0.2	<0.2	<0.2	
1.2-Dichlorobenzene	<0.2	<0.2	<0.2	<0.2	<0.2	
1.3-Dichlorobenzene	<0.2	<0.2	<0.2	<0.2	<0.2	ł
1 4-Dichlorohenzene	<0.2	<0.2	<0.2	<0.2	<0.2	3
Hexachlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	I
Hexachlorohutadiene	<0.05	<0.05	<0.05	<0.05	<0.05	92%
Hexachlorocyclopentadiene	<0.05	<0.05	<0.05	<0.05	<0.05	78%
Hexachloroethane	<0.05	<0.05	<0.05	<0.05	<0.05	81%
1.3.5-Trichlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	ł
1.2.4-Trichlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	1
a a-Dichlorotoluene	<0.05	<0.05	<0.05	<0.05	<0.05	I
1.2.3-Trichlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	1
a a - Trichlorotoluene	<0.05	<0.05	<0.05	<0.05	<0.05	J
1.2.3.5-Tetrachlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	ı
1.2.4.5-Tetrachlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	1
1,2,3,4-Tetrachlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	1
Results in ppm (soils mg/kg dry, waters mg/l). Extract	tion MGT 300A soils, U	sEPA 3510 waters.				

Date received 20/08/04

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Site : FRANKLIN ST 40032004.00

CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	Meth.Bl.(mg/l)		
Lab. No. / Sample matrix			
Benzvl chloride	<0.02		
1.2-Dichlorobenzene	<0.02		
1.3-Dichlorobenzene	<0.02		
1,4-Dichlorobenzene	<0.02		
Hexachlorobenzene	<0.005		
Hexachlorobutadiene	<0.005		
Hexachlorocyclopentadiene	<0.005		
Hexachloroethane	<0.005		
1.3.5-Trichlorobenzene	<0.005		
1.2.4-Trichlorobenzene	<0.005		
a.a-Dichlorotoluene	<0.005		
1,2,3-Trichlorobenzene	<0.005		
a,a,a-Trichlorotoluene	<0.005		
1,2,3,5-Tetrachlorobenzene	<0.005		
1,2,4,5-Tetrachlorobenzene	<0.005		
1,2,3,4-Tetrachlorobenzene	<0.005		
Results in ppm (soils mg/kg dry, waters mg/l). Extracti	ion MGT 300A soils, US	SEPA 3510 waters.	

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Site : FRANKLIN ST 40032004.00

CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

			alist.B	BUS2-A	BUS2-B	BUS3-A
Gamnle	BUS1-A	k-i sha dha	200			
a trimp c			ALI3089#Soil	AU3090#Soil	AU3091#Soil	AU3092#501
r.ah No. / Samula matrix	AU3088#Sol	AU30000#301			U U	<0.05
		20.05	<0.05	<0.0>	c0.0>	20.07
Dantachlorohenzene	c0.0>	-0.02 -		, <u>,</u> ,		<0.05
	10.01	20.05	<0.05	<0.0>	50.02	22.2
alnha_RHC	cn'n>	00.04			20 02	<0.05
		<0.05	1 <0.05	cn.u>	20.02	22.2
namma-BHC	cn.u>	00.07			50.02	<0.05
gamma area		<0.05	<0.05	cu.u>	0.07	
heta-BHC	00.07		n C C		<0.05	<0.05
		<0.05	cn'n>	20,02		
delta-BHC	00.07					
Desuits in nom (soils ma/ka drv, waters mg/l). Extracti	ion MGT 300A soils, U	SEPA 3510 Waters.				

ĥ ò Results in ppm (source and

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Site : FRANKLIN ST 40032004.00

CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	BUS4-A	BUS5-A	BUS6-A	BUS6-AA	BUS6-B	BUS7-A
Lab. No. / Sample matrix	AU3093#Soil	AU3094#Soil	AU3095#Soil	AU3096#Soil	AU3097#Soil	AU3098#Soil
	<0.05	<0.5	<0.05	<0.05	<0.05	<0.5
	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
della-brio	22.2					
Results in ppm (soils mg/kg dry, waters mg/l). Extractic	ion MGT 300A soils, US	SEPA 3510 waters.				

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CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B Site : FRANKLIN ST 40032004.00

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Sample	BUS7-AA	BUS7-B	Dup BUS7-B	D-72UB	BUS8-A	BUS9-A
Lab. No. / Sample matrix	AU3099#Soil	AU3100#Soil	AU3100D#Soil	AU3101#Soil	AU3102#Soil	AU3103#Soil
Pentachlorobenzene	<0.5	<0.05	<0.05	<0.1	<0.05	<0.05
alpha-BHC	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05
aamma-BHC	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05
beta-BHC	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05
delta-BHC	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05
Results in ppm (soils mg/kg dry, waters mg/l). Extractic	on MGT 300A soils, U	SEPA 3510 waters.				

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Site : FRANKLIN ST 40032004.00

CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

	BUS10-A	BUS10-B	BUS11-A	BUS12-A	BUS12-AA	BUS12-B
ат Ліпра			0.0070	1:0072010114	A1124/08#Soil	A113109#Soil
Lab. No. / Sample matrix	AU3104#Soil	AU3105#Soil	AU3106#Soll	AUSIU/#SOIL		100-100
	<0.05	<0.1	<0.05	<0.2	<0.05	<0.05
Pentachlorobenzene	00.07				10.05	<0.05
	<0.05	<0.1	<0.05	<u.1< td=""><td>c0.0&gt;</td><td>0.00</td></u.1<>	c0.0>	0.00
alpia-biid				101	<0.05	<0.05
namma_RHC	<0.05	<0.1	c0.0>		00.07	
gamma-Di S		Ţ		F 07	<0.05	<0.05
heta-RHC	<0.05	<u.1< td=""><td>50.05</td><td>07</td><td>00.0</td><td></td></u.1<>	50.05	07	00.0	
	L	Ţ		<01	<0.05	<0.05
delta-BHC	<0.U>	<ul><li></li></ul>	0.07			
Results in ppm (soils mg/kg dry, waters mg/l). Extraction	on MGT 300A soils, L	ISEPA 3510 waters.				

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Site : FRANKLIN ST 40032004.00

CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

						RUS15_R
Sample	BUS13-A	BUS13-B	BUS14-A	Dup pus It-A	V-01000	202
		1: OH X X OL V	A110440#CCil	ALI31100#Soil	AU3113#Soil	AU3114#Soil
Lab. No. / Sample matrix	AU3110#Soil	AU3111#501	AU3112#301		100 100 1000	
	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Pentachioropenzene	00.0			L		70.05
	<0.05	<0.05	<0.05	c0.0>	c0.02	50.0V
			10 Q.	10 0E	~0.05	<0.05
amma_BHC	<0.0>	c0.0>	c0.0>	20.02	00.07	
damma or o			<0.05	<0.05	<0.05	<0.05
beta-BHC	cn.u>	00.07	000			
	<0.05	<0.05	<0.05	<0.05	cu.u>	cn.0>
Ueila-Di IV						
Results in ppm (soils mg/kg dry, waters mg/l). Extraction	ion MGT 300A soils, U	SEPA 3510 waters.				

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Site : FRANKLIN ST 40032004.00

CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	BUS16-A	BUS17-A	BUS17-B	BUS19-A	BUS20-A	BUS20-AA
Lab. No. / Sample matrix	AU3115#Soil	AU3116#Soil	AU3117#Soil	AU3118#Soil	AU3119#Soil	AU3120#Soil
Pentachlorobenzene	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-BHC	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05
damma-BHC	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	<0.1	<0.05	<0.05	<0.05	<0.05	<0.05
Results in ppm (soils mg/kg dry, waters mg/l). Extractic	on MGT 300A soils, U	SEPA 3510 waters.				

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Site : FRANKLIN ST 40032004.00

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	CHLORINATED H	IYDROCARBONS US	EPA SW846 METHO	D 8021B		
Sample	BUS20-B	BUS21-A	BUS22-A	BUS22-B	BUS6-C	Spike % Recov
Lab. No. / Sample matrix	AU3121#Soil	AU3122#Soil	AU3123#Soil	AU3124#Soil	AU3219#Soil	AU3124S#Soil
Dentachlorohenzene	<0.05	<0.05	<0.05	<0.05	<0.05	-
aluha-RHC	<0.05	<0.05	<0.05	<0.05	<0.05	84%
aprice 21.0	<0.05	<0.05	<0.05	<0.05	<0.05	85%
	<0.05	<0.05	<0.05	<0.05	<0.05	79%
delta-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	91%
Results in ppm (soils mg/kg dry, waters mg/l). Extracti	ion MGT 300A soils, U	SEPA 3510 waters.				

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Site : FRANKLIN ST 40032004.00

CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	Meth.Bl.(mg/l)		
тар. No. / Sample matrix			
Pentachlorobenzene	<0.005		
alpha-BHC	<0.005		
gamma-BHC	<0.005		
beta-BHC	<0.005		
delta-BHC	<0.005		
Results in ppm (soils mg/kg dry, waters mg/l). Extractio	on MGT 300A soils, US	5EPA 3510 waters.	

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Site : FRANKLIN ST 40032004.00

HEAVY METALS USEPA 6010B (ICP), 7470/1 (CVAA)

Sample	BUS1-A	Dup BUS1-A	BUS1-B	BUS2-A	BUS2-B	BUS3-A
Tab. No. / Sample matrix	AU3088#Soil	AU3088D#Soil	AU3089#Soil	AU3090#Soil	AU3091#Soil	AU3092#Soil
Antimony	<10	<10	<10	<10	<10	<10
Anumony Areanic	~	<2	5	2	<2	2.3
Auseriuc Bervilium	7	<2	<2	<2	<2	<2
Cadmium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromitim	18	19	8.9	10	11	<5
	<2	<5	55	<5	<5	<5
Condit	\$5	<5	<5	11	<5	5.4
cupper Land	- 22 ~2	5	<5	21	<5	20
Marciny	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Meloury	<10	<10	<10	<10	<10	<10
	≤5	<5	5.7	5.6	6.3	<5
Nickel	• ∽	\$	<2	\$	2	<2
Selerinum	<10	<10	<10	<10	<10	<10
Zinc	~2 ~2	<5	7.5	72	7.5	39
Extraction with H2O2, HNO3 & HCI. Results in ppm (s	soils mg/kg dry, waters	п mg/l).				

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(CVAA)
:P), 7470/1
6010B (IC
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Sample	BUS4-A	Dup BUS4-A	BUS5-A	Dup BUS5-A	BUS6-A	BUS6-AA
Lab. No. / Sample matrix	AU3093#Soil	AU3093D#Soil	AU3094#Soil	AU3094D#Soil	AU3095#Soil	AU3096#Soil
Antimony	<10	<10	<10	<10	<10	<10
Arsenic	2	~2	<2	9	<2	<2
Beryllium	<2	<2	<2	<2	<2	<2
Cadmium	<0.5	<0.5	<0.5	1	<0.5	0.55
Chromium	17	19	9.0		17	24
Cobalt	ŝ	· <5	<5	-	<5	<5
Copper	6.5	5.9	<5	1	11	9.3
Lead	9.2	7.7	7.9	-	6.0	5.5
Mercury	<0.1	ł	<0.1	1	<0.1	<0.1
Molybdenum	<10	<10	<10	<10	<10	<10
Nickel	5.4	<5	<5		10	12
Selenium	<2	<2	<2	<2	<2	<2
Tin	<10	<10	<10	<10	<10	<10
Zinc	19	18	30		15	18
Extraction with H2O2, HNO3 & HCI. Results in ppm ( $\epsilon$	soils mg/kg dry, waters	m9/l).				

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HEAVY METALS USEPA 6010B (ICP), 7470/1 (CVAA)

Sample	BUS6-B	BUS7-A	BUS7-AA	BUS7-B	BUS7-C	BUS8-A
Lab. No. / Sample matrix	AU3097#Soil	AU3098#Soil	AU3099#Soil	AU3100#Soil	AU3101#Soil	AU3102#Soil
Antimonv	<10	<10	<10	<10	<10	<10
Arenic	2.4	∽	₽	~2	7.4	2.8
Republicum	<2	5	₽	₽	<2	<2
Cadmium	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	12	19	27	17	18	<5
Cohalt	~5	£ ∿	<5	<5	<5	<5
Conner	~55	<5	5	6.7	5.0	<5
lead	<5	<5	<5	<5	<5	<5
Mercury	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Molvbdenum	<10	<10	<10	<10	<10	<10
Nickel	6.4	<5	<5	8.6	6.8	<5
Selenium	2	<2	<2	<2	<2	<2
Tin	<10	<10	<10	<10	<10	<10
Zinc	0.6	6.0	6.4	13	16	8.0
Extraction with H2O2, HNO3 & HCI. Results in ppm (s	soils mg/kg dry, waters	mg/l).				

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HEAVY METAL S USEPA 6010B (ICP). 7470/1 (CVAA) Site : FRANKLIN ST 40032004.00

			101010	Dun BUS11-A	BUS12-A
	10-A B	US10-B	¥-11000		
AU3	104#Soil A	U3105#Soil	AU3106#Soil	AU3106D#Soil	AU3107#Soil
	0	<10	<10	<10	<10
2 9	2 0	Ŷ	42	<2	<2
		, <i>ć</i>	Ŷ	<2	5
2		20 K	<0.5	<0.5	<0.5
0.5	 G.(	0.07		20	16
2.	ç	2	40		ц \ \
<5	ι.	<5	<5	ი ∽	67
10	ų	<5	12	9.8	21
	ų	<5	12	19	8.7
	?		0 28	0.23	<0.1
.15			04/	<10	<10
<10	01	012		7 7	<5
<5	<5	6.9	0.0	- (	~
~2 ~	<2	\$	7,>	7~	2
<10	10	<10	<10	<10	<10
75	С	7.6	23	24	19
2					
	0 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	7.6 <u>~</u> ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~		<ul> <li>-5</li> <li>-5</li> <li>-5</li> <li>-12</li> <li>12</li> <li>12</li> <li>-12</li> <li>-10</li> <li>8.5</li> <li>-2</li> <li>-2</li> <li>-2</li> <li>-3</li> <li>-3</li> </ul>	<5

Extraction with H2O2, HNO3 & HCI. Results in ppm (soils mg/kg dry, waters mg/l).

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HEAVY METALS USEPA 6010B (ICP), 7470/1 (CVAA)

Sample	BUS12-AA	BUS12-B	BUS13-A	BUS13-B	BUS14-A	Dup BUS14-A
Lab. No. / Sample matrix	AU3108#Soil	AU3109#Soil	AU3110#Soil	AU3111#Soil	AU3112#Soil	AU3112D#Soil
Antimony	<10	<10	<10	<10	<10	<10
Arcanic	<2	<2	₽	5	<2	<2
Parolli III Berolli III	<2	<2 2	<2	<2	<2	<2
Cadmittm	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	18	18	8.7	8.7	<5	<b>∿</b> 5
Cobalt	<5	<5	<5	<5	<5	<5
Conner	16	12	13	5.2	<5	<5
	20	13	16	<5	<5	<5
Mercini	<0.1	0.14	<0.1	<0.1	<0.1	<0.1
Maluhden im	<10	<10	<10	<10	<10	<10
Nickel	-51 -51	8.5	<5	5.7	<5	<5
Selenium	5	\$	<2	2	<2	<2
Tin	<10	<10	<10	<10	13	<10
Zinc	18	13	26	7.3	7.8	7.1
Extraction with H2O2, HNO3 & HCI. Results in ppm (s	soils mg/kg dry, waters	mg/l).				

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HEAVY METALS USEPA 6010B (ICP), 7470/1 (CVAA)

ם [ייייים]	BUS15-A	BUS15-B	BUS16-A	BUS17-A	BUS17-B	BUS19-A
at dimps	1104404001	AI 12114#Snil	At 13115#Soil	AU3116#Soil	AU3117#Soil	AU3118#Soil
Lab. No. / Sample matrix	AUST 13#301			047	-10	. <10
Antimonv	<10	<10	<10 <	<10	2	2
	⊲2	3.0	₽	<2	<2	~~
Alsenic		Ŷ	2	\$	¢	<2
Beryllium	7	1 1	<0 5	<0.5	<0.5	<0.5
Cadmium	c.U>	c.0~		7	00	11
Chromium	13	14	D.1	2	) L	
Cobalt	<5	<5	<5	<5	ç,	C 1
CUbait	ج۶	~5 ~5	34	690	<5	<5
Copper	, c	- u \	28	40	<5	15
Lead	2.2	?		0.05	102	<0.1
Mercury	0.19	<0.1	-0. -1	0.00		
	<10	<10	<10	<10	<10	012
Molybueriurit	57	7.0	<5 <5	6.3	5.7	<5
Nickel	Ś	۲ ۲	Ŷ	Ø	2	<2
Selenium	75	3		077	<10	<10
Tin	<10	01.>	212	2	2	
Zinc	11	8.6	44	25	6.0	2-
Extraction with H2O2, HNO3 & HCI. Results in ppm (	soils mg/kg dry, water	s mg/l).				

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> HEAVY METALS LISEPA 6010B (ICP) 7470/1 (CVAA) Site : FRANKLIN ST 40032004.00

Samo l e	BUS20-A	BUS20-AA	BUS20-B	BUS21-A	BUS22-A	BUS22-B
rat No / Comelo motrix	A113119#Soil	AU3120#Soil	AU3121#Soil	AU3122#Soil	AU3123#Soil	AU3124#Soil
Laus No. / Odilipie Illaula	<10	<10	<10	<10	<10	<10
Antimony	2, 5	~	Ŷ	~	\$	2.5
Arsenic	×, '	ų c	۱ ۲	~	Ŷ	22
Beryllium	~7>	75	7,	4	L C	и ^
Cadmium	<0.5	<0.5	0.60	<0.5	¢.0>	c.u>
Chromitim	6.4	10	28	10	20	20
	<u>ح</u> 5	~5	7.2	<5	<5	5.8
Cobait		- L	Ţ	R A	-55 -	₽
Copper	<5	¢>		r		,
	7.9	14	5.7	32	ç	ç,
LGau	<0.1	<0.1	<0.1	0.25	<0.1	<0.1
Mercury			071	V10	<10	<10
Molybdenum	<10	01>	017	2		9.0
Nickel	<5	-25	12	\$	ç, ′	0.0
Selenium	2	4	8	₽	7	7
Tio	<10	<10	<10	<10	<10	<10
	i (	Ţ	18	39	5.0	12
Zinc	9.6	-	01	2		
Extraction with H202, HNO3 & HCI. Results in p	pm (soils mg/kg dry, wate	rs mg/l).				

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Site : FRANKLIN ST 40032004.00

HEAVY METALS USEPA 6010B (ICP), 7470/1 (CVAA)

Sample	BUS6-C	Spike % Recov	Spike % Recov	Spike % Recov	Meth.BI.(mg/l)	
Lab. No. / Sample matrix	AU3219#Soil	AU3088S#Soil	AU3106S#Soil	AU3112S#Soil		
Antimony	<10	83%	87%	84%	<0.1	
Arsenic	3.1	81%	91%	83%	<0.01	
Bervilium	2	82%	82%	81%	<0.01	
Cadmium	<0.5	82%	85%	82%	<0.01	
Chromium	16	86%	82%	84%	<0.05	
Cohalt	<5	81%	87%	82%	<0.05	
Conner	<5	83%	%06	83%	<0.05	
	<5	86%	81%	83%	<0.05	
Mercuity	<0.1	I		85%	<0.001	
Molvhdenum	<10	83%	89%	87%	<0.1	
Nickel	6.2	81%	86%	81%	<0.05	
Selenium	<2	86%	84%	82%	<0.01	
Tin	<10	87%	83%	84%	<0.1	
Zinc	12	86%	91%	77%	<0.05	
Extraction with H2O2, HNO3 & HCI. Results in ppm (	r soils mg/kg dry, waters	ng/l).				

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MISCELLANEOUS ANALYSES. METHODS US EPA SW846 OR APHA STANDARD METHODS 19TH ED. 1995.

Sample	BUS1-A	Dup BUS1-A	BUS1-B	BUS2-A	BUS2-B	BUS3-A
. I.ab. No. / Sample matrix	AU3088#Soil	AU3088D#Soil	AU3089#Soil	AU3090#Soil	AU3091#Soil	AU3092#Soil
pH (units) (1:5 aqueous extract)	10	9.9	9.8	8.9	9.5	9.4
Desuits in num (soils malka dry waters mall) excent y	where specified otherwi	- S				

Results in ppm (soils mg/kg dry, waters mg/l.) except where specified otherw

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MISCELLANEOUS ANALYSES. METHODS US EPA SW846 OR APHA STANDARD METHODS 19TH ED. 1995.

almu1e	BUS4-A	BUS5-A	BUS6-A	BUS6-AA	BUS6-B	BUS7-A
						1:0000011
ret No / Camalo matrix	A113093#Soil	AU3094#Soil	AU3095#Soil	AU3096#Soll	HOSH/BUSUA	AUSU30#SUI
HAM . NO. / Dalipic Illality				(	0	0
	96	0.6	0.0	8.6	u.U	a.u
pH (units) (1:5 aqueous exitact)	0.0					
Results in ppm (soils mg/kg dry, waters mg/l.) except w	where specified otherwi	se.				

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MISCELLANEOUS ANALYSES. METHODS US EPA SW846 OR APHA STANDARD METHODS 19TH ED. 1995.

Sample	BUS7-AA	BUS7-B	Dup BUS7-B	BUS7-C	BUS8-A	BUS9-A
Lab. No. / Sample matrix	AU3099#Soil	AU3100#Soil	AU3100D#Soil	AU3101#Soil	AU3102#Soil	AU3103#Soil
nH ((inits) (1.5 adtred)s extract)	9.1	8.4	8.5	9.2	8.9	8.3
Results in ppm (soils mg/kg dry, waters mg/l.) except w	where specified otherw	ise.				

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MISCELLANEOUS ANALYSES. METHODS US EPA SW846 OR APHA STANDARD METHODS 19TH ED. 1995.

						0 01010
	BIIS10-A	BUS10-B	BUS11-A	BUS12-A	BUS12-AA	DU312-D
Sample	1-21-22-22					
			A 13106#Soil	AU3107#Soil	AU3108#Soll	AUG 108#301
tish No / Semule matrix	AU3104#201	100+001004	1001001			
		(	0 1	۲ 0	62	9.2
	5.00	8.9	0.7	0.0		
pH (units) (1:5 aqueous exit act)						
Results in ppm (soils mg/kg dry, waters mg/l.) except v	where specified otherw	rise.	_	-		

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MISCELLANEOUS ANALYSES. METHODS US EPA SW846 OR APHA STANDARD METHODS 19TH ED. 1995.

Sample	BUS13-A	BUS13-B	BUS14-A	Dup BUS14-A	BUS15-A	BUS15-B
Lab. No. / Sample matrix	AU3110#Soil	AU3111#Soil	AU3112#Soil	AU3112D#Soil	AU3113#Soil	AU3114#Soil
nH (units) (1.5 adueous extract)	9.1	9.1	9.3	9.4	9.0	9.0
hit (attraction of the advance of the advance)						
a state of the second second second second second	t where enerified otherwi					

٤. 2 Results III ppill (solis IIIgrad ury, water

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MISCELLANEOUS ANALYSES. METHODS US EPA SW846 OR APHA STANDARD METHODS 19TH ED. 1995.

Sample	BUS16-A	BUS17-A	BUS17-B	BUS19-A	BUS20-A	BUS20-AA
tah. No. / Samula matrix	AU3115#Soil	AU3116#Soil	AU3117#Soil	AU3118#Soil	AU3119#Soll	AU3120#Soll
attain (115 aduatic actract)	06	80	9.2	9.5	9.4	8.D
hu (niiis) ( i.o adneone exilant)						
n - 11- i (ile mellic dar watere mall) event	where sherified otherwi	as				

Results in ppm (soils mg/kg dry, waters mg/l.) except where specified otherwise.

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MISCELLANEOUS ANALYSES. METHODS US EPA SW846 OR APHA STANDARD METHODS 19TH ED. 1995.

Sample	BUS20-B	BUS21-A	BUS22-A	BUS22-B	BUS6-C	
T.ah No. / Samnle matrix	AU3121#Soil	AU3122#Soil	AU3123#Soil	AU3124#Soil	AU3219#Soil	
nH (rinite) (1.5 adueoris extract)	0.3	8.8	t	9.6	9.2	
Desuits in num (soits ma/ka drv waters ma/l.) except w	where specified otherwi	se.				

Σ. Results in ppm (solis ing/kg diy, waters ing/i.) e/

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CYANIDE (CN-) US EPA SW846 METHOD 9010B.

Sample	BUS1-A	Dup BUS1-A	BUS1-B	BUS2-A	BUS2-B	BUS3-A
Lab. No. / Sample matrix	AU3088#Soil	AU3088D#Soil	AU3089#Sail	AU3090#Soil	AU3091#Soil	AU3092#Soil
Cvanide (total)	<5	<5	<b>√</b> 5	<5	<5	<5
Results in ppm (soils mg/kg dry, waters mg/l).						

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> CYANIDE (CN-) US EPA SW846 METHOD 9010B. Site : FRANKLIN ST 40032004.00

					1	
r 1	RIS4-A	BUS5-A	BUS6-A	BUS6-AA	BUS6-B	BUS/-A
Sample						1. 0200001.
			A112005#Coil	A113096#Soil	AU3097#Soil	AUGUS8#SOI
tothe matrix	- AU3093#505		IDO HORDOOC			
				E	1	R^ 2
	ц,	<u>ر</u>	<55 <	¢۷	C/	07
Cvanide (total)	2					
Desuits in num (suits ma/ka drv. waters ma/l).	_	_	_			

Date received 20/08/04

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> CYANIDE (CN-) US EPA SW846 METHOD 9010B. Site : FRANKLIN ST 40032004.00

	BIIS7-AA	BUS7-B	Dup BUS7-B	BUS7-C	BUS8-A	BUS9-A
sampre			-			110400#Cc11
Tak No / Sample matrix	AU3099#Soil	AU3100#Soil	AU3100D#Soil	AU3101#Soil	AU3102#Soll	AU3103#S0I
Ham. two. / Odilibic illania				LL L	ų V	
Cuanida (total)	~5	\$	c>	ç,	2	
Uyaiiide (iulai)						
Results in ppm (soils mg/kg dry, waters mg/l).		_	-	_		

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CYANIDE (CN-) US EPA SW846 METHOD 9010B.

Sample	BUS10-A	BUS10-B	BUS11-A	BUS12-A	BUS12-AA	BUS12-B
Tab. No. / Samula matrix	AU3104#Soil	AU3105#Soil	AU3106#Soil	AU3107#Soil	AU3108#Soll	AU3108#201
					Ľ	Ļ
Cranida (total)	~5 5		~2 <u>0</u>	<del>ر</del> ه	<b>¢</b> >	ŝ
Results in ppm (soils mg/kg dry, waters mg/l).			_			_

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CYANIDE (CN-) US EPA SW846 METHOD 9010B. Site : FRANKLIN ST 40032004.00

				-		011015 0
	D11013_0	BUS13-B	BUS14-A	Dup BUS14-A	A-clsUa	a-ci cha
Sample						10044440114
	. 0.0	1004446110	AI 13112#Soil	AU3112D#Soil	AU3113#00	
rah No / Samula matriy	AU3110#501		10011211004			
		•	LI V	ري د	ۍ ۲	ŝ
	یہ ۲	0.7	7	<b>D</b>		
Cvanide (total)	~					
Beents in num (soils ma/ka drv. waters mg/l).		_	-			

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Site : FRANKLIN ST 40032004.00

CYANIDE (CN-) US EPA SW846 METHOD 9010B.

e [b	BUS16-A	BUS17-A	BUS17-B	BUS19-A	BUS20-A	BUS20-AA
at Ampo					1: 0::07 7 0:: 0	1:010000010
Tab No / Samula matrix	AU3115#Soil	AU3116#Soil	AU3117#Soil	AU3118#Sol	AU3119#501	AUS 120#Soll
				Ļ	u V	۲×
Cuanida (total)	< <u>5</u>	 20	ი ~	C>	./	<b>)</b>
Uyal live (tutal)						
Results in ppm (soils mg/kg dry, waters mg/l).		-	_	-	_	

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CYANIDE (CN-) US EPA SW846 METHOD 9010B.

						Calle 0/ Decov
	a ucsi a	BUS21-A	BUS22-A	BUS22-B	BUS6-C	Spike % Recov
Sample	0.000					
			N121224001	A113124#Snil	AU3219#Soil	AU31110#201
	I AU3121#Soil	AU3122#50		1001-31000		
Lab. No. / Sample mauix					ų	210/_
		5	ц V	¢ ℃	<b>c</b>	0/10
		?				
Decute in nom (soits ma/ka drv waters ma/l).		_	-			

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Adelaide South Australia 5000	Site FRANKLIN (	:T 40032004.00	Page 40 of 96
	CYANID	E (CN-) US EPA SW846 METHOD 90	10B.
Sample	Spike % Recov	Meth.Bl. (mg/l)	
Lab. No. / Sample matrix	AU3124S#Soil		
Cyanide (total)	95%	<0.005	
Results in ppm (soils mg/kg dry, waters mg/l).			
Date received 20/08/04		Date Reported 23/09/04	



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MAH'S AROMATIC VOLATILE ORGANICS US EPA SW846 METHODS 8021B,8260B,5030 & MGT 350A

Gamile	BUS1-A	Dup BUS1-A	BUS1-B	BUS2-A	BUS2-B	BUS3-A
					11000170	
Tab No. / Sample matrix	AU3088#Soil	AU3088D#Soil	AU3089#Soil	AU3090#Soll	AU3091#301	
		1		~0.0E	<0.05	<0.05
Dentene	<0.05	<0.0>	- cn.u>	c0.0~	00.07	00.0-
	LO O'	70.05	<01	<0.2	<0.05	<0.05
Toluene	cn'n>	20.02				
	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethyl Benzene	00.07	222				
Vidooco	<0.05	<0.05	<0.05	0.62	cn.u>	cn.u>
Ayleries						
Results in ppm (soils mg/kg dry, waters mg/l).						

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MAH'S AROMATIC VOLATILE ORGANICS US EPA SW846 METHODS 8021B,8260B,5030 & MGT 350A

Sample	BUS4-A	BUS5-A	BUS6-A	BUS6-AA	BUS6-B	BUS7-A
Tab No / Samula matrix	ALI3093#Soil	AU3094#Soil	AU3095#Soil	AU3096#Soil	AU3097#Soil	AU3098#Soil
			<0.05	<0.05	<0.05	<0.05
Benzene	cn.u2		00.07	00.0		
Tolitane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	/0.0E	<0.05	<0.05	<0.05	<0.05	<0.05
Ethyl Benzene	CD-D-	00.07	000			L 0 0
Xvlenes	<0.05	<0.05	<0.05	<0.05	<0.0>	c0.0>
Results in ppm (soils mg/kg dry, waters mg/l).						

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MAH'S AROMATIC VOLATILE ORGANICS US EPA SW846 METHODS 8021B,8260B,5030 & MGT 350A

Samnje	BUS7-AA	BUS7-B	Dup BUS7-B	BUS7-C	BUS8-A	BUS9-A
			A1134000#Coil	A113101#Snil	ALI3102#Soil	AU3103#Soil
Lab. No. / Sample matrix	AU30994201	AU3100#201				
	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
auazuad					VO OE	20.05
Telione	<pre></pre>	<0.05	<b>4</b> 0.0≻	cu.u>	50.US	00.07
		L		10.05	<0.05	<0.05
Ethvi Renzene	<0.05	<0.0>	cu.u>	c0.0>	0.07	00.0
	L	r 0 1	- 07	<0.05	<0.05	<0.05
Xvlenes	c0.0>		07	20.07		
Results in ppm (soils mg/kg dry, waters mg/l).					••	

Date received 20/08/04



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MAH'S AROMATIC VOLATILE ORGANICS US EPA SW846 METHODS 8021B,8260B,5030 & MGT 350A

	BUS10-A	BUS10-B	BUS11-A	BUS12-A	BUS12-AA	BUS 12-B
at dimpo				A119407#Scil	A113108#Snil	AU3109#Soil
rsh No / Samula matriv	AU3104#Soil	AU3105#Sol	AU3100#201	AU3 101 #301	1001001	
				20 02	<0.05	<0.05
Banzene	<0.05	c0.0>	-0.07	00.07		L
	30 OU	<0.05	<0.05	<0.05	<0.05	<0.0>
Toluene	cn.u2	00.07			L L L	
		<0.05	−0 05	<0.05	GU.U>	<u.u0< td=""></u.u0<>
Ethyl Benzene	cn.u>	00.07		1		/0 0E
	<0.05	<0.05	<0.05	c0.0>	c0.0>	0.07
Xylenes	00.0					
Results in ppm (soils mg/kg dry, waters mg/l).						

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S 8021B,8260B,5030 & MGT
IS 8021B,8260B,5030 & I
IS 8021B,8260B,5030
IS 8021B,8260B,5
S 8021B,8260
S 8021B,8:
S 8021
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	BUS13-A	BUS13-B	BUS14-A	Dup BUS14-A	BUS15-A	BUS15-B
Sample	10000					
	ALI3110#Soil	AU3111#Soil	AU3112#Soil	AU3112D#Soil	AU3113#Soil	AU3114#50I
Lab. No. / Sample many	1001011001				L	10 0E
	<0.05	<0.05	<0.05	<0.05	cu.u>	CU.U2
benzene	00.0			LQ Q		<0.05
	<0.05	<pre></pre>	<0.05	cn.u>	<0.U0	00.04
loluene	22:2			Ĺ		10.05
	<0.05	<0.05	<0.05	GU.U>	cn.u>	-u-u-
Ethyi benzene	00.0				10 0E	<0.05
Vulcanes	<0.05	<0.05	GU.U>	c0.0>	0.04	00.07
Ayieiteo						
Results in ppm (soils mg/kg dry, waters mg/l).						

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MAH'S AROMATIC VOLATILE ORGANICS US EPA SW846 METHODS 8021B,8260B,5030 & MGT 350A

				• 0701 id		
Sample	BUS16-A	BUS17-A	BUS17-B	BUS19-A	RU>∠U-A	
			1.0.17.10114	1:0040104011	A113110#Shil	A113120#Snil
Lab. No. / Sample matrix	AU3115#Soil	AU3116#Soil	AU311/#201	AU3110#301	1004011004	1004071001
	~0.0E	<0.05	<0.05	<0.05	<0.05	<0.05
Benzene	-0.	00.07			L	
Tol.coc	<0.05	<0.05	<0.05	<0.05	<0.05	c0.0>
I Olueite			Ļ		70.05	<0.05
Ethvi Ranzana	<0.05	<0.05	c0.0>	cn.u>	co.n~	00.07
		1.C. C.		20.05	<0.05	<0.05
Xvlenes	<0.05	GU.U>	CV. D>	00.07	00.0	
Results in ppm (soils mg/kg dry, waters mg/l).						

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Sample	BUS20-B	BUS21-A	BUS22-A	BUS22-B	BUS6-C	Spike % Recov
Lab. No. / Sample matrix	AU3121#Soil	AU3122#Soil	AU3123#Soil	AU3124#Soil	AU3219#Soil	AU3111S#Soil
Benzene	<0.05	<0.05	<0.05	<0.05	<0.05	88%
Toluene	<0.05	<0.05	<0.05	<0.05	<0.05	86%
Ethvi Renzene	<0.05	<0.05	<0.05	<0.05	<0.1	92%
Xvienes	<0.05	<0.05	<0.05	<0.05	0.14	%06
Results in ppm (soils mg/kg dry, waters mg/l).						

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## MAH'S AROMATIC VOLATILE ORGANICS US EPA SW846 METHODS 8021B,8260B,5030 & MGT 350A

Sample	Meth.Bl.(mg/l)	
Lab. No. / Sample matrix		
Benzene	<0.001	
	<0.001	
a nano i		
Ethyl Benzene	<0.001	
Xvlenes	<0.001	
Results in ppm (soils mg/kg dry, waters mg/l).		

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ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

	BLIS1_A	Dinp BUS1-A	BUS1-B	BUS2-A	BUS2-B	BUS3-A
Sample			A112000#Coil	ALI3090#Soil	AU3091#Soil	AU3092#Soil
Lab. No. / Sample matrix	AU3088#Soil		HOGHEODEDH		100	20.05
	<0.05	<0.05	<0.05	<0.05	CU.U>	cp.0~
Aldrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-BHC	0.00	20.0F	<0.05	<0.05	<0.05	<0.05
beta-BHC	cn.u>		-0.05 -0.05	<0.05	<0.05	<0.05
delta-BHC	<0.05	cn.u>	-0.02	0.00	/0 DF	<0.05
l indane	<0.05	<0.05	<0.05	cn.u>	0.07	20.0
	<01	<0.1	<0.1	<0.1	<0.1	1.0>
Cnloraane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4'-DDD			<0.05	<0.05	<0.05	<0.05
4,4'-DDE	<b>c</b> ∩.0>	cn.n>	20.07	200	~0.05	<0.05
	<0.05	<0.05	<0.U5	67.N	00.07	
	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	-0.0 <u>-</u>	20.0		70.0F	<0.05	<0.05
Endosulfan I	<0.05	¢0.0>	cn.u>	CO.O/	0.00	
Codecutan II	<0.05	<0.05	<0.05	<0.05	cn.u>	c0.0>
	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosultan Sulphate	0.0	10.05	<0.05	<0.05	<0.05	<0.05
Endrin	cn.u>	00.02	0.0		70.05	<0.05
Endrin Aldehyde	<0.05	<0.05	<b>c</b> 0.0>	cn.v>	0.07	
	<0.05	<0.05	<0.05	<0.05	<0.05	c0.0>
Endrin Ketone						
Results in ppm (soils mg/kg dry, waters mg/l). Extracti	on MGT 300A soils, U	SEPA 3510 waters.				

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ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

	RUS4-A	BUS5-A	BUS6-A	BUS6-AA	BUS6-B	BUS7-A
	A113093#Soil	AU3094#Soil	AU3095#Soil	AU3096#Soil	AU3097#Soil	AU3098#Soil
Lab. No. / Sample maury	1000	C 07	<0.05	<0.05	<0.05	<0.2
Aldrin	c0.0>	\$U.2	00.07	20.0		c 0/
alnha-BHC	<0.05	<0.2	<0.05	<b>c</b> 0.0>	cn.u>	Z.U^
keta-RHC	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
ucida-pri to	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
	<01	<0.5	<0.1	<0.1	<0.1	<0.5
	<0.05 <0.05	<0.2	<0.05	<0.05	<0.05	<0.2
4,4-UUU			20.05	<0.05	<0.05	<0.2
4,4'-DDE	c0.0>	5U.2	0.07			
4 4'-DDT	<0.05	<0.2	<0.05	<0.05	cn.u>	\$0.2
	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
	70 0E	<0.2	<0.05	<0.05	<0.05	<0.2
Endosultan I	0.00		/0.0E	<0.05	<0.05	<0.2
Endosulfan II .	¢0.0>	<0.2			20 OF	<ul><li>0.0</li></ul>
Endosulfan Sulphate	<0.05	<0.2	<0.05	cu.u>	cn.u>	2.0.
	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
	<0.05	<0.2	<0.05	<0.05	<0.05	<0.2
Englin Aluenyae			70.05	<0.05	<0.05	<0.2
Endrin Ketone	¢0.0>	\$U.2	0.07	0.0		
Results in ppm (soils mg/kg dry, waters mg/l). Extract	tion MGT 300A soils, U	SEPA 3510 waters.				

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AU3103#Soil <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 0.07 °0.1 BUS9-A AU3102#Soil <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 BUS8-A ≤0.1 AU3101#Soil <u>0</u>.1 <0.2 ç. V °. . 0 ₽ . • <u>0</u> ç. Ş °. °. BUS7-C ç. ₽ <u>6</u> \$0.1 0 <u>6</u>0.1 \$0.1 0.1 °. ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A. AU3100D#Soil Dup BUS7-B <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.1 Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters. AU3100#Soil <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.05 <0.1 BUS7-B AU3099#Soil BUS7-AA <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.5 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 < <0.2 <0.2 <0.2 / Sample matrix Endosulfan Sulphate Endrin Aldehyde Endrin Ketone Endosulfan II Endosulfan alpha-BHC Chlordane delta-BHC beta-BHC Lab. No. 4,4'-DDD 4.4'-DDE 4,4'-DDT Lindane Dieldrin Endrin Sample Aldrin

Date received 20/08/04

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ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

Sample	BUS10-A	BUS10-B	BUS11-A	BUS12-A	BUS12-AA	BUS12-B
Lab. No. / Sample matrix	AU3104#Soil	AU3105#Soil	AU3106#Soil	AU3107#Soil	AU3108#Soil	AU3109#Soil
Aldrin	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
ainha-RHC	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
aprocesso heta-RHC	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
	<0.05	<0.1	<0.05	<0.1	<0.05`	<0.05
define de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la companya de la company	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
Chlordane	<0.1	<0.2	<0.1	<0.2	<0.1	<0.1
4 4'-DDD	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
4 4'-DDE	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
4.'DDT	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
Codon (for f	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
Elidosullari II Fastantisa Sulahata	<0.05 <0.05	<0.1	<0.05	<0.1	<0.05	<0.05
Eridosuliari Suipriare	<0.05 <0.05	<0.1	<0.05	<0.1	<0.05	<0.05
Endrin Aldohudo	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
Endrin Autone	<0.05	<0.1	<0.05	<0.1	<0.05	<0.05
Results in ppm (soils mg/kg dry, waters mg/l). Extract	iion MGT 300A soils, U	SEPA 3510 waters.				÷

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**ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.** 

Sample	BUS13-A	BUS13-B	BUS14-A	Dup BUS14-A	BUS15-A	BUS15-B
Tab. No. / Sample matrix	AU3110#Soil	AU3111#Soil	AU3112#Soil	AU3112D#Soil	AU3113#Soil	AU3114#Soil
	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Autili Juba BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
l indane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordana	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
4,4-005 4 A-DDF	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Tightin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulian II r	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Enunn Fradria Machindo	<ul><li>0.05</li></ul>	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Aueriyae Endrin Kotone	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Results in ppm (soils mg/kg dry, waters mg/l). Extracti	on MGT 300A soils, U	SEPA 3510 waters.				

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ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

Sample	BUS16-A	BUS17-A	BUS17-B	BUS19-A	BUS20-A	BUS20-AA
Lab. No. / Sample matrix	AU3115#Soil	AU3116#Soil	AU3117#Soil	AU3118#Soil	AU3119#Soil	AU3120#Soil
Aldrin	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-BHC	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
Lindane	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
Chlordane	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1
4,4'-DDD	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
4,4'-DDE	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
4.4'-DDT	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan I	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan II	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan Sulphate	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Aldehyde	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
Endrin Ketone	<0.2	<0.05	<0.05	<0.05	<0.05	<0.05
Results in ppm (soils mg/kg dry, waters mg/l). Extracti	tion MGT 300A soils, U	SEPA 3510 waters.				

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ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

Sample	BUS20-B	BUS21-A	BUS22-A	BUS22-B	BUS6-C	Spike % Recov
Lab. No. / Sample matrix	AU3121#Soil	AU3122#Soil	AU3123#Soil	AU3124#Soil	AU3219#Soil	AU3124S#Soil
Aldrin	<0.05	<0.05	<0.05	<0.05	<0.05	111%
aloha-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	84%
heta-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	79%
delta-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	91%
Lindane	<0.05	<0.05	<0.05	<0.05	<0.05	85%
Chlordane	<0.1	<0.1	<0.1	<0.1	<0.1	I
44'-DDD	<0.05	<0.05	<0.05	<0.05	<0.05	81%
4.4'-DDE	<0.05	<0.05	<0.05	<0.05	<0.05	111%
4.4'-DDT	<0.05	<0.05	<0.05	<0.05	<0.05	88%
Dieldrin	<0.05	<0.05	<0.05	<0.05	<0.05	89%
Endosulfan I	<0.05	<0.05	<0.05	<0.05	<0.05	-
Endosulfan II	<0.05	<0.05	<0.05	<0.05	<0.05	108%
Endosulfan Sulphate	<0.05	<0.05	<0.05	<0.05	<0.05	122%
Fndrin	<0.05	<0.05	<0.05	<0.05	<0.05	119%
Endrin Aldehvde	<0.05	<0.05	<0.05	<0.05	<0.05	97%
Endrin Ketone	<0.05	<0.05	<0.05	<0.05	<0.05	1
Results in ppm (soils mg/kg dry, waters mg/l). Extract	tion MGT 300A soils, U	SEPA 3510 waters.				

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ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

	•	
Sample	Meth.Bl. (mg/l)	
t the Mo / Samula matrix		
	<0.005	
Aldrin	~0.005	
alpha-BHC	CUU.U~	
beta-BHC	<0.005	
delta-BHC	<0.005	
l indane	<0.005	
Chlordane	<0.01	
	<0.005	
4-1-1-0 1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	<0.005	
4,4'-DUE	000.07	
4,4'-DDT	<0.005	
Dieldrin	<0.005	
radocutton	<0.005	
	<0.005	
Endosuitan II		
Endosulfan Sulphate	c00.0>	
Endrin	<0.005	
Endrin Aldehvde	<0.005	
Fndrin Ketone	<0.005	
Results in ppm (soils mg/kg dry, waters mg/l). Extraction	r on MGT 300A soils, US	SEPA 3510 waters.

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ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

						BIIC3.A
	RIS1-A	Dup BUS1-A	BUS1-B	BUS2-A	a-260a	
Sample			1:00000114	ALIZOOD#Coil	A113091#Soil	AU3092#Soil
	AU3088#Soil	AU3088D#Soll	AUSU88#SUI	HOUGO HOUGO		
Lab. No. / Sample maulx			10 0E	<0.05	<0.05	<0.05
1 Leatachtor	<0.05	cn.u>	cn.n<	00.0		LC C
Heptaction			<0.05	<0.05	<0.05	c0.0>
	<b>c</b> 0.0≻	20.02	00.07			
			-0 05	<0.05	<0.05	cn.u>
11	<pre>&lt;0.05</pre>	cn.u>	-004	2012		100
Hexaci liui uueli zeli e		10.0	20.05	<0.05	<0.05	cn.u>
Noth control or	<0.05	cn'n>	20.04			
Metrioxycriioi	,	t C'	<01	<0.1	<0.1	<0.1
Tawanbana	<0.1	su. I	07			
Results in nnm (soils ma/kg dry, waters mg/l). Extract	tion MG1 300A soils, V	JOEFA 33 10 Wales.				

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ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

					RIIS6-B	BUS7-A
	DISA_A	BUS5-A	BUS6-A		acce 1	
Sample						A113098#Soil
	1:-01100001.4	ALIZOOA#Coil	AU3095#Soil	AU3096#Soll	HUSUS/#301	
· · · · · · · · · · · · · · · · · · ·	BOO#SPOSOA					<0.0
		C U/	<0.05	<0.05	cu.u>	7.07
llostochlor	GU.U>	2.0<		L		<0.2
	L C C	C 07	<0.05	<u>c0.0&gt;</u>	20.02	
	c0.0>	2.0.4				<02
Heptachior epuxiue			<0.05	<0.05	cn.u>	10.4
	<0.0>	<0.2	00.07			C 0/
Hexachioropenzene		ç	-0 0E	<0.05	c0.0>	20.2
	<0.05	<0.2	0.07			NO E
Methoxychior		Ĺ	101	<0.1	<0.1	20.0
	40.1	C.U>				
I oxaphene						
		ICEDA 3510 Waters				
Desults in num (soils mo/kg drv, waters mg/l). Extract	tion MG1 300A solis, L					

5 Kesults in ppin (solis manya u ),

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ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

Samole	BUS7-AA	BUS7-B	Dup BUS7-B	BUS7-C	BUS8-A	BUS9-A
	1:-0:0000114	A110400400it	ALI21000#Coil	A113101#Soil	ALI3102#Soil	AU3103#Soil
Lab. No. / Sample matrix	AU3080#2001	AU3100#201	100#0001004	1001000		
- Lot-oblor	<0.2	<0.05	<0.05	<0.1	<0.05	<0.05
Heplaciiu	1		1	T C	10.01	<0.05
Lantachlar anavida	<0.2	<0.05	c0.0>	<u.1< td=""><td>50.02</td><td>0.07</td></u.1<>	50.02	0.07
			r (	Ţ		
Havachlorohenzene	<0.2	<0.05	cu.u>	<u.1< td=""><td>50°0/</td><td>00.07</td></u.1<>	50°0/	00.07
		/0.0K	<0.05	<0.1	<0.05	<0.05
Methoxychlor	<ul> <li>&gt; 0.2</li> </ul>	0.07	0.0			, C
Tovonhowo	<0.5	<0.1	<0.1	<0.2	<0.1	<0.1
i oxaprierie	2.2					
Results in ppm (soils mg/kg dry, waters mg/l). Extractic	on MGT 300A soils, U	SEPA 3510 waters.				

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ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

			DI 1011 A	BUS12-A	BUS12-AA	BUS12-B	
	BUS10-A	BUS10-B					
Sample			A113106#Soil	AU3107#Soil	AU3108#Soil	AU3109#Soil	
- · ·· · · · · · · · · · · · · · · · ·	AU3104#Soil	NO2#COLEOP	100-100V			20.05	
Lab. No. / Sample mauly		F 01	<0.05	€0.1	GU.U>	00.07	
Lontachlor	GU.U>	07		Ţ	20.02	<0.05	
Heplaninu	30.01	<01	<0.05	<u. i<="" td=""><td>00.07</td><td></td><td></td></u.>	00.07		
Hantachlor anoxide	cn.u>			T C	<0.05	<0.05	
		<01	€0.05	<u. td=""  <=""><td>00.07</td><td></td><td></td></u.>	00.07		
Heyachlorobenzene	c0.0×		LOO	F 0/	<0.05	<0.05	
	<0.05	<0.1	<0.U>			T ()	-
Methoxychlor	00.07		Ť Ċ,	<0.2	<u>6.1</u>	<0.1	
	, ,	<0.2	0~	4.57			
Toxaphene	- 0/						
Fxtracti	tion MGT 300A soils, L	JSEPA 3510 Waters.					

Results in ppm (soils mg/kg dry, waters mg/l). Ex

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**ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.** 

Sample	BUS13-A	BUS13-B	BUS14-A	Dup BUS14-A	BUS15-A	BUS15-B
Lab. No. / Sample matrix	AU3110#Soil	AU3111#Soil	AU3112#Soil	AU3112D#Soil	AU3113#Soil	AU3114#Soil
Heptachlor	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Toxaphene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Results in ppm (soils mg/kg dry, waters mg/l). Extracti	on MGT 300A soils, L	JSEPA 3510 waters.				

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ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

			0 100110	RUS19-A	BUS20-A	BUS20-AA	
	BUS16-A	BUS17-A					
Sample			A112447#Coil	A113118#Soil	AU3119#Soil	AU3120#Soil	
	AU3115#Soil	AU3116#501					
Lab. No. / Sample Induix		LO OF	<0.05	<0.05	<0.05	c0.0>	-
1 Lootachior	<0.2	50°.02				<0.05	-
	c c	20.02	<0.05	<0.0>	50.02	00.01	
	<0.2	20.02				10.05	
			<0.05	<0.05	cn.u>	00.04	
11	<0.2	c0.0>	22.27			<0.05	
Hexactilion oner iterie			<0.05	<0.0>	cn.u>	00.07	
Methowychlor	<0.2	cn.0×	000		۲ ر ا	<0.1	
INIGUTOAY OF THOS	Ĺ	t c \	C V	-0.1	-0-		-
Tevonhana	C.U>						-
1 OXAPITETE							
		ICLDA 2510 Waters					-
Extraction and the multiplication of the matters ma/l). Extract	ction MG1 300A solls, 1	UDELA UDIO MAICIS.					

5 Results in ppm (soils mg/kg ury, wa

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Site : FRANKLIN ST 40032004.00

**ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.** 

Sample	BUS20-B	BUS21-A	BUS22-A	BUS22-B	BUS6-C	Spike % Recov
Lab. No. / Sample matrix	AU3121#Soil	AU3122#Soil	AU3123#Soil	AU3124#Soil	AU3219#Soil	AU3124S#Soil
Hentechlor	<0.05	<0.05	<0.05	<0.05	<0.05	84%
Hentachlor enoxide	<0.05	<0.05	<0.05	<0.05	<0.05	123%
Heverhordhenzene	<0.05	<0.05	<0.05	<0.05	<0.05	E
Mathowichlor	<0.05	<0.05	<0.05	<0.05	<0.05	E
Metroxycrinor Tovanhana	<0.1	<0.1	<0.1	<0.1	<0.05	Ľ
Results in ppm (soils mg/kg dry, waters mg/l). Extraction	on MGT 300A soils, U	SEPA 3510 waters.				

Date received 20/08/04



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ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

Sample	Meth.Bl.(mg/l)	
Lab. No. / Sample matrix		
Heptachlor	<0.005	
Heptachlor epoxide	<0.005	
Hexachlorobenzene	<0.005	
Methoxychlor	<0.005	
Toxaphene	<0.01	
Results in ppm (soils mg/kg dry, waters mg/l). Extractio	on MGT 300A soils, US	EPA 3510 waters.

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mgt

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& 8270C(GC/MS).	
D 8310(HPLC)	
W846 METHOI	
NS US EPA S	
ATIC HYDROCARBOI	
<b>/NUCLEAR AROM</b>	
POL	

Sample	BUS1-A	Dup BUS1-A	BUS1-B	BUS2-A	BUS2-B	BUS3-A
Lah No. / Samula matrix	AU3088#Soil	AU3088D#Soil	AU3089#Soil	AU3090#Soil	AU3091#Soil	AU3092#Soil
	<0.1	<0.1	<0.1	<0.1	<0.1	0.19
Naphunalene	1.0	<01	<0.1	<0.1	<0.1	<0.1
Acenaphinyiene				4 U A	<0.1	0.35
Acenaphthene	<0.1	<0.1	<0.1	-0-		
Fluorene	<0.1	<0.1	<0.1	<0.1	<0.1	0.28
Phenanthrene	<0.1	<0.1	<0.1	0.15	<0.1	2.0
Anthracene	<0.1	<0.1	<0.1	<0.1	<0.1	0.44
Fluoranthrene	<0.1	<0.1	<0.1	0.38	<0.1	1.6
Pyrana	<01	<0.1	<0.1	0.35	<0.1	1.4
l yruco Bontofalanthracana	<0.1	<0.1	<0.1	0.19	<0.1	0.71
	<0.1	<0.1	<0.1	0.21	<0.1	0.71
			1 0 2	0.26	<0.1	0.72
Benzo(b)fluoranthene	~0. I			0.10		LC O
Benzo(k)fluoranthene	<0.1	<0.1	<0.1	0.16	<0.1	0.37
Benzo(a)pyrene	<0.1	<0.1	<0.1	0.32	<0.1	0./5
Dibenzo(a, h)anthracene	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	<0.1	<0.1	<0.1	<0.1	<0.1	0.54
Indeno(1.2.3-cd)pvrene	<0.1	<0.1	<0.1	<0.1	<0.1	0.46
Total PAH's	<2	4	2	2.1	<2 .	11
Results in ppm (soils mg/kg dry, waters mg/l). Extract	tion MGT 300A soils, U	SEPA 3510 waters.				

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mgt

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Sample	BUS4-A	BUS5-A	BUS6-A	BUS6-AA	BUS6-B	BUS7-A
Lab. No. / Sample matrix	AU3093#Soil	AU3094#Soil	AU3095#Soil	AU3096#Soil	AU3097#Soil	AU3098#Soil
Nanhthalene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Acenanthylene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Acenaphthene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Flintene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Phenanthrene	<0.1	<0.5	<0.1	<0.1	<0.1	<0.2
Anthracene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Fluoranthrene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Pvrene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Renzo(a)anthracene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Chrysene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Renzo(h)filioranthene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Benzo(k)filioranthene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Dibenzo(a, h)anthracene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Benzo(a,h,i)pervlene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Indeno(1.2.3-cd)pvrene	<0.1	<0.2	<0.1	<0.1	<0.1	<0.2
Total PAH's	<2	\$	<2	7	42	<2
Results in ppm (soils mg/kg dry, waters mg/l). Extract	ion MGT 300A soils, U	SEPA 3510 waters.				

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POLYNUCLEAR AROMATIC HYDROCARBONS US EPA SW846 METHOD 8310(HPLC) & 8270C(GC/MS).

BUS7-AA	BUS7-B	Dup BUS7-B	BUS7-C	BUS8-A	BUS9-A
AU3099#Soil	AU3100#Soil	AU3100D#Soil	AU3101#Soil	AU3102#Soil	AU3103#Soil
<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
<0.2	<0.1	<0.1	<0.1	<0.1	0.24
<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
<0.2	<0.1	<0.1	<0.1	<0.1	0.73
<0.2	<0.1	<0.1	<0.1	<0.1	0.86
<0.2	<0.1	<0.1	<0.1	<0.1	0.47
<0.2	<0.1	<0.1	<0.1	<0.1	0.47
<0.2	<0.1	<0.1	<0.1	<0.1	0.57
<0.2	<0.1	<0.1	<0.1	<0.1	0.32
<0.2	<0.1	<0.1	<0.1	<0.1	0.66
<0.2	<0.1	<0.1	<0.1	<0.1	<0.1
<0.2	<0.1	<0.1	<0.1	<0.1	0.29
<0.2	<0.1	<0.1	<0.1	<0.1	0.21
<2	<2	<2	<2	<2	5.0
t on MGT 300A soils, U	I ISEPA 3510 waters.				
	BUS7-AA AU3099#Soil <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2 <0.2  <0.2 <0.2 <0.2 <0.2  <0.2  <0.2       <td>BUS7-AA     BUS7-B       AU3099#Soil     AU3100#Soil       &lt;0.2</td> <0.1	BUS7-AA     BUS7-B       AU3099#Soil     AU3100#Soil       <0.2	BUS7-AA         BUS7-B         Dup BUS7-B           AU3099#Soil         AU31000#Soil         AU31000#Soil           AU3099#Soil         AU31000#Soil         AU31000#Soil           <0.2	BUS7-AA         BUS7-B         Dup BUS7-B         BUS7-C           AU3009#Soil         AU3100#Soil         AU3100#Soil         AU3101#Soil           AU3009#Soil         AU3100#Soil         AU3101#Soil         AU3101#Soil           <0.2	BUS7-AA         BUS7-B         Dup BUS7-B         BUS7-C         BUS8-C           AU30099#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3102#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil
BUS7-AA         BUS7-B         Dup BUS7-B         BUS7-C           AU3009#Soil         AU3100#Soil         AU3100#Soil         AU3101#Soil           AU3009#Soil         AU3100#Soil         AU3101#Soil         AU3101#Soil           <0.2	BUS7-AA         BUS7-B         Dup BUS7-B         BUS7-C         BUS8-C           AU30099#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3102#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil         AU3100#Soil				

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POLYNUCLEAR AROMATIC HYDROCARBONS US EPA SW846 METHOD 8310(HPLC) & 8270C(GC/MS).

sam.1e	BUS10-A	BUS10-B	BUS11-A	BUS12-A	BUS12-AA	BUS12-B
Jaury 14	A112404400il	ALI3105#Snil	AU3106#Soil	AU3107#Soil	AU3108#Soil	AU3109#Soil
Lab. No. / Sample matrix	100-10-004			<0.2	<0.2	<0.1
Naphthalene	<0.1	<0.1	-0.1	7.07		- C/
Acenanhthviene	<0.1	<0.1	<0.1	<0.2	<0.2	
	<0.1	<0.1	<0.1	<0.2	<0.2	<0.1
Acenaprimene		<01	<0.1	<0.2	<0.2	<0.1
Fluorene			<0.1	<0.2	<0.2	<0.1
Phenanthrene	-0.1 ,				C 01	<0.1
Anthracene	<0.1	<0.1	<0.1	<0.2	2.02	
Choranthrana	<0.1	<0.1	0.11	<0.2	<0.2	<0.1
	<0.1	<0.1	0.11	<0.2	<0.2	<0.1
ryrene		F 01	<0.1	<0.2	<0.2	<0.1
Benzo(a)anthracene	×0.1					
Chrysene	<0.1	<0.1	<0.1	<0.2	<0.2	
Donzo(h)fluoranthene	<0.1	<0.1	<0.1	<0.2	<0.2	<0.1
	- 0 -	<0.1	<0.1	<0.2	<0.2	<0.1
Benzo(k)tluorantnene			T C	<0.0	<0.2	<0.1
Benzo(a)pyrene	<0.1	<0.1		7.0, 7.0,		<0.1
Dihenzo(a.h)anthracene	6.1	<0.1	<0.1	<0.2	\$U.2	
Donto(a h i)nen/lene	<0.1	<0.1	<0.1	<0.2	<0.2	<0.1
	- C \	102	<01	<0.2	<0.2	<0.1
Indeno(1,2,3-cd)pyrene				ç	51	Ŷ
Total PAH's	2	-2	7>	75	75	
Results in ppm (soils mg/kg dry, waters mg/l). Extract	tion MGT 300A solls, L	SEPA 3510 Waters.				

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POLYNUCLEAR AROMATIC HYDROCARBONS US EPA SW846 METHOD 8310(HPLC) & 8270C(GC/MS).

					BUS15-A	BUS15-B
Sample	BUS13-A	BUS13-B	BUS14-A			
	ALI2110#Soil	A113111#Soil	AU3112#Soil	AU3112D#Soil	AU3113#Soil	AU3114#Soil
Lab. No. / Sample matrix		101	<01	<0.1	<0.1	<0.1
Naphthalene	<0.1			<0.1	<0.1	<0.1
Acenaphthylene	<0.1	<0.1			+ U/	<0.1
Acanaphthene	<0.1	<0.1	<0.1	-0.1		
Tourana Fluorana	<0.1	<0.1	<0.1	<0.1	<0.1	
	<0.1	<0.1	<0.1	<0.1	<u.1< td=""><td>-0.1</td></u.1<>	-0.1
Pheliainuiceite	<0.1	<0.1	<0.1	<0.1	<0.1	
Anthracene		<0.1	<0.1	<0.1	0.15	<0.1
Fluoranthrene	0. I4			<01	0.15	<0.1
Pvrene	0.15	<0.1			+ 0 \	<0.1
Douzo(a)anthracana	<0.1	<0.1	<0.1	<u.1< td=""><td></td><td>· · ·</td></u.1<>		· · ·
DELIZU(a)altilitacorio	* 0/	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	1.02			<0.1	<0.1	<0.1
Benzo(b)fluoranthene	<0.1	<0.1	-0-		<0.1	<0.1
Renzo(k)filioranthene	<0.1	<0.1	<0.1	-0.1		t c l
	<0.1	<0.1	<0.1	<0.1	<0.1	0/
Benzu(a)pyrerie	<01	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene		+ C/	< U 1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	<0.1			107	<0.1	<0.1
Indeno(1,2,3-cd)pyrene	<0.1	<0.1	-0.		د> د	<2
Total PAH's	<2	<2	7>	75		
Results in ppm (soils mg/kg dry, waters mg/l). Extra	iction MGT 300A soils, L	JSEPA 3510 waters.				

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Sample	BUS16-A	BUS17-A	BUS17-B	BUS19-A	BUS20-A	BUS20-AA
Lab. No. / Sample matrix	AU3115#Soil	AU3116#Soil	AU3117#Soil	AU3118#Soil	AU3119#Soil	AU3120#Soil
Nanhthalene	0.46	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	0.38	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	0.82	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	0.61	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	9.9	<0.1	<0.1	<0.1	0.10	0.13
Anthracene	2.2	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthrene	16	0.17	<0.1	<0.1	0.18	0.40
Pvrene	17	0.20	<0.1	<0.1	0.21	0.41
Renzo(a)anthracene		0.18	<0.1	<0.1	0.12	0.21
Chrysene	8.7	0.15	<0.1	<0.1	0.15	0.26
Benzo(h)fluoranthene		0.18	<0.1	<0.1	0.16	0.40
Banzo(b)filioranthana	7.9	0.12	<0.1	<0.1	0.12	0.18
Derico(A)havianano Renzo(a)hvrene	12	0.16	<0.1	<0.1	0.19	0.36
Duhanzo(a,p)romo	2.0	<0.1	<0.1	<0.1	<0.1	<0.1
Donzola h ihamilana	66	<0.1	<0.1	<0.1	<0.1	0.20
	5	<0.1	<0.1	<0.1	<0.1	0.19
Indeno(1,2,3-cu)pyrene	2		ç	ç	۲ د /	78
Total PAH's	110	~7	~	~~	~	D.Y
Results in ppm (soils mg/kg dry, waters mg/l). Extract	tion MGT 300A soils, I	JSEPA 3510 waters.				

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Site : FRANKLIN ST 40032004.00

POLYNUCLEAR AROMATIC HYDROCARBONS US EPA SW846 METHOD 8310(HPLC) & 8270C(GC/MS).

Gamale	BUS20-B	BUS21-A	BUS22-A	BUS22-B	BUS6-C	Spike % Recov
	A113404#Soil	ALI3122#Soil	AU3123#Soil	AU3124#Soil	AU3219#Soil	AU3111S#Soil
Lab. No. / Sample matrix	1001 7 1000		101	<0.1	<0.1	108%
Naphthalene	<0.1	<0.1		- · ·		98%
Acenaphthylene	<0.1	<0.1	<0.1	<0.1		2007
	<0.1	<0.1	<0.1	<0.1	<0.1	108%
Acertaptiuterie	<01	<0.1	<0.1	<0.1	<0.1	100%
Fluorene		010	<0.1	<0.1	<0.1	93%
Phenanthrene	<0.1 20.1	5.0	<0.1	<0.1	<0.1	%06
Anthracene	<0.1	- 0, 0		107	<0.1	94%
Fluoranthrene	<0.1	0.49	<0.1			07%
Dvrena	<0.1	0.52	<0.1	<0.1	<0.1	31.70
	<0.1	0.30	<0.1	<0.1	<0.1	94%
Benzo(a)antnracene	į,	20.0	- 07	<0.1	<0.1	94%
Chrysene	<0.1	10.0			- C \	107%
Renzo(h)fluoranthene	<0.1	0.35	<0.1	-0.1		
Douto(V)manumente Douto(V)finerothana	<0.1	0.23	<0.1	<0.1	<0.1	101%
Benzu(K)IIUUIai IUI Elite	<0.1	0.30	<0.1	<0.1	<0.1	97%
Benzo(a)pyrene			<0.1	<0.1	<0.1	94%
Dibenzo(a,h)anthracene	<ul> <li>- 1</li> </ul>		- <del>-</del>	- C/	<0.1	91%
Benzo(a,h,i)perylene	<0.1	91.0	1.02			0.40/
Indeno(1,2,3-cd)pvrene	<0.1	0.14	<0.1	<0.1	l.'n>	34 /0
Total PAH's	<2	3.0	₽	<2	<2	1
Results in ppm (soils ma/kg dry, waters mg/l). Extrac	tion MGT 300A soils, L	JSEPA 3510 waters.				

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POLYNUCLEAR AROMATIC HYDROCARBONS US EPA SW846 METHOD 8310(HPLC) & 8270C(GC/MS).

6 am 1 a	Spike % Recov	Meth.Bl. (mg/l)	
a t dimpo	ALI2124S#Soil		
Lab. No. / Sample matrix			
Naphthalene	114%	100.0X	
Acenanhthylene	102%		
According to the second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second second	110%	<0.001	
	104%	<0.001	
riuolerie	115%	<0.001	
Phenanthrene	86%	<0.001	
Anthracene	104%	<0.001	
Fluoranthrene	10101		
Pvrene	104%		
n justice and the second second second second second second second second second second second second second se	92%	<0.001	
Benzu(a)ai minacente	82%	<0.001	
Chrysene			
Benzo(b)fluoranthene	108%		
Renzo(k)filioranthene	96%	<0.001	
	%66	<0.001	
Belizu(a/pyrenc	86%	<0.001	
Ulbenzo(a,n)ariunacene	%66	<0.001	
Benzo(g,h,i)perylene	2000		
Indeno(1,2,3-cd)pyrene	83%		
Total PAH's	-	<pre><n.uz< pre=""></n.uz<></pre>	
Besults in nom (soils ma/kg dry, waters mg/l). Extrac	tion MGT 300A soils, (	JSEPA 3510 waters.	

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POLYCHLORINATED BIPHENYLS (PCB's) US EPA SW846 METHOD 8082.

					RIIS7_R	BUS3-A
	BUS1-A	Dup BUS1-A	BUS1-B	A-26Ua	0-7000	
Sampte			AI 13080#Soil	AU3090#Soil	AU3091#Soil	AU3092#Soil
Lab. No. / Sample matrix	AU3088#501	HUSUPPHUS		101	<0.1	<0.1
·	<0.1	€0.1	<0.1			
Arochiof-1016		<01	<0.1	€0.1	<0.1	<0.1
Arochlor-1221	×0. I			4 0/	<0.1	<0.1
	<0.1	<0.1	<ul> <li>- N</li> </ul>			
Arochlor-1232		Ţ	107	<01	<0.1	<0.1
Arachlar-1242	<0.1	<0.1				107
	7 C/	<0.1	<0.1	<0.1	<0.1	0.7
Arochlor-1248	1.02		Ţ	<01	<0.1	<0.1
Arochler 1064	<0.1	<0.1				F 0 V
		<0.1	<0.1	<0.1	<0.1	07
Arochlor-1260			<b>T</b>		V	۲ ۲
	2	<1	21	-		
10(di r.c.o.s						
Results in ppm (soils mg/kg dry, waters mg/l). Extracti	ion MGT 300A soils, U	SEPA 3510 waters.				

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POLYCHLORINATED BIPHENYLS (PCB's) US EPA SW846 METHOD 8082.

					BLIS6-B	BUS7-A
Gemrle	BUS4-A	BUS5-A	BUS6-A			
อาภัพชอ		1:-0#10001.0	ALIZODE#Soil	ALI3096#Soil	AU3097#Soil	AU3098#Soil
Lab. No. / Sample matrix	AU3093#Soil	AU3084#501	IDD HORDODA			C ()
	101	<0.2	<0.1	<0.1	<0.1	\$U.Z
Arochlor-1016	0~	2.5		۲ م ۱	<0.1	<0.2
	<01	<0.2	<0.1			
Arochiof-1221		c ç,	101	<01	<0.1	<0.2
Arnchlnr-1232	<0.1	50.2	07		Ţ	c 0/
	- C \	<0.2	<0.1	<0.1	<0.1	2.0~
Arochlor-1242	-0.	4.07		T OY	<0.1	<0.2
	<0.1	<0.2	<0.1	-0.1		
Arochior-1246		, ,	+ c/	<0 1	<0.1	<0.2
Arochlor-1254	<0.1	50.Z	07		Ţ.	< 0.7
	F 0 \	<0.2	<ul> <li>-0.1</li> </ul>	<0.1	<u.1< td=""><td>1.07</td></u.1<>	1.07
Arochlor-1260	07		,	Ţ	<1 1	<2
	V	<2	</td <td>- /</td> <td></td> <td></td>	- /		
10(a) FOD S						
Results in ppm (soils mg/kg dry, waters mg/l). Extracti	ion MGT 300A soils, U	SEPA 3510 waters.				

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POLYCHLORINATED BIPHENYLS (PCB's) US EPA SW846 METHOD 8082.

						RUS9-A
•	BUS7-AA	BUS7-B	Dup BUS7-B	PUS/-L		
Sample		ALID400#Coil	ALI3100D#Soil	AU3101#Soil	AU3102#Soil	AU3103#Soil
Lab. No. / Sample matrix	AU3099#Soll	AU3100#301		<0.2	<0.1	<0.1
Arachlar-1016	<0.2	<0.1	-0.1		t CV	<0.1
		<01	<0.1	<0.2	-0.1	
Arochlor-1221	20.2		+ 01	<0.2	<0.1	<0.1
	<0.2	<0.1	-0.1	1.07		T ()
Arochlor-1232		7 C \	<0.1	<0.2	<0.1	<0.1
Arnchlor-1242	<0.2	-0.1		Q	101	<0.1
	C 01	<01	€.0	2.0>	-0.1	
Arochlor-1248	×0.2			<0.2	<0.1	<0.1
Arochlor-1954	<0.2	<0.1	0/		Ţ	107
		<0.1	<0.1	<0.2	- <0.1	07
Arochlor-1260	70.7			Ş	۲.	۸ <u>۲</u>
	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	<1	1~	7		
101al PUDS						
Results in ppm (soils mg/kg dry, waters mg/l). Extractit	ion MGT 300A soils, U	SEPA 3510 waters.				

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POLYCHLORINATED BIPHENYLS (PCB's) US EPA SW846 METHOD 8082.

		DI ICAO R	RIIS11-A	BUS12-A	BUS12-AA	BUS12-B
Sample	BUS 10-A				. 0.000	A112400460il
	0113104#Snil	AU3105#Soil	AU3106#Soil	AU3107#Soil	AU3108#Soil	AU3109#501
Lab. No. / Sample maurx			F 0/	<0.2	<0.1	<0.1
Arochlor-1016	<0.1	×U.Z	01			۲ د /
	<0.1	<0.2	£.0	<0.2	· <u. 1<="" td=""><td>07</td></u.>	07
Arochlor-1221			t cr	<0.2	<0.1	<0.1
Arochlor.1232	<0.1	<0.2	50.1	4.07		
AI UCITICI = 1232	Ţ	C 07	1	<0.2	≤0.1	<0.1
Arochlor-1242	<0.1	-0.2	•		Ţ	<0.1
	<0.1	<0.2	<0.1	<0.2	su. 1	
Arochlor-1248			F O V	<0.2	<0.1	<0.1
Arochlor-1254	<0.1	<0.2	5/	1.5		F C
	۲ ر <i>۲</i>	<0.0		<0.2	<0.1	0/
Arochlor-1260	07			ر ۱	۲ ۲	V
	v	₽	l>	7	-	
I Utal rups						
		ICTDA 2510 watere				
Results in ppm (soils mg/kg dry, waters mg/l). Extracti	100 MG1 200A SOIIS, L	DELA COTO MARENS.				

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POLYCHLORINATED BIPHENYLS (PCB's) US EPA SW846 METHOD 8082.

Sample	BUS13-A	BUS13-B	BUS14-A	Dup BUS14-A	BUS15-A	BUS15-B
tab. No. / Sample matrix	AU3110#Soil	AU3111#Soil	AU3112#Soil	AU3112D#Soil	AU3113#Soil	AU3114#Soil
	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor-1001	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Arochior 1232	<01	<0.1	<0.1	<0.1	<0.1	<0.1
AI UCI II 01 - 1242	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Arociiloi-1240	- 07	<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor-1254	102	<01	<0.1	<0.1	<0.1	<0.1
	-;-;- V	- 		۲ ۲	~	4
I OTAL PUBS	-					
Results in ppm (soils mg/kg dry, waters mg/l). Extracti	on MGT 300A soils, U	SEPA 3510 waters.				

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POLYCHLORINATED BIPHENYLS (PCB's) US EPA SW846 METHOD 8082.

					RUS20-A	BUS20-AA
Samrle	BUS16-A	BUS17-A	BUS1/-B	A-81000	60040	
	11-01-1-10-1	A112446#Coil	AI 13117#Soil	AU3118#Soil	AU3119#Soil	AU3120#Soil
Lab. No. / Sample matrix	HUSTIC#SUI	100-01-000		F 0/	<01	<0.1
Arachlar-1016	<0.2	<0.1	- 1.0	0/		ţ
		<01	<0.1	<0.1	<0.1	<0.1
Arochlor-1221	2.0%			• 01	40 4	<0.1
Arachlar 1939	<0.2	<0.1	<0.1			
		<0.1	<0.1	<0.1	<0.1	<0.1
Arochlor-1242	20.6		,	5 0 V	<0.1	<0.1
Arochlor-1248	<0.2	<0.1	<0.'I	0.		Ţ
	<02	<0.1	<0.1	€.0	<0.1	<0.1
Arochlor-1254	7.0~		T OV	<01	<0.1	<0.1
Arochlor-1260	<0.2	-0.1 				ر ۲
Total PCR's	~2	-1	₽	V V	-	-
		ISEDA 3510 waters				
Results in ppm (soils mg/kg dry, waters mg/i). Extraction						

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POLYCHLORINATED BIPHENYLS (PCB's) US EPA SW846 METHOD 8082.

				BUS22-B	BUS6-C	Spike % Recov
e [ume b	BUS20-B	BUSZ1-A				
Janipte	1:-04040014	A112400#Scil	A113123#Soil	AU3124#Soil	AU3219#Soil	AU3124S#Soil
Lab. No. / Sample matrix	AU3121#501	1004221004				81%
	+ 0\ \	<0.1	<0.1	<0.1	1.0>	01/0
Arochlor-1016			4 C 1	<0.1	<0.1	1
Arechler-1221	<0.1	1.U>				
	• •	<0.1	<0.1	<0.1	1.U>	
Arochlor-1232	- 0-		, (۲ را	<0.1	1
	<0.1	<0.1		0~		
Arochlor-1242		Ţ	F 0 V	<0 1	<0.1	1
Arochlor-1248	<0.1	<0.1			+ C/	
	10.4	<0.1	<0.1	<0.1	- SU. I	
Arochlor-1254			T ()	<01	<0.1	93%
Arachlar-1260	<0.1	<0.1	0>		-	
AI UGI 101-1200	T	1	V	V	<	-
Total PCB's	v	-				
Results in ppm (soils mg/kg dry, waters mg/l). Extract	tion MGT 300A solls, u	JOEPA 30 10 Walers.				

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POLYCHLORINATED BIPHENYLS (PCB's) US EPA SW846 METHOD 8082.

			Г
Sample	Meth.Bl.(mg/l)		Т
Lab. No. / Sample matrix			Г
			T
Arochlor-1016			
Arachlar 1001	<0.001		Г
AI 0011101-122 1			
Arochlor-1232	<0.001		
	<0.001		T
Arochlor-1242	100.07		
Assochar 1248	<0.001		Т
AI 001101-1240			
Arochlor-1254	<0.001		
	<0.001		T
Arochlor-1260			
	<0.01		
Results in ppm (soils mg/kg dry, waters mg/l). Extractic	on MGT 300A soils, USE	EPA 3510 waters.	

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PHENOLS & CRESOLS - HPLC- JRNL. CHROM 464(1989) 405-410

			RUS1-B	BUS2-A	BUS2-B	BUS3-A	
Sample	BUS I-A						
			ALI3080#Soil	AU3090#Soil	AU3091#Soil	AU3092#501	
	AU3088#Sol	HUSUDOULAU	in the second				
Tap. No. / Oditipic induiv			+ 0'	<0.1 	€.0	<0.'I	
		<0.1	<0.1	>			
Pheno				Ţ		<0 >	
	, ç		, C>	>			
	0>	-0.1					
Clearly (rorar)							

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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Site : FRANKLIN ST 40032004.00

PHENOLS & CRESOLS - HPLC- JRNL. CHROM 464(1989) 405-410

5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	BUS4-A	BUS5-A	BUS6-A	BUS6-AA	BUS6-B	BUS7-A
					1: - OH LOOO!	
T-t No / Domalo motrix	A113093#Soil	AU3094#Soil	AU3095#Soil	AU3096#Soil	HU308/#2011	
	1000001				ļ	
	107	<0.2	<0.1	<0.1	<0.1	5U.Z
Phenol	0.	>				L C'
	101	и С/	<01	<0.1	<0.1	c.0>
Cresols (total)	-0.1	0.07				

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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Site : FRANKLIN ST 40032004.00

PHENOLS & CRESOLS - HPLC- JRNL. CHROM 464(1989) 405-410

				D-7211	BUS8-A	BUS9-A
	BUS7-AA	BUS7-B	a-vena dna l	2		
a trino a				1:04 04 HO 1 V		A113103#Soil
		AU3100#Soil	AU3100D#Sol	AU3101#201	HU3102#301	
Lab. No. / Sample maurix	100-10000C					t 0 1
		<0.1	<01	<0.1	<0.1	-U. I
Dhenol	20.2	07				
			F 0 /	10	<0.1	<0.1
Creenie (total)	<0.0>	<0.1	0/			
Extraction Extraction	on MGT 300A soils. US	SEPA 3510 waters.				

Results in ppm (soils mg/kg dry, waters mg/l). Extraction world your

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Site : FRANKLIN ST 40032004.00

PHENOLS & CRESOLS - HPLC- JRNL. CHROM 464(1989) 405-410

					BUS12-AA	BUS12-B
	BUS10-A	BUS10-B	BUS11-A			
Sample	2000			1.040740114	A112108#Soil	AU3109#Soil
	N 12404450il	AU3105#Soil	AU3106#Soil			
Lab. No. / Sample matrix						<0.1
	× (101	<01	<0.2	2.02	
	1.0>	-0			l	101
P[16]101			<01	<0.5	<0.5	10.1
Creents (total)	<0.1	04	- ;;;			
Ci cacia (inimi)						

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 water

Date received 20/08/04

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South Australia 5000

Adelaide

Environmental Consulting Pty. Ltd.

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Site : FRANKLIN ST 40032004.00

PHENOLS & CRESOLS - HPLC- JRNL. CHROM 464(1989) 405-410

			DIIC14_0	Dun BUS14-A	BUS15-A	BUS15-B
Samnle	BUS13-A	BU213-D				
			110440HC:		AI13113#Snil	AU3114#Soil
	AII3110#Soil	AU3111#501				
Lab. No. / Sample maun						<0.1
	<01	0.1	<u>6</u>	N>		
Phenol						* C \
		101	<0.1	<0.1	<0.1	-0.1
Cresols (total)	SU.1					
Describe in some /coile ma/ba day waters ma/l) Extraction	on MGT 300A soils, U	SEPA 3510 waters.				

Results in ppm (soils mg/Kg dry, waters mg/i). Ex

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Site : FRANKLIN ST 40032004.00

PHENOLS & CRESOLS - HPLC- JRNL. CHROM 464(1989) 405-410

					BIIS20-4	BUS20-AA
	BUS16-A	BUS17-A	BUS17-B	A-81000		
Sample	1000				1004040401V	A113120#Soil
	104454011	A113116#Soil	AU3117#Soil	AU3118#Sol		100 103 1000
r.ab. No. / Samule matrix	Dotto Look					
		F ()	<0.1	<0.1	<0. I	-0.1
	<0.1	-0.1				• • •
Pnenoi		· 0,	107	<0.1	<0.1	<u. i<="" td=""></u.>
Crocole (total)	<0.1	<0.1				
Cleans (iniai)						
		NTTA JOIN WOLLO				

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510

Date received 20/08/04

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Site : FRANKLIN ST 40032004.00

PHENOLS & CRESOLS - HPLC- JRNL. CHROM 464(1989) 405-410

Ramnie Ramnie	BUS20-B	BUS21-A	BUS22-A	BUS22-B	BUS6-C	Spike % Recov
					1:-0#0700114	1:0343116110
rsh No / Samala matrix	AU3121#Soil	AU3122#Soil	AU3123#Soil	AU3124#501	AU3218#501	AU31113#301
					2	106%
	0 1	<0.1	<0.1	<0.1	<u. i<="" td=""><td>100/0</td></u.>	100/0
Phenol				, ,		102%
Creente (total)	<0.1	<0.1	<0.1	<u.1< td=""><td>-0.1</td><td>1.02 /0</td></u.1<>	-0.1	1.02 /0
of coold fixed.						
		777 × 3640 × 540 ×				

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 20/08/04



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Site : FRANKLIN ST 40032004.00

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PHENOLS & CRESOLS - HPLC- JRNL. CHROM 464(1989) 405-410

	:		
Sample	Spike % Recov	Meth.Bi.(mg/i)	
Lab. No. / Sample matrix	AU3124S#Soil		
Phenol	110%	<0.001	
Cresols (total)	104%	<0.001	
C =	ALT 200A solle 110	CEDA 3510 weters	

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

Date received 20/08/04



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TOTAL RECOVERABLE HYDROCARBONS (GC) MGT METHOD 100A-GC

Site : FRANKLIN ST 40032004.00

Sample	BUS1-A	Dup BUS1-A	BUS1-B	BUS2-A	BUS2-B	BUS3-A
Lab. No. / Sample matrix	AU3088#Soil	AU3088D#Soil	AU3089#Soil	AU3090#Soil	AU3091#Soil	AU3092#Soil
T D H Ce Co Exaction by CC	<20	<20	<20	<20	<20	<20
	<50 <50	<50	<50	<50	<50	<50
	007	<100	<100	<100	<100.	110
T.R.H. C15-C28 Fraction by GC		<100	<100	<100	<100	<100
I.K.H. UZ9-C36 Fraction by GU	001/	007				
Results in ppm (soils mg/kg dry, waters mg/l). Extraction	ion MGT 300A soils, Ut	SEPA 3510 waters.				

Date received 20/08/04



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Site : FRANKLIN ST 40032004.00

TOTAL RECOVERABLE HYDROCARBONS (GC) MGT METHOD 100A-GC

Sample	BUS4-A	BUS5-A	BUS6-A	BUS6-AA	BUS6-B	BUS7-A	
Lab. No. / Sample matrix	AU3093#Soil	AU3094#Soil	AU3095#Soil	AU3096#Soil	AU3097#Soil	AU3098#Soil	
T.R.H. C6-C9 Fraction by GC	<20	<20	<20	<20	<20	<20	
T R H C10-C14 Fraction bv GC	<50	<50	<50	<50	<50	<100	
T R H C15-C28 Fraction by GC	<100	<100	<100	<100	<100	<500	
T R H C29-C36 Fraction by GC	<100	160	<100	<100	<100	<500	
Results in ppm (soils mg/kg dry, waters mg/l). Extractive	tion MGT 300A soils, U	SEPA 3510 waters.					

Date received 20/08/04

Date Reported 23/09/04



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Site : FRANKLIN ST 40032004.00

TOTAL RECOVERABLE HYDROCARBONS (GC) MGT METHOD 100A-GC

Sammle	BUS7-AA	BUS7-B	Dup BUS7-B	BUS7-C	BUS8-A	BUS9-A
					1004007011	A112403#Coil
Lab. No. / Samule matrix	AU3099#Soil	AU3100#Soil	AU3100D#Soil	AU3101#501	AU3102#301	
				¢,		00/
TD U DE DO Eraction hy GC	<20	<20	<20	<20	<2U	74.0
1.N.H. 60-03 Haction b) 00				CL	, FD	150
T D U C10 C14 Eraction by GC	<100	<50	<50	06>	200	007/
1.N.T. 010-01411 action by 00				001		110
	<500	<100	<100	001>	<100	21
I.K.M. U 13-UZO FIAUNUI NY GO				007	0071	100
T D H COOLC36 Eraction hv GC	<500	<100	<100	<100	>100	0017
1:1V:11: 023-0301 1 40001 2) 00						
Results in num (snits md/kg drv. waters mg/l). Extraction	tion MGT 300A soils, U	SEPA 3510 waters.				

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Date received 20/08/04



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TOTAL RECOVERABLE HYDROCARBONS (GC) MGT METHOD 100A-GC Site : FRANKLIN ST 40032004.00

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		-				
Sample	BUS10-A	BUS10-B	BUS11-A	BUS12-A	BUS12-AA	BUS12-B
Lab. No. / Sample matrix	AU3104#Soil	AU3105#Soil	AU3106#Soil	AU3107#Soil	AU3108#Soil	AU3109#Soil
T.R.H. C6-C9 Fraction by GC	<20	<20	<20	<20	<20	<20
T.R.H. C10-C14 Fraction by GC	<50	<50	<50	<50	<50	<50
T.R.H. C15-C28 Fraction by GC	<100	<100	<100	<100	<100	<100
T.R.H. C29-C36 Fraction by GC	<100	<100	<100	<100	<100	<100
Results in num (soils ma/ka drv waters ma/l) Extractio	n MGT 300A soils. U	SEPA 3510 waters.				_

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Site : FRANKLIN ST 40032004.00

TOTAL RECOVERABLE HYDROCARBONS (GC) MGT METHOD 100A-GC

Sample	BUS13-A	BUS13-B	BUS14-A	Dup BUS14-A	BUS15-A	BUS15-B
Lab. No. / Sample matrix	AU3110#Soil	AU3111#Soil	AU3112#Soil	AU3112D#Soil	AU3113#Soil	AU3114#Soil
T.R.H. C6-C9 Fraction by GC	<20	<20	<20	<20	<20	<20
T.R.H. C10-C14 Fraction by GC	<50	<50	<50	<50	<50	<50
T R.H. C15-C28 Fraction by GC	<100	<100	<100	<100	<100	<100
T.R.H. C29-C36 Fraction by GC	<100	<100	<100	<100	<100	<100
Results in ppm (soils mg/kg dry, waters mg/l). Extracti	tion MGT 300A soils, U	SEPA 3510 waters.				

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South Australia 5000 Adelaide

Site : FRANKLIN ST 40032004.00

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MGT METHOD 100A-GC
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AL RECOVERABLE HYDROCARBONS

Sample	BUS16-A	BUS17-A	BUS17-B	BUS19-A	BUS20-A	BUS20-AA
Lab. No. / Sample matrix	AU3115#Soil	AU3116#Soil	AU3117#Soil	AU3118#Soil	AU3119#Soil	AU3120#Soil
T.R.H. C6-C9 Fraction by GC	<20	<20	<20	<20	<20	<20
T.R.H. C10-C14 Fraction by GC	<50	<50	<50	<50	<50	<50
T.R.H. C15-C28 Fraction by GC	300	<100	<100	<100	<100	<100
T.R.H. C29-C36 Fraction by GC	310	<100	<100	<100	110	<100
Results in ppm (soils mg/kg dry, waters mg/l). Extractic	ion MGT 300A soils, U	SEPA 3510 waters.				

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Site : FRANKLIN ST 40032004.00

TOTAL RECOVERABLE HYDROCARBONS (GC) MGT METHOD 100A-GC

	BI 1520-B	BUS21-A	BUS22-A	BUS22-B	BUS6-C	Spike % Recov
sample	2000					A LOODC#Coil
tot No / Comple matrix	AU3121#Soil	AU3122#Soil	AU3123#Soil	AU3124#Soll	AU3219#501	
nam. wo. / Salipie Illauly			00		002	1
T D U C6 C0 Fraction by GC	<20	<20	<2U	220	07/	
1.N.H. 00-001 18000 by 00		()	C L	C L L L	<50 <50	127%
T D H C10-C14 Fraction by GC	<50	<04>	002	201	2007	
1. N. 11. O 10-01-1 1 1 4000 by 00				100	<100	1
T D H C15_C38 Fraction by GC	<100	<100	< 100	> 100	00-7	
1. A.T. 010-0201 18000 by 00		007		100	<100	ı
T D H C30-C36 Fraction by GC	<100	00L>	< 100	001 /	000	
Results in ppm (soils mg/kg dry, waters mg/l). Extracti	ion MGT 300A soils, U	SEPA 3510 waters.				

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Date received 20/08/04

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Site : FRANKLIN ST 40032004.00

TOTAL RECOVERABLE HYDROCARBONS (GC) MGT METHOD 100A-GC

	Snike % Recov	Spike % Recov	Meth.Bl.(mg/l)	
sampte				
- 1. V. / Damata matrix	AU3111S#Soil	AU3124S#Soil		
Lab. No. / Sample Induix				
	1	I	\$0.UZ	
I.K.H. Co-CS Flaction by SC		/000	~0.05	
T D U 010 C14 Eraction by GC	123%	80%	0.00	
1. N. D. O 10-0 14 1 1 400 01 0) 00				
T P H C15-C28 Fraction by GC	1	1	07	
			<01	
T P H C20-C36 Fraction by GC	ł	\$	- • • • •	
Recults in nnm (soils mo/kg dry, waters mg/l). Extraction	on MGT 300A soils, U	SEPA 33 10 Walers.		

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Date received 20/08/04

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CLIENT :-	Maunsell Australia Pty Ltd. Level 6/100 Pirie Street Adelaide South Australia 5000
SITE :-	CENTRAL WEST 40032004.00
DATE RECEIVED :-	29/09/04
DATE EXTRACTED C	RFFARED :- 29/09/04 - 30/09/04
DATE REPORTED :-	26/10/04
QA/QC DETAILS :-	The QA/QC for these samples is detailed in this report no 176122
	A total of 9 duplicate, 9 matrix spike % recovery and 11 method blank analyses
	or sets of analyses were carried out on this batch of samples.
	All QA/QC results for duplicates, matrix spike % recoveries, method blanks
	and known QC standards were within the set acceptable criteria.
FINAL REPORT :-	The results in this report supersede any previously corresponded results.



Michael Wright

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Site : CENTRAL WEST 40032004.00

CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

				MN/V/-7	MW-8	6-WW
Sample	MW-5	c-www.guu	0-77 M	1-A A 1A1		
r.ab. No. / Samole matrix	SE3692#Water	SE3692D#Water	SE3693#Water	SE3694#Water	SE3695#Water	SE3696#Water
	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Benzyi chioride	-0.000E	~0.000E	<0.0005	<0.0005	<0.0005	<0.0005
1,2-Dichlorobenzene	c	0000	0.000		~0.000E	<0.0005
1.3-Dichlorobenzene	<0.0005	<0.0005	cnnn.u>	<0.0003		
1 A Dicklorchenzene	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	GUUU.U>
1,4-Didilio Uddilizerio 	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Hexachioloperizerie		<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Hexachlorobutadiene	conn.n-	1000.07		~0.000E	<0.0005	<0.0005
Hexachlorocyclopentadiene	<0.0005	<000.0>	cuuu>	0000.04		
	<0.0005	<0.0005	<0.0005	<0.0005	<0000.0>	GUUU.U>
	<0.0005	<0:0005	<0.0005	<0.0005	<0.0005	<0.0005
1'2'2-1 LICUIOLODEUTELIE	-0.00E	~0.000E	<0.0005	<0.0005	<0.0005	<0.0005
1,2,4-Trichlorobenzene	ennn.n>	0000.01		0.000		
a a-Dichlorotoluene	<0.0005	<0.0005	<0.005	cnnn.u>		
1 2 3-Trichlorobenzene	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
a a a Trichlorotoli iene	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<00005
	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1, Z, 3, 5-1 ETTACHIOLODELIZELE	2000.0			<0.0005	<0.0005	<0.0005
1,2,4,5-Tetrachlorobenzene	<pre>cn00.0></pre>	ennn'n>	0000.0<	-0.000 T		
1,2,3,4-Tetrachlorobenzene	<0.0005	<0.0005	\$000 [.] 0>	5000.U>	\$0.0000	0000
Results in ppm (soils mg/kg dry, waters mg/l). Extracti	ion MGT 300A soils, U	SEPA 3510 waters.				

Date received 29/09/04

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Site : CENTRAL WEST 40032004.00

CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	Spike % Recov	Meth.Bl.(mg/l)	
Lab. No. / Sample matrix	SE3696S#Water		
Donard chloride	-	<0.0005	
Delizyi uningi de 1 2 Dichlarchanzana	1	<0.0005	
		<0.0005	
1, 3-Dicnioroberizerie			
1,4-Dichlorobenzene	J	G000.0>	
Hexachlorobenzene	-	<0.0005	
Hexachlorobutadiene	%06	<0.0005	
Hexachlorocyclopentadiene	88%	<0.0005	
Hexachloroethane	89%	<0.0005	
1 3 5-Trichlorohenzene		<0.0005	
1.2.4. Trichlorobenzene		<0.0005	
a a_Dickhorotoli rana	-	<0.0005	
a,a-Dicinorocousero 1.0.3.Trichlorohenzene	1	<0.0005	
a a -Trichlorotoluene		<0.0005	
1 2 3 5-Tetrachlorobenzene		<0.005	
1.2.4.5-Tetrachlorobenzene		<0.0005	
1,2,3,4-Tetrachlorobenzene	a construction of the second se	<0.0005	
Results in ppm (soils mg/kg dry, waters mg/l). Extracti	I ion MGT 300A soils, U	I SEPA 3510 waters.	

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Site : CENTRAL WEST 40032004.00

CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	MW-5	Dup MW-5	MW-6	MW-7	MW-8	6-WM
Lab. No. / Sample matrix	SE3692#Water	SE3692D#Water	SE3693#Water	SE3694#Water	SE3695#Water	SE3696#Water
Pentachlorohenzene	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Varinina-Drivo hota-BHC	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0001
Results in ppm (soils mg/kg dry, waters mg/l). Extractio	n MGT 300A soils, U	SEPA 3510 waters.				

Date received 29/09/04



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Site : CENTRAL WEST 40032004.00

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CHLORINATED HYDROCARBONS US EPA SW846 METHOD 8021B

Sample	Spike % Recov	Meth.Bl.(mg/l)	
	CEDENC#MAter		
Lab. No. / Sample matrix	OF JUSUO# VAIG		
Pentachlorobenzene	t	<0.0005	
	111%	<0.0005	
alpna-BHC	2/ -		
	119%	<0.0005	
gannina-Driv			
heta-BHC	ł	G000.0>	
	110/		
delta-BHC	0/011		
Results in ppm (soils mg/kg dry, waters mg/l). Extraction	on MGT 300A soils, U	SEPA 3510 waters.	

Date received 29/09/04

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> HEAVY METALS USEPA 6010B (ICP), 7470/1 (CVAA) Site : CENTRAL WEST 40032004.00

Sample	MW-5	Dup MW-5	MW-6	7-WM	MW-8	MW-9
Lab. No. / Sample matrix	SE3692#Water	SE3692D#Water	SE3693#Water	SE3694#Water	SE3695#Water	SE3696#Water
Antimonv	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Arsenic	0.004	0.004	0.003	0.004	0.003	0.003
Bervillium	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Cadmium	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Chromium	0.003	0.004	0.003	0.003	0.003	0.003
Cobalt	<0.001	<0.001	0.001	<0.001	<0.001	0.002
Copper	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
lead	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Mercury	<0.0001	<0.0001	0.0003	<0.0001	<0.0001	<0.0001
Moivbdenum	<0.005	<0.005	<0.005	<0.005	0.006	0.011
Nickel	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	0.005	0.005	0.006	0.005	<0.005	0.007
Tin	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Zinc	0.025	0.025	0.027	0.012	0.013	0.011
Extraction with H2O2, HNO3 & HCI. Results in ppm (s	ı soils mg/kg dry, waters	mg/l).				

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Site : CENTRAL WEST 40032004.00

HEAVY METALS USEPA 6010B (ICP), 7470/1 (CVAA)

Sample	Spike % Recov	Meth.Bl.(mg/l)	
Lab. No. / Sample matrix	SE3692S#Water		
Antimony	93%	<0.01	
Arsenic	113%	<0.001	
Beryllium	107%	<0.001	
Cadmium	85%	<0.0002	
Chromium	110%	<0.001	
Cobalt	%66	<0.001	
Copper	95%	<0.001	
Lead	%66	<0.001	
Mercury	I	<0.0001	
Molvbdenum	91%	<0.005	
Nickel	92%	<0.001	
Selenium	102%	<0.005	
	86%	<0.005	
Zinc	84%	<0.001	
Extraction with H2O2, HNO3 & HCl. Results in ppm (s	olls mg/kg dry, waters	mg/l).	

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MISCELLANEOUS ANALYSES. METHODS US EPA SW846 OR APHA STANDARD METHODS 19TH ED. 1995.

			TANK TANK TANK TANK TANK TANK TANK TANK				
e l cress		MW-5	MW-6	MW-7	MW-8	MW-9	
Tob No / C	'amala matrix	SE3692#Water	SE3693#Water	SE3694#Water	SE3695#Water	SE3696#Water	
	Dallipie manix						
		7 1	7 1	7.0	7.3	1.7	
pH(units)		- •					
Desults in nnm	(soils ma/ka dry_waters ma/l.) except w	here specified otherwis	e.	~	-	-	

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ETHOD 9010B.	
CYANIDE (CN-) US EPA SI	

Sample	MW-5	9-WM	7-WM	MW-8	MW-9	Meth.Bl.(mg/l)
Lab. No. / Sample matrix	SE3692#Water	SE3693#Water	SE3694#Water	SE3695#Water	SE3696#Water	
Cvanide (total)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Results in ppm (soils mg/kg dry, waters mg/l).						·

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Site : CENTRAL WEST 40032004.00

MAH's AROMATIC VOLATILE ORGANICS US EPA SW846 METHODS 8021B,8260B,5030 & MGT 350A

Sample	MW-5	MW-6	7-WM	MW-8	6-WM	Spike % Recov
Lab. No. / Sample matrix	SE3692#Water	SE3693#Water	SE3694#Water	SE3695#Water	SE3696#Water	SE3696S#Water
Renzene	<0.001	<0.001	<0.001	<0.001	<0.001	80%
Toluene ·	<0.001	<0.001	<0.001	<0.001	<0.001	85%
Fthvi Renzene	<0.001	<0.001	<0.001	<0.001	<0.001	80%
Xvlenes	<0.001	<0.001	<0.001	<0.001	<0.001	87%
Results in ppm (soils ma/kg drv, waters mg/l).						

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MAH'S AROMATIC VOLATILE ORGANICS US EPA SW846 METHODS 8021B,8260B,5030 & MGT 350A

Sample	Meth.BI. (mg/l)	
Lab. No. / Sample matrix		
Benzene	<0.001	
Toluene	<0.001	
Ethvi Benzene	<0.001	
Xvlenes	<0.001	
Results in ppm (soils mg/kg dry, waters mg/l).		

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Site : CENTRAL WEST 40032004.00

		ANA/ O	R-V/W	SE3696#Water	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		50.00 I	<0.0001	<0.0001		<0.0001	<0.0001	<0.000	1000.00	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001		
			MW-8	SE3695#Water	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		<0.001	<0.0001		<0.0001	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001	-0 001	1000.04	<0.0001	<0.0001		
	J 8081A.		MW-7	SE3694#Water	<0.0001	<0.0001	<0.0001	<0.0001		- 000.02	<0.001	<0.0001	1000.0	1000.0>	<0.0001	<0.0001	1000.0	<0.0001	<0.0001	<0.0001	1000 0	<0.0001	<0.0001		-000.04	
	EPA SW846 METHOI		MW-6	SE3693#Water	<0.0001	-0.0001	0000	10000	1000.0	 	<0.001		-0.000	<0.0001	<0.0001		-0.001	<0.0001	<0.0001			<0.0001	<0.0001	10000 Q-	<0.0001	
VEST 40032004.00	NE PESTICIDES US I		Dup MW-5	SE3692D#Water	-0 001	0.000	<0.0001	\$0.001	<0.0001	<0.0001	<0.001	2000	 	<0.0001	20 001	1000.0	<0.0001	<0.0001	<0.0001	10000	<0.0001	<0.0001	-0 001		<0.0001	JSEPA 3510 waters.
Site : CENTRAL V	ORGANOCHLORI		MW-5	CE2600#Moter	0E3032#VVate1	<0.0001	<0.001	1000.0>	<0.0001	<0.0001	<0.001	100.04	<0.0001	<0.0001		<0.0001	<0.0001	<0.0001	10,000	-0.00	<0.0001	<0.0001	1000 01	<0.0001	<0.0001	ction MGT 300A soils, L
South Australia 5000				Sampre	Lab. No. / Sample matrix	Aldrin	alpha-BHC	beta-BHC	delta-BHC			Chlordane	4 4'-DDD		4,4-UUE	4,4'-DDT	Dieldrin		Endosultari I	Endosulfan II	Endosulfan Sulphate		Endrin	Endrin Aldehyde	Endrin Ketone	Results in ppm (soils mg/kg dry, waters mg/l). Extract

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ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

Sample	Spike % Recov	Meth.Bl.(mg/l)		
Lab. No. / Sample matrix	SE3693S#Water			
Aldrin	92%	<0.0001		
alpha-BHC	94%	<0.0001		
beta-BHC	106%	<0.0001		
delta-BHC	87%	<0.0001		
Lindane	84%	<0.0001		
Chlordane	•	<0.001		
4,4'-DDD	80%	<0.0001		
4.4'-DDE	82%	<0.0001		
44'-DDT	81%	<0.0001		
Dieldrin	94%	<0.0001		
Endosulfan I	87%	<0.0001		
Endosulfan II	83%	<0.0001		
Endosulfan Sulphate	80%	<0.0001		
Endrin	%66	<0.0001		
Endrin Aldehvde	93%	<0.0001		
Endrin Ketone		<0.0001		
Results in ppm (soils mg/kg dry, waters mg/l). Extracti	l ion MGT 300A soils, U	SEPA 3510 waters.		

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Site : CENTRAL WEST 40032004.00

ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

Sample	MW-5	Dup MW-5	9-WW	MW-7	MW-8	MW-9
. тар. No. / Sample matrix	SE3692#Water	SE3692D#Water	SE3693#Water	SE3694#Water	SE3695#Water	SE3696#Water
Heptachlor	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Heptachlor epoxide	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Hexachlorobenzene	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Methoxychior	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Toxaphene	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Results in ppm (soils mg/kg dry, waters mg/l). Extraction	n MGT 300A soils, US	SEPA 3510 waters.				

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ORGANOCHLORINE PESTICIDES US EPA SW846 METHOD 8081A.

Sample	Spike % Recov	Meth.Bl.(mg/l)	
Lab. No. / Sample matrix	SE3693S#Water		
Heptachlor	92%	<0.0001	
Heptachlor epoxide	86%	<0.0001	
Hexachlorobenzene	1	<0.0001	
Methoxychlor	80%	<0.0001	
Toxanhene		<0.001	
Results in ppm (soils mg/kg dry, waters mg/l). Extractic	on MGT 300A soils, US	SEPA 3510 waters.	

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Site : CENTRAL WEST 40032004.00

POLYNUCLEAR AROMATIC HYDROCARBONS US EPA SW846 METHOD 8310(HPLC) & 8270C(GC/MS).

MW-5	Dup MW-5	MW-6	MW-7	MW-8	6-WM
SE3692#Water	SE3692D#Water	SE3693#Water	SE3694#Water	SE3695#Water	SE3696#Water
<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
<0.0002	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001
<0.005	<0.005	<0.005	<0.002	<0.002	<0.002
tion MGT 300A soils, U	SEPA 3510 waters.				
	MW-5 SE3692#Water <0.0002	MW-5 Dup MV-5 SE3692#Water SE3692#Water SE3692#Water SE3692D#Water <0.0002	MW-5 Dup MW-5 MW-6 SE3692#Water SE3692D#Water SE3692B#Water <0.0002	MW-5 Dup MM-5 MW-6 MV-7 SE3692#Water SE3692D#Water SE3693#Water SE3693#Water SE3692#Water SE3692#Water SE3693#Water SE3694#Water <0.0002	MV-5 Dup MV-5 MV-6 MV-7 MV-8 SE3692#Water SE3695#Water

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Site : CENTRAL WEST 40032004.00

POLYNUCLEAR AROMATIC HYDROCARBONS US EPA SW846 METHOD 8310(HPLC) & 8270C(GC/MS).

Sample	Spike % Recov	Meth.Bl. (mg/l)	
dab. No. / Dample maurx	100%	<0.0001	
Acenaphthylene	86%	<0.0001	
Acenaphthene	107%	<0.0001	
Fluorene	98%	<0.0001	
Phenanthrene	104%	<0.0001	
Anthracene	96%	<0.0001	
Fluoranthrene	95%	<0.0001	
Pyrene	95%	<0.0001	
, Benzo(a)anthracene	112%	<0.0001	
Chrysene	92%	<0.0001	
Benzo(b)fluoranthene	107%	<0.0001	
Benzo(k)fluoranthene	116%	<0.0001	
Benzo(a)pyrene	110%	<0.0001	
Dibenzo(a,h)anthracene	66%	<0.0001	
Benzo(a.h.i)pervlene	112%	<0.0001	
Indeno(1,2,3-cd)pyrene	105%	<0.0001	
Total PAH's	3	<0.002	
Results in ppm (soils mg/kg dry, waters mg/l). Extraction	on MGT 300A soils, U	SEPA 3510 waters.	

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POLYCHLORINATED BIPHENYLS (PCB's) US EPA SW846 METHOD 8082.

MW-6 MW- SE3693#Water SE36	7	AMAT O	MVV/-0
SE3693#Water SE36		0-111	
	394#Water	SE3695#Water	SE3696#Water
<0.001 <0	.001	<0.001	<0.001
<0.001 <0	.001	<0.001	<0.001
<0.001 <0	.001	<0.001	<0.001
<0.001 <0	.001	<0.001	<0.001
<pre><0.001</pre> <pre><0</pre>	.001	<0.001	<0.001
<0.001 <0	.001	<0.001	<0.001
<0.001 <0	0.001	<0.001	<0.001
<0.01 <0	.01	<0.01	<0.01
<0.001 <0.001 <0.001 <0.001 <0.001 <0 <0.001 <0 <0.001 <0 <0.001 <0 <0.001 <0 <0.001 <0 <0.001 <0 <0.001 <0 <0.001 <0 <0.001 <0 <0.001 <0 <0.001 <0	001 001 001 001 001 001 001 001 001 001		 <0.001 <0.001 <0.001 <0.001 <0.001 <0.001 <0.01

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Site : CENTRAL WEST 40032004.00

POLYCHLORINATED BIPHENYLS (PCB's) US EPA SW846 METHOD 8082.

Sample	Meth.Bl.(mg/l)			
Lab. No. / Sample matrix				
Arochlor-1016	<0.001			
Arochlor-1221	<0.001			
Arochlor-1232	<0.001			
Arochlor-1242	<0.001			
Arochlor-1248	<0.001			
Arochlor-1254	<0.001			
Arochlor-1260	<0.001			
Total PCB's	<0.01			
Results in ppm (soils mg/kg dry, waters mg/l). Extractic	un MGT 300A soils, US	SEPA 3510 waters.		

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Site : CENTRAL WEST 40032004.00

PHENOLS & CRESOLS - HPLC- JRNL. CHROM 464(1989) 405-410

							_
Sample	MW-5	Dup MW-5	MW-6	MW-7	MW-8	MW-9	
Tab. No. / Samula matrix	SE3692#Water	SE3692D#Water	SE3693#Water	SE3694#Water	SE3695#Water	SE3696#Water	
							-
Phenoi	<0.0002	<0.0002	<u.uuu2< td=""><td><0.000 I</td><td>-U.UUU I</td><td>1000.04</td><td></td></u.uuu2<>	<0.000 I	-U.UUU I	1000.04	
		1000	10,0005				
Cresols (total)	G000.0>	<000.0>	c000.0>	<0.000z	20.00Z	-0.00 	
							-
							÷

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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Site : CENTRAL WEST 40032004.00

PHENOLS & CRESOLS - HPLC- JRNL. CHROM 464(1989) 405-410

Sample	Spike % Recov	Meth.Bl.(mg/l)	
Lab. No. / Sample matrix	SE3693S#Water		
Phenol	104%	<0.0001	
Cresols (total)	101%	· <0.0002	

Results in ppm (soils mg/kg dry, waters mg/l). Extraction MGT 300A soils, USEPA 3510 waters.

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Site : CENTRAL WEST 40032004.00

TOTAL RECOVERABLE HYDROCARBONS (GC) MGT METHOD 100A-GC

Sample	MW-5	Dup MW-5	MW-6	MW-7	MW-8	MW-9
тар. No. / Sample matrix	SE3692#Water	SE3692D#Water	SE3693#Water	SE3694#Water	SE3695#Water	SE3696#Water
T.R.H. C6-C9 Fraction by GC	<0.02	1	<0.02	<0.02	<0.02	<0.02
T.R.H. C10-C14 Fraction by GC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
T.R.H. C15-C28 Fraction by GC	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
T.R.H. C29-C36 Fraction by GC	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Results in ppm (soils mg/kg dry, waters mg/l). Extractio	on MGT 300A soils, US	SEPA 3510 waters.				

Date received 29/09/04



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Environmental Consulting Pty. Ltd.

3 KingstonTown Close, Oakleigh, Victoria, 3166, Australia Postal Address P.O. Box 276 Oakleigh Victoria, 3166, Australia Telephone (03) 9564 7055 Fax (03) 9564 7190 Email: mgt@mgtenv.com.au

> Maunsell Australia Pty Ltd. Level 6/100 Pirie Street Adelaide South Australia 5000

Site : CENTRAL WEST 40032004.00

Page 23 of

23

TOTAL RECOVERABLE HYDROCARBONS (GC) MGT METHOD 100A-GC

Sample	Spike % Recov	Meth.Bl.(mg/l)	
Lab. No. / Sample matrix	SE3696S#Water		
T.R.H. C6-C9 Fraction by GC	3	<0.02	
T R H C10-C14 Fraction by GC	116% -	<0.05	
		<0.1	
T D 11 010-0201 (action b) 00		<01	
I.K.H. UZS-USD FIACUUI DY UC			
Results in ppm (soils mg/kg dry, waters mg/l). Extractic	on MGT 300A soils, US	SEPA 3510 waters.	

Date received 29/09/04



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Environmental Consulting Pty. Ltd.

3 KingstonTown Close, Oakleigh, Victoria, 3166, Australia Postal Address P.O. Box 276 Oakleigh Victoria, 3166, Australia Telephone (03) 9564 7190 Fax (03) 9564 7190 Email: mgt@mgtenv.com.au

CLIENT :-	Maunsell Australia Pty Ltd. Level 6/100 Pirie Street Adelaide
SITE :-	South Australia 5000 CENTRAL WEST PRECINCT 40032004.00
DATE RECEIVED :-	26/10/04
DATE EXTRACTED O	3 PREPARED :- 26/10/04 - 27/10/04
DATE REPORTED :-	03/11/04
QA/QC DETAILS :-	The QA/QC for these samples is detailed in this report no 176799
	A total of 1 method blank analyses or sets of analyses were carried out
	on this batch of samples.
	All QA/QC results for method blank and known QC standards were within the
	set acceptable criteria.
FINAL REPORT :-	The results in this report supersede any previously corresponded results.

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South Australia 5000

Adelaide

Environmental Consulting Pty. Ltd.

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 Fax (03) 9564 7055

.

Page 2 of 2

POLYNUCLEAR AROMATIC HYDROCARBONS US EPA SW846 METHOD 8310(HPLC) & 8270C(GC/MS).

Site : CENTRAL WEST PRECINCT 40032004.00

Sample	BUS3-B	BUS9-B	BUS16-B	Meth.Bl.(mg/l)	
tab. No. / Sample matrix	OC2947#Soil	OC2948#Soil	OC2949#Soil		
Nanhthalene	<0.1	<0.1	<0.1	<0.001	
Acenanditiviene	<0.1	<0.1	<0.1	<0.001	
Acenaphthene	<0.1	<0.1	<0.1	<0.001	
Flintene	<0.1	<0.1	<0.1	<0.001	
Phenanthrene	<0.1	<0.1	0.11	<0.001	
Anthracene	<0.1	<0.1	<0.1	<0.001	
Flinranthrene	<0.1	<0.1	0.18	<0.001	
Direne	<0.1	<0.1	0.19	<0.001	
r yreno Renzof alanthracene	<0.1	<0.1	0.12	<0.001	
Christolajananacouro	<0.1	<0.1	0.14	<0.001	
Cirry Serve Renzo(h Yili joranthene	<0.1	<0.1	0.11	<0.001	
Benzo(k)fluoranthene	<0.1	<0.1	<0.1	<0.001	
Benzo(a)pyrene	<0.1	<0.1	0.15	<0.001	
Dibenzo(a,h)anthracene	<0.1	<0.1	<0.1	<0.001	
Benzo(a.h.i)nervlene	<0.1	<0.1	<0.1	<0.001	
Indeno(1 2 3-cd)ovrene	<0.1	<0.1	<0.1	<0.001	
Total PAH's	~2	\$	-23	<0.02	
Results in ppm (soils mg/kg dry, waters mg/l). Extraction	ion MGT 300A soils, U	SEPA 3510 waters.			

Date received 26/10/04

Date Reported 03/11/04



Report No. 176799



ALS Environmental

CERTIFICATE OF ANALYSIS

CONTACT:MR S GRAYCLIENT:MAUNSELL AUSTRALIA PTY LTDADDRESS:

100 PIRIE STREET ADELAIDE SA 5000

 ORDER No.:
 40032004.00

 PROJECT:
 FRANKLIN ST

BATCH: SUB BATCH: LABORATORY: DATE RECEIVED: DATE COMPLETED: SAMPLE TYPE: No. of SAMPLES: EM26163 0 MELBOURNE 20/08/2004 31/08/2004 SOIL 3

COMMENTS

pH determined and reported on 1:5 soil/water extract. Results apply to sample(s) as submitted. Samples as received digested by USEPA method 200.2 (modified) prior to the determination of metals. Results

reported on a dry weight basis.

NOTES

This is the Final Report and supersedes any preliminary reports with this batch number. All pages of this report have been checked and approved for release.

ISSUING LABORATORY: MELBOURNE

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 Fax:
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 Email:
 tim.kilmister@alsenviro.com

Valda Chen Senior Inorgani	c Chemist	Wade Guye Inorganic Ch Reports	A emist Si signed by signal	aron Stott enior Organic Chemist ^{ories as required}	Steven McGrath Organic Chemist	Phillip Hill Senior Microbiologist	:
					The second		
LABORATORIES				- 6 SEP 2004		Laboratory Number 825	
AUSTRALA	SIA	Aħ	IERICAS	entropy of the second	Site: MELBOUI	RNE	
Brisbane Melbourne Sydney Newcastle Auckland	Hong Kong Singapore Kuala Lump Bogor Mumbai	Va Sa ur An Lin	ncouver ntiago tofagasta na		Diss Johns Rony Sciences of Besting Authorstees berein have been perfec gradeeration. Diss de exceptue full	арысы, заславства сласти не марада Эльская горолом пар асполяранае алболе особ фактер сомплостие сображивая с	
a a three take sets	n Sandaca E	Div I to (ARN RA	009 936 029	Provence Allona	61 00	Page 1	of 2
Australian Laborato	ry Services P	LU ADN 04	000 000 020,	1 TILE 1 TO 5 100	4.00		



CERTIFICATE OF-ANALYSIS

- sector -

MAUNSELL AUSTRALIA PTY LTD FRANKLIN ST 31/08/2004 EM26163 0 Client Reference: Sub Batch: Date of Issue: Client: Batch:

			1				SAMPLE	= IDFNTIFIC	ATION			
						-			· · · ·			i
		Laborato	ry I.D.	-	8	ĉ	-		-			1
		Date Sar	npled			· · · · · · · · · · · · · · · · · · ·				1		1
		,		BUS7-AA	BUS12-AA	BUS20-AA					 	
MFTHOD	ANALYSIS DESCRIPTION	UNIT	LOR								 	
	entev He		0.1	<u>6</u> .3	9.3	9.4					 	
	Moistirre Content (dried @ 103°C)	%	0.1	3.0	3.1	3.8					 	
EG-005T	Arsenic - Total	mg/kg	-	₽ V	5	~					 	
EG-005T	Bervilium - Total	mg/kg	~~	۲.	2	2					 	
EG-005T	Cadmium - Total	mg/kg	-	5	2	۲					 	
EG-005T	Cobalt - Total	mg/kg		2	5	2					 reacted	
EG-005T	Chromium - Total	mg/kg	-	19	18	12					 	
FG-005T	Copper - Total	mg/kg	۲	ю —	19	4	_				 1.000	
FG-005T	Molybdenum - Total	mg/kg			ž.	⊽					 	
EG-005T	Nickel - Total	mg/kg	-	7	~	5					 	
EG-005T	Lead - Total	mg/kg	-	2	28	13					 	
EG-005T	Antimony - Total	mg/kg		2	V	-					 	
EG-005T	Selenium - Total	mg/kg	~	2	↓	⊽ .					 	
EG-005T	Tin - Total	mg/kg		7	7	√ !					 	
EG-005T	Zinc - Total	mg/kg	~	10	18	12		<u></u>			 	
EG-035T	Mercury - Total	mg/kg	0.1	<0.1	<0.1	<0.1					 	
EK-026	Total Cyanide	mg/kg	-	₹	41		_				 	

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Batch:	EM26163
Sub Batch:	0
Date of Issue:	31/08/2004
Client:	MAUNSELL AUSTRALIA PTY LTD
Client Reference:	FRANKLIN ST

QUALITY CONTRUL REPORT



								SAMPLE IDENTIFI(CATION	
		Laborati	ory I.D.		ო	200	201	202		
		Date Sa	mpled			20/08/2004	20/08/2004	20/08/2004		
				BUS7-AA	BUS20-AA	METHOD	rcs	MS		
METHOD	ANALYSIS DESCRIPTION	UNIT	LOR	MS	CHK	BLANK				
		-					0	HECKS AND SPIKES		
A-005	pH Value		0.1				1			
A-055	Moisture Content (dried @ 103'C)	%	0.1				-	1		
G-005T	Arsenic - Total	mg/kg	~	1	V	Ÿ	108%	91.0%		
-0.05T	Bervllium - Total	mg/kg	-		5	7		105%		
-0.05T	Cadmium - Total	mg/kg	-	1	5	۲.	102%	100%		
-0 005T	Cohalt - Total	mg/kg	-	1	7	7		98.0%		
-0-005T	Chromium - Total	mg/kg	-		12	7	100%	108%		
-0.005T	Copper - Total	mg/kg	-]	4	7	100%	105%		
-0.005T	Molvbdenum - Total	mg/kg	~		7	7		83.0%		
-G-005T	Nickel - Total	mg/kg		1	5	2	82.0%	93.0%		
EG-005T	Lead - Total	mg/kg	-		12	V	%076	95.0%		
EG-005T	Antimony - Total	mg/kg	-		¥	5		1		
EG-005T	Selenium - Total	mg/kg	،	-	Ŷ	7	1	102%		
EG-005T	Tin - Total	mg/kg	~		<1	₽	1	1		
5G-005T	Zinc - Total	mg/kg	-		1	7	101%	103%		
EG-035T	Mercury - Total	mg/kg	0.1		<0.1	<0.1	88.0%	92.0%		
EK-026	Total Cvanide	mg/kg	~	87.0%	7	ŗ.	80.0%	87.0%		



ALS Environmental

CERTIFICATE OF ANALYSIS

MR S GRAY CONTACT: MAUNSELL AUSTRALIA PTY LTD CLIENT: ADDRESS:

100 PIRIE STREET ADELAIDE SA 5000

40032004.00 ORDER No.:

FRANKLIN ST PROJECT:

BATCH: 1 SUB BATCH: LABORATORY: DATE RECEIVED: DATE COMPLETED: SOIL SAMPLE TYPE: No. of SAMPLES: 3

EM26163 MELBOURNE 20/08/2004 31/08/2004

COMMENTS

Results apply to sample(s) as submitted. Samples analysed on an as

received basis. Results reported on a dry weight basis.

NOTES

This is the Final Report and supersedes any preliminary reports with this batch number. All pages of this report have been checked and approved for release.

ISSUING LABORATORY: MELBOURNE

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Valda Chen Senior Inorganic Chemist Inorganic Chemist

Wade Guye

Aaron Stott Senior Organic Chemist Reports signed by signatories as require

Steven McGrath **Organic Chemist** the Melle

Phillip Hill Senior Microbiologist

LABORATORIES

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Hong Kong Singapore Kuala Lumpur Bogor Mumbai

AMERICAS

Vancouver Santiago Antofagasta Lima



NATA Accredited Laboratory Number 825 Site: MELBOURNE

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> Page 4 of

Australian Laboratory Services Pty Ltd (ABN 84 009 936 029)

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E OF ANALYS		SAMPI F IDENTIF		1																																•••			
TIFICATI			E	, , , ,	BUS20-AA		9.8 R	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	c.0>	<0.5	<0.5	2	 :	<0.5	<0.5	<0.5	<0.5	-0.5 r	C.U>	c.U>	ÿ L	C.U> R O/		C. D>	2, L	0.0v	- u	2 Q	c.D>	C.0^	c.0>	<.U>
CER			5		BUS12-AA E		ť.	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	£		<0.5	<0.5	<0.5	<0.5	<0.5	¢.0>	<0.0 2.0 F	0, L	<0.5 7 0,7		C D V	ο Γ	c. 0	_ u	с. С.О.У	¢.U>	<0.5	C.U>	¢.0>
			+	•	BUS7-AA		3.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	v		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.57	C.U>	<pre>< 0.5</pre>	C.D>	<0.5	C.U>	¢.0≻	v i	C.O>	<0.5	<0.5	<0.5	<0.5
2	ΤΥ LTD		ny I.D.	mpled		LOR	0.1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	~		0.5	0.5	0.5	0.5	0.5	0.5	0,5	¢.0	0.5	c .0	0.5	C, D	0.2	- ;	ç .0	0.5	. 0.5	0.5	0.5
	STRALIA P		Laborato	Date Sal		LINU	%	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	ma/ka
EW/20103	Je: 31/08/2004 MAUNSELL AU: FRANKI IN ST					ANALYSIS DESCRIPTION	Moisture Content (dried @ 103'C)	² henol	2-Chlorophenol	2-Methylphenol	3- & 4-Methylphenol	2-Nitrophenol	2.4-Dimethylphenol	2.4-Dichlorophenol	2.6-Dichlorophenol	4-Chloro-3-methylphenol	2.4.6-Trichlorophenol	2.4.5-Trichlorophenol	Pentachlorophenol	POLYNUCLEAR AROMATICS	Naphthalene	2-Methyinaphthalene	2-Chloronaphthalene	Acenaphthylene	Acenaphthene	Fluorene	Phenanthrene	Anthracene	Fluoranthene	Pyrene	N-2-Fluorenylacetamide	Benz(a)anthracene	Chrysene	Benzo(b) & (k)fluoranthene	7_12-Dimethylbenz(a)anthracene	Benzo(a)pyrene	3-Methylcholanthrene	Indeno(1.2.3-cd)pyrene	Ditesta hastbracene
Batch: Sub Batch:	Date of Issu Client:	Cilent Keter				METHOD	EA-055 N EP-075 A-SS P	EP-075A-SS F	EP-075A-SS 2	EP-075A-SS 2	EP-075A-SS 3	EP-075A-SS 2	EP-075A-SS 2	EP-075A-SS 2	EP-075A-SS 2	EP-075A-SS 4	EP-075A-SS	EP-075A-SS	EP-075A-SS	EP-075B-SS	EP-075B-SS	EP-075B-SS	EP-0758-SS	EP-075B-SS	EP-075B-SS	EP-075B-SS	EP-075B-SS	EP-075B-SS	EP-075B-SS	EP-075B-SS	EP-0758-SS	EP-075B-SS	EP-075B-SS	EP-0758-SS	EP-075B-SS	EP-0758-SS	EP-075B-SS	EP-075B-SS	

CERTIFICATE OF ANALYSIS	



Batch:EM26163Sub Batch:1Date of Issue:31/08/2004Date of Issue:MAUNSELL AUSTRALIA PTY LTDClient:FRANKLIN ST

							SAMPLE IDENTIFICATION	
		Laboratic	Ny I.D.		5	с С		
		Date Sai	mpled				-	
			-	BUS7-AA	BUS12-AA	BUS20-AA		
METHOD	ANALYSIS DESCRIPTION	UNIT	LOR					
EP-075B-SS	Benzo(g.h.i)perylene	mg/kg	0.5	<0.5	<u>2</u> .0≻	<0.5		
EP-075G-SS	CHLORINATED HYDROCARBONS							
EP-075G-SS	1.3-Dichlorobenzene	mg/kg	0.5	<0.5	<0.5	<0.5		
FP-075G-SS	1.4-Dichlorobenzene	mg/kg	0.5	<0.5	<0.5	<0.5		
FP-075G-SS	1.2-Dichlorobenzene	mg/kg	0.5	<0.5	<0.5	<0.5		
EP-075G-SS	Hexachloroethane	mg/kg	0.5	<0.5	<0.5	<0.5		
FP-075G-SS	1.2.4-Trichlorobenzene	mg/kg	0.5	<0.5	<0.5	<0.5		
EP-075G-SS	Hexachloropropylene	mg/kg	0.5	<0.5	<0.5	<0.5		
EP-075G-SS	Hexachlorobutadiene	mg/kg	0.5	<0.5	<0.5	<0.5		
EP-075G-SS	Hexachlorocyclopentadiene	mg/kg	က	ŝ	ς,	ę		
EP-075G-SS	Pentachlorobenzene	mg/kg	0.5	<0.5	<0.5	<0.5		
EP-075G-SS	Hexachlorobenzene	mg/kg	4	2	v	5		~~~~~
EP-075S-SS	ACID EXTRACTABLE SURROGATES							
EP-075S-SS	2-Fluorophenol	%	-	78	70	41		
EP-075S-SS	Phenol-D6	%	-	85	78	80		
EP-075S-SS	2-Chlorophenol-D4	%	-	88	70	55		
EP-075S-SS	2.4.6-Tribromophenol	%	-	62	73	62		
EP-075T-SS	BASE/NEUTRAL EXTRACTABLE SURRO	DGATES						
EP-075T-SS	Nitrobenzene-D5	%	-	19	67	47		
EP-075T-SS	1.2-Dichlorobenzene-D4	%	-	66	50	28		
EP-075T-SS	2-Fluorobiphenyl	%	-	91	82	78		
EP-075T-SS	Anthracene-d10	%	~ -	86	82	86		
EP-075T-SS	p-Terphenyl-D14	%	+	89	80	84		

Batch:	EM26163
Sub Batch:	-
Date of Issue:	31/08/2004
Client:	MAUNSELL AUSTRALIA PTY LTD
Client Reference:	FRANKLIN ST

QUALITY CONTRUL REPORT



Client Ke				-					NTIFICATION		[
		Laborato	ny I.D.	100	101	102	103	104		· · · · · · · · · · · · · · · · · · ·	:
		Date Sar	mpled	20/08/2004	20/08/2004	20/08/2004	20/08/2004	20/08/2004 V/S///CS762		1	İ
	ANALYSIS DESCRIPTION	LINU	LOR	BLANK	SCS	DCS	MS	MSD			
							0	HECKS AND S	PIKES		
EA-055	Moisture Content (dried @ 103'C)	%	0.1	-		-					
EP-075A-SS	PHENOLS	-	ŭ	и С/	20 EA 502	63 R%	%b Cb	104%			
EP-075A-SS	Phenol	mg/kg	с. о		04.2.% 65.0%	70.1%	104%	115%		-	
EP-075A-SS	2-Chlorophenol	mg/kg	0.5	c.0%	63.8%	69.6%					
EP-075A-SS	2-Ivernyiprierioi	ma/ka	0.5	<0.5	67.6%	73.2%	l				
EP-0/ 34-53	2-Altronhenol	ma/ka	0.5	<0.5	65.4%	72.6%	114%	120%			
EP-075A-SS	2 4-Dimethylphenol	mg/kg	0.5	<0.5	65.3%	72.1%	•	1			
EP-075A-SS	2.4-Dichlorophenol	mg/kg	0.5	<0.5	66.6%	71.8%		1			
EP-075A-SS	2.6-Dichlorophenol	mg/kg	0.5	<0.5	67.2%	74.8%		1			
EP-075A-SS	4-Chioro-3-methylphenol	mg/kg	0.5	<0.5	68.7%	74.1%	104%	108%			
EP-075A-SS	2 4 6-Trichlorophenol	mg/kg	0.5	<0.5	68.3%	76.0%	1	1			
EP-075A-SS	2 4 5-Trichlorophenol	mg/kg	0.5	<0.5	60.8%	75.6%	1	I			
EP-075A-SS	Pentachlorophenol	mg/kg	-	√	41.1%	49.6%	107%	111%			
EP-075B-SS	POLYNUCLEAR AROMATICS										
EP-075B-SS	Naphthalene	mg/kg	0,5	<0.5	66.6%	73.8%	1	1			
EP-075B-SS	2-Methylnaphthalene	mg/kg	0,5	<0.5	66.3%	73.7%		1			
EP-075B-SS	2-Chloronaphthalene	mg/kg	0.5	<0.5	60.2%	65.2%	•				
EP-075B-SS	Acenaphthylene	mg/kg	0.5	<0.5	68.4%	74.5%		1			
EP-075B-SS	Acenaphthene	mg/kg	0.5	<0.5	66.8%	73.3%	122%	112%			
EP-075B-SS	Fluorene	mg/kg	0.5	<0.5	67.9%	72.8%	-	1			
EP-075B-SS	Phenanthrene	mg/kg	0.5	<0.5	70.9%			1			
EP-075B-SS	Anthracene	mg/kg	0.5	<0.5	70.9%	%6`77					
EP-075B-SS	Fluoranthene	mg/kg	0.5	<0.5	72.0%	80.6%					
EP-075B-SS	Pyrene	mg/kg	0.5	<0,5	72.0%	80.8%	125%	128%			
FP-075B-SS	N-2-Fluorenylacetamide	mg/kg	0.5	<0.5	58.2%	68.2%					
EP-075B-SS	Benz(a)anthracene	mg/kg	0.5	<0.5	67.7%	20.0%					
EP-075B-SS	Chrysene	mg/kg	0.5	<0.5	75.2%	80.7%	1	-			
EP-075B-SS	Benzo(b) & (k)fluoranthene	mg/kg	-	<	71.2%	80.2%					
EP-075B-SS	7.12-Dimethylbenz(a)anthracene	mg/kg	0.5	<0.5	75.0%	84.4%					
EP-075B-SS	Benzo(a)pyrene	mg/kg	0.5	<0.5	70.2%	78.9%					
EP-0758-SS	3-Methylcholanthrene	mg/kg	0.5	<0.5	. 69.0%	75.9%				- mar - marrier - Marrier - Andre - Marrier - Ma	-
1		 			Australia	n Laboratory 3	Services Pty Lt	d (ABN 84 009	936 029)	Page 7 of 2	52

EM26163	
1	QUALIT CONTROL NEL ON
31/08/2004	
MAUNSELL AUSTRALIA PTY LTD	
FRANKLIN ST	

Client Reference:

Date of Issue:

Client:

Sub Batch:

Batch:



							• • • .	SAMPLE IUE	NIFICATIC	2	-	,	_
		Laborator	y I.D.	100	101	102	103	104	;				
		Date Sam	pled	20/08/2004	20/08/2004	20/08/2004	20/08/2004	20/08/2004				ì	
				METHOD	VSVOCS762	VSVOCS762	VSVOCS762	VSVOCS762					
METHOD	ANAI YSIS DESCRIPTION	UNIT	LOR	BLANK	scs	DCS	MS	MSD					
METION							C	HECKS AND :	SPIKES				
CD 0750 SS	Indeno(1 2 3-cd)ovrene	mg/kg	0.5	<0.5	66.5%	75.7%	1						
	Dihenzia hianthracene	m9/kg	0.5	<0.5	67.3%	76.0%							
FP-075B-SS	Benzo(g.h.i)perylene	mg/kg	0.5	<0.5	67.2%	76.1%							
EP-075G-SS	CHLORINATED HYDROCARBONS						-						
EP-075G-SS	1.3-Dichlorobenzene	mg/kg	0.5	<0.5	61.4%	69.8%							
EP-075G-SS	1 4-Dichlorobenzene	m9/kg	0.5	<0.5	62.9%	70.6%	97.9%	113%					4
EP-075G-SS	1.2-Dichlorobenzene	mg/kg	0.5	<0.5	64.5%	73.9%		1					
EP-075G-SS	Hexachloroethane	mg/kg	0.5	<0.5	61.7%	71.0%	1	ļ					
EP-075G-SS	1 7 4-Trichlorobenzene	mg/kg	0.5	<0'2	66.9%	71.9%	114%	109%	_				
EP-075G-SS	Hexachloropropylene	mg/kg	0.5	<0.5	66.6%	73.8%							
EP-075G-SS	Hexachlorobutadiene	mg/kg	0.5	<0.5	69.2%	76.2%							
EP-075G-SS	Hexachlorocyclopentadiene	mg/kg	ę	ŝ	24.1%	39.4%	1	1					
EP-075G-SS	Pentachlorobenzene	mg/kg	0.5	<0.5	68.5%	75.2%		1					
EP-075G-SS	Hexachlorobenzene	mg/kg	-	5	48.7%	55.8%	1						
EP-075S-SS	ACID EXTRACTABLE SURROGATES							i					
EP-075S-SS	2-Fluorophenol	%	۲	85	92	84	73	/4					
EP-075S-SS	Phenol-D6	%	۲	62	69	84	61	2					
EP-075S-SS	2-Chlorophenol-D4	%	*	75	76	83	63	<i>))</i>					
FP-075S-SS	2.4.6-Tribromophenol	%	۰.	58	87	32	/3	50					
EP-075T-SS	BASE/NEUTRAL EXTRACTABLE SURRO	JGATES											
EP-075T-SS	Nitrohenzene-D5	%	-	75	74	80	66	22					
EP-075T-SS	1 2-Dichlorohenzene-D4	%	*	77	73	78	55	65					
	2-Elinorohinhenvi	%		78	80	85	20	86					
		%	-	17	78	86	02	84					
EP-U/31-55		%	- -	94	83	92	67	84					
EP-0/51-55	p-lerpneuyui4	2						2 -					

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ALS Environmental

CERTIFICATE OF ANALYSIS

CONTACT: MR S GRAY MAUNSELL AUSTRALIA PTY LTD CLIENT: ADDRESS:

100 PIRIE STREET ADELAIDE SA 5000

ORDER No.: 40032004.00 **PROJECT:** FRANKLIN ST

BATCH: SUB BATCH: LABORATORY: DATE RECEIVED: DATE COMPLETED: SAMPLE TYPE: No. of SAMPLES:

EM26163 2 MELBOURNE 20/08/2004 31/08/2004 SOIL 3

COMMENTS

Results apply to sample(s) as submitted. All analysis and Laboratory

QC conducted in accordance with Schedule B(3) NEPM Guideline on

Laboratory Analysis of Potentially Contaminated Soil (December 1999).

Samples analysed on an as received basis. Results reported on a dry

weight basis.

NOTES

This is the Final Report and supersedes any preliminary reports with this batch number. All pages of this report have been checked and approved for release.

ISSUING LABORATORY: MELBOURNE

Address Unit 6 / Adamco Business Park 2 Sarton Road Clayton VIC 3168 Signatory

Phone: 61-3-9538 4444 61-3-9538 4400 Fax: tim.kilmister@alsenviro.com Email:

Valda Chen Wade Guye Aaron Stott Senior Inorganic Chemist Inorganic Chemist Senior Organ Reports signed by signalories as required

Senior Organic Chemist

Steven McGrath **Organic Chemist** få Male

Phillip Hill Senior Microbiologist

LABORATORIES

AUSTRALASIA

Brisbane Melhourne Sydney Newcastle Auckland

Hong Kong Singapore Kuăla Lumpur Bogor Mumbai

AMERICAS Vancouver Santiago Antofagasta

Lima



NATA Accredited Laboratory Number 825

Site: MELBOURNE

This taboratory is accredited by the National Association of Sesting Authorates. Areitralia. The tests reported berein have been performed in accordance with its score of accreditation. This dorsement spall out he reported in sector full. except in full

	EM36463
Batch:	
Sub Batch:	2 CER
Date of Issue:	31/08/2004
Client:	MAUNSELL AUSTRALIA PTY LTD
Client Reference:	FRANKLIN ST

TIFICATE OF ANALYSIS



· · · · · · · · · · · · · · · · · · ·							SAMPLE IDENTIFICATION			4	
		Laboratc	Jry I.D.		5	ę					· · · · ·
		Date Sai	mpled				:		1		
			- vullet	BUS7-AA	BUS12-AA	BUS20-AA					
METHOD	ANALYSIS DESCRIPTION	UNIT	LOR								
EA-055	Moisture Content (dried @ 103'C)	%	0.1	3.0	3.1	3.8		-			
EP-071-SS	TOTAL PETROLEUM HYDROCARBONS										
EP-071-SS	C6 - C9 Fraction	mg/kg	2	\$	<2	<2					
EP-071-SS	C10 - C14 Fraction	mg/kg	50	<50	<50	<50					
FP-071-SS	C15 - C28 Fraction	mg/kg	100	190	<100	<100					
EP-071-SS	C29 - C36 Fraction	mg/kg	100	569	194	204					
EP-080-SS	втех										
EP-080-SS	Benzene	mg/kg	0.2	<0.2	<0.2	<0.2					
EP-080-SS	Toluene	mg/kg	0.2	<0.2	<0.2	<0.2					
EP-080-SS	Chlorobenzene	mg/kg	0.2	<0.2	<0.2	<0.2					
EP-080-SS	Ethylbenzene	mg/kg	0.2	<0.2	<0.2	<0.2		mart of P			
EP-080-SS	meta- & para-Xylene	mg/kg	0.2	<0.2	<0.2	<0.2					
EP-080-SS	ortho-Xylene	mg/kg	0.2	<0.2	<0.2	<0.2					
EP-080S-SS	VOLATILE TPH/BTEX COMPOUND SURR	ROGATES									
EP-080S-SS	1 2-Dichloroethane-D4	%	-	91	06	68					
EP-080S-SS	Toluene-D8	%	t	87	87	85					
EP-080S-SS	4-Bromofluorobenzene	%	-	89	86	85					

Batch:	EM26163	
Sub Batch:	2	QUALITY CONTROL REPORT
Date of Issue:	31/08/2004	
Client:	MAUNSELL AUSTRALIA PTY LTD	
Client Reference:	FRANKLIN ST	

a and a second a second of a second of a second second second second second second second second second second		-						***														
ser		, ,																				
NO		;																				
ENTIFICATIC	104	20/08/2004	BUS7-AA	MSD	SPIKES	•		91.0%	84.0%	84.0%	106%		103%	102%	89.9%	1	1			83	62	81
SAMPLE IDE	103	20/08/2004	BUS7-AA	MS	HECKS AND	ł		%0.06	85.0%	84.0%	108%		102%	100%	87.8%			*		91	85	86
	102	20/08/2004	VTPHT2229	DCS	U			91.0%	92.0%	95.0%	80.0%		98.0%	95.1%	96.1%	96.3%	97.0%	99.1%		109	100	104
	101	20/08/2004	VTPHT2229	scs				98.0%	92.0%	94.0%	80.0%		101%	%2.66	98.3%	97.3%	96.3%	%9 [.] 66		110	100	100
	100	20/08/2004	METHOD	BLANK				<2	<50	<100	<100		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		66	96	96
	e		BUS20-AA	CHK		3.8		<2	<50	<100	220		<0.2	<0.2	<0.2	<0.2	<0.2	<0.2		95	06	06
	ory I.D.	mpled		LOR		0.1		2	50	100	100		0.2	0.2	0.2	0.2	0.2	0.2				
	Laborat	Date Sa	1	UNIT		%		mg/k9	mg/kg	mg/kg	mg/kg		m9/k9	m9/kg	mg/k9	mg/kg	mg/kg	m9/k9	ROGATES	%	%	%
				ANALYSIS DESCRIPTION		Moisture Content (dried @ 103'C)	TOTAL PETROLEUM HYDROCARBONS	C6 - C9 Fraction	C10 - C14 Fraction	C15 - C28 Fraction	C29 - C36 Fraction	BTEX	Benzene	Toluene	Chiorobenzene	Ethylbenzene	meta- & para-Xylene	ortho-Xylene	VOLATILE TPH/BTEX COMPOUND SUR	1.2-Dichloroethane-D4	Toluene-D8	4-Bromofluorobenzene
			-	METHOD		EA-055	EP-071-SS	EP-071-SS	EP-071-SS	EP-071-SS	EP-071-SS	EP-080-SS	EP-080-SS	FP-080-SS	EP-080-SS	EP-080-SS	EP-080-SS	EP-080-SS	EP-080S-SS	EP-080S-SS	FP-080S-SS	FP-080S-SS



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ALS Environmental

CERTIFICATE OF ANALYSIS

MR S GRAY CONTACT: MAUNSELL AUSTRALIA PTY LTD CLIENT: ADDRESS:

100 PIRIE STREET ADELAIDE SA 5000

ORDER No.: 40032004.00 **PROJECT:** FRANKLIN ST BATCH: SUB BATCH: LABORATORY: DATE RECEIVED: DATE COMPLETED: SAMPLE TYPE: No. of SAMPLES:

EM26163 3 MELBOURNE 20/08/2004 31/08/2004 SOIL 3

COMMENTS

Results apply to sample(s) as submitted. All analysis and Laboratory

QC conducted in accordance with Schedule B(3) NEPM Guideline on

Laboratory Analysis of Potentially Contaminated Soil (December 1999).

Samples analysed on an as received basis. Results reported on a dry

weight basis.

NOTES

This is the Final Report and supersedes any preliminary reports with this batch number. All pages of this report have been checked and approved for release.

Fax:

Email:

ISSUING LABORATORY: MELBOURNE

Phone: 61-3-9538 4444

61-3-9538 4400

tim.kilmister@alsenviro.com

Address Unit 6 / Adamco Business Park 2 Sarton Road Clayton VIC 3168 **Signatory**

Valda Chen Senior Inorganic Chemist Inorganic Chemist Senior Orga Reports signed by signalories as required

Wade Guye

Aaron Stott Senior Organic Chemist

Organic Chemist Sta Miller

Steven McGrath

Phillip Hill Senior Microbiologist

LABORATORIES

AUSTRALASIA

Brisbane Melbourne Sydney Newcastle Auckland

Hong Kong Singapore Kuala Lumpur Bogor Mumbai

AMERICAS Vancouver Santiago Antofagasta Lima



NATA Accredited Laboratory Number 825 Site: MELBOURNE

This laboratory is accounted by the National Association of Testing Authorities, Australia. The tests reported herein have been performed in accordance with its scope of accreditation. This document shall net be reproduced. except in full

> Page 12 of 2

Australian Laboratory Services Pty Ltd (ABN 84 009 936 029)

Batch:	EM26163	
Sub Batch:	3	
Date of Issue:	31/08/2004	
Client:	MAUNSELL AUSTRALIA PTY LTD	
Client Reference:	FRANKLIN ST	
		SAMPLE IDENTIFICATI

			!	~		· · · · · · · · · · · · · · · · · · ·				
	Laborato	ny I.D.	-	2	3	-	1			
	Date Sa	mpled	BLIS7-AA	BUS12-AA	BUS20-AA) ::			
ANALYSIS DESCRIPTION	UNIT	LOR								
Moisture Content (dried @ 103'C) FUMIGANTS	%	0.1	3.0	3.1	9. 9.					
2.2-Dichloropropane	mg/kg	0.5	<0.5	<0.5	<0.5					
1.2-Dichloropropane	mg/kg	0.5	<0.5	<0.5	<0.5			•		
cis-1.3-Dichloropropylene	mg/kg		2	7	v					
trans-1.3-Dichloropropylene	mg/kg	-	2	۲ ۲	2					
1.2-Dibromoethane (EDB)	mg/kg	0.5	<0.5	<0.5	<0.5				a	
		ŝ	<5	ŝ	<5					
	ma/ka	ഹ	° ℃	<5	₹ 5					
	mo/ka	ŝ	<5	<5	<5					
	mo/ko	LC.	<5	<5	<5					
	ma/ka	ы чЛ	<5	<5	~2 ~					
Unior Octuarie Trickhoroft ocomethane	ma/ka	2	<5	<2	<2		-			
	ma/ka	0.5	<0.5	<0.5	<0.5					
	mg/kg	0.5	<0.5	<0.5	<0.5					
trans-1.2-Dichloroethene	mg/kg	0.5	<0.5	<0.5	<0.5					
1.1-Dichloroethane	mg/kg	0.5	<0.5	<0.5	<0.5					
cis-1.2-Dichloroethene	mg/kg	0.5	<0.5	<0.5	<0.5					
1.1.1.1-Trichloroethane	mg/kg	0.5	<0.5	<0.5	<0.5					
1.1-Dichloropropylene	mg/kg	0.5	<0.5	<0.5	<0.5					
Carbon tetrachloride	mg/kg	0.5	<0.5	<0.5	<0.05	-				
1.2-Dichloroethane	mg/kg	0.5	<0.5	<0.5	<0.5 7 0.5					
Trichloroethene	mg/kg	0.5	<0.5	<u>9</u> .0≻	C.U>					
Dibromomethane	mg/kg	0.5	<0.5	<0.5	C. 0 2					
1.1.2-Trichloroethane	mg/kg	0.5	C.U>							
1.3-Dichloropropane	mg/kg	0.5	<0.5	c.0>	c.∪> 					
Tetrachloroethene	mg/kg	0.5	<0.5	<0.5 <0.5	G .0>			. ,		
1.1.1.2-Tetrachloroethane	mg/kg	0.5	<0.5	<0.5	<0.5					
trans-1.4-Dichloro-2-butene	mg/kg	0.5	<0.5	<0.5	- 0.5					
cis-1.4-Dichloro-2-butene	mg/kg	0.5	<0.5	<0.05	c.0>				~	
1.1.2.2-Tetrachloroethane	mg/kg	0.5	<0.5	<0.5	G .0>					
1 2 3-Trichloropropane	mg/kg	0.5	<0.5	<0.5	<0.5					
Pentachloroethane	mg/kg	0.5	<0.5	<0.5	<0.5		- +		:	
				•		DUD BA NBN 1 HA VUD	1000 2001			, , , , , , , , , , , , , , , , , , ,

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CERTIFICATE OF ANALYSIS

Batch:EM26163Sub Batch:3Date of Issue:31/08/2004Date of Issue:MAUNSELL AUSTRALIA PTY LTDClient:FRANKLIN ST

				And a second secon			SAMPLE IDE	NTIFICATIO	Z			
		Laborato	N LD.		5	ر ب					 1	
										a		
		Date San	upled				ł				-	-
	ANALYSIS DESCRIPTION	TINIT	IOR	AA-1608							 	
MEINOU					201	10 2						
EP-074E-SS	1.2-Dibromo-3-chloropropane	mg/kg	c.0	c.U>	C.U>	C. D.					 	
EP-074E-SS	Hexachlorobutadiene	mg/kg	0.5	<0.5	<0.5	<0.5					 	
EP-074F-SS	HALOGENATED AROMATIC HYDROCARE	SNOS									 	
EP-074F-SS	Chlorobenzene	mg/kg	0.5	<0.5	<0.5	<0.5					 	
FP-074F-SS	Bromobenzene	mg/kg	0.5	<0.5	<0.5	<0.5					 	
EP-074F-SS	2-Chlorotoluene	mg/kg	0.5	<0.5	<0.5	<0.5						
EP-074F-SS	4-Chlorotoluene	mg/kg	0.5	<0.5	<0.5	<0.5					 	
EP-074F-SS	1.3-Dichlorobenzene	mg/kg	0.5	<0.5	<0.5	<0.5					 	
EP-074F-SS	1 4-Dichlorobenzene	mg/kg	0.5	<0.5	<0.5	<0.5					 	
EP-074F-SS	1.2-Dichlorobenzene	mg/kg	0.5	<0.5	<0.5	<0.5					 	
EP-074F-SS	1.2.4-Trichlorobenzene	mg/kg	0.5	<0.5	<0.5	<0.5					 	
EP-074F-SS	1.2.3-Trichlorobenzene	mg/kg	0.5	<0.5	<0.5	<0.5					 	· · · · · ·
EP-074G-SS	TRIHALOMETHANES (VOLATILES)										 	
EP-074G-SS	Chloroform	mg/kg	0.5	<0.5	<0.5	<0.5					 	
EP-074G-SS	Bromodichloromethane	mg/kg	0.5	<0.5	<0.5	<0.5					 	
FP-074G-SS	Dibromochloromethane	mg/kg	0.5	<0.5	<0.5	<0.5					 	
EP-074G-SS	Bromoform	mg/kg	0.5	<0.5	<0.5	<0.5					 	
EP-074S-SS	VOLATILE COMPOUND SURROGATES										 	
EP-074S-SS	1.2-Dichloroethane-D4	%	-	94	63	92					 t-d-7	
EP-074S-SS	Toluene-D8	%	-	83	89	87					 	
EP-074S-SS	4-Bromofluorobenzene	%		92	89	88					 -	1

Batch: Sub Batch Date of Is	EM26163 1: 3 sue: 31/08/2004				gl	JALITY	CONTI	RUL RE	PORT
Client: Client Ref	MAUNSELL AL erence: FRANKLIN ST	ISTRALIA	ΡΙΥ ΓΙΟ						-
		1						SAMPLE IDE	NTIFICATION
		Labora	tory I.D.	100	101	102	103	104	
		Date S	ampled	20/08/2004	20/08/2004	20/08/2004	20/08/2004	20/08/2004	
				METHOD	WSCS357	WSCS357	VVSCS357	VVSCS357	
METHOD	ANAL YSIS DESCRIPTION	UNIT	LOR	BLANK	scs	DCS	WS	MSD	
METTO							U	HECKS AND	SPIKES
EA-055	Moisture Content (dried @ 103'C)	%	0.1	I				ł	
EP-074D-SS	FUMIGANTS								
EP-074D-SS	2 2-Dichloropropane	mg/kg	0.5	<0.5	108%	%/`06	1		
					1150/	UB EV			

	D SPIKES																																
MSD	HECKS AN					١		1				•	1			115%				-					89.5%					I			
WS	J			-								-	1	1	-	108%				1	-	1	1	1	85.1%				-	-	•		:
DCS				60.7%	98.6%	93.6%	89.5%	%0.66		<u>98.7%</u>	g1.7%	g6.8%	88.7%	G6.0%	95.7%	<u> </u> 33.7%	88.8%	36.9%	96.5%	g8.6%	80.0%	94.7%	83.6%	98.9%	106%	102%	103%	101%	92.4%	81.6%	75.0%	96.7%	101%
scs				108%	115%	104%	100%	60.3%		113%	117%	103%	110%	121%	123%	106%	103%	101%	101%	119%	110%	118%	104%	113%	110%	106%	102%	106%	95.6%	94.4%	76.9%	%6.68	102%
BLANK		-		<0.5	<0.5	5	2	<0.5		Å5 ک	<5	<5	<5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
LOR		0.1		0.5	0.5	.		0.5		5	5	5	5	5	5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0,5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
LIND		%		mg/kg	m9/kg	mg/kg	mg/kg	mg/kg	BONS (VOL)	mg/kg	mg/kg	mg/kg	mg/k9	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
ANAI YSIS DESCRIPTION		Moisture Content (dried @ 103'C)	FUMIGANTS	2.2-Dichloropropane	1.2-Dichloropropane	cis-1,3-Dichloropropylene	trans-1.3-Dichloropropylene	1 2-Dibromoethane (EDB)	HALOGENATED ALIPHATIC HYDROCAR	Dichlorodifluoromethane	Chloromethane	Vinvl chloride	Bromomethane	Chloroethane	Trichlorofluoromethane	1 1-Dichloroethene	lodomethane	trans-1 2-Dichloroethene	1.1-Dichloroethane	cis-1 2-Dichloroethene	1 1 1-Trichloroethane	1.1-Dichloropropylene	Carbon tetrachloride	1 2-Dichloroethane	Trichloroethene	Dibromomethane	1.1.2-Trichloroethane	1.3-Dichloropropane	Tetrachloroethene	1 1 1 2-Tetrachloroethane	trans-1 4-Dichloro-2-butene	cis-1 4-Dichloro-2-butene	1.1.2.2-Tetrachloroethane
NETHOD	METUOD	FA-055	EP-074D-SS	EP-074D-SS	FP-074D-SS	EP-074D-SS	EP-074D-SS	FP-074D-SS	EP-074E-SS	FP-074F-SS	EP-074F-SS	EP-074F-SS	EP-074F-SS	EP-074F-SS	EP.074E-SS	EP-074E-SS	EP-074E-SS		EP-074E-SS	EP-074E-SS	EP-074F-SS	EP-074F-SS	EP-074E-SS	EP-074E-SS	EP-074E-SS	EP-074E-SS	EP-074E-SS	EP-074E-SS	EP-074E-SS	EP-074E-SS	EP-074E-SS	EP-074E-SS	EP-074E-SS

Australian Laboratory Services Pty Ltd (ABN 84 009 936 029)

Page 15 of 22



Batch:	EM26163
Sub Batch:	n
Date of Issue:	31/08/2004
Client:	MAUNSELL AUSTRALIA PTY LTD
Client Reference:	FRANKLIN ST

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QUALITY CONTRUL REPORT



								SAMPLE IDI	ENTIFICATION
		Laborato	ry I.D.	100	101	102	103	104	
		Date Sar	npled	20/08/2004	20/08/2004	20/08/2004	20/08/2004	20/08/2004	
			-	METHOD	VVSCS357	VVSCS357	VVSCS357	WSCS357	
METHOD	ANALYSIS DESCRIPTION	LINU	LOR	BLANK	scs	DCS	MS	MSD	
							S	HECKS AND	SPIKES
FP-074F-SS	1.2.3-Trichloropropane	mg/k9	0.5	<0.5	%2.66	102%		1	
EP-074E-SS	Pentachioroethane	mg/kg	0.5	<0.5	96.2%	70.3%		1	
EP-074E-SS	1.2-Dibromo-3-chloropropane	mg/kg	0.5	<0.5	96.2%	87.3%			
EP-074E-SS	Hexachlorobutadiene	mg/kg	0.5	<0.5	102%	90.2%			-
FP-074F-SS	HALOGENATED AROMATIC HYDROCARI	BONS							
EP-074F-SS	Chlorobenzene	mg/kg	0.5	<0.5	101%	96.4%	84.5%	89.5%	
FP-074F-SS	Bromobenzene	mg/kg	0.5	<0.5	102%	101%	1	-	
EP-074F-SS	2-Chlorotoluene	mg/kg	0.5	<0.5	111%	95.4%	•		
FP-074F-SS	4-Chlorotoluene	mg/kg	0.5	<0.5	115%	97.3%			
FP-074F-SS	1.3-Dichlorobenzene	m9/kg	0.5	<0.5	97.8%	94.9%			
EP-074F-SS	1.4-Dichlorobenzene	mg/kg	0.5	<0.5	109%	62.3%	1	1	
FP-074F-SS	1.2-Dichlorobenzene	mg/kg	0.5	<0.5	105%	98.9%			
EP-074F-SS	1.2.4-Trichlorobenzene	64/6m	0.5	<0.5	100%	91.0%			
EP-074F-SS	1.2.3-Trichlorobenzene	mg/k9	0.5	<0.5	101%	94.3%		1	
EP-074G-SS	TRIHALOMETHANES (VOLATILES)								
EP-074G-SS	Chloroform	m9/kg	0.5	<0.5	115%	103%	1		
EP-074G-SS	Bromodichloromethane	mg/kg	0.5	<0.5	106%	90.3%			
FP-074G-SS	Dibromochloromethane	mg/kg	0.5	<0.5	91.5%	82.2%			
EP-074G-SS	Bromoform	mg/kg	0.5	<0.5	92.8%	85.6%	1	1	
EP-074S-SS	VOLATILE COMPOUND SURROGATES	-							
FP-074S-SS	1.2-Dichloroethane-D4	%		105	106	103		63	
EP-074S-SS	Toluene-D8	%	-	100	6	100	88	83	
EP-074S-SS	4-Bromofluorobenzene	%	-	61	60	102	6	91	

Page 16 of 22



ALS Environmental

CERTIFICATE OF ANALYSIS

MR S GRAY CONTACT: MAUNSELL AUSTRALIA PTY LTD CLIENT: ADDRESS:

100 PIRIE STREET ADELAIDE SA 5000

ORDER No.: 40032004.00 **PROJECT:** FRANKLIN ST

BATCH: SUB BATCH: LABORATORY: DATE RECEIVED: DATE COMPLETED: SAMPLE TYPE: No. of SAMPLES:

EM26163 4 MELBOURNE 20/08/2004 31/08/2004 SOIL 3

COMMENTS

Results apply to sample(s) as submitted. All analysis and Laboratory

QC conducted in accordance with Schedule B(3) NEPM Guideline on

Laboratory Analysis of Potentially Contaminated Soil (December 1999).

Samples analysed on an as received basis. Results reported on a dry

weight basis.

NOTES

This is the Final Report and supersedes any preliminary reports with this batch number. All pages of this report have been checked and approved for release.

Fax:

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ISSUING LABORATORY: MELBOURNE

Phone: 61-3-9538 4444

61-3-9538 4400

tim.kilmister@alsenviro.com

Address Unit 6 / Adamco Business Park 2 Sarton Road Clayton VIC 3168 Signatory

Valda Chen

Wade Guye Senior Inorganic Chemist Inorganic Chemist Senior Orga Reports signed by signatories as required

Aaron Stott Senior Organic Chemist

Steven McGrath **Organic Chemist** ft Melle

Phillip Hill Senior Microbiologist

LABORATORIES

AUSTRALASIA

Brisbane Melbourne Sydney Newcastle Auckland Hong Kong Singapore Kuala Lumpur Bogor Mumbai

AMERICAS Vancouver

Santiago Antofagasta Lima



Site: MELBOURNE

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Page 17 of 2



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Batch:EM26163Sub Batch:4Date of Issue:31/08/2004Date of Issue:MAUNSELL AUSTRALIA PTY LTDClient:FRANKLIN ST

					And the second se		SAMPLE IDENTIFICATION
		Laborato	iry I.D.		2	е С	
		Date Sar	mpled		-	1	
				BUS7-AA	BUS12-AA	BUS20-AA	
METHOD	ANALYSIS DESCRIPTION	UNIT	LOR				
EA-055	Moisture Content (dried @ 103'C)	%	0.1	3.0	3.1	3.8	
EP-068A-SS	ORGANOCHLORINE PESTICIDES						
EP-068A-SS	aloha-BHC	mg/kg	0.05	<0.05	<0.05	<0.05	
EP-068A-SS	HCB	mg/kg	0.05	<0.05	<0.05	<0.05	
EP-068A-SS	heta-BHC & gamma-BHC	mg/kg	0.1	<0.1	<0.1	<0.1	
EP-068A-SS	delta-BHC	mg/kg	0.05	<0.05	<0.05	<0.05	
ED-D68A-SS	Hentachlor	mg/kg	0.05	<0.05	<0.05	<0.05	
ED-0684-SS	Aldrin	mg/kg	0.05	<0.05	<0.05	<0.05	
	Hentachtor enoxide	mg/kg	0.05	<0.05	<0.05	<0.05	
	Chlordane - trans	mg/kg	0.05	<0.05	<0.05	<0.05	
EP-D68A-SS	Endosultan 1	mg/kg	0.05	<0.05	<0.05	<0.05	
		mg/kg	0.05	<0.05	<0.05	<0.05	
		mg/kg	0.05	<0.05	<0.05	<0.05	
EP-068A-SS	DOF	mg/kg	0.05	<0.05	<0.05	<0.05	
EP-068A-SS	Endrin	mg/kg	0.05	<0.05	<0.05	<0.05	
EP-068A-SS	Endosulfan 2	mg/kg	0.05	<0.05	<0.05	<0.05	-
EP-068A-SS	DDD	mg/kg	0.05	<0.05	<0.05	<0.05	-
EP-068A-SS	Endrin aldehvde	mg/kg	0.05	<0.05	<0.05	<0.05	
EP-068A-SS	Endosulfan sulfate	mg/kg	0.05	<0.05	<0.05	<0.05	
EP-068A-SS	DDT	mg/kg	0.2	<0.2	<0.2	<0.2	
EP-068A-SS	Endrin ketone	mg/kg	0.05	<0.05	<0.05	<0.05	
EP-068A-SS	Methoxychlor	mg/kg	0.2	<0.2	<0.2	<0.2	-
EP-068.S-S.S	ORGANOCHLORINE PESTICIDE SURRC	OGATE	a				
EP-068S-SS	Dibromo-DDE	%		06	80	63	

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REPORT	
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QUALITY	

31/08/2004

Sub Batch: Date of Issue:

EM26163

Batch:

4



Client:	MAUNSELL AUST	TRALIA P1	ΓΥ LTD								
Client Ref	erence: FRANKLIN ST										
								SAMPLE ID	ENTIFICATION		
		Laborato	ny I.D.	ę	100	101	102	103	104		
		Date San	npled	t	20/08/2004	20/08/2004	20/08/2004	20/08/2004	20/08/2004		
				BUS20-AA	METHOD	VOCOPS496	VOCOPS496	BUS7-AA	BUS7-AA		
METHOD	ANALYSIS DESCRIPTION	UNIT	LOR	CHK	BLANK	scs	DCS	WS	MSD		
							O	HECKS AND	SPIKES]
A-055	Moisture Content (dried @ 103'C)	%	0.1	3.8							
P-068A-SS		ma/ka	0.05	<0.05	<0.05	85.9%	86.1%		1		
P-068A-SS	alpha-BHC	Bullet	50.0	<0.05	<0.05	85.6%	87.3%	ł			
EP-068A-SS	HCB	6y/Au		0.07 7	0	85.9%	%0.88	77.5%	79.5%		
EP-068A-SS	beta-BHC & gamma-BHC	."		1.00	- 0 02	86.6%	%3 68	1			
EP-068A-SS	delta-BHC	mg/k9	cn.0	20.02	0.07		00.107	70 0%	67 5%		
⁻ P-068A-SS	Heptachlor	mg/kg	0.05	<0.05	c0.0>	83.9%	03.1%	0/6.71	0/ 7.70		
EP-068A-SS	Aldrin	m9/kg	0.05	<0.05	<0.05	86.3%	88.8%	81.8%	88.1%		
22-0680-11	Hentachlor enoxide	mg/kg	0.05	<0.05	<0.05	87.8%	92.2%	l			
	Chlordane - trans	mg/kg	0.05	<0.05	<0.05	89.1%	93.3%				
20-7007-13	Endosultan 1	mg/kg	0.05	<0.05	<0.05	85.9%	%0.06	1	1		
		mg/kg	0.05	<0.05	<0.05	88.9%	93.1%				
		ma/ka	0.05	<0.05	<0.05	87.8%	92.6%	78.7%	80.8%		
EP-068A-00		ma/ka	0.05	<0.05	<0.05	87.5%	91.3%		1		
EP-068A-55		ma/ka	0.05	<0.05	<0.05	85.9%	92.1%	73.5%	73.8%		
EP-0684-33		ma/ka	0.05	<0.05	<0.05	86.6%	90.4%				
EPU00A33		04/000	500	<0.05	<0.05	87.7%	91.4%	1			
EP-068A-SS	000	64/611	200	<0.05	<0.05	89.4%	92.6%				
EP-068A-SS	Endrin aidenyde	54/A11	0.0	30.07	20.05	89.7%	96.8%	1			
EP-068A-SS	Endosulfan sulfate	mg/kg	cn.u	CO.O~	0.07		100 00	10 7 01	700 01	-	
EP-068A-SS	DDT	mg/kg	0.2	<0.2	7.0>	83.0%	30.3%	40.7.0	2/ 7:74		
EP-068A-SS	Endrin ketone	m9/k9	0.05	<0.05	<0.05	94.0%	. 101%				
EP-068A-SS	Methoxychlor	mg/kg	0.2	<0.2	<0.2	80.7%	88.3%				
	ORGANOCHLORINE PESTICIDE SURRO	CATE				8 ==					
		%	-	102	78	68	. 75	83	80		
EP-0685-50		~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~					-				

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ALS Environmental

CERTIFICATE OF ANALYSIS

CONTACT: MR S GRAY MAUNSELL AUSTRALIA PTY LTD CLIENT: ADDRESS:

100 PIRIE STREET ADELAIDE SA 5000

40032004.00 ORDER No.: PROJECT: FRANKLIN ST

BATCH: SUB BATCH: LABORATORY: DATE RECEIVED: DATE COMPLETED: SAMPLE TYPE: No. of SAMPLES:

EM26163 5 MELBOURNE 20/08/2004 31/08/2004 SOIL 3

COMMENTS

Results apply to sample(s) as submitted. All analysis and Laboratory QC conducted in accordance with Schedule B(3) NEPM Guideline on Laboratory Analysis of Potentially Contaminated Soil (December 1999). Samples analysed on an as received basis. Results reported on a dry weight basis.

NOTES

This is the Final Report and supersedes any preliminary reports with this batch number. All pages of this report have been checked and approved for release.

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Valda Chen Senior Inorganic Chemist Inorganic Chemist

Wade Guye

Aaron Stott nic Chemist Senior Organic Chemist Reports signed by signatories as required

Steven McGrath **Organic Chemist** At Mille

Phillip Hill Senior Microbiologist

LABORATORIES

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AMERICAS

Vancouver Santiago Antofagasta Lima



NATA Accredited Laboratory Number 825 Site: MELBOURNE

This faboratory is accretioned by the National Association of Besting Authorities. Anistratia The tests reported berein bave been performed in accordance with its scope or accretioner. This document shall not be reported except in full

ALS									
			1				-		
IF-ANALYSIS	SAMPLE IDENTIFICATION		7						
ERTIFICATE O		e	 A AVAILABLE AVAIL AVAILABLE AVAIL	BUS20-AA		3.8	<0.1		20
J	new restriction - the first Manager Conference on the first state of the second state of the second state of the	2		JS7-AA BUS12-AA		3.0 3.1	<0.1 <0.1		72 75
TY LTD		iry I.D.	npled	8	LOR	0.1	0.1		-
STRALIA P		Laborato	Date Sar	1	UNIT	%	mg/kg	OGATE	%
EM26163 5 31/08/2004 MAUNSELL AU: FRANKLIN ST					ANALYSIS DESCRIPTION	sture Content (dried @ 103'C)	al Polychlorinated biphenyls	LYCHLORINATED BIPHENYL SURRC	cachlorobiphenyl
Batch: Sub Batch: Date of Issue: Client: Client Referen					MFTHOD	FA-055 Moi	EP-066-SS Tota	FP-066S-SS POL	EP-066S-SS Dec

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Page 21 of 22

DENTIFICATIO	20/08/2004	103 20/08/2004	102 20/08/2004	101 20/08/2004	100 20/08/2004	FRANKLIN ST Laboratory I.D. Date Sampled	Client Reference:
DENTIFICATIO	SAMPLE						
						MAUNSELL AUSTRALIA PTY LID FRANKLIN ST	Client: Client Reference:
						31/08/2004	Date of Issue:
				ング		5	Sub Batch:
FPORT		TNCC		Ċ		EM26163	Batch:

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ALS Environmental

ORGANICS QUALITY CONTROL REPORT

BATCH NO: EM26163

DATE BATCH RECEIVED: 20/8/04

CLIENT: Maunsell (Adelaide)

DATE BATCH COMPLETED: 31/8/04

PROJECT: FRANKLIN ST

Method	Test	Matrix	Method I	Reference	QC Lot Number	Date Samples	Date Samples
Code			Extraction	Analysis		Extracted	Analysed
EP-066	РСВ	Soil	Tumbler	USEPA 8270B	VPCBS225	24/08/04	25/08/04
EP-068	Pesticides	Soil	Tumbler	USEPA 8270B	VOCOPS496	24/08/04	25/08/04
	TPH(SV)	Soil	Tumbler	USEPA 8015A	VTPHT2229	24/08/04	25/08/04
EP-071/80	TPH(V)/BTEX	Soil	USEPA 5030A	USEPA 8260A	VVOCS2229	24/08/04	24/08/04
EP-074	Volatiles Scan	Soil	USEPA 5030A	USEPA 8260A	VVSCS357	24/08/04	24/08/04
EP-075	SV Scan	Soil	Tumbler	USEPA 8270B	VSVOCS762	26/08/04	26/08/04
							1

All analysis and laboratory QC pertaining to Environmental Site Assessments and Remedition have been conducted in accordance with Schedule (B3) NEPM Guidline on Laboratory Analysis of Potentially Contaminated Soil (December 1999). Please refer to Certificate of analysis for any exceptions to this clause. Where applicable, internal standards are added to sample extracts prior to instrumental analysis. Absolute peak areas and retention times fall within the criteria specified in the individual methods. Continuing Calibration (CC) standards are run at the frequency of 1 in every 20 samples.

Abbreviations: SV = semivolatile, V = volatile *: In-house methods

Page 1 of 1

BATCH QUALITY CONTROL : PCB SCS / DCS

ALS EP-066 : POLYCHLORINATED BIPHENYLS

VPCBS225 MATRIX: Soil ANALYST: N.WANG

Blank	QC S	PIKE RES	ULTS		Co	ntrol Lim	nits
Conc.	SCS	DCS	Average	RPD	R	ec.	RPD
	Conc	Conc	Rec.				
ma/ka	%	%	%	%	Low	High	%
	98	108	103	9	72	129	20
-2017							
							<u> </u>
86.00	90	94	92	4	55	132	20
	Blank Conc. mg/kg <lor 86.00</lor 	Blank QC S Conc. SCS Conc mg/kg % <lor 98<br="">86.00 90</lor>	Blank QC SPIKE RES Conc. SCS DCS Conc Conc mg/kg % % <lor 108<br="" 98="">86.00 90 94</lor>	Blank Conc.QC SPIKE RESULTSConc.SCSDCSAverage Concmg/kg%%% <lor< td="">9810810386.00909492</lor<>	Blank Conc. QC SPIKE RESULTS Conc. SCS DCS Average RPD mg/kg % % % % <lor< td=""> 98 108 103 9 86.00 90 94 92 4</lor<>	Blank Conc. QC SPIKE RESULTS Co Conc. SCS DCS Average RPD Ref mg/kg % % % Low <lor< td=""> 98 108 103 9 72 86.00 90 94 92 4 55</lor<>	Blank Conc. QC SPIKE RESULTS Control Lin Conc. SCS DCS Average RPD Rec. mg/kg % % % Low High <lor< td=""> 98 108 103 9 72 129 86.00 90 94 92 4 55 132</lor<>

COMMENTS :

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)

1) The control limits are based on ALS laboratory statistical data (Method QWI-ORG/07)

2) The control limits on RPD (relative percentage deviation) are fixed.

3) * : RPD or recovery falls outside the recommended control limit.

4) ND : Compound not detected

BATCH QUALITY CONTROL : DUPLICATE 1

ALS EP-066 : PCB

VPCBS225 MATRIX: Soil

ANALYST: N.WANG SAMPLE ID: EM26140-10

	QC	DUPLICATE RESL	ILTS
	SAMPLE	DUPLICATE	
COMPOUND	Conc	Conc	RPD
	ng/uL	ng/uL	%
	<u> </u>		
Total PCB	<lor< td=""><td><lor< td=""><td>0</td></lor<></td></lor<>	<lor< td=""><td>0</td></lor<>	0
	<u>A.,</u>		
Surrogate	66	61	8
Currogato			

Note: The permitted range for RPD (relative percentage deviation) is specified by ALS Method QWI-EN/38 and is dependent on the magnitude of the result in comparision to the level of reporting.

Result < 10 times LOR, no limit.

Result between 10 and 20 times LOR, 0% -50 %.

Results > 20 times LOR, 0% - 20 %.

BATCH QUALITY CONTROL : MATRIX SPIKE / DUPLICATE

ALS EP-066 : POLYCHLORINATED BIPHENYL ANALYSIS

VPCBS225

MATRIX: Soil

ANALYST: N.WANG SPIKED SAMPLE : EM26140-10

	Sample	Spike					Control
	Results	Level	MS	MSD	Average	RPD	Limit
COMPOUND			Conc	Conc	Rec.		RPD
00111 00110	mg/kg	mg/kg	%	%	%	%	%
Total PCB	<lor< td=""><td>10</td><td>71</td><td>79</td><td>75</td><td>11</td><td>20</td></lor<>	10	71	79	75	11	20
Surrogate					<u> </u>		
DCBP	66	10	63	63	63	0	20

COMMENTS :

1) The control limits on RPD (relative percent deviation) are fixed.

2) * : RPD falls outside the recommended control limit.

3) # : Unable to determine result due to sample matrix.

4) ND : Compound not detected

BATCH QUALITY CONTROL -- CONTROL SPIKE/DUPLICATE

		ALS E	P-068 : P	esticides					
QC LOT No. :	VOCOPS	496			ANALYST	NW			
MATRIX:	Soils						r		
	Blank	Spike	9	PIKE QC F	RESULTS		Con	trol Li	nits
	Conc	Level	SCS	DCS	Average	RPD	Re	eC.	RPD
COMPOUND			Rec.	Rec.	Rec.		ļ		
	mg/kg	mg/kg	c	%	%	%	Low	High	%
EP068A : OC Pesticides								Fri de	
a-BHC	<0.025	0.25	85.9	86.1	86	0.23	63	105	0 - 20
НСВ	<0.025	0.25	85.6	87.3	86.5	1.97	63.4	102	0 - 20
b- & g-BHC	<0.05	0.5	85.9	89	87.5	3.54	67.4	105	0 - 20
d-BHC	<0.025	0.25	86.6	89.8	88.2	3.63	64.7	105	0 - 20
Heptachlor	<0.025	0.25	83.9	89.1	86.5	6.01	71.4	106	0 - 20
Aldrin	<0.025	0.25	86.3	88.8	87.6	2.86	65.8	107	0 - 20
Heptachlor epoxide	<0.025	0.25	87.8	92.2	90	4.89	68	107	0 - 20
Chlordane peak no 1	<0.025	0.25	89.1	93.3	91.2	4.61	67.5	109	0 - 20
Endosulfan 1	<0.025	0.25	85.9	90	88	4.66	67.6	111	0 - 20
Chlordane peak no. 2	<0.025	0.25	88.9	93.1	91	4.62	63.2	117	0 - 20
Dieldrin	<0.025	0.25	87.8	92.6	90.2	5.32	64.8	114	0 - 20
DDE	<0.025	0.25	87.5	91.3	89.4	4.25	68.3	107	0 - 20
Endrin	<0.025	0.25	85.9	92.1	89	6.97	69.5	122	0 - 20
Endosulfan 2	<0.025	0.25	86.6	90.4	88.5	4.29	67.3	116	0 - 20
DDD	<0.025	0.25	87.7	91.4	89.6	4.13	68.7	108	0 - 20
Endrin aldehyde	<0.025	0.25	89.4	92.6	91	3.52	57.5	110	1 - 20
Endosulfan sulfate	<0.025	0.25	89.7	96.8	93.3	7.61	57	117	0 - 20
DDT	<0.1	0.25	83	90.3	86.7	8.42	67.8	113	0 - 20
Endrin ketone	<0.025	0.25	94	101	97.5	7.18	67.2	108	0 - 20
Methoxychlor	<0.1	0.25	80.7	88.3	84.5	8.99	65.8	117	0 - 20
EP068S : OC Surrogate						<u>- 1000</u>		2014 (1 1	<u>Skieve</u> T
Dibromo-DDE	78.1%	0.5	68.3	75.1	71.7	9.48	58.8	102	0 - 20

COMMENTS:

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1) The recovery control limits are based on ALS laboratory statistical data. (Method QWI-ORG/07)

2) The control limits on RPD (relative percent deviation) are fixed.

3) * : Recovery or RPD falls outside of the recommended control limits.

BATCH QUALITY CONTROL -- DUPLICATE

ALS EP-068 : Pesticides

QC LOT No. : MATRIX : ANALYST: VOCOPS496 Soils NW

		(QC DUPLICATE	RESULTS	
		EM26163	EM26163		
COMPOUND	LOR	3	3D	RPD	Cont. Limit
	mg/kg	mg/kg	mg/kg		%
EP068A : OC Pesticides			~ 1.00	e e de la companya de la companya de la companya de la companya de la companya de la companya de la companya de	
a-BHC	0.025	<0.025	<0.025	n/a	
НСВ	0.025	<0.025	<0.025	n/a	
b- & a-BHC	0.05	< 0.05	<0.05	n/a	
d-BHC	0.025	<0.025	<0.025	n/a	
Heptachlor	0.025	<0.025	<0.025	n/a	
Aldrin	0.025	<0.025	<0.025	n/a	
Heptachlor epoxide	0.025	<0.025	<0.025	n/a	
Chlordane peak no 1	0.025	<0.025	<0.025	n/a	
Endosulfan 1	0.025	<0.025	<0.025	n/a	
Chlordane peak no. 2	0.025	<0.025	<0.025	n/a	
Dieldrin	0.025	<0.025	<0.025	n/a	
DDE	0.025	<0.025	<0.025	n/a	
Endrín	0.025	<0.025	<0.025	n/a	
Endosulfan 2	0.025	<0.025	<0.025	n/a	
DDD	0.025	<0.025	<0.025	n/a	
Endrin aldehvde	0.025	<0.025	<0.025	n/a	
Endosulfan sulfate	0.025	<0.025	<0.025	n/a	
DDT	0.1	<0.1	<0.1	n/a	
Endrin ketone	0.025	<0.025	<0.025	n/a	
Methoxychlor	0.1	<0.1	<0.1	n/a	
EP068S : OC Surrogate					
Dibromo-DDE	1%	93.3%	102%	8.91	0 - 20

Note: The permitted range for RPD (relative percent deviation) is specified in ALS Method QWI-EN/38 and is dependent on the magnitude of results in comparison to the level of reporting:

Result < 10 times LOR, no limit.

Result between 10 and 20 times LOR, 0% - 50%.

Results > 20 times LOR, 0% - 20%.

BATCH QI	JALITY	CONTF	:OL	MATRIX	SPIKE/DUPL	ICATE	
AL	S EP-068	: Semi	volatile (Organic Co	ompounds		
QC LOT No. :	VOCOPS	\$496			ANALYST :	NW	
MATRIX:	Soils				Sample ID:	E	M26163-1
	Sample	Spike		SPIKE Q	C RESULTS		Cont. Limit
	Results	Level	MS	MSD	Average	RPD	RPD
COMPOUND			Rec.	Rec.	Rec.		
	mg/kg	mg/kg	%	%	%	%	%
EP068A : OC Pesticides				an an an an an an an an an an an an an a			
b- & a-BHC	< 0.05	0.25	77.5	79.5	78.5	2.55	0 - 20
Heptachlor	<0.025	0.25	72.9	62.5	67.7	15.4	0 - 20
Aldrin	<0.025	0.25	81.8	88.1	85	7.42	0 - 20
Dieldrin	<0.025	0.25	78.7	80.8	79.8	2.63	0 - 20
Endrin	<0.025	0.25	73.5	73.8	73.7	0.407	0 - 20
DDT	<0.1	0.25	49.7	42.2	46	16.3	0 - 20
EP068S : OC Surrogate						<u>1, 9 a a</u>	
Dibromo-DDE	89.7%	0.5	83	79.8	81.4	3.93	0 - 20

COMMENTS:

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The RPD control limits are fixed.
 *: RPD falls outside the recommended control limit.

BATCH QUALITY CONTROL - CONTROL SPIKE/DUPLICATE

ALS EP-071 : Total Petroleum Hydrocarbons by Fractions

VVOCS2229 Vol QC Lot : Semivol QC Lot : VTPHT2229

MATRIX : Soil

	BATCH	Blank	Spike		Spike F	Results		Coi	ntrol Lir	nits
COMPOUND	ADJ.	Conc.	Conc.	SCS	DCS	Av.	RPD	Reco	ove ry	RPD
	(MDL)			Conc.	Conc.	Rec.		9	6	
	ma/ka	ma/ka	mg/kg	mg/kg	mg/kg	%	%	Low	High	%
C6-C9	2.0	<lor< td=""><td>20</td><td>20</td><td>18</td><td>94</td><td>7</td><td>81</td><td>123</td><td>20</td></lor<>	20	20	18	94	7	81	123	20
C10 C14	25		524	484	484	92	0	79	121	20
015 028	50		906	850	862	94	1	78	120	20
010-020	50		410	330	330	80	0	63	105	20
C29-C36	00	-LUK	<u> </u>				1	L		

COMMENTS:

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1) The control limits are based on ALS laboratory statistical data (Method QWI-ORG/07).

2) * : Recovery or RPD falls outside the recommended control limit.

3) MDL = Method Detection Limit

4) LOR = Level Of Reporting

BATCH QUALITY CONTROL

4

ALS EP-071 : TOTAL PETROLEUM HYDROCARBONS

Svol QC Lot No : Vol QC Lot No : Matrix :	VTPHT2229 VVOCS2229 SOIL	SVol Analyst : Vol Analyst :	Maria Ashton Emily Yuen
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	QC DUPLICATE RESULTS						
	EM26163	EM26163	RPD				
COMPOUND	-3	-3D	%				
	mg/kg	mg/kg					
EP-071 : TOTAL PETROLEUM H	YDROCARBONS						
C6-C9	<lor< td=""><td><lor< td=""><td></td></lor<></td></lor<>	<lor< td=""><td></td></lor<>					
C10-C14	30.00	<lor< td=""><td></td></lor<>					
C15-C28	54.00	<lor< td=""><td></td></lor<>					
C29-C36	196.00	212.00	8				

BATCH QUALITY CONTROL - MATRIX SPIKE/DUPLICATE

ALS EP-071 : Total Petroleum Hydrocarbons by Fractions

VVOCS2229 Vol QC Lot : Semivol QC Lot : VTPHT2229

SPIKED SAMPLE : EM26163 1 MATRIX : Soil

	Sample	Spike		Spike Results					
COMPOUND	Results	Level	MS	MSD	Av.	RPD	Limits		
			Conc	Conc	Rec.				
	ma/ka	ma/ka	ma/ka	mg/kg	%	%	RPD		
		10	9.0	9.1	90	1	20		
010 011		592	196	488	85	2	20		
<u>C10-C14</u>	<lor< td=""><td>1002</td><td>4440</td><td>1104</td><td>84</td><td>1</td><td>20</td></lor<>	1002	4440	1104	84	1	20		
C15-C28	184	1320	1112	1104		+			
C29-C36	552	368	398	390	107		20		

COMMENTS:

1) LOR: level of reporting

2) The control limits are based on ALS laboratory statistical data. (Method QWI-ORG/06)

3) * : Recovery or RPD falls outside of the recommended control limits.

4) # : Unable to determine result due to sample matrix.

BATCH QUALITY CONTROL - CONTROL SPIKE/DUPLICATE

ALS EP-080 : BTEX ANALYSIS

VVOCS2229 QC Lot No. :

MATRIX : Soil

	BATCH	Blank	Spike	[Spike Results					nits
	ADJ.	Conc.	Conc.	SCS	DCS	Av.	RPD	Reco	overy	RPD
COM CONE	(MDL)	•••••		Conc.	Conc.	Rec.		9	6	
	ma/ka	ma/ka	ma/ka	mg/kg	mg/kg	%	%	Low	High	%
Banzana	0.1	OR</td <td>2.0</td> <td>2.02</td> <td>1.95</td> <td>99</td> <td>3</td> <td>80</td> <td>122</td> <td>20</td>	2.0	2.02	1.95	99	3	80	122	20
Teluane	0.1		2.0	1.99	1.90	97	5	80	122	20
Oldene	0.1		2.0	1.97	1.92	97	2	81	123	20
	0.1		2.0	1.01	1.93	97	1	80	122	20
Ethylbenzene	0.1	SLUK	2.0	2.05	2.88	97	1	80	122	20
m- & p-Xylene	0.1	<lor< td=""><td>4.0</td><td>3.00</td><td>3.00</td><td></td><td></td><td>01</td><td>122</td><td>20</td></lor<>	4.0	3.00	3.00			01	122	20
o-Xylene	0.1	<lor< td=""><td>2.0</td><td>1.99</td><td>1.98</td><td>99</td><td></td><td>01</td><td>123</td><td></td></lor<>	2.0	1.99	1.98	99		01	123	

COMMENTS:

The control limits are based on ALS laboratory statistical data (Method QWI-ORG/07).
 *: Recovery or RPD falls outside the recommended control limit.
 MDL = Method Detection Limit

4) LOR = Level Of Reporting

BATCH QUALITY CONTROL

ALS EP-071 : TOTAL PETROLEUM HYDROCARBONS ALS EP-080 : BTEX

 Vol QC Lot No :
 VVOCS2229
 Vol Analyst :
 Emily Yuen

 Matrix :
 SOIL

	QC DUPLICATE RESULTS							
	EM26163	EM26163	RPD					
COMPOUND	-3	-3D	%					
	mg/kg	mg/kg						
EP-080 : BTEX	· ·							
Benzene	<lor< td=""><td><lor< td=""><td></td></lor<></td></lor<>	<lor< td=""><td></td></lor<>						
Toluene	<lor< td=""><td><lor< td=""><td></td></lor<></td></lor<>	<lor< td=""><td></td></lor<>						
Chlorobenzene	<lor< td=""><td><lor< td=""><td></td></lor<></td></lor<>	<lor< td=""><td></td></lor<>						
Ethylbenzene	<lor< td=""><td><lor< td=""><td><u></u></td></lor<></td></lor<>	<lor< td=""><td><u></u></td></lor<>	<u></u>					
meta- & para-Xylene	<lor< td=""><td><lor< td=""><td></td></lor<></td></lor<>	<lor< td=""><td></td></lor<>						
ortho-Xylene	<lor< td=""><td><lor< td=""><td></td></lor<></td></lor<>	<lor< td=""><td></td></lor<>						

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ALS EP-080 : BTEX ANALYSIS

QC Lot No. :

VVOCS2229

SPIKED SAMPLE : EM26163 1 MATRIX : Soil

	Sample	Spike		Control			
COMPOUND	Results	Level	MS	MSD	Av.	RPD	Limits
			Conc	Conc	Rec.		
	mg/kg	mg/kg	mg/kg	mg/kg	%	%	RPD
Benzene	<lor< td=""><td>2.0</td><td>2.0</td><td>2.1</td><td>102</td><td>1</td><td>20</td></lor<>	2.0	2.0	2.1	102	1	20
Toluene	<lor< td=""><td>2.0</td><td>2.0</td><td>2.0</td><td>101</td><td>2</td><td>20</td></lor<>	2.0	2.0	2.0	101	2	20
Chlorobenzene	<lor< td=""><td>2.0</td><td>1.8</td><td>1.8</td><td>89</td><td>2</td><td>20</td></lor<>	2.0	1.8	1.8	89	2	20

COMMENTS :

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1) LOR: level of reporting

2) The control limits are based on ALS laboratory statistical data. (Method QWI-ORG/06)
3) * : Recovery or RPD falls outside of the recommended control limits.

BATCH QUALITY CONTROL -- CONTROL SPIKE/DUPLICATE

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ALS EP-074 : Volatile Organic Compounds

OC LOT No. :	VVSCS35	7		ANALYST EMILY YUEN						
MATRIX:	Soils									
					FOL 11 T.D.	1			nile	
	Blank	Spike	<u> S</u>	PIKE OC R	ESULIS	DDD	R		RPD	
	Conc	Level	SCS	DCS	Average	RPU	ne	···		
			Rec. [Rec.	<u>лец.</u> %	%	Low	High	%	
COMPOUND	mg/kg [mg/kg [<u></u>	n a heryakap	70 (1) (1) (1) (1)	<u></u>	4. 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	- सुरु है।	5.8 M.S.	
EP-0/D-SS : Fumigants	dop	10.0	108	90.7	99.4	17.4	57.3	134	0 - 20	
2.2-Dichloropropane		10.0	115	98.6	107	15.4	89	125	0 - 20	
1,2-Dichloroproparie		20.0	104	93.6	98.8	10.5	80	121	0 - 20	
CIS-1.3-DIChloroproperle	d OR	20.0	100	89,5	94.8	11,1	81.9	123	0 - 20	
(rans- r.s-Dictioropropere		10.0	99.3	99	99.2	0.3	79.2	129	0 - 20	
EP 074E-SS Chiorinate	d Alinhatic	Compoi	inds		5. 20 m	201	in a laga in 1979 - Maria	(M) (M)	2541	
Dichlorodifluoromethane	<lor< td=""><td>100.0</td><td>113</td><td>98.7</td><td>106</td><td>13,5</td><td>74.9</td><td>128</td><td>0 - 20</td></lor<>	100.0	113	98.7	106	13,5	74.9	128	0 - 20	
Chloromethane	<i or<="" td=""><td>100.0</td><td>116</td><td>91.7</td><td>104</td><td>23.4 *</td><td>85.3</td><td>110</td><td>0 - 20</td></i>	100.0	116	91.7	104	23.4 *	85.3	110	0 - 20	
Vinyl chloride	<lor< td=""><td>100,0</td><td>103</td><td>96.8</td><td>99.9</td><td>6.21</td><td>82.7</td><td>116</td><td>0 - 20</td></lor<>	100,0	103	96.8	99.9	6.21	82.7	116	0 - 20	
Bromomethane	<lor< td=""><td>100.0</td><td>110</td><td>88.7</td><td>99.4</td><td>21.4 •</td><td>81.5</td><td>129</td><td>0 - 20</td></lor<>	100.0	110	88.7	99.4	21.4 •	81.5	129	0 - 20	
Chloroethane	<lor< td=""><td>100.0</td><td>121</td><td>96</td><td>109</td><td>23 ·</td><td>78.1</td><td>119</td><td>0 - 20</td></lor<>	100.0	121	96	109	23 ·	78.1	119	0 - 20	
Trichlorofluoromethane	<lor< td=""><td>100.0</td><td>123</td><td>95,7</td><td>109</td><td>25 ·</td><td>86.1</td><td>118</td><td>0 - 20</td></lor<>	100.0	123	95,7	109	25 ·	86.1	118	0 - 20	
1 1-Dichloroethene	<lor< td=""><td>10.0</td><td>106</td><td>93.7</td><td>99.9</td><td>12.3</td><td>74.4</td><td>125</td><td>0 - 20</td></lor<>	10.0	106	93.7	99.9	12.3	74.4	125	0 - 20	
lodomethane	<lor< td=""><td>10.0</td><td>103</td><td>88.8</td><td>95.9</td><td>14.8</td><td>41.5</td><td>143</td><td>0 - 20</td></lor<>	10.0	103	88.8	95.9	14.8	41.5	143	0 - 20	
Methylene chloride		10.0			n/a	n/a	n/a	n/a	0 - 20	
trans-1.2-Dichloroethene	<lor< td=""><td>10.0</td><td>101</td><td>96.9</td><td>99</td><td>4.14</td><td>86.5</td><td>114</td><td>0 - 20</td></lor<>	10.0	101	96.9	99	4.14	86.5	114	0 - 20	
1,1-Dichloroethane	<lor< td=""><td>10.0</td><td>101</td><td>96.5</td><td>98.8</td><td>4.56</td><td>81.7</td><td>120</td><td>0 - 20</td></lor<>	10.0	101	96.5	98.8	4.56	81.7	120	0 - 20	
cis-1,2-Dichloroethene	<lor< td=""><td>10.0</td><td>119</td><td>98.6</td><td>109</td><td>18.8</td><td>87.2</td><td>116</td><td>0 - 20</td></lor<>	10.0	119	98.6	109	18.8	87.2	116	0 - 20	
1,1,1-Trichloroethane	<lor< td=""><td>10.0</td><td>110</td><td>89</td><td>99.5</td><td>21.1 *</td><td>66.2</td><td>131</td><td>0 - 20</td></lor<>	10.0	110	89	99.5	21.1 *	66.2	131	0 - 20	
1.1-Dichloropropylene	<lor< td=""><td>10,0</td><td>118</td><td>94.7</td><td>108</td><td>21.9 *</td><td>78.2</td><td>125</td><td>0 - 20</td></lor<>	10,0	118	94.7	108	21.9 *	78.2	125	0 - 20	
Carbon tetrachloride	<lor< td=""><td>10.0</td><td>104</td><td>83.6</td><td>93.8</td><td>21.7 *</td><td>70,9</td><td>132</td><td>0 - 20</td></lor<>	10.0	104	83.6	93.8	21.7 *	70,9	132	0 - 20	
1.2-Dichloroelhane	<lor< td=""><td>10.0</td><td>113</td><td>98.9</td><td>106</td><td>13.3</td><td>83.9</td><td>121</td><td>0 - 20</td></lor<>	10.0	113	98.9	106	13.3	83.9	121	0 - 20	
Trichloroethene	<lor< td=""><td>10.0</td><td>110</td><td>106</td><td>108</td><td>3.7</td><td>83.5</td><td>121</td><td>0 - 20</td></lor<>	10.0	110	106	108	3.7	83.5	121	0 - 20	
Dibromomethane	<lor< td=""><td>10.0</td><td>106</td><td>102</td><td>104</td><td>3.85</td><td>83</td><td>117</td><td>0 - 20</td></lor<>	10.0	106	102	104	3.85	83	117	0 - 20	
1.1.2-Trichloroethane	<lor< td=""><td>10.0</td><td>102</td><td>103</td><td>103</td><td>0,98</td><td>70,9</td><td>139</td><td>0-20</td></lor<>	10.0	102	103	103	0,98	70,9	139	0-20	
1.3-Dichloropropane	<lor< td=""><td>10,0</td><td>106</td><td>101</td><td>104</td><td>4.83</td><td>76.3</td><td>130</td><td>0.20</td></lor<>	10,0	106	101	104	4.83	76.3	130	0.20	
Tetrachloroethene	<lor< td=""><td>10.0</td><td>95.6</td><td>92.4</td><td>94</td><td>3.4</td><td>71.2</td><td>140</td><td>0.20</td></lor<>	10.0	95.6	92.4	94	3.4	71.2	140	0.20	
1,1,1,2-Tetrachloroethane	<lor< td=""><td>10,0</td><td>94.4</td><td>81.6</td><td>76</td><td>25</td><td>52 4</td><td>140</td><td>0 - 20</td></lor<>	10,0	94.4	81.6	76	25	52 4	140	0 - 20	
trans-1.4-Dichloro-2-butene	<lor< td=""><td>10.0</td><td>76.9</td><td>/5</td><td>/0</td><td>7.00</td><td>65.1</td><td>136</td><td>0 - 20</td></lor<>	10.0	76.9	/5	/0	7.00	65.1	136	0 - 20	
cis-1.4-Dichloro-2-butene	<lor< td=""><td>10.0</td><td>89.9</td><td>101</td><td>102</td><td>0.99</td><td>84.2</td><td>127</td><td>0 - 20</td></lor<>	10.0	89.9	101	102	0.99	84.2	127	0 - 20	
1,1,2,2-Tetrachloroethane	LOR	10.0	102	107	101	2.28	76.5	131	0 - 20	
1.2.3-Trichloropropane	<lor< td=""><td>10.0</td><td>99.7</td><td>70.3</td><td>83.3</td><td>31.1</td><td>71.2</td><td>147</td><td>0 - 20</td></lor<>	10.0	99.7	70.3	83.3	31.1	71.2	147	0 - 20	
Pentachloroelhane	<lor d OR</lor 	10.0	06.2	87.3	91.8	9.7	69.1	141	0 - 20	
1.2-Dibromo-3-chioropropa		10.0	102	90.2	96.1	12.3	67.1	117	0 - 20	
Hexachiorobulaciene	ted Aromat	c Compr	unds	L	1	1.1.1	u ⁴ 1.7	0.00	$\left\langle m_{1},m_{2}^{2}\right\rangle <$	
Chierobanzana		10.0	101	96.4	98.7	4.66	81	123	0 - 20	
Bromohenzene	<lor< td=""><td>10.0</td><td>102</td><td>101</td><td>102</td><td>0,99</td><td>81</td><td>123</td><td>0 - 20</td></lor<>	10.0	102	101	102	0,99	81	123	0 - 20	
2-Chlorotoluene	<lor< td=""><td>10.0</td><td>111</td><td>95.4</td><td>103</td><td>15.1</td><td>77.9</td><td>120</td><td>0 - 20</td></lor<>	10.0	111	95.4	103	15.1	77.9	120	0 - 20	
4-Chlorotoluene	<lor< td=""><td>10,0</td><td>115</td><td>97.3</td><td>106</td><td>16.7</td><td>80.9</td><td>120</td><td>0 - 20</td></lor<>	10,0	115	97.3	106	16.7	80.9	120	0 - 20	
1.3-Dichlorobenzene	<lor< td=""><td>10.0</td><td>97.8</td><td>94.9</td><td>96.4</td><td>3.01</td><td>80.9</td><td>121</td><td>0 - 20</td></lor<>	10.0	97.8	94.9	96.4	3.01	80.9	121	0 - 20	
1.4-Dichlorobenzene	<lor< td=""><td>10,0</td><td>109</td><td>95.9</td><td>102</td><td>12.8</td><td>81.5</td><td>122</td><td>0 - 20</td></lor<>	10,0	109	95.9	102	12.8	81.5	122	0 - 20	
1.2-Dichlorobenzene	<lor< td=""><td>10.0</td><td>105</td><td>98.9</td><td>102</td><td>5.98</td><td>81</td><td>126</td><td>0 - 20</td></lor<>	10.0	105	98.9	102	5.98	81	126	0 - 20	
1.2.4-Trichlorobenzene	<lor< td=""><td>10.0</td><td>100</td><td>91</td><td>95.5</td><td>9.42</td><td>71.7</td><td>123</td><td>0 - 20</td></lor<>	10.0	100	91	95.5	9.42	71.7	123	0 - 20	
1.2,3-Trichlorobenzene	<lor< td=""><td>10.0</td><td>101</td><td>94.3</td><td>97.7</td><td>6.86</td><td>76.6</td><td>129</td><td>0 - 20</td></lor<>	10.0	101	94.3	97.7	6.86	76.6	129	0 - 20	
EP-074G-SS : Trihalor	nethanes				n nyajata	<u>.</u>	1398.39	T C		
Chloroform	<lor< td=""><td>10.0</td><td>115</td><td>103</td><td>109</td><td>11</td><td>77.9</td><td>120</td><td>0 - 20</td></lor<>	10.0	115	103	109	11	77.9	120	0 - 20	
Bromodichloromethane	<lor< td=""><td>10.0</td><td>106</td><td>90.3</td><td>98.2</td><td>16</td><td>74</td><td>128</td><td>0 - 20</td></lor<>	10.0	106	90.3	98.2	16	74	128	0 - 20	
Dibromochloromethane	<lor< td=""><td>10.0</td><td>91.5</td><td>82.2</td><td>86.9</td><td>10.7</td><td>83.5</td><td>134</td><td>0 - 20</td></lor<>	10.0	91.5	82.2	86.9	10.7	83.5	134	0 - 20	
Bromoform	<lor< td=""><td>10.0</td><td>92,8</td><td>85.6</td><td>89.2</td><td>8.07</td><td>84.6</td><td> 133</td><td>0 - 20</td></lor<>	10.0	92,8	85.6	89.2	8.07	84.6	133	0 - 20	
EP-074S-SS : Surroga	tes			-1			<u> </u>	1	1	
1.2-Dichloroethane-d4	105%	50.0	106	103	105	2.87	85.8	115	0 - 20	
Toluene-d8	99.7%	50.0	97.3	99.7	98.5	2.44	85.4	111	0 - 20	
4-Bromofluorobenzene	90.8%	50.0	89.7	102	95.9	12.8	1 83.9	1111	10-20	
COMMENTS:					ant det - 1	dathad		201071		
1) The recovery contro	I limils are t	ased on	ALS labora	nory statisti	cai data. (I	viett (00 C	, vvi-Ut	(GIUT)		

2) The control limits on RPD (relative percent deviation) are fixed.
 3) *: Recovery or RPD falls outside of the recommended control limits.

BA	TCH QUALI	TY CONTROL	- DUPLICAT	E	
	ALS EP-074 :	Volatile Organio	: Compounds		
OC LOT No	VVSCS357				
MATRIX	Soils				
ANALYST:	EMILY YUEN	ł			
				PDI	2
	1	OC DUPLICAT	E RESULTS EM26161	IM	<u></u>
	LOR	2	2D	RPD 0	Cont. Limit
COMPOUND	ma/ka	mg/kg	mg/kg	%	
EP-07D-SS : Fumigants		<u> </u>			
2.2-Dichloropropane	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
1.2-Dichloropropane	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
cis-1.3-Dichloropropene	1	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
trans-1,3-Dichloropropene	1	<lor< td=""><td></td><td>n/a D/a</td><td></td></lor<>		n/a D/a	
1.2-Dibromoethane	0.5	<u><lor [<="" u=""></lor></u>	<lor< td=""><td>1//a]</td><td>anter a de la</td></lor<>	1//a]	anter a de la
EP-074E-SS : Chlorinated	Aliphatic Comp		<lor 1<="" td=""><td>n/a l</td><td></td></lor>	n/a l	
Dichlorodilluoromelhane			<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
Uniorometriane	5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
vinyi chionoe	5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
Chloroelhane	5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
Trichlorofluoromethane	5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
1.1-Dichloroethene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
lodomethane	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
Methylene chloride				n/a	
trans-1,2-Dichloroethene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
1,1-Dichloroethane	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
cis-1,2-Dichloroethene	0.5	<lor< td=""><td><lur< td=""><td>0/2</td><td></td></lur<></td></lor<>	<lur< td=""><td>0/2</td><td></td></lur<>	0/2	
1,1,1-Trichloroethane	0.5	<lor< td=""><td></td><td>n/a</td><td></td></lor<>		n/a	
1,1-Dichloropropylene	0.5			n/a	
Carbon tetrachloride	0.5		<1.0R	n/a	
1.2-Dichloroethane	0.5		<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
Dibromomethane	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
1 1 2-Trichlorpelbane	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
1.3-Dichloropropane	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
Tetrachloroelhene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
1,1,1.2-Tetrachloroethane	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
trans-1,4-Dichloro-2-butene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
cis-1,4-Dichloro-2-butene	0.5	<lor< td=""><td></td><td>n/a</td><td></td></lor<>		n/a	
1.1,2.2-Tetrachloroethane	0.5	<lor< td=""><td></td><td>n/a</td><td></td></lor<>		n/a	
1,2,3-Trichloropropane	0.5			n/a	
Pentachloroethane	0.5			n/a	
1,2-Dibromo-3-chloropropane	0.5		<lor <lor< td=""><td>n/a</td><td></td></lor<></lor 	n/a	
Hexachiorobulaciene	Aromatic Com	nounds			
Chlorobenzene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
Bronobenzene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
2-Chlorotoluene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
4-Chlorololuene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
1.3-Dichlorobenzene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td>ļ</td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td>ļ</td></lor<>	n/a	ļ
1.4-Dichlorobenzene	0.5	<lor< td=""><td>LOR LOR</td><td></td><td></td></lor<>	LOR LOR		
1,2-Dichlorobenzene	0.5	<lor< td=""><td></td><td></td><td><u> </u></td></lor<>			<u> </u>
1,2,4-Trichlorobenzene	0.5			n/a	
1.2,3-Trichlorobenzene	0.5			<u> 1#8</u>	
EP-074G-SS : Trihalomet	nanes			n/a	T.
Chloroform	0.5			n/a	1
Bromodichioromethane	0.5	<1.0R	<lor< td=""><td>n/a</td><td>1</td></lor<>	n/a	1
Bromoform	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td>1</td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td>1</td></lor<>	n/a	1
FP-074S-SS : Surrogates	<u></u>				
1.2-Dichloroethane-d4	1%	91.9%	102%	10.4	0 - 20
Toluene-d8	1%	88.3%	94%	6.25	0 - 20
4-Bromofluorobenzene	1%	89.4%	96.5%	7.64	0 - 20

 4-Bromofluorobenzene
 1%
 89.4%
 96.5%
 7.54
 0-20

 Note: The permitted range for RPD (relative percent deviation) is specified in ALS Method QWI-EN/38 and is dependent on the magnitude of results in comparison to the level of reporting: Result 10 times LOR, no limit.
 Result 10 times LOR, no limit.

 Result between 10 and 20 times LOR. 0% - 50%.
 Results > 20 times LOR. 0% - 20%.
BATCH QUALITY CONTROL -- MATRIX SPIKE/DUPLICATE

QC LOT No. : MATRIX: VVSCS357 Soils

S357 ANALYST :

Sample ID:

EMILY YUEN EM26161-1

	Sample	Spike		SPIKE QC	RESULTS		Cont. Limit
	Results	Level	MS	MSD	Average	RPD	RPD
COMPOUND			Rec.	Rec.	Rec.		
	mg/kg	mg/kg	%	%	%	%	%
EP-074E-SS : Chlorinated	Aliphatic C	ompoun	ds				
1 1-Dichloroethene	<lor< td=""><td>20</td><td>108</td><td>115</td><td>112</td><td>6.28</td><td>0 - 35</td></lor<>	20	108	115	112	6.28	0 - 35
Trichloroethene	<lor< td=""><td>20</td><td>85.1</td><td>89.6</td><td>87.4</td><td>5.15</td><td>0 - 35</td></lor<>	20	85.1	89.6	87.4	5.15	0 - 35
EP-074F-SS : Chlorinated	Aromatic C	ompoun	ds				
Chlorobenzene	<lor< td=""><td>20</td><td>84.5</td><td>89.5</td><td>87</td><td>5.75</td><td>0 - 35</td></lor<>	20	84.5	89.5	87	5.75	0 - 35
EP-074S-SS : Surrogates							
1 2-Dichloroethane-d4	81.2%	50	90.7	92.5	91.6	1.97	0 - 35
Toluene-d8	79.6%	50	87.9	88.5	88.2	0.68	0 - 35
4-Bromofluorobenzene	84.5%	50	89.9	91	90.5	1.22	0 - 35

COMMENTS:

1) The RPD control limits are fixed.

2) *: RPD falls outside the recommended control limit.

3) # Unable to determine due to matrix interference

CONTROL SPIKE/DUPLICATE BATCH QUALITY CONTROL --

ALS EP-075 : Semivolatile Organic Compounds ANALYST X.LIN

VSVOCS762

QC	LOT	No.	:

Soils MATRIX: **Control Limits** SPIKE QC RESULTS Spike Blank RPD RPD Rec. DCS Average SCS Level Conc Rec. Rec. Rec. % High Low % % % mg/kg mg/kg COMPOUND EP-075A ; PHENOLS 125 0 - 35 45.9 64.2 1.09 63.8 10.0 64.5 <LOR Phenol 0 - 35 43.5 121 7.55 67.6 70.1 10.0 65 <LOR 2-Chlorophenol 116 0 - 35 8.7 48.7 66.7 69.6 10.0 63.8 <LOR 2-Methylphenol 0 - 35 121 50.4 7.95 73.2 70.4 67.6 10.0 <LOR 4-Methylphenol 0 - 35 126 45.5 69 10.4 10.0 65.4 72.6 <LOR 2-Nitrophenol 0 - 35 21.9 120 9.9 72.1 68.7 10.0 65.3 <LOR 2,4-Dimethylphenol 0 - 35 46.4 124 7.51 71.8 69.2 66.6 10.0 <LOR 2,4-Dichlorophenol 122 0 - 35 48.3 10.7 74.8 71 <LOR 10.0 67.2 2,6-Dichlorophenol 128 0 - 35 7.56 55.9 71.4 68.7 74.1 10.0 <LOR 4-Chloro-3-methylphenol 10.7 135 0 - 35 34.4 72.2 10.0 68.3 76 <LOR 2,4,6-Trichlorophenol 44.1 133 0 - 35 21.7 68.2 75.6 10.0 60.8 <LOR 2,4,5-Trichlorophenol 0 - 35 109 5.8 18.7 49.6 45.4 10.0 41.1 <LOR Pentachlorophenol EP-075B : POLYAROMATIC HYDROCARBONS 0 - 35 122 70.2 10.3 47.4 73.8 <LOR 10.0 66.6 Naphthalene 0 - 35 49.9 122 10.6 73.7 70 10.0 66.3 <LOR 2-Methylnaphthalene 125 0 - 35 53.7 62.7 7.97 65.2 10.0 60.2 <LOR 2-Chloronaphthalene 125 0 - 35 52.4 8.54 74.5 71.5 10.0 68.4 <LOR Acenaphthylene 0 - 35 130 48.6 70.1 9.28 66.8 73.3 10.0 <LOR Acenaphthene 0 - 35 51.9 129 6.97 67.9 72.8 70.4 10.0 <LOR Fluorene 53.7 132 0 - 35 74.4 9.41 70.9 77.9 10.0 <LOR Phenanthrene 0 - 35 51.1 131 74.4 9.41 70.9 77.9 <LOR 10.0 Anthracene 0 - 35 57.9 130 11.3 76.3 80.6 <LOR 10.0 72 Fluoranthene 0 - 35 62.4 128 11.5 76.4 80.8 <LOR 10.0 72 Pyrene 0 - 35 61.1 135 15.8 63.2 68.2 58.2 <LOR 10.0 N-2-Fluorenylacetamide 0 - 35 54.8 134 73.4 15.4 79 67.7 10.0 <LOR Benz(a)anthracene 130 0 - 35 57.2 78 7.06 80.7 10.0 75.2 <LOR Chrysene 136 0 - 35 48.6 75.7 11.9 71.2 80.2 <LOR 20.0 Benzo(b)&(k)fluoranthene 60.6 133 0 - 35 11.8 84.4 79.7 75 10.0 7,12-Dimethylbenz(a)anthrad <LOR 0 - 35 50.9 133 78.9 74.6 11.7 70.2 <LOR 10.0 Benzo(a)pyrene 0 - 35 138 45.2 9.52 75.9 72.5 10.0 69 <LOR 3-Methylchloanthrene 0 - 35 52.7 126 12.9 75.7 71.1 10.0 66.5 <LOR Indeno(1,2,3-cd)pyrene 0 - 35 12.1 53.2 129 76 71.7 67.3 10.0 <LOR Dibenz(a,h)anthracene 0 - 35 51.7 129 71.7 12.4 76.1 10.0 67.2 <LOR Benzo(g,h,i)perylene

BATCH	QUALITY	CONTI	ROL	CONTRO	L SPIKE/I	OUPLIC	ATE		
	ALS EP-0	75 : Sen	nivolatile	Organic C	ompound	ls			
QC LOT No. :	VSVOCS7	62			ANALYST	X.LIN			
MATRIX:	Soils								
	Blank	Spike	S	PIKE QC R	ESULTS		Con	trol Lin	nits
	Conc	Level	SCS	DCS	Average	RPD	Re	ec.	RPD
			Rec.	Rec.	Rec.		L		
COMPOUND	mg/kg	mg/kg	9	6	%	%	Low	High	%
FP-075G CHLORINATE		ARBONS	6						
1.3-Dichlorobenzene	<lor< td=""><td>10.0</td><td>61.4</td><td>69.8</td><td>65.6</td><td>12.8</td><td>50.7</td><td>113</td><td>0 - 35</td></lor<>	10.0	61.4	69.8	65.6	12.8	50.7	113	0 - 35
1.4-Dichlorobenzene	<lor< td=""><td>10.0</td><td>62.9</td><td>70.6</td><td>66.8</td><td>11.5</td><td>52</td><td>113</td><td>0 - 35</td></lor<>	10.0	62.9	70.6	66.8	11.5	52	113	0 - 35
1,2-Dichlorobenzene	<lor< td=""><td>10.0</td><td>64.5</td><td>73.9</td><td>69.2</td><td>13.6</td><td>50.1</td><td>117</td><td>0 - 35</td></lor<>	10.0	64.5	73.9	69.2	13.6	50.1	117	0 - 35
Hexachloroethane	<lor< td=""><td>10.0</td><td>61.7</td><td>71</td><td>66.4</td><td>14</td><td>47.9</td><td>116</td><td>0 - 35</td></lor<>	10.0	61.7	71	66.4	14	47.9	116	0 - 35
1 2 4-Trichlorobenzene	<lor< td=""><td>10.0</td><td>66.9</td><td>71.9</td><td>69.4</td><td>7.2</td><td>48.9</td><td>122</td><td>0 - 35</td></lor<>	10.0	66.9	71.9	69.4	7.2	48.9	122	0 - 35
Heyachloropropylene	<lor< td=""><td>10.0</td><td>66.6</td><td>73.8</td><td>70.2</td><td>10.3</td><td>35.5</td><td>135</td><td>0 - 35</td></lor<>	10.0	66.6	73.8	70.2	10.3	35.5	135	0 - 35
Hexachlorobutadiene	<lor< td=""><td>10.0</td><td>69.2</td><td>76.2</td><td>72.7</td><td>9.63</td><td>48.6</td><td>124</td><td>0 - 35</td></lor<>	10.0	69.2	76.2	72.7	9.63	48.6	124	0 - 35
Hexachlorocyclopentadiene	<lor< td=""><td>10.0</td><td>24.1</td><td>39.4</td><td>31.8</td><td>48.2 *</td><td>13.4</td><td>116</td><td>0 - 35</td></lor<>	10.0	24.1	39.4	31.8	48.2 *	13.4	116	0 - 35
Pentachlorobenzene	<lor< td=""><td>10.0</td><td>68.5</td><td>75.2</td><td>71.9</td><td>9.32</td><td>55.6</td><td>130</td><td>0 - 35</td></lor<>	10.0	68.5	75.2	71.9	9.32	55.6	130	0 - 35
Hexachlorobenzene	<lor< td=""><td>20.0</td><td>48.7</td><td>55.8</td><td>52.3</td><td>13.6</td><td>38.4</td><td>146</td><td>0 - 35</td></lor<>	20.0	48.7	55.8	52.3	13.6	38.4	146	0 - 35
EP-075S ; ACID EXTRA	TABLE SU	JRROGA	TES		n argene en aner i dit. Terlik son er i dit. T		1		e (d'Electric) I
2-Fluorophenol	85%	10.0	91.9	84.4	88.2	8.51	44.7	127	0 - 35
Phenol-d6	78.7%	10.0	69.4	83.5	76.5	18.4	52.5	123	0 - 35
2-Chlorophenol-d4	75.3%	10.0	76.2	82.8	79.5	8.3	55.9	111	0 - 35
2,4,6-Tribromophenol	57.7%	10.0	86.5	92.4	89.5	6.6	52	116	0 - 35
EP-075T : BASE/NEUTR	AL EXTRA	CTABLE	SURROGA	TES		1	1	T	
Nitrobenzene-d5	74.9%	10.0	74	79.9	77	7.67	60.9	122	0 - 35
1,2-Dichlorobenzene-d4	77.1%	10.0	72.7	78.4	75.6	7.54	58.8	111	0 - 35
2-Fluorobiphenyl	77.8%	10.0	80.2	85.1	82.7	5.93	64.9	111	0 - 35
Anthracene-d10	76.6%	10.0	77.9	86.4	82.2	10.3	65.3	110	0 - 3
4-Terphenyl-d14	93.9%	10.0	83.3	91.5	87.4	9,38	70.4	111	0 - 35

COMMENTS:

1) The recovery control limits are based on ALS laboratory statistical data. (Method QWI-ORG/07)

2) The control limits on RPD (relative percent deviation) are fixed.

3) * : Recovery or RPD falls outside of the recommended control limits.

BATCH QUALITY CONTROL -- DUPLICATE

ALS EP-075 : Semivolatile Organic Compounds

QC LOT No. : MATRIX : ANALYST:

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VSVOCS762 Soils X.LIN

T	<u> </u>	QC DUPLICA	TE RESULTS	R	PD
	F	EM26213	EM26213		
COMPOUND	LOR	7	7D	RPD	Cont. Limit
	ma/ka	mg/kg	mg/kg		%
FP-075A · PHENOLS	9_91			2 (a 1995) a 1977	and the second second
Phenol	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
2-Chiorophenol	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
2-Methylphenol	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
4-Methylphenol	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
2-Nitrophenol	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
2 4-Dimethylphenol	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
2 4-Dichlorophenol	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
2.6-Dichlorophenol	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
4-Chloro-3-methylphenol	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
2 4 6-Trichlorophenol	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
2.4.5-Trichlorophenol	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
Pentachlorophenol	1	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
EP-075B : POLYNUCLEAR A	ROMATIC H	DROCARBONS			
Naphthalene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
2-Methylnaphthalene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
2-Chloronaphthalene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
Acenaphthylene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
Acenaphthene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
Fluorene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
Phenanthrene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
Anthracene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
Fluoranthene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
Pyrene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
N-2-Fluorenylacetamide	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
Benz(a)anthracene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
Chrysene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
Benzo(b)&(k)fluoranthene	1	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
7.12-Dimethylbenz(a)anthracene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
Benzo(a)pyrene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
3-Methylchloanthrene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
Indeno(1.2.3-cd)pyrene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
Dibenz(a,h)anthracene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
Benzo(a h i)perviene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	

BATCH QUALITY CONTROL -- DUPLICATE

ALS EP-075 : Semivolatile Organic Compounds

QC LOT No. : MATRIX : ANALYST: VSVOCS762 Soils X.LIN

		QC DUPLICA	TE RESULTS	R	PD
		EM26213	EM26213		
	LOR	7	7D	RPD	Cont. Limit
	ma/ka	mg/kg	mg/kg		%
EP-075G CHI ORINATED	HYDROCARBO	DNS			
1 3-Dichlorobenzene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
1 4-Dichlorobenzene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
1 2-Dichlorobenzene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
Hexachloroethane	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
1 2 4-Trichlorohenzene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
Hexachloropropylene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
Hexachlorobutadiene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
Hexachlorocyclopentadiene	2.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
Pentachlorobenzene	0.5	<lor< td=""><td><lor< td=""><td>n/a</td><td></td></lor<></td></lor<>	<lor< td=""><td>n/a</td><td></td></lor<>	n/a	
Hexachlorobenzene	1	<lor< td=""><td><pre><lor< pre=""></lor<></pre></td><td><u> </u></td><td></td></lor<>	<pre><lor< pre=""></lor<></pre>	<u> </u>	
EP-075S : ACID EXTRACT	ABLE SURRO	GATES			
2-Fluorophenol	1%	68.7%	77.7%	12.3	0 - 20
Phenol-d6	1%	67.9%	68.5%	0.88	0-20
2-Chlorophenol-d4	1%	73%	70.2%	3.91	0 - 20
2.4.6-Tribromophenol	1%	70.4%	64.8%	8.28	0-20
EP-075T : BASE/NEUTRAL	EXTRACTAB	LE SURROGATE	<u>S</u>		- 0 20
Nitrobenzene-d5	1%	71.9%	73.8%	2.61	0-20
1,2-Dichlorobenzene-d4	1%	62.4%	59.6%	4.59	0-20
2-Fluorobiphenyl	1%	75.6%	73.2%	3.23	0 - 20
Anthracene-d10	1%	79.1%	77%	2.69	0 - 20
4-Terphenyl-d14	1%	81.4%	75.5%	/.52	0-20

Note: The permitted range for RPD (relative percent deviation) is specified in ALS Method QWI-EN/38 and is dependent on the magnitude of results in comparison to the level of reporting:

Result < 10 times LOR, no limit.

Result between 10 and 20 times LOR, 0% - 50%.

Results > 20 times LOR, 0% - 20%.

MATRIX SPIKE/DUPLICATE BATCH QUALITY CONTROL --

AL	.S EP-075	: Semiv	volatile Or	ganic Con	npounds		
OC LOT No. :	VSVOCS	762		ANALYST :		X.LIN	
MATRIX:	Soils		ç	Sample ID:		EM26213	-6
	Sample	Spike		SPIKE QC	RESULTS		Cont. Limit
	Results	Level	MS	MSD	Average	RPD	RPD
COMPOUND			Rec.	Rec.	Rec.	<u> </u>	
-	mg/kg	mg/kg	%	%	%	%	%
EP-075A : PHENOLS		S. Martin		George States		2.150).50(3) T	
Phenol	<lor< td=""><td>5</td><td>92.9</td><td>104</td><td>98.5</td><td>11.3</td><td>0 - 35</td></lor<>	5	92.9	104	98.5	11.3	0 - 35
2-Chlorophenol	<lor< td=""><td>5</td><td>103</td><td>115</td><td>109</td><td>11</td><td>0 - 35</td></lor<>	5	103	115	109	11	0 - 35
2-Nitrophenol	<lor< td=""><td>5</td><td>113</td><td>120</td><td>117</td><td>6.01</td><td>0 - 35</td></lor<>	5	113	120	117	6.01	0 - 35
4-Chloro-3-methvlphenol	<lor< td=""><td>5</td><td>104</td><td>108</td><td>106</td><td>3.77</td><td>0 - 35</td></lor<>	5	104	108	106	3.77	0 - 35
Pentachlorophenol	<lor< td=""><td>5</td><td>107</td><td>111</td><td>109</td><td>3.67</td><td>0 - 35</td></lor<>	5	107	111	109	3.67	0 - 35
EP-075B : POLYAROMATI	C HYDROC	ARBON	S		ann an the second		n College and Caller The Caller and Caller T
Acenaphthene	<lor< td=""><td>5</td><td>121</td><td>112</td><td>117</td><td>7.73</td><td>0 - 35</td></lor<>	5	121	112	117	7.73	0 - 35
Pyrene	<lor< td=""><td>5</td><td>124</td><td>128</td><td>126</td><td>3.17</td><td>0 - 35</td></lor<>	5	124	128	126	3.17	0 - 35
EP-075G : CHLORINATED	HYDROCA	RBONS					T
1,4-Dichlorobenzene	<lor< td=""><td>5</td><td>97.9</td><td>113</td><td>105</td><td>14.3</td><td>0 - 35</td></lor<>	5	97.9	113	105	14.3	0 - 35
1,2,4-Trichlorobenzene	<lor< td=""><td>5</td><td>114</td><td>109</td><td>112</td><td>4.48</td><td>0 - 35</td></lor<>	5	114	109	112	4.48	0 - 35
EP-075S : ACID EXTRACT	ABLE SUR	ROGATI	ES			1 1	T
2-Fluorophenol	53.8%	2.5	72.9	74.1	73.5	1.63	0 - 35
Phenol-d6	61.3%	2.5	60.9	69.7	65.3	13.5	0 - 35
2-Chlorophenol-d4	66.6%	2.5	62.7	76.9	69.8	20.3	0 - 35
2,4,6-Tribromophenol	77.5%	2.5	72.9	88.5	80.7	19.3	<u> </u>
EP-075T BASE/NEUTRA	LEXTRACT	ABLES	URROGAT	ES	101904349691 T	and Holder	
Nitrobenzene-d5	64.2%	2.5	65.5	77	71.3	16.1	0 - 35
1,2-Dichlorobenzene-d4	55.8%	2.5	54.8	65.2	60	17.3	
2-Fluorobiphenyl	67.7%	2.5	70.3	86	78.2	20.1	0 - 35
Anthracene-d10	69.9%	2.5	70.1	84.1	77.1	18.2	0 - 35
4-Terphenyl-d14	68.5%	2.5	66.5	84.2	75.4	23.5	

COMMENTS:

The RPD control limits are fixed.
 *: Recoveries or RPD's fall outside the specified limits.



Soil and Groundwater Investigation Central West Precinct

Franklin Street Bus Station and Car Parks

Adelaide City Council

November 2004



Central West Precinct

Prepared for Adelaide City Council

Prepared by

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November 2004

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Reviewed by Daryl Burrows

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Revision	Revision Date	Details	Name/Position	Signature		
А	11/11/2004		Elmar Schaffeler Associate Director	Sind		

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Appendices

Appendix A Figures

- Appendix B Soil and Groundwater Bore Logs
- Appendix C Summary of Analytical and Quality Sampling Spreadsheet
- Appendix D Groundwater Purging & Development Records
- Appendix E Photographs
- Appendix F Quality Assessment Data
- Appendix G Summary Results

Accompanying Document

Franklin Street Bus Station Laboratory Reports

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1.0 Introduction

1.1 General

This report has been prepared by Maunsell Australia Pty Ltd (Maunsell) for the Adelaide City Council. It provides the results of soil and groundwater investigations performed at the Franklin Street Bus Station and associated car parks between July and September 2004.

This site, together with the Balfours site, is known as the Central West Precinct, which the Adelaide City Council plans to redevelop. It is Maunsell's understanding that the bus station site and car parks are to be redeveloped for high density residential use, commercial developments and a bus terminal. As a result an investigation to characterise the quality of the soil and groundwater was required.

A previous soil investigation, undertaken in 1997 by Rust PPK, found areas of contamination and recommended that if the site was to be redeveloped into a more sensitive land use, further investigations should be undertaken to characterise the soil in more detail. On the basis of information available it appears that the contamination is generally limited to fill materials and the natural soil in close proximity to this material. The scope of this investigation was designed to compliment the previous investigation and was reviewed by the Environmental Auditor appointed for this site by the Adelaide City Council.

The site under investigation contains the Franklin Street Bus Station and associated car parks, herein referred to as the Franklin Street Bus Station.

1.2 Investigation Program

This investigation program was aimed at adequately assessing the quality of the site to a point where an acceptable understanding of soil and groundwater quality is achieved.

It was assumed that the materials (natural and fill) are suitable to remain on site. The excavation and replacement of the material would result in a more homogenous quality, relative consistency and higher compaction. The final nature of the site was considered when designing the scope of the investigation, which was to provide an understanding of the quality of the material over the entire site with an emphasis on average conditions. The investigation program involved a theoretical grid formation of sampling sites, however sampling locations were limited by the existing infrastructure on the sites. The sampling sites were designated so as to not overlap the sampling sites from previous investigations, in order to provide greater coverage of the site. It was known from the previous investigation that the fill material was generally confined to the top 1m hence the sampling was generally limited to 3 meters in depth.

The scope of this investigation involved:

- further investigation of soil quality generally in accordance with Australian Standard AS4482
- establishment of groundwater bores and sampling of groundwater

The investigation was designed to compliment and augment the data previously collected by Rust PPK in 1997 by positioning sampling sites in areas not previously tested, greater emphasis on the affect of fill on underlying materials and the application of a broad screen analysis.

The Environmental Auditor assigned to this project agreed to the scope of the investigation.

A site inspection was undertaken on 19 July 2004, the soil investigation was undertaken on the 18-19 August 2004, the groundwater bores were constructed on 23-26 August and groundwater sampling undertaken on 24 September 2004.

2.1 Site Characteristics

The Franklin Street bus station is located in the Adelaide CBD. The site consists of two irregular shaped parcels of land located on the eastern and western sides of Bowen Street, the former is 0.9 hectares in size and the latter 0.5 hectares (refer to Appendix A for a site map). The site is bounded to the north by Franklin Street and to the south by Grote Street. The site consists of a number of terminals, infrastructure supporting the bus station and a number of car parks, both private and public. The site is surrounded by various commercial and light industrial activities.

The site is currently owned by the Adelaide City Council (ACC) and is utilised by a number of passenger and freight companies including Premier Stateline, Coachfreight, Greyhound Pioneer Australia, McCafferty's Express Coaches, The Adelaide Central Mission and two public car parks.

In detail the site under investigation at Franklin Street currently contains:

- Premier Stateline bus terminal and canopy on the north-west of the site
- Coachfreight parcel collection and drop off point in the western side of the site
- A bitumen-sealed private car park in the south-west of the site
- Greyhound and McCaffertey's Express bus terminal and canopy on the north-east of Bowen Street
- A single storey house, a private car park, a toilet block and a two-storey building previously utilised by the Adelaide Central Mission on the south-east of Bowen Street
- Two bitumen sealed public car parks in the east of the site

Appendix A contains a layout of the site.

2.2 Previous Reports

An inspection undertaken by Rust PPK in May 1997 involved 20 sampling sites (boreholes) in a grid pattern across the site. The bores were generally drilled to no more than 2.3m deep. The materials encountered during drilling include:

- Surface layer of yellow silty sand with some gravel overlying dark brown silty clays to depths ranging from 0.5 to 1.2m
- Brick fragments and cinders in 13 out of the 20 boreholes, and fragments of vesicular slag were identified in one of the boreholes
- Natural sediments were calcareous silty clays with some calcareous gravel to about 2m
- At some boreholes the soil became greenish brown at around 2m as it became Hindmarsh Clay

The field observations concluded that there was no visible or olfactory evidence of hydrocarbon contamination recorded at the surface or subsurface soils at any of the boreholes. The visible contamination was ash and cinders.

The soil samples were analysed for a broad spectrum of analytes. The conclusions of the site assessment were that elevated levels of metals (lead, zinc and copper) and PAHs were encountered and total fluoride was also identified. These elevated levels were considered to be associated with the fragments of ash, cinders and/or slag which were observed within the sub-surface soils profile. The soil was also found to be moderately alkaline.

2.3 Site History Summary

A site history was undertaken by Rust PPK in 1997. A summary of conclusions is as follows:

- From 1850 to early 1900's the site was generally used for residential purposes however there were also a number of commercial activities on site including a garage, forge, workshop, bakehouse, and a private road.
- From the 1920's a number of small light industries were established on the site, including a factory, garages, forges, stables, printing works, workshops, shops and offices, for business such as plumbers, radio and electrical companies.
- During the 1960's a large proportion of the residential land in the western part of the site was cleared and used as an open lot car park.
- By 1972 the Corporation of the City of Adelaide (now the ACC) had acquired most of the land comprising the site, except for 104 Grote Street. The land was then cleared, and by 1979 the majority of the existing bus terminals and car parks had been constructed.
- The residences on the 104 Grote Street site were acquired by the Corporation of the City of Adelaide (now the ACC) in the early 1990's and are currently used by the Adelaide Central Mission. The front part of the buildings at 104 Grote Street have been condemned by the Council due to problems with rust and cracking.
- Between 1989 and 1995 a new terminal building was constructed on the eastern side of Bowen Street on what was previously either car or bus parking space.

The site history concluded that it was likely that contaminants were present on site due to a number of past activities.

2.4 Geology

Previous reports suggest that the top one meter of material consists of reworked soils and building rubble, underlying this layer is a Brown Solonised Soil type BS classification. This classification consists of brown sandy to clayey soils with abundant earthy lime and calcrete in the subsoil. Such soils vary from a thin layer to up to 3 meters thick and this layer overlies Hindmarsh Clay.

2.5 Topography

The site is flat and is surrounded by flat land. Any stormwater would run off and enter the municipal stormwater system or soak into the garden beds.

2.6 Groundwater

Previous reports noted that groundwater was expected to be at depths ranging from 6 to 40 meters and no groundwater was encountered when drilling to a depth of 2.3 meters in previous investigations. The aquifers are expected to be in Hallett Cove Sandstone.

3.0 Scope of Work

3.1 Site Inspection

An experienced environmental scientist conducted a site inspection on 19 July 2004 primarily to determine accessibility for drill rigs to various areas within the site. The inspection also confirmed that, as expected, the site is predominantly covered with buildings, concrete and asphalt, as car parks and roadways. Furthermore, the inspection revealed the presence of an underground fuel storage tank (UST) on an adjacent site, situated next to the coach freight car park. An underground services clearance was undertaken by Suresearch on 16 August 2004.

3.2 Soil Investigation

Maunsell, following discussions with the Auditor, decided to undertake a grid based sampling with a view to increasing the accuracy of information relating to the average quality of materials over the site. As a result of this, it was decided that the establishment of 22 grid based boreholes, in conjunction with previous investigation results, would provide sufficient information for this purpose. Fieldwork was carried out by experienced environmental professionals, in accordance with Maunsell's Environmental Investigation Manual.

3.2.1 Soil Sampling

Soil sampling was undertaken on 18 and 19 August 2004 and involved the following activities:

- **Sampling locations.** The sampling locations were laid out in a grid formation across the areas that were accessible, ie. not occupied by buildings. The sampling sites were also chosen not to overlap those sites already tested by Rust PPK in 1997.
- Borehole establishment. Twenty-one boreholes were successfully established for logging and sampling purposes, of those originally planned one location was inaccessible (Bus 18). Each borehole was allocated a unique number, "Bus X" where X is the sampling location, (refer to Figure 1 Appendix A for a site map depicting the sampling locations). The boreholes were established using pushtubes, which were forced by a drill rig, with the resultant soil cores extracted into soil core trays. Photographs were taken of soil cores for 19 out of 21 of the boreholes and are presented in Appendix E. Where pushtubes encountered refusal, or were expected to encounter refusal, (which occurred regularly near the surface in gravelly material), relief augering was undertaken, generally to a depth of no more than 500mm. In such instances, the auger cuttings were used to represent material in these sections.

The majority of boreholes extended to a depth of 2m to 2.5m below ground surface. This depth was extended to 3m in the vicinity of an underground fuel storage tank (UST) (locations Bus 6 & Bus 7), which was identified on an adjacent site during the site inspection, to ensure samples would be obtained from the soil strata near the base of the tank pit. In addition the first two

boreholes Bus 16 & Bus 17 were established to 3m and 3.3m respectively to determine the approximate depth to natural and types of materials likely to be encountered.

All pushtubes and core trays were cleaned with environmental cleaning equipment prior to use for each borehole.

Borehole locations were measured by hand using surrounding landmarks and buildings as reference points, with locations chosen to compliment, not overlap, previous investigations.

- Soil logging. During soil core extraction, the material was logged. Logs were only kept for failed bores that met refusal at a depth of 0.5m or greater. Specific characteristics of the materials, such as moisture content, colour and particle size were observed and noted on the log sheets, in addition to the type of material being extracted. Additional information recorded on the borelogs included sampling intervals, sample and duplicate numbers, field observations, comments relating to the material and approximate location of natural material. The log sheets are presented in Appendix B.
- **Sampling preparation.** The sample jars were labelled in the field prior to beginning each borehole. Sample jars were labelled as follows:

BusX-#

- BusX denotes the sampling location (described above)
- '#' is the sample designation and is either A, B or C
- If a duplicate sample was collected the letter 'A' was added immediately after the '#'

In general, from each borehole, a sample (the A sample) was taken from material identified as being fill material, and a second sample (the B sample) was taken containing natural material immediately underlying the fill. Additionally, a third sample (the C sample) was taken from boreholes Bus 6 & 7 to investigate the quality of soil strata assumed to be at the base of the adjacent UST.

Sampling. Drill rig mounted pushtubes were used to extract soil cores. Where pushtubes encountered refusal, relief augering was undertaken as described above. Soil cores were then placed in a soil core tray. The sampling interval was determined and the section representing the interval separated from the rest of the core. The section was then hand-mixed in the tray and sampled. Sample jars were kept in an esky with ice until transportation to the laboratory.

Samples were collected by hand. Clean gloves were used for each sample to avoid crosscontamination. In addition, natural materials were handled first to reduce the risk of any cross-contamination involving materials from fill sections mixing with samples containing natural material prior to sampling. It was considered less likely that false-positive results would occur as a result of natural material in fill samples.

Quality sampling. Quality sampling was undertaken at or above the rates indicated in Table 1.

Table 1 – Quality Sampling		
Quality Sampling	Rate	
Intra Laboratory Duplicate	1 per 20 regular samples	
Inter Laboratory Duplicate	1 per 20 regular samples	

The procedure for collecting the quality sample was the same as for normal samples, but the mixed material was sequentially added to each jar to ensure the samples were as analogous as possible.

- On-site screening. Material from the soil core was screened at half metre intervals for volatile organic carbon using a MiniRae 2000 Photo-ionisation Detector (PID). Material was collected separately from any laboratory samples. Material from each interval was placed in a separate sealed plastic bag and stored in an esky. At the completion of each borehole, these bags of soil were tested using the PID with readings recorded on borelogs, presented in Appendix B.
- Tracking of samples. Tracking of samples was undertaken using a summary spreadsheet developed for the purpose of creating Chain of Custody (COC) documentation. All sample numbers and duplicates were listed in the spreadsheet.

The spreadsheet allows for the allocation of laboratory testing for all samples and calculates the total number of original and duplicate samples, the percentage of duplicates to original samples and the percentage of natural material containing samples tested to those collected. In addition, sample hold times, tests undertaken on each sample, and laboratory report numbers are recorded on this spreadsheet. The spreadsheet is provided in Appendix C.

COCs were sent to the laboratory with the instructions of the analysis required. The laboratory checked the condition and number of samples, and signed and returned by fax a copy of the COC to confirm receipt of samples.

3.2.2 Analytical Testing

The following scope of analytical testing was undertaken:

- Analysis of all A (ie fill) samples for Victorian EPA (VIC EPA) Screen and pH
- Analysis of 50% of randomly selected B (ie containing natural material) samples for VIC EPA Screen and pH

- Analysis of all C (ie near assumed base of UST) samples for VIC EPA Screen and pH
- PID field analysis of material for Volatile Organic Carbon at half metre intervals in every borehole
- Collection and analysis of duplicate samples at rates indicated in Table 1, with duplicates being of fill material only, to reduce the likelihood of original and duplicate analytes all returning results less than the limits of reporting, thus voiding the usefulness of duplicate analysis.

Analyses of soil samples were conducted by MGT Environmental Consulting Pty Ltd. The laboratory holds National Association of Testing Authorities (NATA) registration for the parameters listed in Table 2.

Parameter	Analytical Method	Limits of Reporting	Number of Samples Tested
pH (unitless)	US EPA SW846 or APHA Standard	0.1	34 + 4 quality
	Methods 19" Edition 1995		
Metals Screen	US EPA 6010B (ICP), 7470/1 (CVAA)	Various	34 + 4 quality
МАН	US EPA SW846 Methods 8021B, 8260B, 5030 & MGT 350A	0.05	34 + 4 quality
РАН	US EPA SW846 Method 8310(HPLC) & 8270C(GC/MS)	Various (0.1-2)	37 + 4 quality
TRH	MGT Method 100A-GC	Various (20-500)	34 + 4 quality
Phenols & Cresols	HPLC – JRNL. CHROM 464(1989) 405- 410	0.1, 0.2 or 0.5	34 + 4 quality
Cyanide	US EPA SW846 Method 9010B	5	34 + 4 quality
Chlorinated Hydrocarbons	US EPA SW846 Method 8021B	0.05, 0.1 or 0.2	34 + 4 quality
Organochlorine Pesticides	US EPA SW846 Method 8081A	0.05, 0.1 or 0.2	34 + 4 quality
Polychlorinated Biphenyls	US EPA SW846 Method 8082	Various (0.1-2)	34 + 4 quality

Table 2 - Analytical Methods and Limits of Reporting

Note - Units are in mg/kg unless otherwise stated.

Interlaboratory duplicates were analysed by ALS Environmental. The laboratory holds NATA registration for the parameters listed in Table 3.

Table 3 – Analy	rtical Methods and	Limits of Reporting	g for ALS Environmental
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Parameter	Analytical Method	Limits of Reporting	Number of Samples Tested
pH (unitless)	APHA 4500-H ⁺ B	0.1	3
Metals Screen	ICP/AES	0.1 or 1	3
MAH	USEPA8260 P&T/GC	0.2	3
PAH	GC/MS – SIM	0.5 or 1	3
TRH	P&T/GC/MS/FID & GC/FID	Various (2-100)	3

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Parameter	Analytical Method	Limits of Reporting	Number of Samples Tested
Phenols & Cresols	APHA 5530 B&D	0.5 or 1	3
Cyanide	APHA 4500-CN C&N	1	3
Chlorinated Hydrocarbons	USEPA8270 GC/MS	1,3 or 0.5	3
Organochlorine Pesticides	GC/ECD/ECD/MS	0.2, 0.1 or 0.05	3
Polychlorinated Biphenyls	GC/ECD/ECD/MS	0.1	3

Note - Units are in mg/kg unless otherwise stated.

In addition to laboratory testing, field analysis for volatile organic carbon was undertaken using a PID meter. These results are presented on the environmental logs in Appendix B.

3.3 Groundwater Investigation

Following on-site discussions with the Auditor, it was decided to establish 5 groundwater wells positioning one in each corner of the site and one in the approximate centre of the site. The number and position of the wells allows for water quality monitoring at the site boundaries as well as the interior, and provides sufficient information to determine hydraulic gradients and groundwater contours that assist interpretation of results. Fieldwork was carried out by experienced environmental professionals, in accordance with Maunsell's Environmental Investigation Manual.

3.3.1 Groundwater Sampling

The groundwater wells were established between 23 and 26 August 2004. Sampling was undertaken on 24 September 2004. These activities involved the following:

- **Sampling locations.** Five groundwater wells were established, one in each corner of the site and one in the approximate centre of the site.
- Groundwater well establishment. Five groundwater wells were established (refer to Figure 2, Appendix A for a site map indicating the locations of groundwater wells). Each monitoring well was allocated a unique number, "MWX¹" where X is the monitoring well location.

According to PIRSA, it was expected that groundwater would be reached at a depth of not more than 15m. This proved inaccurate, and final depths of wells were determined on the basis of wet auger cuttings and the difficulty of drilling experienced at depth, assumed to be due to sandstone. The final depths and materials encountered suggested this was a Tertiary aquifer

¹ With regards to labelling, it should be noted that the groundwater wells at the Balfours site, the other site in the Central West Precinct project, also have wells labelled 'MW' as was noted in reports forwarded to Maunsell post well establishment at the bus station site. Maunsell have not changed the well labels from the bus station site as laboratory reports had already been created using the originally developed labelling scheme.

located in Hallett Cove Sandstone. Drilling depths ranged from approximately 19.5m to 22m, with collapses reducing the actual depth of wells.

The bores were drilled using 110mm solid augers. Upon withdrawal of the augers, PVC pipe was inserted into the borehole and forced into collapsed materials using the drill rig. The wells were constructed using 50mm diameter PVC pipe, with a 3m machine slotted section, across the water bearing interval, at the base of each. Additionally 100mm long conical end pieces were attached to assist pushing through collapsed materials. Approximately 1.4m to 2.4m of water was present in each well.

Upon verbal instruction from PIRSA, the annulus required construction as follows:

- Sand pack was to be in place to at least 0.5m above screen
- At least 1m of bentonite seal above the sand pack
- Several metres (approximately 5m) of concrete above bentonite to ensure the aquifer reached was not able to be infiltrated by water from any aquifers above, perched or otherwise, none of which were encountered in the field
- Bentonite seal to surface

Detailed well construction information is provided on environmental logs in Appendix B

Additionally, gatic covers were installed over the capped pipes and casing, the PVC pipe was cut just below ground surface and a thin concrete layer placed over bentonite around the capped well. The locations and tops of casing (TOC) level were surveyed for all wells. The TOC level to mAHD is recorded on the logs.

An initial attempt to establish MW6 (north west corner of site in a private carpark) was abandoned due to substantial water being encountered at less than 3m in depth, with standing water existing at a depth of approximately 1.8m. The water intercepted was sitting on firm, slightly moist clay. Due to the depth and quantity, it was not possible to continue drilling in this area and the bore was backfilled and abandoned. It was assumed this water was the result of localised leaking underground water infrastructure and not directly relevant to the investigation of groundwater. The eventual position of this well was moved east several meters, as it was known that a borehole previously drilled in the area, Bus 1, was not affected by subsurface water. The environmental log relating to the failed attempt is labelled MW6(a) and is provided in Appendix B.

 Soil logging. During well establishment, material derived from auger cuttings extracted from the borehole was logged at approximately 1m intervals. Specific characteristics of the materials, such as moisture content, colour and particle size were observed and noted on the log sheets, in addition to the type of material being extracted. Observations were recorded at 1m intervals with depths of material being approximate as a reflection of the difficulty of depth estimation using auger cuttings, particularly in situations where borehole collapse may have occurred. The log sheets are presented in Appendix B.

- Bore Development. Wells were developed on 30 and 31 August 2004 using disposable bailers to remove soil fines and water disturbed or introduced during drilling. Approximately five well volumes of groundwater were extracted from four of the wells. Monitoring well MW8 had the equivalent of approximately 2.5 well volumes of groundwater removed as the water level dropped significantly to the point where extraction with a bailer was no longer possible. The recharge rate in this well appears low. The water obtained prior to this point indicated that the groundwater had become reasonably clear and that, to achieve the purposes of development, sufficient groundwater had been extracted. Records of development are provided in Appendix D.
- Sampling preparation. The sample bottles were labelled prior to going on site. Sample bottles
 for a particular well were removed from the site vehicle immediately prior to sampling and after
 purging. Sample bottles were labelled with the groundwater well designation (ie MWX as
 described above) as only one sample was to be taken from each well.
- **Sampling.** Groundwater sampling was undertaken on 23 September 2004. Depths to water were measured prior to sampling, on the day of sampling, from the highest point on the pipe.

All wells were purged prior to sampling until conductivity, pH and temperature readings, measured in the field using a TPS WP81 multi-parameter meter, had stabilised and at least 3 bore volumes were removed or until purged dry. Purging was undertaken using bailers. Groundwater well summary records for purging prior to sampling of each well are provided in Appendix D.

Following determination that stabilisation had occurred, samples were then taken from the well using a disposable bailer. One sample was collected from each well. Appropriate sampling bottles were used and all samples were stored in an esky with ice prior to transportation to the laboratory to ensure that optimal storage conditions were achieved relating to the type of analysis to be undertaken.

A new disposable bailer was used for each individual well. The bailer was used for both purging and sampling.

• Quality sampling. It was originally envisaged that the investigations undertaken at Franklin Street Bus Station and at the Balfours site would be reported together. As a result of this, quality sampling objectives were to be achieved over the investigation as a whole. A decision was made prior to going into the field, that the quality groundwater sample would come from the Balfours site. Franklin Street Bus Station wells were sampled first and due to unforeseen circumstances the quality sample was not collected at the Balfours site, therefore there are no quality samples for groundwater in this report.

- **On site screening.** Conductivity, pH and temperature of the groundwater were measured in the field using a TPS WP81 multi-parameter meter to ensure stabilisation of water during purging prior to sampling. This data is provided in the developing and purging records in Appendix D.
- Tracking of samples. Tracking of samples was undertaken using a summary spreadsheet developed for the purpose of creating Chain of Custody (COC) documentation. All sample numbers were listed in the spreadsheet.

The spreadsheet allows for the allocation of laboratory testing for all samples. In addition, sample hold times, tests undertaken on each sample, and laboratory report numbers are recorded on this spreadsheet. The spreadsheet is provided in Appendix C.

COCs were sent to the laboratory with the instructions of the analysis required. The laboratory checked the condition and number of samples, and signed and returned by fax a copy of the COC to confirm receipt of samples.

3.3.2 Analytical Testing

The following scope of analytical testing was undertaken:

- Analysis of all samples for Victorian EPA (VIC EPA) Screen and pH
- Field analysis of samples for conductivity, pH and temperature

Analyses of groundwater samples were conducted by MGT Environmental Consulting Pty Ltd. The laboratory holds National Association of Testing Authorities (NATA) registration for the parameters listed in Table 4.

Parameter	Analytical Method	Limits of Reporting	Number of Samples Tested
pH (unitless)	US EPA SW846 or APHA Standard	-	5
	Methods 19 th Edition 1995		
Metals Screen	US EPA 6010B (ICP), 7470/1 (CVAA)	Various	5
MAH	US EPA SW846 Methods 8021B, 8260B,	0.001	5
	5030 & MGT 350A		
PAH	US EPA SW846 Method 8310(HPLC) &	0.002, 0.005, 0.0001,	5
	8270C(GC/MS)	or 0.0002	

Table 4 - Analytical Methods and Limits of Reporting - Groundwater

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Parameter	Analytical Method	Limits of Reporting	Number of Samples Tested
TRH	MGT Method 100A-GC	0.02, 0.05, 0.1	5
Phenols & Cresols	HPLC – JRNL. CHROM 464(1989) 405-	0.0001, 0.0002 or	5
	410	0.0005	
Cyanide	US EPA SW846 Method 9010B	0.005	5
Chlorinated Hydrocarbons	US EPA SW846 Method 8021B	0.0001 or 0.0005	5
Organochlorine Pesticides	US EPA SW846 Method 8081A	0.001 or 0.0001	5
Polychlorinated Biphenyls	US EPA SW846 Method 8082	0.001 or 0.01	5

Note - Units are in mg/l unless otherwise stated.

4.0 Quality

4.1 General

Maunsell conducts investigations in accordance with a quality assurance/control system (QA/QC). The 'National Environment Protection (Assessment of Site Contamination) Measure, 1999', states that a quality assurance system is 'actions, procedures, checks and decisions to ensure representativeness and integrity of samples and accuracy and reliability of analysis results'. It goes on to say that the system involves 'selection of appropriate sampling and presentation methods, documentation and sample storage, cleaning of tools before sampling and between samples, cleaning of containers, maintenance of sample environment to minimise sample contamination and analyte losses, delivery to the laboratory in good condition and within timeframes required for the particular analytes'.

Maunsell has developed an Environmental Investigation Manual, which provides the basis for undertaking environmental investigations and the QA/QC procedure.

The Maunsell QA/QC procedures include:

- Application of a third party accredited quality system in accordance with the ISO9000 series
- Use of established procedures and suitably qualified field personnel for environmental sampling
- Documentation of chain-of-custody and sample handling and storage
- Use of NATA registered laboratories as preselected subconsultants performing interlaboratory quality control checks
- Use of field duplicates and field blank samples

Quality of project outputs is maintained by:

- Ensuring all staff are appropriately trained
- Safety standards are defined and implemented
- Good housekeeping practices are adopted during all phases of the project
- Complete records of fieldwork, samples and data are maintained

Specific quality control procedures conducted for this project include:

- The use of appropriate sample collection and handling procedures
- The use of appropriately skilled and experienced personnel
- The application of decontamination procedures where appropriate to minimise cross contamination
- The extraction and analysis within appropriate handling times
- The use of an independent, NATA accredited laboratory for analysis
- The collection and analysis of blind duplicates, split duplicates, and internal laboratory duplicates and matrix spike/matrix spike duplicates

4.2 Field QA/QC Procedures

The laboratory supplied clean jars for soil samples and clean bottles for water samples. The jars were labelled in the field prior to borehole establishment based on the predetermined sampling program. The bottles were labelled in the office prior to sample collection based on the predetermined sampling program. On site the jars and bottles were filled with a soil sample or water sample respectively and stored in an esky with ice. At the end of each day samples were stored in a refrigerator if not sent to the laboratory. During transportation to the laboratory the samples were packed in an esky with ice and packaging to avoid damage.

Blind (intralaboratory) and split (interlaboratory) duplicate samples were collected in the field at the rates specified in Table 1. No water quality samples were collected for the reasons stated in Section 3.3.1.

4.3 Laboratory QA/QC Procedures

During the analysis of samples, the analytical laboratory conducted internal QA/QC procedures including the analysis of laboratory duplicates, laboratory spiked samples and method blank samples. All percentage recoveries for laboratory spiked sample analyses were between the acceptance criteria of 70-130%.

Method blank results are of an acceptable quality. Method blank and spiked sample results are presented on analytical reports in the accompanying document 'Franklin Street Bus Station Laboratory Reports'.

4.4 Analytical Procedures

4.4.1 Duplicates

Duplicate samples were collected to provide an indication of the sampling and analysis process. Duplicate soil samples were analysed for the full range of parameters. The duplicate soil sample results are presented on analytical reports in the accompanying document 'Franklin Street Bus Station Laboratory Reports' and in the quality assessment data provided in Appendix F.

Relative Percentage Differences (RPDs) for intra- and inter-laboratory duplicate samples were calculated and are presented in Appendix F. It was noted that several elevated RPDs were observed for samples where results were relatively low, close to the limits of laboratory reporting, or where limits of reporting differed between laboratories.

Based on a qualitative assessment of the data, it appears that neither laboratory is consistently over or underestimating and that the difference in the reported results is not a reflection of laboratory procedures, but rather the inherent heterogeneity of soil, particularly fill material.

4.5 QA/QC Discussion

Quality assurance and quality control was conducted in accordance with Maunsell's Environmental Investigation Manual to ensure that data of known quality is reported.

The required scope of samples collected, analytical testing, and quality testing was achieved for soil samples. The required scope of samples collected and analytical testing was achieved for groundwater samples. Ideally, given that the Franklin Street Bus Station investigation is now being presented separately to the Balfours site investigation, a ground water quality sample should have been collected and analysed for the same range of analytes as the original sample. This was not undertaken. However it is considered that due to the similarity of the results from each of the five wells this does not unduly affect the level of confidence in the accuracy of the results obtained.

Specific aspects of the project used to maintain QA/QC were:

- Field Procedures the design of the investigation, including the collection of duplicates, is of a standard that provides confidence in the quality of the samples collected
- Analytical Procedures The laboratory's internal QA/QC results indicate that analytical information provided by the laboratory is reliable
- Inter- and Intra-Laboratory Duplicate Samples the results indicate that there was no bias in the analysis as a consequence of the selection of the laboratory

Three B samples were analysed for PAHs outside of recommended holding times. These samples were not originally selected for analysis but were later chosen to undergo testing due to the elevated levels of PAHs in the A samples from these boreholes. It is considered that these results may still be valid as the analytes of interest are PAHs, and in particular the less volatile PAHs, which are not likely to significantly decline over time through volatilisation. A table comparing the volatility of PAHs to water (a non volatile substance) is presented in Appendix F and forms the basis for this reasoning.

Based on the QA/QC information available for this project, the results are of an appropriate standard and can be used as part of a basis of interpretation of site conditions.

5.0 Results

5.1 General

The current investigation was designed to complement the previous Rust PPK investigation of 1997, in part by decreasing the effective grid size of soil testing and undertaking, for the first time, groundwater monitoring. By doing so, confidence in the accuracy of all findings regarding the site conditions at the Franklin Street Bus station was to be increased. As a result of the complementary nature of investigations, undertaken by independent consultancies, results and statistical analysis performed on results from both reports are presented in combined and individual formats in Appendix G. Only the metals, PAH and pH results from the Rust PPK investigation have been presented in this report, as a reflection of the concerns highlighted in their report. The assessment criteria being used in this report are the currently accepted guidelines as presented in the National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPM). It is recognised that these criteria differ to those applicable at the time of the previous investigation by Rust PPK in 1997.

5.2 Assessment Criteria

5.2.1 Soil

The laboratory analysis results for soil have been assessed against the appropriate NEPM Health Investigation Levels (HILs) as presented in Table 5-A of that document. The proposed use of the site as high-rise residential and commercial/industrial suggest NEPM HILs 'D' and 'F' respectively are the most appropriate guidelines. Initial comparison is made with the more conservative NEPM HIL 'D', based on an exposure setting of residential with minimal opportunities for soil access. Where analytical results conform to NEPM 'D' guidelines, it is therefore inferred that the results also satisfy NEPM 'F' guidelines. The NEPM states "investigation levels provide a trigger to assist in judging whether a detailed investigation of a site is necessary". Consequently, NEPM HIL 'D' is herein referred to as preliminary acceptance criteria as, if not exceeded, Auditor appointed site specific criteria may not be required. However, comparison is also made with interim urban ecological investigation levels (EILs) where data and guidelines exist. Triggered EILs give an indication of the potential for toxicological effects should sensitive receiving environments exist.

5.2.2 Groundwater

All waters in South Australia are to be considered as being suitable for potable use and are to be assessed against the South Australian Environment Protection (Water Quality) Policy 2003 (SAEPP) potable water criteria. The field measurements of total dissolved solids suggest the groundwater is too saline for potable use. The Australian Water Quality Guidelines for Fresh and Marine Waters November 1992 suggest the salinity of the groundwater classifies it as high-salinity water not suitable for irrigation water under ordinary conditions. As a consequence of this classification, groundwater results are compared to SAEPP Irrigation criteria.

5.2.3 Statistics

The statistical analysis performed on results are the same for both groundwater and soil investigations.

Statistical calculations such as the mean, standard deviation and 95% upper confidence level of the arithmetic mean (95%UCL) were undertaken for each analyte detected at concentrations above the limit of reporting. The confidence statistic provides a measure of the uncertainty of the estimate of the population proportion, that is there is a 95% confidence that the true unknown mean of the population portion is in the computed interval. The standard deviation and 95%UCL were only calculated where there were three or more samples in the data set. The 95%UCLs were initially calculated based on the assumption of normal data distribution. For analytes identified as potentially being of concern (benzo(a)pyrene and total PAHs), reassessment of data distribution and recalculation of 95%UCL values was undertaken using a computer program ProUCL 3.0, developed for the US EPA. These recalculations are presented in Appendix G.

It is acknowledged that some individual samples may exceed guideline levels, however the focus of this report are the 95%UCL values relating to the average quality of material over the entire Bus Station site. For reference, summary results are provided in Appendix G and original laboratory reports are provided in the accompanying document to this report, "Franklin Street Bus Station Laboratory Reports".

The 95%UCL of sample sets was assessed against the appropriate guidelines described above.

In the data summaries provided in Appendix G, half of the limits of reporting (LOR) were used for the purposes of statistics and are known as proxy values. The italics and blue text indicate these results. As a result the total PAH was re-calculated by Maunsell using half the limits of reporting, which is different to the methodology used by the laboratory.

In the discussion of the results, the statement "all samples returned results less than the limits of reporting" implies that all samples, A, B and C, are below the specified criteria.

5.3 Log Findings

5.3.1 Soil

The borehole logs for the soil investigations can be found in Appendix B. Summaries of these logs are presented in Table 5.

Looution	(m)	Interface Depth (m)	Description of Natural Substrate	Description of Fill
Bus1	2.4	0.8	Sandy clay, sandy silty clay, minor gravel	Surface asphalt, gravelly sand, clay
Bus2	2.4	1.45	Sandy silty clay, clay	Surface asphalt, gravelly sand, sand, crushed masonry, minor wood
Bus3	2.25	0.6	Sandy silty clay, clay	Surface asphalt, gravelly sand, clay
Bus4	2.1	0.75	Sandy clay, sandy silty clay	Surface asphalt, gravelly sand, sand clay, min organic matter
Bus5	2.4	0.5	Clay	Surface asphalt, gravelly sand, clay
Bus6	3.0	0.75	Clay, sandy silty clay	Surface asphalt, gravelly cobbly sand, clay
Bus7	3.0	0.75	Clay, sandy silty clay	Surface asphalt, gravelly cobbly sand, clay
Bus8	2.4	0.65	Clay, sandy clay, sandy silty clay	Surface asphalt, gravelly sand, clay
Bus9	2.1	0.3	Clay	Sand, gravelly sandy clay
Bus10	2.4	0.7	Sandy silty clay, clay	Surface asphalt, gravelly sand, gravelly sand
Bus11	2.1	0.7	Sandy silty clay, clay	Surface asphalt, gravelly sand, gravelly sand
Bus12	2.4	0.7	Clay, sandy silty clay	Surface asphalt, gravelly sand, gravelly sandy clay, clay
Bus13	2.4	1.05	Sandy silty clay, clay, minor gravel	Surface asphalt, gravelly sand, gravelly sandy clay, clay
Bus14	2.1	0.75	Silty clay, clay	Surface asphalt, gravelly sand
Bus15	2.4	0.55	Sandy silty clay, clay	Surface asphalt, gravelly sand, gravelly sand
Bus16	3.0	1.15	Clay, sandy silty clay	Surface asphalt, gravelly sand, gravelly sand
Bus17	3.3	1.0	Clay, sandy silty clay	Surface asphalt, gravelly sand, gravelly sand clay, clay
Bus19	2.4	0.55	Clay, gravelly sandy clay, sandy silty clay	Surface asphalt, gravelly sand, gravelly sand
Bus20	2.4	0.55	Clay	Surface asphalt, gravelly sand, gravelly sand clay
Bus21	2.1	0.55	Calcrete, sandy clay, clay, minor root material	Surface asphalt, gravelly sand, gravelly sand clay
Bus22	2.1	0.65	Silty sandy clay, clay	Surface asphalt, sand, concrete, gravelly san
Bus22	0.5	-	-	Surface asphalt, gravelly sand, sandy gravelly

Soil and Groundwater Investigation Central West PrecinctJ:\2004\40032004.00\Report\058SDG.doc Revision A November 2004 J:\2004\40032004.00\Report\058SDG.doc Pag It was noted during the investigation that the fill/natural interface often showed signs of a layer of reworked natural material, mixed with above fill materials. This was classified as fill material for the purpose of this investigation.

5.3.2 Groundwater

The borehole logs for the groundwater investigations can be found in Appendix B. Summaries of these logs are presented in Table 6.

Sample Location	Total Depth (m)	Fill/Natural Interface Depth (m)*	Description of Natural Substrate	Description of Fill
MW5	20.3	1	Sandy silty clay, clay, sandy clay, sand, hard drilling suggests sandstone	Surface asphalt, gravelly cobbly sand, clay
MW6 (a)	5.0	1	Sandy clay, clay	Surface asphalt, gravelly sand, clay
MW6 (b)	22.0	1	Sandy clay, sandy silty clay, clay, gravelly clayey sand, gravel is crushed sandstone	Surface asphalt, gravelly sand, clay
MW7	21.8	1	Clay, sandy silty clay, sand, hard drilling suggests sandstone	Surface asphalt, gravelly sand, gravelly sandy clay, clay
MW8	19.6	0.5	Sandy silty clay, clay, sandy clay, clayey sand, sand, hard drilling suggests sandstone	Surface asphalt, gravelly sand, gravelly sandy clay
MW9	19.3	1	Sandy silty clay, clay, sand, rock, presume sandstone based on hard drilling and gravel fragments	Surface asphalt, gravelly sand

Table 6 – Groundwater Borehole Log Findings

*Approximate as generally only logged at 1m intervals

Groundwater was generally found at a depth of between 26.3mAHD and 25.7mAHD. A groundwater contour map, provided as Figure 2 in Appendix A, indicates the groundwater flow to be toward the northwest.

5.4 Monocyclic Aromatic Hydrocarbons

5.4.1 Soil

There were no preliminary acceptance criteria specified for MAHs. All samples returned results less than the limits of reporting with the exception of Bus2-A and Bus6-C, in which xylenes were detected at a level of 0.62mg/kg and 0.14mg/kg respectively.

5.4.2 Groundwater

There were no irrigation acceptance criteria specified for MAHs. All samples returned results less than the limits of reporting.

5.5 Phenols and Cresols

5.5.1 Soll

The NEPM D HIL specified for phenol was 34,000mg/kg. There were no acceptance criteria specified for cresols. All samples returned results less than the limits of reporting.

5.5.2 Groundwater

There were no irrigation acceptance criteria specified for phenols and cresols. All samples returned results less than the limits of reporting.

5.6 Chlorinated Hydrocarbons

5.6.1 Soil

There were no preliminary acceptance criteria specified for chlorinated hydrocarbons. All samples returned results less than the limits of reporting.

5.6.2 Groundwater

There were no irrigation acceptance criteria specified for chlorinated hydrocarbons. All samples returned results less than the limits of reporting.

5.7 Organochlorine Pesticides

5.7.1 Soil

The preliminary acceptance criteria specified for organochlorine pesticides are presented below in Table 7.

Table 7 – Acceptance Criteria for Organochlorine Pesticides		
Analyte	NEPM 'D' HIL (mg/kg)	
Aldrin + Dieldrin	40	
Chlordane	200	
DDT + DDD + DDE	800	
Heptachlor	40	

All samples returned results less than the limits of reporting with the exception of two A samples, BUS2-A and Bus9-A, in which DDT was detected at levels well below the acceptance criteria. The mean and 95%UCL value were also well below acceptance criteria for this analyte.

5.7.2 Groundwater

The acceptance criteria for organochlorine pesticides states that it must not be detectable when measured by a method approved by the Authority. All samples returned results less than the limits of reporting.

5.8 Polychlorinated Biphenyls

5.8.1 Soil

The NEPM D HIL specified for total PCBs was 40mg/kg. All samples returned results less than the limits of reporting.

5.8.2 Groundwater

There were no irrigation acceptance criteria specified for PCBs. All samples returned results less than the limits of reporting.

5.9 Cyanide

5.9.1 Soil

The NEPM D HIL specified for free cyanide was 1000mg/kg. All samples returned results less than the limits of reporting with the exception of Bus9-A and Bus13-B in which cyanide was detected at levels well below the acceptance criteria. The mean and 95%UCL values were also well below acceptance criteria for this analyte.

5.9.2 Groundwater

There were no irrigation acceptance criteria specified for cyanide. All samples returned results less than the limits of reporting.

5.10 pH

5.10.1 Soil

There was no preliminary acceptance criteria specified for this analyte. The values of pH ranged from 8.3 to 11.

5.10.2 Groundwater

The criteria for pH were 4.5 to 9 for irrigation water. The values of pH ranged from 7 to 7.3, which were within the criteria range.

5.11 Total Recoverable Petroleum Hydrocarbons

5.11.1 Soil

There were no preliminary acceptance criteria specified for TRHs as analysis for classification as aromatic or aliphatic was not undertaken. TRH fractions C_{29} - C_{36} were detected in samples Bus5-A (160mg/kg), Bus16-A (310mg/kg) and Bus20-A (110mg/kg). TRH fractions C_{15} - C_{28} were detected in samples Bus3-A (110mg/kg) and Bus9-A (110mg/kg). All other samples returned values less than the limits of reporting. Detected levels are considered low as most are just above the limit of reporting.

5.11.2 Groundwater

There were no irrigation acceptance criteria specified for TRHs. All samples returned results less than the limits of reporting.

5.12 Metals

5.12.1 Soil

The preliminary acceptance criteria and EILs specified for metals analysed are presented below in Table 8. References are made to PPK results as discussed in Section 5.1, above.
Table 8 – Preliminary Acceptance Criteria for Metals											
Analyte	NEPM 'D' HIL (mg/kg)	NEPM Interim Urban EIL (mg/kg)									
Arsenic	400	20									
Beryllium	80	Not specified									
Cadmium	80	3									
Chromium (III)	480,000	400									
Chromium (VI)	400	1									
Cobalt	400	Not specified									
Copper	4,000	100									
Lead	1,200	600									
Manganese	6,000	500									
Methyl Mercury	40	1 (inorganic mercury)									
Nickel	2,400	60									
Zinc	28,000	200									

Several analytes were detected in a number of samples, including A, B and C samples, with all analytes returning mean and 95%UCL values well within the preliminary acceptance criteria, where specified. Combined results from the two investigations show several analytes were detected in a number of samples, both those designated as fill and natural, with all analytes returning mean and 95%UCL values well within the preliminary acceptance criteria, where specified.

Comparing the results from the Rust PPK investigation to the currently applicable criteria indicates that although several analytes were detected in a number of samples, from fill and natural, all analytes returned mean and 95%UCL values within preliminary acceptance criteria, where specified.

With regard to EILs, the 95%UCL values for copper in Maunsell A samples and zinc in Maunsell A and PPK Fill samples combined exceed these guidelines, although not substantially. The 95%UCL value for copper in Maunsell A and PPK Fill samples is close to the guideline level. Total chromium levels from Maunsell A, B, Maunsell A and PPK Fill combined, and Maunsell B and PPK natural combined are within the Chromium (III) EIL. All other 95%UCL values for analytes are within EIL guidelines, where specified.

5.12.2 Groundwater

The irrigation acceptance criteria for metals are presented in Table 9.

Table 9 - Criteria for Metals	
Analyte	Irrigation
Antimony	Not specified
Arsenic	0.1
Beryllium	0.1
Cadmium	0.01
Chromium (total)	1
Cobalt	0.05
Copper	0.2
Lead	0.2
Mercury	0.002
Molybdenum	0.01
Nickel	0.2
Selenium	0.02
Tin	Not specified
Zinc	2

Criteria specified in mg/L

Several analytes were detected in a number of samples, with all samples returning mean and 95%UCL values within the criteria where specified.

5.13 Polynuclear Aromatic Hydrocarbons

5.13.1 Soil

The NEPM D HIL specified for Total PAHs is 80mg/kg. The NEPM D HIL specified for Benzo(a)Pyrene is 4mg/kg. Remaining PAHs do not have individual guideline levels specified in the NEPM. References to PPK results are made as discussed in Section 5.1, above. Several analytes were detected in a number of A samples although the majority of samples returned results less than the limits of reporting for all PAHs. Samples Bus3-A, Bus9-A and Bus16-A returned results indicating elevated levels of PAHs. The lower samples (B samples) from these boreholes were then tested with two of the three returning values lower than the limits of reporting for all PAHs and one (Bus16-B) indicating the presence of several PAHs at levels just above the limit of reporting, and well below preliminary acceptance criteria, where specified.

The remainder of all B samples tested, and all C samples tested, returned results lower than the limits of reporting for all PAHs. The means and 95%UCLs calculated for analytes from all B samples were within preliminary acceptance criteria, where specified. This is also true of combined Maunsell B and PPK natural samples. Only one PPK natural sample was tested for PAHs with all samples returning results lower than the limits of detection. No calculations were done on C samples as only two samples were tested (see Section 5.2.3).

A qualitative and semi-quantitative (based on interquartile range) assessment of data sets for Benzo(a)pyrene and Total PAHs for A samples indicates that both will be skewed due to the presence of one outlying result (sample Bus16-A). As such, the data distributions were reassessed, and the 95%UCLs were recalculated using mathematical methods appropriate for the determined data distribution type. The recalculations are presented in Appendix G. Tables 10 and 11 below compare 95%UCL values calculated based on normal distribution and reassessed data distributions, both with and without the outlying result, for Benzo(a)pyrene and Total PAHs respectively.

Sample Set	Mean	Maximum	Standard Deviation	95% UCL	HIL NEPM D	Compliance Value* ¹
Maunsell A	0.73	12	2.59	1.83	4	0.46
Maunsell A (recalculated)*2				6.35	4	1.59
Maunsell A (outlier removed- recalculated) * ²				0.36	4	0.09
Maunsell A and PPK Fill	0.6	12	2.20	1.40	4	0.35
Maunsell A and PPK Fill (recalculated) * ²				4.56	4	1.14
Maunsell A and PPK Fill (outlier removed-recalculated) * ²				0.85	4	0.21

Table 10 – Statistics of Benzo(a)pyrene results against NEPM D HIL (A samples)

All results specified as mg/kg

*1 Compliance value is 95% UCL/Criteria - thus values of 1 or less indicate compliance with preliminary acceptance criteria

*²Data distribution is non-parametric

Sample Set	Mean	Maximum	Standard Deviation	95% UCL	HIL NEPM D	Compliance Value* ¹
Maunsell A	7.25	113.5	24.4	17.7	80	0.22
Maunsell A (recalculated)*2				60.3	80	0.75
Maunsell A (outlier removed- recalculated) * ²				4.2	80	0.05
Maunsell A and PPK Fill	6.0	113.5	20.6	13.3	80	0.16
Maunsell A and PPK Fill (recalculated) * ²				43.3	80	0.54
Maunsell A and PPK Fill (outlier removed-recalculated) * ²				4.9	80	0.06

All results specified as mg/kg

*1 Compliance value is 95% UCL/Criteria - thus values of 1 or less indicate compliance with preliminary acceptance criteria

*2Data distribution is non-parametric

5.13.2 Groundwater

There were no irrigation acceptance criteria specified for PAHs. All samples returned results less than the limits of reporting.

6.0 Conclusions

6.1 General

This investigation was designed to expand on the previous study undertaken at the Franklin Street Bus Station by Rust PPK in 1997. It is worth noting that the Rust PPK report indicated that a number of samples returned levels of concern for metals or PAHs. This is considered to be a reflection of the criteria applied at the time, which is different to the criteria applicable to this investigation.

6.2 Summary

6.2.1 Soil

The monitoring results indicate that the majority of soil samples returned results below the limits of detection or within the relevant preliminary acceptance criteria (NEPM HIL 'E'). This is the case for both the Maunsell and Rust PPK investigations.

In summary, the following results were obtained from the Maunsell soil investigation:

Nature and location of fill materials	Fill materials were generally confined in the region
	0-1m in depth and consisted of gravelly sand and
	gravelly sandy clay. Occasional rock, crushed
	masonry and organic matter were noted but no
	evidence of ash or cinders was found. Based on a
	visual assessment the materials appear to be
	geotechnically suitable for use in the redevelopment
	although this would need to be analytically confirmed.
Sampling density	The sampling density meets the satisfaction of the
	Environmental Auditor. The combination of the two
	investigations provides sufficient grid based sampling
	to provide confidence in the average quality of
	material across the site at this stage. Further limited
	testing may be required for areas inaccessible during
	this investigation (eg Bus 18) and for areas currently
	covered with structures.
Data quality	Generally acceptable (although three samples were
	tested for PAHs outside recommended holding times)
	as determined in Section 4.
Concentration of chemicals in fill	Fill generally complies with preliminary acceptance
	criteria. Mean and 95%UCL values comply with these
	criteria, with the exception of recalculated 95%UCLs
	for benzo(a)pyrene. No significant volatile organic
	carbon was detected during field PID measurements.

Concentration of chemicals in natural material	All individual, mean and 95% UCL values comply with
	preliminary acceptance criteria. Overlying fill material
	has not significantly negatively impacted the natural
	materials.

Statistical analysis of Rust PPK's data indicates that the mean and 95% UCL values for all analytes measured during their investigation comply with the preliminary acceptance criteria applicable to the current investigation, for both fill and natural materials. This is also the case for the combined results of Maunsell and PPK's investigations, with the exception of recalculated 95% UCLs for Benzo(a)pyrene.

It is considered that recalculated 95%UCLs for Benzo(a)pyrene for Maunsell A samples and for Maunsell A samples combined with PPK fill samples, are due to a skewed data set resulting from one outlying result and a substantial number (greater than 60%) of proxy values, and are unrealistically high (see Appendix G for further information). Effectively, all but one sample (over both investigations) were well below the preliminary acceptance criteria for this project, with more than 60% being non-detects.

Whilst copper and zinc 95%UCL values exceeded NEPM interim urban EILs in certain data sets, it is considered that, at the levels detected, phytotoxic effects are unlikely as a result of this material and that a sensitive receiving environment does not exist in proximity to the site. Additionally it is considered, given the consistent low level of total chromium detected across the entire site, over both investigations, in fill and natural material, that these levels are likely to represent background levels of chromium (III) rather than chromium (VI).

6.2.2 Groundwater

The monitoring results indicate that all samples returned results lower than the limits of reporting or equal to or below the relevant preliminary acceptance criteria, designated as SAEPP 2003 Irrigation Criteria due to salinity. All mean and 95% UCL values are below the relevant preliminary acceptance criteria.

6.2.3 Conclusion

Based upon the currently available information and combined results of both soil investigations, it is considered that the fill is generally of an acceptable quality to be utilised during the redevelopment although geotechnical testing would be required to confirm this. Additionally, further soil testing will be required once the site has been cleared of structures. Should the fill be deemed suitable for use during the redevelopment, it would be utilised for construction purposes and would therefore generally be present under sealed surfaces. As such, the material would be contained and inaccessible to residents. Reuse would involve the removal, stockpiling, and return of material, consequently involving some mixing which is the basis for consideration of average quality rather than concentration on individual samples.

Groundwater is considered to be too saline for potable use. Its quality does not appear to have been affected by activities or fill materials at the Bus Station site and meets SAEPP 2003 Irrigation criteria.

Limitations of Use 7.0

Site contamination is generally a produce of man-made processes and therefore exhibits characteristics and properties that vary from place to place and can change with time. Contamination assessments involve gathering and assimilating limited facts about these characteristics and properties in order to better understand or predict the status of contamination on a particular site under certain conditions.

The facts reported and utilised in this document may have been obtained by inspection, excavation, probing, sampling, testing, other means of investigation or from the client. They are directly relevant only to the ground at the place where and time when the investigation was carried out. Any interpretation or recommendation given in this report is based on judgment and experience and not on greater knowledge of the facts than the sources of information indicate. The interpretations and recommendations are opinions provided for the sole use by the Client identified on the cover sheet and in accordance with a specific brief. Maunsell Australia does not represent that the information or interpretation contained in this document addresses completely existing features such as surface and subsurface contamination, groundwater and geotechnical conditions or ground or contamination behavior on the subject site.

The responsibility of Maunsell Australia Pty Ltd is solely to its Client. It is not intended that this document be relied upon by any third party, other than an environmental auditor engaged by the client for the purpose of a contaminated land audit. Maunsell Australia does not undertake any duty to or accept any responsibility to any other parties who may rely upon this document.

Appendix A - Figures	A	р	pe	en	dix	(A	-	Fig	jur	'es
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LEGEND

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STRUCTURES/BUILDINGS



UNDERCOVER (CANOPY) AREAS



SAMPLING POINTS (Rust PPK 1997) BOREHOLE LOCATIONS (Maunsell 2004) PROPOSED LOCATION AREA INACCESSIBLE AT TIME OF INVESTIGATION

NOTE

STRUCTURES AND SITE LAYOUT WERE OBTAINED FROM Rust PPK's "Environmental Site Assessment" 1997 AND SHOULD BE CONSIDERED APPROXIMATE.

Copyright Maunsell Australia Pty Ltd 2002

APPROXIMATE SCALE 0 7.5 15 22.5 30 37.5m

CENTRAL WEST PRECINCT FRANKLIN STREET BUS STATION SOIL BORE LOCATIONS



maunsell

FIGURE No. 1

Revision: Date: A September 2004



LEGEND

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STRUCTURES/BUILDINGS



UNDERCOVER (CANOPY) AREAS



GROUNDWATER MONITORING WELLS GROUNDWATER CONTOURS (m AHD) IMPLIED DIRECTION OF GROUNDWATER FLOW

NOTES

1. STRUCTURES AND SITE LAYOUT WERE OBTAINED FROM Rust PPK's "Environmental Site Assessment" 1997 AND SHOULD BE CONSIDERED APPROXIMATE.

2.GROUNDWATER CONTOURS BASED ON LEVELS OBTAINED ON 6th OCTOBER 2004.

GROUNDWATER MONITORING WELL LOCATIONS AND GROUNDWATER CONTOURS



maunsell

FIGURE No. 2 CENTRAL WEST PRECINCT FRANKLIN STREET BUS STATION AND GROUNDWATER CONTOURS

Revision: Date:



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	Client:	Ade	aide City	Council		Bore No.	\square	maunsell
	Project:	Cer	ntral West	Precinc	t	BUS 1		
	Locatio	n: Fra	nklin St Bu	is Static	on and Carparks		Job no:	40032004.00
	Excav. 1	Type: I	Borehole	D. I	Length: 2.4	m	Date:	18/8/2004
	Equipmo g	ent: I	Pushtube/	Relief A	Auger Width:	mm	Logged:	SDG
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	0.3				colour change tan			INDICATES SAND
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	BUS1-A	0.6	0.5			<u> </u>		INDICATES ROCK
			F					INDICATES CLAY
	0.7							INDICATES GRAVEL
					CLAY, brown, slightly moist, firm, mixe level	ed with above material at this		
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	Locatio	n: Fra	anklin St Bi	us Statio	on and Carparks		Job no:	40032004.00
	Excav. Type: Borehole Len				Length: 2.4	m	Date:	18/8/2004
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					colour change tan			INDICATES SAND
	0.45							INDICATES ASPHALT/CONCRETE
		1.1	0.5		clayey layer colour change grey/green			INDICATES MASONRY
	BUS2-A							
					slate in layer			INDICATES GRAVEL
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		07	- 1.0		onusneu masoni y (onoks and sialo)		Minor wood in	layer
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Maunsell Australia Pty Ltd Level 6, 100 Pirie Street Adelaide, S.A. , 5000

	Client:	Ade	aide City	Council	il	Bore No.	\square	maunsell
	Project:	Cer	ntral West I	Precinc	ot	BUS 3		
	Location	n: Fra	nklin St Bu	s Statio	on and Carparks		Job no:	40032004.00
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	0.6				Natural, Sandy Silty CLAY, cream tan,	slightly moist, sand medium to		INDICATES CLAY
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	BUS4-A	0.9	0.5		Sandy CLAT, dark brown, slightly mos	51		INDICATES ROCK
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	Location	n: Fra	inklin St Bu	is Statio	on and	Carparks		Job no:	40032004.00	
	Excav. T	ype:	Borehole	m-11-6	A	Length: 2.4	m	Date:	18/8/2004 SDG	
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	/Tes	dd) s	ê	Log				RL Surface	3:	
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			F		to very	coarse			INDICATES SILT	
	BUS5-A		F		sand a colour	nd gravel not as coarse, cream change tan)		INDICATES SAND	
			_			Ū			INDICATES ASPHALT/CONCRETE	
	0.45	3.2	0.5		CLAY,	brown, slightly moist, firm			INDICATES ROCK	
			–						INDICATES CLAY	
	BUS5-B		F						INDICATES GRAVEL	
			È.		colour	change orange brown		Pushtube ref		
	0.80		F					-Relief auger	to 400mm	
		0.6	- 10					Natural, abov	ve material in this section is reworked	
		0.6						with overlyin		
						shanga tan				
					colour	change tan				
			-					Ą		
		2.0	1.5			ſ				
				-	CLAY,	light grey / green, moist, stiff, t	black specks			
			L							
			F						*	
		1.7	2.0							
									-	
									-	
			_						-	
		0.4				END OF HOLE			-	
			2.5							
			F						-	
			F						-	
			L						-	
			3.0						-	

	Client:	A	delaid	le City C	Council		Bore No.	\square	maunsell
	Project:	С	entral	West P	recinc	t	BUS 6		
	Locatior	n: Fi	anklin	n St Bus	Static	on and Carparks		Job no:	40032004.00
	Excav. T Equipme	ype: ont:	Bore Pust	ehole htube/F	Relief A	Length: 3.0 Auger Width:	m mm	Date: Logged:	18/8/2004 SDG
	ests	(md						BL Surface	:
	les/ T	ets (p		Ê	ic Lo			Datum:	•
Water	Samp	PID Te		Depth	Graph	Material Des	cription:	Remarks:	
						ASPHALT	tan slightly moist gravel is	Key To	Granhic Log
	0,15		F			subangular to 30mm, cobbles are sub	angular to 50mm	Key To	
			F						INDICATES SAND
	BUS6-A BUS6-AA		E			CLAY, brown, slightly moist, firm			INDICATES ASPHALT/CONCRETE
	1.7 0.5								INDICATES ROCK
	<u>0.55</u>		F						INDICATES CLAY
	BUS6-B		_			colour change tan moist			INDICATES GRAVEL
	0.85 becon					becoming sandy clay		Natural	
			E						-
		0.4	E	1.0					
			F						
			F						
			F						
		0.4	_	1.5		Sandy Silty CLAY, cream tan, slightly grained	moist, sand medium to coarse		
						r			_
			F						
			-			CLAY, light grey/green, moist, stiff, bla	ock specks		
			-					Thin layer sar	nd rich clay
		0.7	E	2.0					•
			-					Thin layer sar	nd rich clay
	2.06		F						-
	BUS6 C		F						-
		0.7	F	2.5					
	2.50		E	-					
			E						
			F	-					
			F						-
		0.2	F	3.0					_
1						END OF HOLE			

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	Client:	Adelaide City Council		Council		Bore No.		maunsell
	Project:	Cei	ntral West	Precinc	t	BUS /		
	Location:	Fra	nklin St Bu	s Static	on and Carparks		Job no:	40032004.00
	Excav. Ty	rpe:	Borehole Pushtuhe/	Relief <i>I</i>	Length: 3.0 Auger Width:	m .	Logged:	18/8/2004 SDG
	sts	ii (ind					BI Surface	•
	ss/Te	sts (p	Ê	c Log			Datum	
Vater	Sample	olD Te	Depth	Graphi	Material Des	cription:	Remarks:	
-	ASPH				ASPHALT	F		
	025				Gravelly Cobbly SAND, light grey and subangular to 30mm, cobbles are sub	tan, slightly moist, gravel is pangular to 50mm	Key To	Graphic Log
	BUS7-A							
	BUS7-AA BUS7-AA				CLAY, brown, slightly moist, firm			
	2.2 _0.5							
								INDICATES GRAVEL
					colour change tan, moist			······································
					becoming Sandy CLAY		Pushtube ref	usal to 500mm
	1.6	0.5	10				Natural, abov	ve in section appears to be
		0.0	-				reworked nat	ural
			F					
			F					
			F				-	-
		0.8	1.5		Sandy Silty CLAY, cream tan, slightly grained	moist, sand medium to coarse		-
			E		e			-
								-
								-
		0.4	2.0		CLAX light grey/green moist stiff bl	ack specks	Laver sand r	ich material to 2.4
			F		OLAT, Igni greygreen, molet, Still, D	aux openio		-
	22		-					-
								-
	BUS7-C		_					
		0.4	2.5					
	26		F					
			F					-
			_					-
	1.6 3.0							
- 1								

-

	Client: Adelaide City Council		Council		Bore No.	\square	maunsell	
	Project:	Cen	tral West I	Precinc	t	BUS 8		
	Location	ı: Frai	nklin St Bu	is Static	on and Carparks		Job no:	40032004.00
	Excav. T	ype: E	Borehole		Length: 2.4	m	Date:	18/8/2004 SDC
	Equipme ខ្	E E	ushtube/	Relief A		mm	Loggea.	300
	/ Tes	s (pp	•	Fog			RL Surface	:
er	ples	Test	th (T	phic			Datum:	
Wat	San	DID	Dep	Gra	Material Des	cription:	Remar	ks:
	0.05				ASPHALT	oist gravel subangular to	Kev To	Graphic Log
					15mm, sand variable fine to coarse			
			-					
	DU30-A							
		10	-					
	0.5	1.3	- 0.5		CLAY, brown, slightly moist, firm			
	BUS8-B		 					
	0.75				Randy CLAY cream tan slightly mois	F		
			-		Sandy CLAT, cream ran, signify mois	L .	Reworke	ed natural
			È.				0.75m li	mestone layer
		0.6	1.0					
					Sandy Silty CLAY, cream tan, slightly	moist, sand medium to coarse	-	
			_		graned			
			F					
		0.2						
		0.3			CLAY, light grey/green, moist, stiff, bla	ack specks	-	
			-					
		07	20					•
		0.7	-					
			F					-
			-					
		10	F					
		1.9	- 0.5		END OF HOLE			-
								
			 -					-
			<u> </u>					-
			E					
			F					
			3.0					-

Maunsell Australia Pty Ltd Level 6, 100 Pirie Street Adelaide, S.A., 5000

	Client: Project:	Ade Cen	laide City tral West	Counci Precinc	l t		Bore No. BUS 9		maunsell
	Location	: Frar	nklin St Bu	is Statio	on and Carparks			Job no:	40032004.00
	Excav. T	ype: E	lorehole	Delief	Length:	2.1	m	Date:	18/8/2004 SDG
	<u>Equipme</u> ຊູ	<u>ent: P</u>		Reliet			()1111	bu o f	554
	s (pp							RL Surface:	
ter	nples	Test	oth (n	phic				Datum:	
Wa	Sar	OId	Del	Gre		Material Des	cription:	Remark	s:
			-		Topsoil, SAND, da	rk brown, moist, ba	rk chips throughout	Key To	Graphic Log
	BUS9-A				Gravelly Sandy CL	AY, brown, slightly	moist, gravel subangular to		INDICATES SILT
	03		-		5mm, sand variabl	e fine to coarse	-		INDICATES SAND
			-		Natural, CLAY, ora	nge brown, slightly	moist	Kala ka k	INDICATES ASPHALT/CONCRETE
	BUS9-B	0.4	0.5		colour change tan,	minor gravel			INDICATES ROCK
	0.6		-						INDICATES CLAY
			F						INDICATES GRAVEL
			—						
			_						
		0.6	1.0		colour change grey silt and gravel in la	/ green yer			
			-						
			F						-
					CLAY, light grey g	een with orange br	own patches, stiff, slightly	-	
			F		moist	· ·			
		0.1	1.5						
			F		,				
			F						
			F						
			F						-
		0.0	2.0						*
		0.0							-
						END OF HOLE			
			 _						
			F						_
			25						-
			-			×			
									-
			L						-
			\vdash						-
			F						-
			3.0						

	Client: Adelaide City Council Project: Central West Precinct			Counci Precinc	ll St	Bore No. BUS 10		maunsell
	Location	n: Fra	anklin St Bu	s Statio	on and Carparks		Job no:	40032004.00
	Excav. 1	Гуре:	Borehole		Length: 2.4	m	Date:	18/8/2004
	Equipm	ent:	Pushtube/	Relief	Auger Width:	mm	Logged:	SDG
	og (ppn						RL Surface	:
2	ples/	Γests	(E) 4	hicL			Datum:	
Wate	Sam	Old	Dept	Grap	Material Des	cription:	Remark	·s:
					ASPHALT		Kev To	Graphic Log
	5.15		-	in the S	Gravelly SAND, pink tan, slightly mois	t. sand variable fine to verv		
			-		coarse, gravel subangular to 15mm	,,		INDICATES SAND
			F		colour change to tan			INDICATES ASPHALT/CONCRETE
	BUS10-A	3.0	0.5					INOICATES ROCK
			-		Gravelly Sandy CLAY, brown, slightly 5 5 mm, sand variable fine to coarse	moist, gravel subangular to		INDICATES CLAY
	6-65		-					INOICATES GRAVEL
					Natural, Sandy Silty CLAY, cream, dry grained	, sand medium to coarse		
	BUS10-B		F		sand content and grain size decreasin	g down section	Pushtube refu	sal @ 200mm o 350mm
		0.8	1.0					
			-					
	1.1							
			_					
			_		CLAY, light green grey with black spec	cks, moist, stiff		
		0.9	1.5					
			-		r			
			F					•••
			–					
			F					-
		0.6	2.0					
			-					
			<u> </u>					
			F					
			2.5		END OF HOLE			
								-
								-
			L					-
			-					-
			3.0					-

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	Client: Adelaide City Council Project: Central West Precinct				ı t	Bore No. BUS 11		maunsell
	Locatio	n: Fra	nklin St Bu	s Statio	on and Carparks		Job no:	40032004.00
	Excav.	Type:	Borehole		Length: 2.1	m	Date:	18/8/2004
	Equipm	ent:	Pushtube/	Relief /	Auger Width:	mm	Logged:	SDG
	/ Tests	udd) s		Log			RL Surface	1
ter	mples 7 Test aphic						Datum:	
Wa	Material Des				Material Desc	cription:	Remark	s:
	Gravelly SAND, dark grey and tan, slig				ASPHALT Gravelly SAND, dark grey and tan, slig	htly moist, gravel subangular	Key To	Graphic Log
				<u> </u>	to 30mm, sand variable fine to very co colour change tan	arse		
					colour change tan / pink			INDICATES SAND
	0.4							INDICATES ASPHALT/CONCRETE
		1.5	0.5		Gravelly Sandy CLAY, brown, slightly r 5mm, sand variable fine to coarse	noist, gravel subangular to		INDICATES ROCK
	BUS11-A							INDICATES CLAY
	0.25				Natural, Sandy Silty CLAY, cream tan,	dry, sand medium to coarse		INDICATES GRAVEL
			- 1		grained		Push tube refu Auger relief dr	isal @ 300mm illing to 400mm
	BUS11.B		E		colour change light cream tan			
	60311-6	0.7	1.0		sand content and grain size decreasin	g down section		
	1.15							
			_					
								-
					colour change light cream tan with bro	wn patches		
		0.7	1.5		I			
					CLAY, light green grey with black spec	ks, moist, stiff		
								-
			F					
		0.7	2.0					
					END OF HOLE			-
			L					
								-
			- -					
			F					
			L					
			-					_
			F					
			3.0		1			

	Client:	Ade	laide City	Council		Bore No.	\square	maunsell
	Project:	Cer	tral West	Precinc	t	BUS 12		
	Location:	Fran	nklin St Bu	is Static	on and Carparks		Job no:	40032004.00
	Excav. Ty	pe: E	Sorehole		Length: 2.4	m	Date:	18/8/2004
	Equipmen g	<u>11:</u>	usntube/	Reliet A	Auger Width:	mm	Logged:	SDG
	% Tes	boll c bo					RL Surface:	
ter	nples	Test	oth (n	phic			Datum:	
Wa	Sai	DId	Del	Gre	Material Des	cription:	Remark	s:
	0.05				ASPHALT Gravelly SAND, light grey / cream tan.	slightly moist, sand variable	Key To	Graphic Log
					fine to very coarse, gravel subangular	to 15mm		INDICATES SILT
			F		colour change tan			INDICATES SAND
	BUS12-A BUS12-AA BUS12-AA		E					INDICATES ASPHALT/CONCRETE
		0.2	0.5		Gravelly Sandy CLAY, brown, slightly	moist, gravel subangular to		
				<u> </u>	5mm, sand variable fine to coarse CLAY, orange brown, slightly moist			INDICATES CLAY
	0.65		L					INDICATES GRAVEL
			F		colour change tan			
	BUS12-B		F				Auger to 400m	im
	1.0	0.0	1.0		dry		Natural @ 0.7	m - material above in this section
			-				appears to be	reworked natural material
			F					
		0.6	1.5					
			E		Sandy Silty CLAY, cream tan, orange medium to coarse grained	brown flecks, dry, sand		
			_					
		0.0	2.0					* _
			F					-
		0.0	-					
			2.5		END OF HOLE			
			F					-
			F					
			-					
ļ]		3.0		I]	

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	Client: Project:	Ade	laide City	Counci Precinc	l t	Bore No. BUS 13		maunsell
	Location	• Fran	oklin St Bu	is Static	on and Carnarks		Job no:	40032004.00
	Excav. T	ype: E	Borehole		Length: 2.4	m	Date:	18/8/2004
	Equipme	nt: F	Pushtube/	Relief /	Auger Width:	mm	Logged:	SDG
	Tests	udd)		bo			RL Surface	:
r	Tests hit (m)						Datum:	
Wate	Sam	GId	Dept	Grap	Material Des	cription:	Remar	ks:
					ASPHALT Gravelly SAND, tan, slightly moist, sar	nd variable fine to very coarse,	Key To	Graphic Log
			_ , _		gravel subangular to 15mm			INDICATES SILT
								INDICATES SAND
	0.32							INDICATES ASPHALT/CONCRETE
		0.6	0.5		colour change orange / tan			INDICATES ROCK
	BUS13-A		-		colour change vellow / cream			INDICATES CLAY
	0.75				cool change yellow / cloan			INDICATES GRAVEL
					Gravelly Sandy CLAY, brown, slightly 5mm, sand variable fine to coarse	moist, gravel subangular to		
	DI IS12 B				CLAY, tan, dry, firm, minor fine graine	d sand, minor gravel to 20mm		
	00010-0	0.7	1.0					
	1.15				Natural, Sandy Silty CLAY, cream tan,	dry, sand fine to medium		-
							Minor gravol	
							wind graver	
		1.0	1.5		sand content and grain size decreasir	g down section		
			-		,	•		
			E					
			-					-
		0.6	2.0		ULAY, light green grey with black spe	JKS, MOISI, SUIT		ب سر
								-
								-
			-					
		0.4			END OF HOLE		-	
			2.5					
					,			-
			F					-
			_					
			F					-
			3.0			-		

	Client: Adelaide City Council				I	Bore No.	\square	maunsell
	Project:	Cer	ntral West	Precinc	t	BUS 14	V	
	Locatio	n: Fra	nklin St Bu	is Statio	on and Carparks		Job no:	40032004.00
	Excav.	Гуре: І	Borehole		Length: 2.1	m	Date:	18/8/2004
	Equipment: Pushtube/Relief Auger				Auger Width:	mm	Logged:	SDG
	og (ppm Test						RL Surface	:
ter	Tests Tests						Datum:	
Wa	Sar	Old	Det	Gra	Material Des	cription:	Remarl	(S:
					ASPHALT	sand variable fine to very	Key To	Graphic Log
			F		coarse, gravel subangular to 15mm			
			-					
			F					
		1.0	E a s	-				
	BUS14-A	1.0						
			F					
					Nutrie City CLAV groom to a day of	ince fine excinent sound		
					Natural, Sity CLAY, cream tan, dry, m	inor line grained sand	Sand fine to n	nedjum predominantly
	BUS14-B							-
		1.2	1.0					
			L					
			-					
			_					_
		0.3	1.5		CLAY, light green grey with black spec	sks. moist. stiff	-	
			_		o	·····, ·····		
			F					
		0.9	2.0					*
			E		END OF HOLE			-
			L					
			2.5					_
			F					-
			F					-
			L					-
			-					-
			F					-
			3.0					-

	Client: Project:	Ac Ce	lelaide entral W	City Coun /est Precir	cil		Bore No. BUS 15	Θ	maunsell
	Location	n: Fra	anklin S	t Bus Sta	tion and Carpar	ks		Job no:	40032004.00
	Excav. 1	Гуре:	Boreh	ole	Lenç	1th: 2.4	m	Date:	18/8/2004
	Equipm	ent:	Pusht	ube/Relie	Auger Widt	h:	mm	Logged:	SDG
	Tests	mqq)		D D				RL Surface:	
L	. /səlc	ests	1	hic Lo				Datum:	
Wate	Sam	L OId		Grap		Material Description:		Remark	s:
) tan slightly mojet sa	nd variable fine to very coarse	Key To	Granhic Log
			-		gravel subanc	Jular to 15mm	nu vanable fine to very coarse,	icey fo	
	BUS15-A		<u> </u>		colour change	cream tan			
			-		Gravelly Sanc	v CLAY, brown, slightly	moist, gravel subangular to		INOICATES ASPHALT/CONCRETE
		0.4	- 0.1	5	5mm, sand va	riable fine to coarse			INOICATES ROCK
					Natural, Sand	y Silty CLAY, orange tar	n, dry, sand medium to coarse,		INOICATES CLAY
			_		minor gravel s	ubrounded to 4mm			INOICATES GRAVEL
			E						
	BUS15-B				CLAY, light gr	een cream, dry	# 1 # 2 # 2 # 1 # 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1		
		0.8	- 1.0	D					-
			_						-
			_						
			—		colour change	light green grey			
			F		moist, hard				-
		0.10		5					-
			_		2				-
			F						-
			—						
			F						
		1,1	2.	0					*
			-						
			F						
			F						
			_						
			2.	5		END OF HOLE			
			F						
			·上						
			L						
			F						
			3.	0			ana indairi an a ana ana ana ana ana ana ana ana a		

	Client: Adelaide City Coun					Bore No.	\square	maunsell
	Project:	Cer	ntral West	Precinc	t	BUS 16		
	Locatio	n: Fra	nklin St Bu	is Statio	on and Carparks		Job no:	40032004.00
	Excav.	Type: I	Borehole		Length: 3.00	m	Date:	18/8/2004
	Equipm ഇ	ent: I Ê	Pushtube/	Relief /	Auger Width:	mm	Logged:	SDG
	/ Test	idd) s		Pog			RL Surface	:
er	ples	Test	t) (J	phic			Datum:	
Wat	Gray Depr				Material Des	cription:	Remarl	ks:
					ASPHALT Gravelly SAND, tan, slightly moist, sar	nd variable fine to very coarse,	Кеу То	Graphic Log
			F		gravel subangular to 15mm	· · ·		INDICATES SILT
			–		colour change cream			INDICATES SAND
			_				The second second	INDICATES ASPHALT/CONCRETE
		0.8	0.5		colour change tan			INDICATES ROCK
			L					INDICATES CLAY
			L		colour change light pink cream			INDICATES GRAVEL
			L					
			L					
		0.8	1.0	÷.				_
	BUS16-A		-		Gravelly Sandy CLAY, brown, slightly	moist, gravel subangular		
					ROCK, schist, black	a grained cand, minor gravel		
			-		to 20mm			
	BUS16-B		F		Sanuy Silly CLAT, cream lan, ury, san	a medium to coarse gramed		
			L					
		1.1	1.5		sand content and grain size decreasin	g down section		
			F		colour change cream			
			F					-
			-					
			F					
		0.9	2.0					* -
			F					
			F					
					CLAY, light green grey with black spec	cks, moist, stiff		
			-					-
		0.0	25					area Boot
		0.0			· .			
			-					-
			F					-
		0.0	3.0					
			·····		END OF HOLE			

Maunsell Australia Pty Ltd Level 6, 100 Pirie Street Adelaide, S.A., 5000

Project: Central West Precluct BUS 17 Leadenth: Frankin St Bus Station and Camprins Escent: Precluct: Escent: Precluct: Escent: Precluct: Escent: Precluct: Bull St 7 Image: Image: </th <th></th> <th>Client:</th> <th>Ac</th> <th>lelaide City</th> <th>Council</th> <th></th> <th>Bore No.</th> <th>\bigcap</th> <th>maunsell</th>		Client:	Ac	lelaide City	Council		Bore No.	\bigcap	maunsell
Location: Frankin Si Bus Station and Carpakin Longit: 3.3 m Equipment: PublisherBield Ager Vidit: mm Image: Station of the st		Project:	Ce	entral West	Precinct	t	BUS 17		≈ ¤ ≈ ≈ ≈ ≈ a a ≈ ∞ a a
Excert Type: Borehold Largeh 3.5 m Date: 188/2004 Equipment: PublisheeRief Ager Width: mm Coged: SDO 1 1 1 0.9 0.9 0.9 0.9 0.9 1 0.9 0.9 0.9 0.9 0.9 0.9 0.0 0.5 0.5 0.5 0.5 0.6 0.5 0.6 0.5 0.6 0.5 0.6 0.7 0.6 0.7 0		Location	n: Fr	anklin St Bı	us Statio	n and Carparks		Job no:	40032004.00
Equipment: Perturbation Relief Algor Writh: mm Loggest: SDG i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i i		Excav. T	ype:	Borehole		Length: 3.3	m	Date:	18/8/2004
Note Natural Startics: Datum: Note Naterial Description: Remarks: Remarks: Naterial Description: Remarks: Remarks: Remarks: Naterial Description: Remarks: Remarks: Remarks: Naterial Description: Remarks: Remarks: Remarks: Naterial Description: Remarks: Remarks: Remarks: Naterial Description: Remarks: Remarks: Remarks: Naterial Description: Remarks: Remarks: Remarks: Naterial Description: Remarks: Remarks: Remarks: Naterial Description: Remarks: Remarks: Remarks: Naterial Description: Remarks: Remarks: Remarks: Naterial Description: Remarks: Remarks: Remarks: Naterial Description: Remarks: Remarks: Remarks: Naterial Description: Remarks: Remarks: Remarks: Naterial Description: Remarks: Remarks: Remarks: Nateri		Equipme g	ent:	Pushtube	/Relief A	uger Width:	mm	Logged:	SDG
base Base Control Datum: ABPE Control Remarks: Remarks: ABPEALT ABPEALT Remarks: Remarks: ABPEALT ABPEALT Remarks: Remarks: ABPEALT ABPEALT Remarks: Remarks: ABPEALT Sended State All Data: slightly molet, gravel subangular to orm, send variable line to come orm send variable line to come orm send variable line to come orm send variable line to come orm send variable line to come orm send variable line to come orm send variable line to come orm send variable line to come orm send variable line to come orm send variable line to come orm send variable line to come orm send variable line to come orm send variable line to come orm send variable line to come orm send variable line to come orm send variable line to come orm send variable line to come orm send variable line to come or sen		Test	(ppr		- bo			RL Surface):
Image: Section of the section of t		ples/	Fests	E F	hic L			Datum:	
Note: Served according to the served	Wate	Sam	OId	Dept	Grap	Material Des	cription:	Remar	ks:
Busined Circuit SAND, Ian, sightly moist, sand variable fine to vary coarse, praval subangular to 15mm Key to Graphic Log Busined 0.8 0.8 Circuit Sand Variable fine to coarse Busined 0.8 0.8 Circuit Sand Variable fine to coarse Busined 0.8 0.8 Circuit Sand Variable fine to coarse Busined 0.8 0.8 Circuit Sand Variable fine to coarse Busined Circuit Sand Variable fine to coarse Circuit Sand Variable fine to coarse Busined Circuit Sand Variable fine to coarse Circuit Sand Variable fine to coarse Busined Circuit Sand Variable fine to coarse Circuit Sand Variable fine to coarse Busined Circuit Sand Variable fine to coarse Circuit Sand Variable fine to coarse Busined Circuit Sand Variable fine to coarse Circuit Sand Variable fine to coarse Busined Circuit Sand Variable fine to coarse Circuit Sand Variable fine to coarse Busined Circuit Charge tan Newral Busined Sand Silly Circuit Ary, sand modium to coarse grained Busined Circuit Charge tan Newral Busined Circuit Charge tan Newral Busined Circuit Charge tan Newral Busined Circuit Charge tan Newral Busined						ASPHALT			
0.8 0.8 0.8 0.8 0.9 0.0 0.9 <td></td> <td></td> <td></td> <td></td> <td></td> <td>Gravelly SAND, tan, slightly moist, sai gravel subangular to 15mm</td> <td>nd variable fine to very coarse,</td> <td>Key Io</td> <td></td>						Gravelly SAND, tan, slightly moist, sai gravel subangular to 15mm	nd variable fine to very coarse,	Key Io	
0.8 0.8 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>INDICATES SILT</td>									INDICATES SILT
0.5 0.5 <td></td> <td></td> <td></td> <td>_</td> <td></td> <td></td> <td></td> <td></td> <td>INDICATES SAND</td>				_					INDICATES SAND
0.8 0.5 Greenbyl Sandy CLAY, brown, alightly mole, gravel subangular to orm, send variable fine to coarse CLAY, brown, dry, tim, minor fine grained sand, minor gravel to CLAY, brown, dry, tim, minor fine grained sand, minor gravel to CLAY, brown, dry, tim, minor fine grained sand, minor gravel to 20mm Possibly reworked netural 0.9 1.0 CLAY, brown, dry, tim, minor fine grained sand, minor gravel to 20mm Possibly reworked netural 0.9 1.0 colour change tan Natural 0.9 1.0 colour change tan Natural 0.9 1.0 colour change tan Natural 0.9 1.0 colour change tan Natural 0.9 1.0 colour change tan Natural 0.0 2.0 colour change tan Natural 0.0 2.0 colour change tan Natural 0.0 2.0 colour change tan Natural 0.0 2.0 colour change tan size decreasing down section Natural 0.0 2.5 colour change taget cream tan Natural 0.0 3.0 CLAY, light green gray with black specks, molst, att? Natural							hildelik sono ana ana ana ing ana ing ang ing ang ang ang ang ang ang ang ang ang a		INDICATES ASPHALT/CONCRETE
BUBITA			0.8	0.5		Gravelly Sandy CLAY, brown, slightly 5mm, sand variable fine to coarse	moist, gravel subangular to		INDICATES ROCK
Business CLAY, brown, dry, firm, minor fine grained sand, minor gravel to 20mm Possibly reworked natural Business CLAY, brown, dry, firm, minor fine grained sand, minor gravel to 20mm Natural Business Sandy Silty CLAY, cream tan, dry, sand medium to coarse grained Natural Business Sandy Silty CLAY, cream tan, dry, sand medium to coarse grained Natural Business Sandy Silty CLAY, cream tan, dry, sand medium to coarse grained Natural Business Sandy Silty CLAY, cream tan, dry, sand medium to coarse grained Natural Business Sandy Silty CLAY, cream tan, dry, sand medium to coarse grained Natural Business Sandy Clay, draw tan, dry, sand medium to coarse grained Natural Business Sandy Clay, draw tan, dry, sand medium to coarse grained Natural Business Sandy Clay, draw tan, dry, sand medium to coarse grained Natural Business Sandy Silty Clay, cream tan, dry, sand medium to coarse grained Natural Business Colour change light cream tan Sandy cream tan Business Clay, light green grey with black specks, moist, stiff Sandy cream tan Business Sandy Silty CLAY, light green grey with black specks, moist, stiff Sandy Silty Clay		BUS17-A		-		CLAY, brown, dry, firm, minor fine gra 20mm	ined sand, minor gravel to		INDICATES CLAY
Image: Section of the sector of the secto				-		Gravelly Sandy CLAY, brown, slightly 5mm, sand variable fine to coarse	moist, gravel subangular to		INDICATES GRAVEL
0.9 1.0 colour change tan Natural BUSI7-8 1.2 1.5 Sandy Sity CLAY, cream tan, dry, sand medium to coarse grained 1.2 1.5 sand content and grain size decreasing down section Image: sand content and grain size decreasing down section 0.0 2.0 colour change light cream tan colour change light cream tan 0.0 2.0 colour change light cream tan Image: sand content and grain size decreasing down section 0.0 2.0 colour change light cream tan Image: sand content and grain size decreasing down section 0.0 2.0 colour change light cream tan Image: sand content and grain size decreasing down section 0.0 2.0 colour change light cream tan Image: sand content and grain size decreasing down section 0.0 2.0 colour change light cream tan Image: sand content and grain size decreasing down section 0.0 2.0 colour change light cream tan Image: sand content and grain size decreasing down section 0.0 3.0 colour change light cream tan Image: sand content and grain size decreasing down section						CLAY, brown, dry, firm, minor fine gra	ined sand, minor gravel to	Possibly rew	orked natural
0.3 1.0 Scolour change tan Natural BUS17-B 1.2 1.5 Sandy Sity CLAY, cream tan, dry, sand medium to coarse grained 1.2 1.5 sand content and grain size decreasing down section Scolour change light cream tan 0.0 2.0 colour change light cream tan Scolour change light cream tan 0.0 2.0 colour change light cream tan Scolour change light cream tan 0.0 2.5 CLAY, light green grey with black specks, moist, stiff Scolour change light cream tan 0.0 3.0 CLAY, light green grey with black specks, moist, stiff Scolour change light cream tan				_		20mm			_
BUS17-B Image: Constraint of the second			0.9	1.0		colour change tan		Natural	
BUS17-B 1.2 1.5 1.2 1.5 sand content and grain size decreasing down section 0.0 2.0 colour change light cream tan 0.0 2.5 CLAY, light green grey with black specks, moist, stilf 0.0 3.0				-					
1.2 1.5 1.2 1.5 1.2 1.5 1.2 1.5 1.2 1.5 1.2 1.5 1.2 1.5 1.2 1.5 1.2 1.5 1.2 1.5 1.2 1.5 1.2 1.5 1.2 1.5 1.2 1.5 1.2 1.5 1.3 1.5 1.4 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1		BUS17-B		-		Sandy Silty CLAY, cream tan, dry, sar	d medium to coarse grained		
1.2 1.5 1.2 1.5 1.2 1.5 1.2 1.5 1.2 1.5 1.2 1.5 1.2 1.5 1.2 1.5 1.2 1.5 1.2 1.5 1.2 1.5 1.2 2.0 1.2 1.5 1.2 1.5 1.2 2.0 1.3 1.5 1.4 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1				-					
1.2 1.5 sand content and grain size decreasing down section 0.0 2.0 colour change light cream tan 0.0 2.5 CLAY, light green grey with black specks, moist, stiff 0.0 3.0				-					-
0.0 2.0 0.0 2.0 colour change light cream tan 0.0 2.5 CLAY, light green grey with black specks, moist, stiff 0.0 3.0			1.2	1.5					
0.0 2.0 0.0 2.0 colour change light cream tan 0.0 2.5 CLAY, light green grey with black specks, moist, stiff 0.0 3.0				-		sand content and grain size decreasin	a down section		
0.0 2.0 colour change light cream tan 0.0 2.5 CLAY, light green grey with black specks, moist, stiff 0.0 3.0 0.0 3.0				F			guunioonin		-
0.0 2.0 colour change light cream tan 0.0 2.5 CLAY, light green grey with black specks, moist, stiff 0.0 3.0 END OF HOLE									
0.0 2.0 colour change light cream tan 0.0 2.5 0.0 2.5 0.0 2.5 0.0 2.5 0.0 3.0 0.0 3.0				-					
0.0 2.5 0.0 2.5 0.0 2.5 0.0 2.5 0.0 2.5 0.0 2.5 0.0 2.5 0.0 2.5 0.0 2.5 0.0 2.5 0.0 3.0 0.0 3.0 0.0 5.0 0.0 5.0 0.0 5.0 0.0 5.0 0.0 5.0 0.0 5.0 0.0 5.0 0.0 5.0			0.0	2.0					*
0.0 2.5 CLAY, light green grey with black specks, moist, stiff				Ļ		colour change light cream tan			-
0.0 2.5 CLAY, light green grey with black specks, moist, stiff				-					
0.0 2.5 CLAY, light green grey with black specks, moist, stiff				-					
0.0 2.5 CLAY, light green grey with black specks, moist, stiff 0.0 3.0 CLAY, light green grey with black specks, moist, stiff									
CLAY, light green grey with black specks, moist, stiff			0.0	2.5					
CLAY, light green grey with black specks, moist, stiff				-					
				-		CLAY, light green grey with black spe	cks, moist, stiff		
				_					
									-
				L					
			0.0	3.0					
				-					_
				-					
ber IVII 1 (100 bel) 11 ber									

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	Client: Adelaide City Council					Bore No.		maunsell
	Project:	Ce	ntral West	Precinc		003 19		4000004.00
	Location	1: ⊢ra	anklin St Bu	is Static	on and Carparks		Jon dof	40032004.00
	Excav. T	ype:	Borehole	Delief /	Length: 2.4 Nucer Width:	m	Date:	18/8/2004 SDG
	S S	Ê	rusinube/				Logged.	350
	s/ Tes	ts (pp	Ê	Log			RL Surface	
ter	nple) Tesi	pth (r	aphic			Datum:	
Wa	Sa	ЫЧ	De	5	Material Des	Material Description:		s:
					ASPHALT Gravelly SAND, tan, slightly moist, sar	nd variable fine to very coarse.	Kev To	Graphic Log
					gravel subangular to 15mm			
			_					
			F					
	BUS19-A	0.6			Gravelly Sandy CLAY, brown, slightly	moist gravel subangular to		
		0.8	0.5		5mm, sand variable fine to coarse	moist, graver subangular to		
					Natural, CLAY, orange brown, slightly	moist		
	BUS19-B							INDICATES GRAVEL
					colour change tan			-
			_					
		0.0	1.0					
					Gravelly Sandy CLAY cream tan slid	otly moist gravel is subangular		
			-		to 10mm, sand is fine to medium grain	ied		
								-
		0.4	0.4 1.5					
					Sandy Silty CLAY, cream tan, moist, s	and medium to coarse grained		-
			-					_
			-					
		0.0	- 20		sand decreasing through laver			- - ↓
		0.0	-2.0		sana assistanty through layor			-
			_					
			-					-
		0.0			END OF HOLE			
			2.5					_
			F					
			L					
			_					
			-					
	<u> </u>		3.0				L	

	Client:	Ade	Adelaide City Council				Bore No.	\square	maunsell
	Project:	Cen	tral West	Precinc	t		BUS 20		
	Location:	on: Franklin St Bus Station and C				Carparks		Job no:	40032004.00
	Excav. Ty	pe: E	lorehole			Length: 2.4	m	Date:	19/8/2004
	Equipmer g	<u>nt: P</u> Ê	ushtube/	Relief A	luger	Width:	mm	Logged:	SDG
	/Tes	s (pp		Fog				RL Surface:	
Ŀ	nples	Test	th (T	phic				Datum:	
Wa	Sar	DId	De	Gra		Material Des	cription:	Remark	s:
 		****	 		ASPHA Gravelly	LT / SAND, tan, slightly moist, sa	nd variable fine to very coarse.	Kev To	Graphic Log
			F		gravel s	ubangular to 15mm			
	BUS20-A								INDICATES SAND
	BUS20-AA BUS20-AA		F				2	Particular of	INDICATES ASPHALT/CONCRETE
		0.6	0.5		Gravell	/ Sandy CLAY, brown, slightly	moist, gravel subangular to		
					5mm, s Natural	and variable fine to coarse	moist		INDICATES CLAY
			-						
	BUS20-B		–						
								Augered to 500	Omm then pushtube
		0.5			dov				-
		0.5	-		ury				
			L						
			F						
					colour c	hange, lightening			
		1.1	- ^{1.5}		r				
						labe and the state of the state			
			-		GLAY, I	ight grey / green, ary, rea tieck	s, moist, sum		
			-						 +
		1.4	2.0						
			-						
			L						-
		0.6				END OF HOLE			
			2.5						-
			L						
			-						-
			F						
			F						-
			3.0					<u> </u>	-

	Client: Adelaide City Council			Bore No.		maunsell		
	Project:	Ce	ntral West	Precinc		BUS 21		4000004.00
ļ	Location: Franklin St Bus Station and				on and Carparks		JOD NO:	40032004.00
	Excav. T Equipme	ype: ent:	Borehole Pushtube/	Relief /	Length: 2.1 Auger Width:	mm	Logged:	SDG
	sts	(md		_			BL Surface	a :
	es/ Te	ests (p	Ê	ic Loç			Datum:	
Vater	Samp	D Te	Depth	Graph	Material Des	cription.	Bemar	ks:
Ľ					ASPHALT			-
			F		Gravelly SAND, tan, slightly moist, sai gravel subangular to 15mm	nd variable fine to very coarse,	Key To	Graphic Log
			F					INDICATES SILT
			F					INDICATES SAND
	BUS21-A		-		Gravelly Sandy CLAY, brown, slightly 5mm, sand variable fine to coarse, bri	moist, gravel subangular to ck and glass fragments		INDICATES ASPHALT/CONCRETE
		1.1	0.5			-		INDICATES ROCK
					Natural, Calcrete in layer, hard, pink Sandy CLAY, cream orange, dry, sand	l is medium to coarse		INDICATES CLAY
			F					INDICATES CALCRETE
	BUS21-B		 -				Auger to 400	
			F					
		1.2	1.0		colour grading to light grey, brown			
								-
			_					
			- ·					
							Grading into	CLAX -
		1.1	1.5		CLAY, light grey / green, slightly mois		Grading into	
					root material in layer			
			-					
		0.9	2.0					*
					END OF HOLE			
			—					
			F					-
			2.5					
			-					-
			-					-
			F.					-
			L					-
			\vdash					-
			3.0					-

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	Client: Project:	Ade Cen	laide City tral West	Council Precinct	l	Bore No. BUS 22	P	maunsell
	Location	: Fran	klin St Bu	is Statio	n and Carparks		Job no:	40032004.00
	Excav. T	ype: B	lorehole		Length: 2.1	m	Date:	19/8/2004
	Equipme	ent: P	ushtube/	Relief A	uger Width:	mm	Logged:	SDG
	ests	(mqc		5			RL Surface	:
-	les/ T	ests (p	(m)	lic Lo			Datum:	
Nater	Samp	ЦŪ	Depth	Grapt	Material Des	cription:	Remarl	ks:
_					15mm ASPHALT 10mm SAND			·
			_	-	CONCRETE, crushed by auger		Кеу То	Graphic Log
			-					INDICATES SILT
			-					INDICATES SAND
				enten medialing	Gravelly SAND, crushed brick, gravel	is brick and subrounded stone		INDICATES ASPHALT/CONCRETE
		1.0	0.5					INDICATES ROCK
	BUS22-A	1.0						
			L		Natural Olity Canada OL My analy from	n cliabtly moiot		
					inatural, Slity Sandy CLAY, grey / gree	n, siightiy moist		
	BUS22-B		F				Auger to 600r	mm
•			F		sand decreasing			-
		0.6	1.0					-
			_					
			_		CLAY, grey green, moist, red tan spec	ks		
			F					
			È					
		0.3	1.5		2			
			_					
		0.5	2.0					•
			F					-
			-		END OF HOLE			
			F					
			-					-
			F					-
			2.5					
			L		v			-
			╞					-
			L					-
			-					-
			F					-
			3.0					-

	Client: Adelaide City Council							Bore No.		maunsell
	Project:	Cen	tral west	Precinc	t			BUS 22 (lalled)		
	Location	Fran	klin St Bu	is Statio	on and C	arparks			Job no:	40032004.00
	Excav. T Equipme	ype:B ent:P	orehole ushtube/	Relief /	luaer	Length: Width:	0.5	m mm	Date: Logged:	19/8/2004 SDG
	ests	(md							BI Surface	
	les/ Te	ests (p	<u>(</u> ٤	ic Log					Datum	•
Vater	Sampl	D Te	Depth	Graph			Material Dec	vrintion	Datum. Domari	/e.
–		<u> </u>			ASPHA	LT			neman	
					Gravelly sand va	SAND, grey g	reen, slightly mo parse	bist, gravel subangular to 10mm,	Кеу То	Graphic Log
			L		Sandy C crushed	Bravelly CLAY, rock and brick	slightly moist, g , variable form,	rey brown, gravel is sand medium to coarse		INDICATES SILT
			_							INDICATES SAND
			L							INDICATES ASPHALT/CONCRETE
		1.1	0.5				REFUSAL			INDICATES ROCK
			_							INOICATES CLAY
										INDICATES GRAVEL
				:						-
			L.							-
			1.0							-
			F							
										-
										_
			F							-
			1.5							
			F			:				-
			 _							-
			_							
			L							- -
			2.0							• -
										-
										-
			F							-
			2.5							
			-							
			L							
			F							-
			F							-
			3.0							-

	Client: Project:	Adel Cen	laide City Cou tral West Pre	uncil		Bore No. MW 5		maunsell
	Location	- Fran	Klin St Bus S	tation a	and Carparks		Job no:	40032004.00
	Excav. Ty	/pe:	Bore Hole Solid Auger		Length: 20.3 Width:	m	Date:	23/8 & 25/8/2004 SDG
	st						Luggeu.	300
	% Te	Ð	2	Log			RL TOC:	43.171 m
ter	nplet	Bor	tt.	phic			Datum:	AHD
Wa	Sai	GM	Del	Gre	Material Des	cription:	Remar	ks:
			Concrete		ASPHALT Gravelly Cobbly SAND, light grey and	tan, slightly moist, gravel	Kev Ta	Graphic Log
			4		subangular to 30mm, cobbles subang	ular to 50mm		
	F		Bentonite					
	1				CLAV known alightly major firm			
					CLAT, DIOWI, Signay moist, inn			
								INDICATES CLAY
	Ĺ							INDICATES GRAVEL
			$\langle -$					-
		2	A I					_
		1	2.0		Sandy Silty CLAY, slightly moist, crear	n, sand is fine to medium		
	2	1	\mathcal{F}					
	7		4					
	~		4					
								-
		2	3.0		CLAY, light grey / green slightly moist,	stiff, red streaks, minor	Drilling under	r own weight
			\mathcal{A}		very fine sand			-
			A I					
		1	4					
	-							*
	-					stiff and stars by an incom		
			4.0		very fine sand	stin, red streaks, minor		
		2						-
	~	2						-
		2	\mathcal{F}					-
			7-		х.			-
	1		5.0		CLAY, light grey / green slightly moist, very fine sand	stiff, red streaks, minor		
			7					-
								-
			7					
	- -		\sum		OLAV light grow / groop alightly and the	otiff top and rad attacks		-
Net			6.0		minor very fine sand	sun, tan and red streaks,		-

	Client: Adelaide City Cou		uncil		Bore No.		maunsell		
	Project:	Centr	al West Pre	cinct		ww 5 cont.			
L	Location: Franklin St Bus Stat		Franklin St Bus Station and Carparks			Job no:	40032004.00		
	Excav. T Equipme	ype: B ent: S	lore Hole Solid Auger		Length: 20.3 Width:	m mm	Date: Logged:	23/8 & 25/8/2004 SDG	
	Tests			bo			RL Surface:	43.171 m	
1	ples/	Bore	(m) h	hic L			Datum:	AHD	
Wate	Sam	GK	Dept	Grap	Material Des	cription:	Remarks:		
		21	1				Key To G	raphic Log	
								INOICATES SILT	
								INDICATES SAND	
		7 6	7					INOICATES ASPHALT/CONCRETE	
		7 F	7.0		CLAY, light grey / green slightly moist,	stiff, red streaks, minor		INOICATES ROCK	
		21	7		very me sand			INOICATES CLAY	
		7 F	Ż					INOICATES GRAVEL	
	-	27	7					-	
			7						
			8.0		CLAY, light grey / green slightly moist,	stiff, increasing red			
		21	Ţ		Streaks, minor very fine sand				
		7 F	7						
	. P	21	7						
		27	4						
	ľ	27	9.0						
			Concrete		moist, stiff	n to coarse, slignily		-	
								·	
			_						
		2 .						*	
			10.0		Sandy CLAY, red brown, sand mediur	n to coarse, slightly		-	
					moist, stiff				
								-	
			11.0		CLAY, red brown, slightly moist, slight	ly softer		-	
						-		-	
								-	
								-	
								-	
			12.0		CLAY, red brown, slightly moist, slight to light grey / green	tly softer, red decreasing		· -	
No	te: origina	l in colo	ur						

	Client:Adelaide City CouncilProject:Central West Precinct				uncil cinct		Bore No. MW 5 cont.	maunsell		
	Locatio	Location: Franklin St Bus Station a			tation a	and Carparks	3 m	Job no: Date:	40032004.00 23/8 & 25/8/2004	
ļ	Equipm	nent:	So	lid Auger	1	Width:	mm	Logged:	SDG	
	Tests				bo			RL Surface:	43.171 m	
	les/	arc	į	E E	nic Lo			Datum:	AHD	
Wate	Samp	4 MS		Dept	Grapl	Material Des	scription:	Remarks		
				Concrete				Key To G	raphic Log	
									INDICATES SILT	
									INOICATES SAND	
									INDICATES ASPHALT/CONCRETE	
				13.0		CLAY, light grey / green predominate	s over red, slightly moist,		INOICATES ROCK	
						very slightly softer			INOICATES CLAY	
				-					INOICATES GRAVEL	
				 14.0		CLAY, light grey / green, slightly drye	r			
				-						
			Ber	tonite						
			\langle	–						
		\square		Ē					-	
		\langle		15.0		ISAND, grey tan, slightly moist, sticky	, sand medium to coarse	Very soft drilling		
				-						
		\square		È.						
		2								
		\mathbb{Z}	\geq	<u>-</u>					•	
		Added	Sand			Claver SAND grev tan elightly moin	t sand medium to coorse			
				-		grained	, sand mount it boalse			
				F						
				<u>+</u>		grading into SAND, grey tan, wet, me	edium to coarse grained	Drilling suspend	ed 23/8	
			reen					continued 25/8		
									-	
_				17.0						
▼ Star] nding	Collap	sed S	and					-	
									-	
				 					-	
									-	
Not	e: origin	al in c	olour	18.0	<u> </u>	grading into SAND, grey tan, wet, me	edium to coarse grained	Evidence of coll	apse	

	Client: Project	م : C	Adela Centr	aide ral \	e City Cou West Pre	uncil cinct		Bore No. MW 5 cont.		maunsell
	Location: Franklin St Bus Station and Carp					tation a	and Carparks		Job no:	40032004.00
	Excav. Type: Bore Hole				e Hole		Length: 20	3 m	Date:	23/8 & 25/8/2004
	Equipment: Solid Auger			d Auger		Width:	mm	_ Logged:	SDG	
	/Tes		_		-	Бо			RL Surface:	43.171 m
er	ples		Bore		th (m	phic			Datum:	AHD
Wat	Wat Sam GW Dep			Dep	Gra	Material De	Remarks:			
 									Key To (Graphic Log
		Colla	nser	152	and					INDICATES SILT
				ļ						
			Scree	en			grading into SAND, gravitan, wat, m	adium to coarse grained		
				ł	19.0		grading into SAWD, grey tan, wet, m	Submit to coarse granted		
				-						
			V E	L Ind	Сар					INDICATES GHAVEL -
										-
				ļ						-
					20.0		grading into SAND, grey tan, wet, m	edium to coarse grained		
				:			hard drilling - end of hole presume sandstone			
				-			END OF HOLE			
										-
				ļ	21.0		r			
				ŀ						
										-
				-						
										• -
					22.0					-
										-
										-
					_					-
										-
										-
					24.0					
Not	te · origin	al in	colo	1112						

Client: Adelaide City Counc Project: Central West Precin-					and Carnarks	Bore No. MW 6 (A)	lob no:	maunsell
	Excav		Bore Hole		l ength:	m	Date:	24/08/2004
	Excav. Type: Equipment:		Bore Hole Solid Auger		Width:	mm	Logged:	SDG
Water	Samples/ Tests GW Bore		Depth (m)		Material Des	cription:	RL Surface Datum: Remark	: :s:
					ASPHALT Gravelly SAND, light grey cream, slig 15mm, sand variable fine to very coa Sandy CLAY, tan / brown, very soft, s Sandy CLAY, tan / brown, very soft, s CLAY, olive grey, slightly moist, firm	htty moist, gravel angular to rse and fine, moist and fine, wet	Key To	Graphic Log
Not			6.0					-

Location: Franklin St Bus Station and Carparks Job no:: 40032004.00 Equipment: Sold Auger unit 22.0 m Logged:: 50.00 ging Sold Auger Ging Ging Ging Ging Sold Auger Naterial Description: RL TOC: AID ging ging Ging Ging Ging Ging AID Datum: AID ging Ging Ging Ging Ging Material Description: Remarks: Remarks: Ging <		Client: Project:	Adelaic Central	le City Cou West Pre	uncil cinct		Bore No. MW 6 (B)		maunsell
Excav. Type: Bore Hole Length: 22.0 m Date:: 2408/2004 Equipment: Solid Auger Width: mm Date:: 2408/2004 Image: Solid Auger Image: Solid Auger Solid Auger RL TOC:: 43.151 m Image: Solid Auger Solid Auger Solid Auger APPL/ALT Date::: 2408/2004 Image: Solid Auger Solid Auger Solid Auger Solid Auger APPL/ALT Date::: 2408/2004 Image: Solid Auger Solid Auger Solid Auger Solid Auger APPL/ALT Date::: 2408/2004 Image: Solid Auger Solid Auger Solid Auger Solid Auger APPL/ALT Date:::: Solid Auger Image: Solid Auger Solid Auger Solid Auger Solid Auger APPL Date::::: Solid Auger Image: Solid Auger Solid Auger Solid Auger Solid Auger Solid Auger APPL Date::::::::::::::::::::::::::::::::::::		Locatio	n: Franklir	n St Bus S	Station and Carparks			Job no:	40032004.00
Equipment: Solid Auger Width: nm Logged: SDG gender		Excav. Type: Bore Hole				Length: 22.0	m	Date:	24/08/2004
Notes Second		Equipm ខ្ល	ent: So	lid Auger		Width:	mm	Logged:	SDG
Ball million Datum: AHD Image: Second matrix of the second ma		s/Tes	ø	Ê	: Log			RL TOC:	43.151 m
S G G K G Material Description: Remarks: Image: Solution of the sol	ater	mples V Bore			aphic			Datum:	AHD
Concrease Astron.c. First SAND. light grey orsen, slightly moist, gravel angular to Gravely SAND, light grey orsen, slightly moist, tan, minor gravel rounded to 5mm First Sandy CLAY, slightly moist, tan, minor gravel rounded to 5mm Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, orange and brown flocks Sondy Silty CLAY, cream tan, slightly moist, sand medium to coarse, red streaks CLAY, light grey / green, slightly moist, sand medium to coarse, red and tan streaks CLAY, light grey / green, slightly moist, sand medium to coarse, red and tan streaks CLAY, light grey / green, slightly moist, sand medium to coarse, red and tan streaks CLAY, light grey / green, slightly moist, sand medium to coarse, red and tan streaks CLAY, light grey / green, slightly moist, sand medium to coarse, red and tan streaks CLAY, light grey / green, slightly moist, sand medium to coarse, red and tan streaks CLAY, light grey / green, slightly moist, sand medium to coarse, red and tan streaks	Ň	ů	5	ă A	ซี	Material Des	cription:	Remar	ks:
Sandy Silty CLAY, slightly moist, tan, minor gravel rounded to 5mm Sandy Silty CLAY, slightly moist, tan, minor gravel rounded to 5mm Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, rotarge and brown flecks Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, red streaks CLAY, light gray / green, slightly moist, sand medium to coarse, red and tan streaks			スマ			Gravelly SAND, light grey cream, sligh	tly moist, gravel angular to	Key To	Graphic Log
 Sandy CLAY, slightly molst, tan, minor gravel rounded to 5mm Sandy CLAY, slightly molst, tan, minor gravel rounded to 5mm Sandy Slity CLAY, cream tan, slightly moist, sand medium to coarse, orange and brown flecks Sandy Slity CLAY, cream tan, slightly moist, sand medium to coarse, red streaks Sandy Slity CLAY, cream tan, slightly moist, sand medium to coarse, red and tan streaks CLAY, light gray / graen, slightly moist, sand medium to 			Bei	- itonite		Tomm, sand variable fine to very coar	50		
 Sandy CLAY, slightly molst, tan, minor gravel rounded to 5mm Sandy CLAY, slightly molst, tan, minor gravel rounded to 5mm Sandy Sity CLAY, cream tan, slightly molst, sand medium to coarse, orange and brown flecks Sandy Sity CLAY, cream tan, slightly molst, sand medium to coarse, red streaks CLAY, light grey / green, slightly molst, stiff, no streaks 			20	-					INDICATES SAND
1.0 Sandy CLAY, slightly moist, tan, minor gravel rounded to 5mm NOICATES ROCK 2.0 Sandy Silty CLAY, oream tan, slightly moist, sand medium to coarse, orange and brown flecks NOICATES GRAVEL 3.0 Sandy Silty CLAY, oream tan, slightly moist, sand medium to coarse, red streaks Sandy Silty CLAY, oream tan, slightly moist, sand medium to coarse, red streaks 4.0 Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, red streaks 5.0 CLAY, light grey / green, slightly moist, sand medium to				-					INDICATES ASPHALT/CONCRETE
 Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, orange and brown flecks Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, red streaks Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, red streaks CLAY, light grey / green, slightly moist, stiff, no streaks 			10	1.0		Sandy CLAY, slightly moist, tan, minor	gravel rounded to 5mm		INDICATES ROCK
 Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, orange and brown flecks Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, red streaks Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, red streaks CLAY, light grey/ green, slightly moist, stift, no streaks 			40	-					INDICATES CLAY
2.0 Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, orange and brown flecks 3.0 Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, red streaks 4.0 Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, red streaks 5.0 CLAY, light grey / green, slightly moist, stiff, no streaks				Ē					INDICATES GRAVEL
 Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, orange and brown flecks Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, red streaks Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, red streaks CLAY, light grey / green, slightly moist, stiff, no streaks 			14	E					-
 Sandy Sitty CLAY, cream tan, slightly moist, sand medium to coarse, orange and brown flocks Sandy Sitty CLAY, cream tan, slightly moist, sand medium to coarse, red streaks Sandy Sitty CLAY, cream tan, slightly moist, sand medium to coarse, red streaks Sandy Sitty CLAY, cream tan, slightly moist, sand medium to coarse, red streaks CLAY, light grey / green, slightly moist, stiff, no streaks 			26	F					
 3.0 Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, red streaks 4.0 Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, red and tan streaks 5.0 CLAY, light grey/green, slightly moist, stiff, no streaks 				2.0		Sandy Silty CLAY, cream tan, slightly r coarse, orange and brown flecks	moist, sand medium to		
 Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, red streaks Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, red and tan streaks CLAY, light grey / green, slightly moist, stiff, no streaks 			20	-					
 3.0 Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, red streaks 4.0 Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, red and tan streaks 5.0 CLAY, light grey / green, slightly moist, stiff, no streaks 			40	<u></u>					
 Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, red streaks Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, red and tan streaks CLAY, light grey / green, slightly moist, stiff, no streaks 			22	-					
4.0 Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, red streaks 5.0 CLAY, light grey / green, slightly moist, stiff, no streaks		r r	22	- -		Condy Silty CLAY, groom ton all ability	moint and modium to		
4.0 Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, red and tan streaks 5.0 CLAY, light grey / green, slightly moist, stiff, no streaks			20	3.0 		coarse, red streaks	hoist, sand medium to		
4.0 Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, red and tan streaks			22	L					
4.0 Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, red and tan streaks			28	-					
4.0 Sandy Silty CLAY, cream tan, slightly moist, sand medium to coarse, red and tan streaks		ł	22	-					*
coarse, red and tan streaks			42	- 40		Sandy Silty CLAY, cream tan, slightly	moist sand medium to		
5.0 CLAY, light grey / green, slightly moist, stiff, no streaks			22			coarse, red and tan streaks			
5.0 CLAY, light grey / green, slightly moist, stiff, no streaks				-					
5.0 CLAY, light grey / green, slightly moist, stiff, no streaks									
5.0 CLAY, light grey / green, slightly moist, stiff, no streaks			/ /	-					
				 5.0		CLAY, light grey/green, slightly mois	t. stiff. no streaks		
			22						-
			2.7	Ē					
			/ /	_					
			27	F					
6.0 CLAY, light grey / green, slightly moist, stiff, tan and red streaks Sample from auger	NI-			6.0		CLAY, light grey / green, slightly moist	, stiff, tan and red streaks	Sample from	auger

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Location: Franklin St. Bus Station and Catyarks Job no: 40032004.00 Excert, Type: Boe Hole Length: 22.0 m Date: 20.002.004 Rulpment: Solid Auger Videt: mm Loggers: SOG Image: Solid Auger Image: Solid Auger Solid Auger SOG RL Surface: 43.151 m Image: Solid Auger Image: Solid Auger Image: Solid Auger AHD Date: Solid Auger Image: Solid Auger Image: Solid Auger Image: Solid Auger RL Surface: 43.151 m Image: Solid Auger Image: Solid Auger Reserve Reserve Reserve Image: Solid Auger Image: Solid Auger Reserve Reserve Reserve Image: Solid Auger Image: Solid Auger Reserve Reserve Reserve Image: Solid Auger Image: Solid Auger Reserve Reserve Reserve Image: Solid Auger Image: Solid Auger Reserve Reserve Reserve Image: Solid Auger Image: Solid Auger Reserve Reserve Reserve Image: Solid Auger Image: Solid Auger Reserve Reserve Reserve Image: Solid Auger Image: Solid Auger Image: Solid Auger Reserve <td< th=""><th></th><th>Client: Project:</th><th>Ade : Cer</th><th>elaide City Co ntral West Pre</th><th>uncil cinct</th><th></th><th>Bore No. MW 6 (B) cont.</th><th></th><th>maunsell</th></td<>		Client: Project:	Ade : Cer	elaide City Co ntral West Pre	uncil cinct		Bore No. MW 6 (B) cont.		maunsell
Eactory Type: Born Hole Length: 22.9 m Backgrout: Solid Auger Width: mm Backgrout: Solid Auger Width: mm Backgrout: Solid Auger Width: mm Backgrout: Solid Auger Width: mm Backgrout: Solid Auger Width: mm Backgrout: Solid Auger Material Description: Historial Description: Backgrout: Solid Auger Solid Auger Material Description: Backgrout: Solid Auger Solid Auger Material Description: Backgrout: Solid Auger Solid Auger Material Description: Backgrout: Solid Auger Solid Auger Material Description: Backgrout: Solid Auger Solid Auger Solid Auger Solid Auger Solid Auger Solid Auger Material Description: Backgrout: Solid Auger Solid Auger Solid Auger Formation: Solid Auger Solid Auger Solid Auger Formation: Solid Auger Solid Auger Solid Auger Formation: Solid Auger CLAV, light ger/ green, slightly moist, stiff, tan Backgrout: Solid Auger Solid Auger		Locatio	n: Fra	nklin St Bus S	station a	and Carparks		Job no:	40032004.00
Full prenet: Solid Auger Width: mm Logged: SOQ 1 <td< th=""><th>-</th><th colspan="2">Excav. Type: Bo</th><th colspan="2">Bore Hole</th><th>Length: 22.0</th><th>m</th><th>Date:</th><th>24/08/2004</th></td<>	-	Excav. Type: Bo		Bore Hole		Length: 22.0	m	Date:	24/08/2004
up 0 up 0 up 0 up 0 up 0 up 0 up 0 up 0 up 0 1 0 <		Equipment:		Solid Auger	1	Width:	mm	Logged:	SDG
Base Base Datum: AHD Remarks: Remarks: <t< th=""><th></th><th>/ Test</th><th></th><th>-</th><th>Log</th><th></th><th></th><th>RL Surface:</th><th>43.151 m</th></t<>		/ Test		-	Log			RL Surface:	43.151 m
Š Č Č Š Material Description: Remarks: k <	ıter	nples/		pth (m	aphic			Datum:	AHD
Settorite LAY, light grey / green, slightly moist, stiff, tan and red streaks. appears to have small damp pocket but is believed to have arginited from auger Mod Artis are in the count is and in the streaks. The manual damp pocket but is believed to have arginited from auger 6.0 CLAY, light grey / green, slightly moist, stiff, tan and red streaks. no evidence of moisture pockets but is believed to have arginited from auger Mod Artis are in the count is and in the stiff, sand fine to medium grained 1.0 CLAY, light grey / green, slightly moist, firm to stiff, sand fine to medium grained Not Artis are in the stiff, sand fine to medium grained 1.1.0 CLAY, light grey / green, slightly moist, sliff, sand fine to medium grained Not Artis are in the stiff, sand fine to medium grained	Ň	Sa	ß	å	້ອ	Material Description:		Remarks	:
Bottonite CLAY, light grey / green, slightly moist, slift, tan Image: contrast address for address fo			/					Key To G	iraphic Log
7.0 CLAY, light grey / green, slightly moist, stiff, tan 8.0 CLAY, light grey / green, slightly moist, stiff, tan 8.0 CLAY, light grey / green, slightly moist, stiff, tan 8.0 CLAY, light grey / green, slightly moist, stiff, tan 8.0 CLAY, light grey / green, slightly moist, stiff, tan 8.0 CLAY, light grey / green, slightly moist, stiff, tan 8.0 CLAY, light grey / green, slightly moist, stiff, tan 8.0 CLAY, light grey / green, slightly moist, stiff, tan 8.0 CLAY, light grey / green, slightly moist, stiff, tan 8.0 CLAY, light grey / green, slightly moist, slightly softer, sliff, tan and red streaks, no evidence of moisture pockets 10.0 Sandy CLAY, tan brown, slightly moist, firm to stiff, sand fine to medum grained 11.0 CLAY, light grey / green, stiff, slightly moist 11.0 CLAY, light grey / green, stiff, slightly moist 11.0 CLAY, light grey / green, stiff, slightly moist			2	Bentonite					INOICATES SILT
 CLAY, light gray / green, slightly moist, stiff, tan and red streaks CLAY, light gray / green, slightly moist, stiff, tan and red streaks. CLAY, light gray / green, slightly moist, stiff, tan and red streaks. CLAY, light gray / green, slightly moist, stiff, tan and red streaks. CLAY, light gray / green, slightly moist, slightly softer, stiff, tan and red streaks. CLAY, light gray / green, slightly moist, slightly softer, stiff, tan and red streaks. CLAY, light gray / green, slightly moist, slightly softer, stiff, tan and red streaks, no evidence of moisture pockets CLAY, light gray / green, slightly moist, slightly softer, stiff, tan and red streaks, no evidence of moisture pockets Concrete CLAY, light gray / green, stift, slightly moist CLAY, light gray / green, stift, slightly moist 			\mathcal{A}	F					INDICATES SANO
7.0 CLAV, light grey / green, slightly moist, stiff, tan and red streaks 0.0 CLAY, light grey / green, slightly moist, stiff, tan and red streaks. 0.0 CLAY, light grey / green, slightly moist, stiff, tan and red streaks, appears to have small damp pocket but is believed to have orginisted from auger 5.0 CLAY, light grey / green, slightly moist, slightly softer, stiff, tan and red streaks, no evidence of moisture pockets 10.0 Sandy CLAY, tan brown, slightly moist, firm to stiff, sand fine to medium grained 11.0 CLAY, light grey / green, stiff, slightly moist 11.0 CLAY, light grey / green, stiff, slightly moist 12.0 CLAY, tan, light grey / green, stiff, slightly moist			2	4					INDICATES ASPHALT/CONCRETE
8.0 CLAY, light grey / green, slightly moist, stiff, tan and red streaks, appears to have small damp pocket but is balleved to have orginiated from auger 9.0 CLAY, light grey / green, slightly moist, slightly softer, stiff, tan an and red streaks, no evidence of moisture pockets 10.0 Sandy CLAY, tan brown, slightly moist, firm to stiff, sand fine to medium grained 11.0 CLAY, light grey / green, stiff, slightly moist 11.0 CLAY, light grey / green, stiff, slightly moist			$\langle \rangle$	7.0		CLAY, light grey / green, slightly moist and red streaks	t, stiff, tan		INDICATES ROCK
CLAY, light grey / green, slightly moist, stiff, tan and red streaks, appears to have small damp pocket but is believed to have orginiated from auger CLAY, light grey / green, slightly moist, slightly softer, stiff, tan and red streaks, no evidence of moisture pockets Concrete Concrete Lao CLAY, light grey / green, stiff, slightly moist, firm to stiff, sand fine to medium grained CLAY, light grey / green, stiff, slightly moist CLAY, light grey / green, stiff, slightly moist CLAY, light grey / green, stiff, slightly moist CLAY, light grey / green, stiff, slightly moist CLAY, tan, light grey / green, stiff, slightly moist			\sim						INDICATES CLAY
 CLAY, light grey / green, slightly moist, stiff, tan and red streaks, appears to have small damp pocket but is believed to have orginiated from augor CLAY, light grey / green, slightly moist, slightly softer, stiff, tan and red streaks, no evidence of moisture pockets COncrete Sandy CLAY, tan brown, slightly moist, firm to stiff, sand fine to medium grained CLAY, light grey / green, stiff, slightly moist CLAY, light grey / green, stiff, slightly moist 			\mathcal{A}						INDICATES GRAVEL
0.0 CLAY, light grey / green, slightly moist, stiff, tan and red streaks, appears to have small damp pocket but is believed to have orginiated from auger 0.0 CLAY, light grey / green, slightly moist, slightly softer, stiff, tan and red streaks, no evidence of moisture pockets 10.0 Sandy CLAY, tan brown, slightly moist, firm to stiff, sand fine to medium grained 11.0 CLAY, light grey / green, stiff, slightly moist 11.0 CLAY, light grey / green, stiff, slightly moist			\sim	7					
8.0 CLAY, light grey / green, slightly moist, stiff, tan and red streaks, appears to have small damp pocket but is beleved to have orginiated from auger 9.0 CLAY, light grey / green, slightly moist, slightly softer, stiff, tan and red streaks, no evidence of moisture pockets Concrete 10.0 Sandy CLAY, tan brown, slightly moist, firm to stiff, sand fine to medium grained 11.0 CLAY, light grey / green, stiff, slightly moist 11.0 CLAY, light grey / green, stiff, slightly moist				7					
B.0 CLAY, light grey / green, slightly moist, slightly softer, stiff, tan and red streaks, no evidence of moisture pockets Concrete - 10.0 Sandy CLAY, tan brown, slightly moist, firm to stiff, sand fine to medium grained 11.0 CLAY, light grey / green, stiff, slightly moist 11.0 CLAY, light grey / green, stiff, slightly moist			\mathcal{A}	8.0		CLAY, light grey / green, slightly mois and red streaks, appears to have sma	t, stiff, tan Il damp pocket but is		
9.0 CLAY, light grey / green, slightly moist, slightly softer, stiff, tan and red streaks, no evidence of moisture pockets 10.0 Sandy CLAY, tan brown, slightly moist, firm to stiff, sand fine to medium grained 11.0 CLAY, light grey / green, stiff, slightly moist 11.0 CLAY, light grey / green, stiff, slightly moist						believed to have orginiated from auge	ſ		
9.0 CLAY, light grey / green, slightly moist, slightly softer, stiff, tan and red streaks, no evidence of moisture pockets Concrete			\mathcal{A}						
9.0 CLAY, light grey / green, slightly moist, slightly softer, stiff, tan and red streaks, no evidence of moisture pockets Concrete			2	4					
2.0 CLAY, light grey / green, slightly moist, slightly softer, sliff, tan and red streaks, no evidence of moisture pockets Concrete			2						
Concrete Con			2	9.0		CLAY, light grey / green, slightly moist	, slightly softer, stiff, oisture pockets		
Concrete 10.0 Sandy CLAY, tan brown, slightly moist, firm to stiff, sand fine to medium grained 11.0 CLAY, light grey / green, stiff, slightly moist 12.0 CLAY, tan, light grey / green, stiff, slightly moist			2						
Concrete 10.0 10.0 10.0 CLAY, tan brown, slightly moist, firm to stiff, sand fine to medium grained CLAY, light grey / green, stiff, slightly moist CLAY, tan, light grey / green, stiff, slightly moist CLAY, tan, light grey / green, stiff, slightly moist									
10.0 Sandy CLAY, tan brown, slightly moist, firm to stiff, sand fine to medium grained 11.0 CLAY, light grey / green, stiff, slightly moist 12.0 CLAY, tan, light grey / green, stiff, slightly moist				Concrete					
10.0 Sandy CLAY, tan brown, slightly moist, firm to stiff, sand fine to medium grained 11.0 CLAY, light grey / green, stiff, slightly moist 12.0 CLAY, tan, light grey / green, stiff, slightly moist									°
Land CLAY, light grey / green, stiff, slightly moist						Sandy CLAY, tan brown, slightly moist	t, firm to stiff, sand fine to		
Lange CLAY, light grey / green, stiff, slightly moist						medium gramed			
11.0 CLAY, light grey / green, stiff, slightly moist									
LLAY, tan, light grey / green, stiff, slightly moist									
LAY, light grey / green, stiff, slightly moist									
12.0 CLAY, tan, light grey / green, stiff, slightly moist				11.0		CLAY, light grey / green, stiff, slightly i	moist		
12.0 CLAY, tan, light grey / green, stiff, slightly moist									
12.0 CLAY, tan, light grey / green, stiff, slightly moist									
12.0 CLAY, tan, light grey / green, stiff, slightly moist									
CLAY, tan, light grey / green, stiff, slightly moist									-
Note: original in colour	No		al in col	12.0		CLAY, tan, light grey / green, stiff, slig	htly moist		-

	Client: Adelaide City Council Project: Central West Precinct			e City Cou	uncil		Bore No. MW 6 (B) cont.		maunsell
	Location: Franklin St Bus Stati			St Buc S	tation a	nd Carnarke		Job po:	40032004.00
	Excav T		Bor			l enoth 22 0	m	Date:	24/08/2004
	Equipme	nt:	Sol	id Auger		Width:	mm	Logged:	SDG
	Tests				bo			RL Surface:	43.151 m
fer	nples	Bore		th (m	phic			Datum:	AHD
Wa	Sar	N S		Det	Gra	Material Desc	cription:	Remarks	5:
				Concrete				Key To G	araphic Log
									INDICATES SILT
									INDICATES SAND
				_				Net State	INDICATES ASPHALT/CONCRETE
				13.0		CLAY, tan, light grey / green, stiff, sligl	htly moist		
				-					INDICATES CLAY
									INDICATES GRAVEL
			Ben	14.0		CLAY, tan, light grey / green, stiff, slig	htly moist		
						Sandy CLAY, olive (consistent color medium grained	ur), slightly moist, sand	Minimal recove	ery from here on
	P	dded	Sanc	16.0		Clayey SAND, yellow tan, slightly mois coarse	st, sticky, sand medium to		-
▼ Sta	nding	Se	reen	17.0		grading into SAND, cream, wet, medi evidence on auger suggests near 17	um to very coarse sand, - 17.5		
No	te: origina	Collap	sed S	Sand 18.0		Hole collapsed approximately 1m on	extraction at this point		-