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Environmental Investigation – Audit Report

Yarralumla Brickworks
Sandford Street Complex
Block 1 Section 102 Yarralumla
Canberra Central ACT

October 2006

Client: Territory and Municipal Services Property Group Facilities Management
PO Box 777
Fyshwick ACT 2609

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1 Executive Summary

Robson Laboratories Pty Ltd was commissioned by Territory and Municipal Services Property Group Facilities Management in August 2006 to undertake an Environmental Investigation of specific facilities located within the Yarralumla Brickworks Complex Yarralumla ACT. The purpose of the investigation was to assess the potential environmental impact from the past site use of these facilities to establish budget requirements for effective environmental remediation and hazard abatement (if required).

The facilities targeted include previously identified sources of potential on site contamination:

- Explosive Store (ES);
- Adjacent the asbestos dump (AD);
- Forklift Shed (A6);
- Coal and Oil Storage Area (NE5);
- Kiln Sand;
- General Areas.

Quarry Area (West)

- Machine and Blacksmith Shop Area (M1-M3;
- Quarry Tailing Dump Areas; and
- General Areas.

The representative samples (soil) taken from the site investigations have been classified in accordance with the NEPM (Assessment of Site Contamination).

This assessment is in accordance with the ACT Environment Protection ACT 1997.

The Environmental Investigation identified a range of contaminants which are discussed below.

Fill

Extensive fill was identified adjacent the asbestos dump which comprised mainly of brick waste however ash and slag materials were also identified. The depth of fill horizon ranged between 2 and 3 metres below ground level.

Fill was also located in the levelled grassed section of the Quarry area and is visually apparent as waste mounds in the elevated sections around the lake.

Laboratory analysis to date does not indicate that this fill is contaminated.

Lead

Lead was found to be elevated in the Kiln sands of Kiln 2 (770mg/kg) which exceeds the Sensitive Landuse Criteria of 300mg/Kg. The sample was taken from the northwest corner of Kiln 2.

This result indicates that further testing of the Kiln sands will be required to delineate the extent of the elevated lead levels.

Hydrocarbons

Hydrocarbon contamination was detected at Borehole 14 (0.5-0.7m) in the vicinity of the Machine and Blacksmith Shop Area (Quarry Area directly east of Kiln 2 and 3 – refer Appendix 1).

The concentration of Total Petroleum Hydrocarbons was 10,550 mg/kg which exceeds the Sensitive Landuse Criteria of 1,000mg/kg.

Hydrocarbon odours were observed to be present at this location to a depth of 3m.

This result indicates that further drilling or excavation in this location will be required to delineate the extent of the spill and or remove the hydrocarbon contaminated soil.

Apart from the asbestos dump no other contaminants were identified on site that exceed the Sensitive Landuse criteria at this stage.

Recommendations

Based on the analytical results and field observations Robson Laboratories Pty Ltd recommends the following:

1. In the area adjacent the machine shed where hydrocarbon contamination was identified, excavate and validate the affected area and resultant stockpile for Sensitive Landuse and waste classification purposes.

2. Undertake further sampling and assessment of the Kiln Sands for heavy metal contamination.

3. Undertake further investigation to enable the confirmation of the location of the Septic Tank and the time of the removal of the Coal and Oil Storage Facility.

4. Implement the remediation of the Asbestos Dump and the removal of Asbestos building materials from structures across the site.

5. Ascertain the future use for the site to allow for the design of the appropriate environmental assessment to enable the sites suitability for a change in land use.

6. Ensure a suitable level of Duty of Care is applied to all demolition and waste removal activities as required under the ACT Occupational Health and Safety Act 1989.

2 Introduction

Robson Laboratories Pty Ltd was commissioned by Territory and Municipal Services Property Group Facilities Management in August 2006 to undertake an Environmental Investigation of specific facilities located within the Yarralumla Brickworks Complex Yarralumla ACT. The purpose of the investigation was to assess the potential environmental impact from the past site use of these facilities to establish budget requirements for effective environmental remediation and hazard abatement (if required).

The facilities targeted include previously identified sources of potential on site contamination:

- Explosive Store (ES);
- Adjacent the asbestos dump (AD);
- Forklift Shed (A6);
- Coal and Oil Storage Area (NE5);
- Kiln Sand;
- General Areas.

Quarry Area (West)

- Machine and Blacksmith Shop Area (M1-M3;
- Quarry Tailing Dump Areas; and
- General Areas.

The Environmental Investigation was undertaken on 6 and 7 July 2006.

The representative samples (soil) taken from the site investigations have been classified in accordance with the National Environment Protection Measure (Assessment of Site Contamination).

This assessment is in accordance with the ACT Environment Protection Act 1997.

3 Scope of Work

Robson Laboratories undertook the following scope of works:

Environmental Investigation:

1. Review the Connell Wagner Contamination Report (2001) and all other available information;

2. Design a limited sampling plan (not to EPA requirements) for the site with Data Quality Objectives (i.e. to meet residential land use criteria – the most sensitive landuse);

3. Implement the sampling plan which included:

- Undertake a drilling program targeting seven (7) specific locations across the site.
- Identify depth of fill (if any) in these locations.
- Take representative soil samples from the each of the boreholes, one (1) from the fill soil and one at depth (i.e. natural soil).
- As the source of contamination is specific in some locations and non-specific in general areas the following contaminants were selected for analysis:

  -Benzene, Toluene, Ethyl benzene & Xylene (BTEX);
  -Total Petroleum Hydrocarbons (TPH);
  -Polycyclic Aromatic Hydrocarbons (PAHs);
  -Heavy Metals (As, Cd, Cr, Cu, Hg, Ni, Pb and Zn);
  -Organochlorine Pesticides;
  -Polychlorinated Biphenyls; and
  -Explosives and Nitroglycerin.

4. Based on the results of the sample analysis make recommendations with respect to the likely extent of contamination across the site to TAMS FM.

4 Site Information

4.1 Site Identification

Name and Site Location:	**Yarralumla Brickworks** **Yarralumla ACT** **(Block 1 Section 102)**
Name of the Lessee:	**ACT Government**
Managed by:	**Territory and Municipal Services Property Group Facilities Management (TAMS FM)**
Client:	**TAMS FM** PO Box 777 Fyshwick ACT 2609
Site Assessor:	**Robson Laboratories Pty Ltd** 9 Lyell Street Fyshwick PO Box 112 Fyshwick ACT 2609

4.2 Site Description

The site is located on a large block of 9.6 hectares approximately 4.8 km southwest of Canberra City. The site slopes to the west and is surrounded by a golf course and residential land. Apart from the built up areas on the west side of the site large pine trees line the perimeter of the site and are also dominant on the walls of the Quarry.

The site is bounded by the Royal Canberra Golf course to the west, Lane Poole Place and Bentham Street to the North, Schomburgk and Woollis Streets to the East and South. The site may be accessed by Denman Street at the south end and is secured by a chain wire fence.

The site has two distinct areas the west side which is defined by the kiln buildings and workshops and the East side which is defined by the Quarry. The quarry floor is dominated by a man made lake which was mostly dry at the time of the investigation.

Large areas of the site have been filled with either quarry tailings or brick waste generated from the manufacturing processes.

The facilities targeted include previously identified sources of potential on-site contamination:

- Explosive Store (ES);
- Adjacent the asbestos dump (AD);
- Forklift Shed (A6);
- Coal and Oil Storage Area (NE5);
- Kiln Sand;
- General Areas.

Quarry Area (West)

- Machine and Blacksmith Shop Area (M1-M3;
- Quarry Tailing Dump Areas; and
- General Areas.

4.3 Geology and Other Physiographic Information

Refer Connell Wagner Report 2001 (Appendix 6).

4.4 Site History

Refer Connell Wagner Report 2001 (Appendix 6).

4.4.1 Historical Aerial Photograph Review

Historical aerial photograph review of the site was undertaken through the actpla office located in Dickson ACT. The aerial photographs were reviewed at approximately 10 year intervals from the earliest record to the present.

November 1950: The Brickworks was established and the site was bounded by trees/ orchard to the north, housing development to the east, open paddocks to the south with a number of sheds and established trees to the west.

1955: A third kiln has been established on the site.

1961: A large shed has been built on the east side of the site (NE7) and a drainage line is apparent on the south side of Fan House 2 that flows to the west. There are large stockpiles of material on the quarry side of the site. There is land disturbance on the south boundary of the site which is probably for cultivation.

February 1972: All kilns have been built and a car park has been established on the southeast corner of the site. Red stockpiles (brick) on the boundaries of the quarry (SE and NW end of the lake). Coal and oil storage (NE5) appears to be located outside of the north boundary. CSIRO School of Forestry was established (NE of the site).

1978: Established drainage line between the two fan houses is present and NE5 has been removed. Stockpiles of material are present across the eastern half of the site in two locations and a dump site is present in the NE corner of the property outside the current boundary.

February 1980: A large volume of material is present on the west side of the site 'asbestos dump'. The railway line is established and all kiln roofs appear to be tin. Note: the only kiln roof that may have been asbestos is Kiln 3.

1981: As per 1980 but the 'asbestos dump' was obscured by vegetation.

March 1983: Coal storage area removed.

March 1985: 'Asbestos' dump was clearly present below the drainage line on the west side of the site. The tourist railway line and the artificial lake have been established. Revegetation of the quarry area is apparent. Houses were established on the east and north boundaries of the site.

1991: The dump was covered in vegetation.

1997: As per 1991 but there are logs stored on the east side of the site. Houses are established to the east and north.

2004: As per 1997.

4.5 Contaminated Land Review

The contaminated land search undertaken through Environment ACT Environment Protection Unit did not identify a record of the site on the Register of contaminated sites under section 21(A) of the Environment Protection Act 1997.

However, the site is recorded on the EPU Database as potentially contaminated due the past activities at the site.

Further, the search identified the site as an abandoned commercial brickworks on Blocks 1, 7 and 20 Section 102 Yarralumla and the EPU has received a Phase 1 environmental assessment prepared by Connell Wagner dated February 2001 which is reviewed in this report.

The EPU supported the Consultants recommendations that further investigation, validation and remediation would be required and any further assessment would require an independent audit by an accredited third party environmental auditor.

The EPU has previously indicated to the ACT planning authorities that it would oppose any change in land use from a brickworks until the site is assessed and independently audited by a contaminated land auditor.

4.6 Review of the Connell Wagner Contamination Report 2001

The study was a preliminary (Phase 1) assessment of potential site contamination and was based on interviews with persons who worked on the brickworks and a desktop study which undertook the review of available historic information.

The study identified a number of locations on site which are likely to be sources of on-site contamination but did not identify any off site contamination sources.

These include:

- Coal and Oil Storage Bunkers (NE5);
- Forklift Shed (A6);
- Model Railway Workshops (M1-M3);
- Septic Tank (ST);
- Blacksmiths Shop (M1-M3);
- Explosive Storage Area (ES); and
- General fill on the site.

The report also makes comment on the likely presence of above ground hazardous material in buildings and that the site has been filled in places with materials that have been sourced from the site.

The report concludes that it is probably suitable for its intended site use (a commercial and recreational facility) provided the potential sources of contamination are investigated in accordance with Environment ACT requirements.

4.7 Summary

The review of the available site history information confirmed that the source of land contamination is from on site activities.

The Connell Wagner report identified the presence of the Septic Tank (ST) and the Coal and Oil Storage Area (NE5). These facilities could not be specifically identified in this survey and based on aerial photograph information it appears that the coal and oil storage bunker (NE5) may have been removed from site at another time (between 1972 and 1978) i.e. the development of the Lane Poole residences.

Further prior to the approval of a change of landuse an appropriate environmental investigation must be undertaken and independently audited by a contaminated land auditor.

5 Method and Sampling Plan

The Environmental Investigation was undertaken on 6 and 7 July 2006.

The sampling was undertaken by a Robson Laboratories Environmental Scientist in accordance with Section 7 and 8 of AS 4482.1-2005 *Guide to the sampling and investigation of potentially contaminated soil – Part 1: Non-volatile and semi-volatile compounds.*

This included a Field QA/QC program.

To ensure that the field QA/QC program was upheld the following QA/QC samples were taken.

- Duplicate sample (blind and split duplicate); and
- Rinsate (water).

A duplicate sample is a sample collected at the same place and time as the routine sample and is intended to represent the same entity as closely as possible. A duplicate sample is taken at a rate of 1 per 10 samples and analysed for the same analytes as the routine samples.

A blind duplicate is analysed by the primary lab and a split duplicate is analysed by a secondary lab.

A rinsate sample is a sample of the water used to clean the sampling equipment between sampling events to assess the effectiveness of the decontamination procedure of sampling equipment. A rinsate sample is taken at a rate of 1 per sampling session and analysed for the same analytes as the routine samples.

The analytical laboratory (SGS) completed their own internal QA procedures as required by the National Association of Testing Authorities (NATA) during the analysis of samples. In general terms, this involved duplicates of particular soil samples being analysed for the same parameters. The repeatability of the analytical procedures was assessed in this way by the laboratory. In addition, laboratory blanks and standard solutions were analysed by the laboratory for the same parameters as the soil samples to check instrument accuracy. The QA results are presented with laboratory reports in Appendix 4.

All representative soil samples were sampled with a clean stainless steel auger. The soil samples were placed into sterile glass jars and sealed with teflon coated lids and secured in a cooled container with chain of custody forms for transport to a NATA Registered Laboratory for Analysis.

All sampling equipment was decontaminated between each sampling event with tap water and Decon 90 a phosphate free detergent.

5.1.1 Assessment Criteria

The assessment criteria are defined as threshold levels of the concentration of contaminants in the soil allowable for a designated site use as defined in following Environment ACT approved Guideline:

- National Environmental Protection Council (NEPC) 1999 National Environment Protection Measures. *Assessment of Site Contamination;* and,

The Yarralumla Brickworks is zoned for industrial landuse under the Territory Plan. However, to allow for flexibility for future landuse the assessment criteria have been set to the most sensitive Health Investigation Level i.e. Residential 'A' (NEPM) which is defined as follows:

> **Residential A:** standard residential with garden/accessible soil (home grown produce contributing less than 10% of vegetable and fruit intake; no poultry): this category includes children day-care centres, kindergartens, preschools and primary schools.

A summary of the soil assessment criteria is presented in Table 2 on the next page.

Table 2: Assessment Criteria

Contaminant	Primary Assessment Criteria – Sensitive Land-use (mg/Kg dry wt)	Waste Classification (Environment ACT Tables A3 & A4) (mg/Kg dry wt)	
		Inert	Solid
Petroleum Hydrocarbons (NSW EPA Guidelines for Assessing Service Station Sites; Table 3)			
C_6-C_9	65	650	650
C_{10}-C_{40}	1000	5000	10000
Benzene	1	1	10
Toluene	1.4	28.8	288
Ethyl benzene	3.1	60	600
Total Xylene	14	100	1000
PAHs	20	200	200
Benzo(a)pyrene	1	0.08	0.8
Phenols	8500	28.8	288
Organic Contaminants[1], Heavy Metals and Asbestos			
OC	10	-	-
PCBs	10	2	<50
Arsenic	100	10	100
Cadmium	20	2	20
Chromium (III)	12%	10	100
Chromium (VI)	100		
Copper	1000	Environmental Background 1 - 30	
Lead	300	10	100
Mercury (inorganic)	15	0.4	4
Nickel	600	4	40
Zinc	7000	Environmental Background 2 - 180	
Asbestos	Not Present	Industrial Level Waste	

Table Notes:
[1] National Environment Protection (*Assessment of Site Contamination)* Measures – *Health Based Investigation Levels* (Table 5-A).

All sampling was undertaken in accordance with the sampling plan provided in Table 3 on the next page.

Table 3. Sampling Plan

Area to be validated	***No. of Samples Allowed***	***Analytes***
Kiln Area (West Side)		
Explosive Store (ES)	Borehole samples from **2** locations **Total No. of Samples 3**	Heavy Metals (As, Cd, Cr, Cu, Hg, Pb, Ni and Zn), pH & Explosive Screen (includes nitro-glycerine)
Asbestos Dump (AD)	Borehole samples from **3** locations ***Total No. of Samples 4***	Heavy Metals (As, Cd, Cr, Cu, Hg, Pb, Ni and Zn), PAH and Asbestos
***Forklift Shed* (A6)**	Borehole samples from **2** locations **Total No. of Samples *2***	TPH, PAH and Heavy Metals (As, Cd, Cr, Cu, Hg, Pb, Ni and Zn)
Coal and Oil Storage Area (NE5)	Borehole sample from **1** location **Total No. of Samples *1***	TPH, PAH and Heavy Metals (As, Cd, Cr, Cu, Hg, Pb, Ni and Zn)
Kiln Sand	Sample of sand from **1** location ***Total No. of Samples 1***	PAH and Heavy Metals (As,Cd,Cr, Cu, Hg, Pb, Ni & Zn)
Quarry (East Side)		
Machine and Blacksmith Shop (M1-M3)	Borehole samples from **2** locations **Total No. of Samples *3***	TPH, BTEX & Lead
Quarry tailing dump areas	Borehole samples from **4** locations **Total No. of Samples *4***	TPH, PAH, Heavy Metals (As, Cd, Cr, Cu, Hg, Pb, Ni and Zn), Organochlorine Pesticides (OC) and Polychlorinated Biphenyls (PCB).

Area to be validated	***No. of Samples Allowed***	***Analytes***
General Areas	Borehole samples from **7** locations **Total No. of Samples 7**	TPH, PAH, Heavy Metals (As, Cd, Cr, Cu, Hg, Pb, Ni and Zn), Organochlorine Pesticides (OC) and Polychlorinated Biphenyls (PCB).
Quality Assurance and Quality Control Samples	Duplicate Samples1 per 10 **Total No. of Duplicate Samples 3**	TPH, BTEX, PAH, Heavy Metals (As, Cd, Cr, Cu, Hg, Pb, Ni and Zn).
	1 Rinsate per sampling event **Total No. of Samples 1**	

6 Analytical Results and Field Observations

The analytical results for Soil contaminants are presented below in Table 4. The site soil sampling location plans and the Laboratory Test Reports are included in Appendix 1 and 4 respectively.

6.1 Field Observations

Fill was encountered in all almost all locations across the site. The fill generally consisted of brick fragments, minor slag and coal and gravels.

Hydrocarbon contamination was identified at Borehole 14 to a depth of 3m. Apart from the fill and the asbestos dump on the west side of the site no other obvious signs of contamination were identified.

Table 4. Summary of Analytical Results (mg/kg) – Environmental Site Investigation

Sample No	BTEX	TPH $C_6 - C_9$	TPH $C_{10} - C_{40}$	Total PAHs	OCP	PCB	Nitro-glycerin	Expl.	Asbestos	As	Cd	Cr	Cu	Hg	Pb	Ni	Zn
3144 – BH1 (0.0-0.3m)	<3.0	<0.50	<0.50	NT	NT	NT	NT	<0.05	NT	3	0.1	27	16	<.05	44	11	20
3144 – BH1 (0.7-1.0m)	NT	<0.50	<0.50	NT	NT	NT	0.0	<0.05	NT	13	0.2	21	15	<.05	27	11	160
3144 – BH2 (0.13-0.43m)	NT	<0.50	<0.50	NT	NT	NT	NT	<0.05	NT	6	0.2	24	14	<.05	52	14	66
3144 – BH3 (0.11-0.41m)	NT	<20	<120	<2	<0.1	<0.9	NT	NT	NT	8	0.2	25	17	0.05	280	16	59
3144 – BH4 (0.0-0.03m)	NT	<0.50	<0.50	<2	NT	NT	NT	NT	NAD	<3	<0.1	5.7	7.4	<0.05	5	7.2	7.4
3144 – BH4 (0.7-1.0m)	NT	<0.50	<0.50	<2	NT	NT	NT	NT	NAD	10	0.2	13	19	<0.05	19	27	60
3144 – BH5 (1.8-2.0m)	NT	<20	<120	<2	<0.1	<0.9	NT	NT	NAD	9	1.3	12	13	0.07	38	12	120
3144 – BH6 (0.0-0.3m)	NT	<20	<120	<2	<0.1	<0.9	0.0	<0.05	NT	5	0.2	16	17	<0.05	93	13	75
3144 – BH8 (0.0-0.3m)	NT	<20	<120	<2	NT	NT	0.0	<0.05	NT	10	0.1	8.9	31	<0.05	10	42	35
3144 – BH9 (0.0-0.3m)	NT	<20	<120	<2	NT	NT	NT	NT	NT	4	0.1	20	11	<0.05	28	18	37
3144 – BH10 (0.15-0.45m)	NT	<20	<120	<2.08	NT	NT	NT	NT	NT	10	0.3	20	16	<0.05	22	18	97
Assessment Criteria																	
Residential Landuse 'A'	19.5	65	1000	20	NA	10	NA	NA	Not Present	100	20	100	1000	15	300	600	7000

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Sample No	BTEX	TPH $C_6 - C_9$	TPH $C_{10} - C_{40}$	Total PAHs	OCP	PCB	Nitro-glycerine	Expl.	Asbestos	As	Cd	Cr	Cu	Hg	Pb	Ni	Zn
3144 – BH11 (0.0-0.3m)	NT	<20	<120	<2	<0.1	<0.9	NT	NT	NT	8	0.2	10	16	<0.05	36	13	48
3144 – BH12 (0.0-0.3m)	NT	<20	<120	<2	<0.1	<0.9	NT	NT	NT	20	0.2	20	21	<0.05	33	21	100
3144 – BH13 (0.0-0.3m)	NT	<20	232	<3.56	NT	NT	NT	NT	NT	8	0.1	10	15	<0.05	14	22	22
3144 – BH14 (0.5-0.7m)	<3.0	<20	10,550	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	19	NT	NT
3144 – BH14 (2.3-2.5m)	<3.0	<20	213	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	26	NT	NT
3144 – BH15 (0.7-1.0m)	NT	<20	176	<1.92	<0.1	<0.9	NT	NT	NT	11	0.2	11	47	<0.05	20	32	200
3144 – BH17 (0.0-0.3m)	NT	<20	<120	<2	<0.1	<0.9	NT	NT	NT	7	0.2	17	22	<0.05	16	11	38
3144 – BH18 (0.0-0.3m)	NT	<20	<120	NT	NT	NT	NT	NT	NT	4	0.1	11	11	<0.05	9.2	10	27
3144 – BH19 (0.7-1.0m)	NT	<20	<120	<2	<0.1	<0.9	NT	NT	NT	5	0.2	18	22	<0.05	18	20	60
3144 – BH20 (0.0-0.3m)	NT	<0.50	<0.50	NT	NT	NT	NT	NT	NT	11	0.3	16	42	<0.05	28	29	75
3144 – BH21 (0.0-0.3m)	NT	<0.50	<0.50	<2	NT	NT	NT	NT	NT	5	1.1	10	16	<0.05	190	11	140
3144 – SS1	NT	NT	NT	<2	NT	NT	NT	NT	NT	16	0.6	5.1	38	<0.05	770	8.5	540
Assessment Criteria																	
Residential Landuse 'A'	19.5	65	1000	20	NA	10	NA	NA	Not Present	100	20	100	1000	15	300	600	7000

Sample No	BTEX	TPH $C_6 - C_9$	TPH $C_{10} - C_{40}$	Total PAHs	OCP	PCB	Nitro - glyc erine	Expl.	Asbe stos	As	Cd	Cr	Cu	Hg	Pb	Ni	Zn
3144-DUP-1	<3.0	<20	**6,700**	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	21	NT	NT
3144-DUP-2	NT	<20	<120	<2	NT	NT	NT	NT	NT	4	0.1	11	8.9	<0.05	11	8.4	26
3144-DUP-3	NT	NT	NT	<0.5	NT	NT	NT	NT	NT	7	2	13	18	<0.1	209	NT	249
3144-R1 (water)	NT	<0.040	<0.5	NT	NT	NT	NT	NT	NT	<.05	<0.002	<0.005	0.02	<0.0005	<0.02	<0.009	0.071
Assessment Criteria																	
Residential Landuse 'A'	19.5	65	1000	20	NA	10	NA	NA	Not Pres ent	100	20	100	1000	15	300	600	7000

Table Notes:
NA: Not Available; NT: Not Tested; NAD: No Asbestos Detected
[1] *NEPM (Assessment of Contaminated Sites) 1999* – Table 5A -*Schedule (B1) Guideline on the Investigation Levels for Soil and Groundwater.*
Bold: Exceeds the Assessment Criteria

6.1.1 QA/QC RESULTS

The field QA/QC program included the collection and analysis of the following sample type:

- Blind and Split Duplicate; and
- Rinsate

Duplicate Samples

The duplicate samples were collected at rate of 1 per 10 samples resulting in three (3) duplicate samples (Dup–1 to 3). Duplicate samples 1 and 3 were analysed for a selection of the same analytes using the same methods as the routine samples (refer Table 5). Note: Duplicate 2 is not included in the analysis as the primary sample was not submitted for testing.

To validate the data Relative Percentage Difference (RPD) analysis was undertaken (Refer to formula below). The result of this analysis is presented in Table 5.

$$\text{Relative Percentage Difference (RPD)} = \frac{\text{Result No.1} - \text{Result No. 2}}{\text{Mean result}} * 100$$

The RPD calculation was used to normalise each pair of results, allowing improved QA/QC data interpretation. For those RPD values that exceed a generally accepted 50% limit, the correspondence of data is considered to be unsatisfactory, however, consideration needs to be given to homogeneity of the sampled material. Additionally variation can be expected to be higher for organics than for inorganics and for low concentration of analytes. Duplicate samples with an RPD of less than 50% are considered to have acceptable correlation.

Table 5. RPD Analysis

Sample No.	BTEX	TPH C_6-C_9	TPH C_{10}-C_{36}	PAH	As	Cd	Cr	Cu	Hg	Pb	Ni	Zn
3144 - BH14 (0.5-0.7m)	<3.0	<20	10,550	NT	NT	NT	NT	NT	NT	19	NT	NT
3144 – DUP1	<3.0	<20	6,700	NT	NT	NT	NT	NT	NT	21	NT	NT
RPD %	**NA**	**NA**	**44**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**10**	**NA**	**NA**
3144 – BH21 (0.0-0.3m)	NT	NT	NT	<2	5	1.1	10	16	<0.05	190	11	140
3144 – DUP3	NT	NT	NT	<2	7	2	13	18	<0.1	209	NT	249
RPD %	**NA**	**NA**	**NA**	**NA**	**33**	**29**	**26**	**12**	**NA**	**10**	**NA**	**56**

NA: Not Applicable. **NT:** Not Tested
BOLD: RPD level exceeds the generally accepted 50% limit.

All of the calculated RPD results are below the acceptable limit of 50% apart from the result for the Split Duplicate (Dup 3) for Zinc (56%).

This result may be attributable to the low concentrations of the analyte or sampling error. It is unlikely to be laboratory error as the other results for Dup 3 were below the acceptable limit and therefore this result is not of concern.

Based on the results of the RPD Analysis and consideration given to the results the laboratory data is of acceptable quality.

Rinsate Sample

The rinsate sample (R1) was analysed for Total Petroleum Hydrocarbons (TPH) and Heavy Metals as per the routine samples. The analytical results for the sample were either below the assessment criteria or below the laboratory detection limit indicating that the decontamination procedure between samples was satisfactory.

Laboratory QA/QC Results

The results of the laboratory internal Quality Control program are included along with the analytical results in Appendix 4.

In summary the results indicate:

- The laboratory control samples, which were run with each batch of samples analysed, were within acceptable QC limits set by the laboratory; and
- The concentrations of the Laboratory blanks, which were run with each batch of samples analysed, were below the Practical Quantitation Limit (PQL).

Based on the above information, the laboratory control data indicates that the analytical procedures are considered to be of acceptable quality.

7 Discussion

Total Petroleum Hydrocarbons

Total Petroleum Hydrocarbons (TPH) were only identified in one location BH14 between M3 and M2.

The TPH (C_{10}-C_{36}) were identified in the soils at depth between 0.5m and 3m below the surface and the near surface sample exhibited concentrations in excess of the assessment criteria (TPH C_{10}-C_{36} - 1000mg/kg). The two (2) soil samples taken for analysis at this location returned results of 10,550mg/kg (0.5-0.7m) and 273mg/kg (2.3-2.5m). The source of the contamination is probably temporary fuel storage in this location. The hydrocarbon fractions identified are typical of distillate (diesel fuel).

The extent of the spill is unknown but Borehole 15 located approximately 15m east of Borehole 14 did not identify any fuel contamination. The topsoil in the general area was discoloured i.e. dark and perhaps is the result of long term use of diesel fuel in this location.

Lead

Lead was identified in excess of the assessment criteria (300mg/kg) in the Kiln Sands of Kiln 2 (SS-1 – 770mg/kg). The sample was taken adjacent the kiln wall which was coated with a glaze as result of repeated firings.

The source of the lead may be from the glaze and not be specifically from the kiln sands (sand on the floor of the kilns).

Further investigation would be required to clarify the source of lead and also if this high concentration of lead is representative.

Asbestos

Asbestos building materials are known to exist in large quantities especially in the internal sections of the kiln roofs and in the dump on the west side of the site. However, the quantity of asbestos roof sheeting or other material in the dump is relatively unknown and cannot be quantified until the vegetation and other waste is removed. Based on recent inspections and the knowledge that the original roofs of the larger buildings (kilns) on site have tin roofs the quantity may be less than generally thought.

Other site contaminants

No other contaminants were identified in the fill or in the natural soils in the sampled locations in excess of the assessment criteria.

These contaminants include:

BTEX, PAH, Organochlorine Pesticides (OC), Polychlorinated Biphenyls (PCB), Explosives, Heavy Metals (As, Cd, Cr, Cu, Hg, Ni and Zn) and Asbestos.

Therefore significant contamination from the targeted on-site sources is thought to be unlikely.

Fill

The fill identified across the site comprises of bricks and brick fragments, clay and slag. The presence of this large volume of material is more likely to pose a geotechnical challenge for any major redevelopment of the site and may have to be removed or at least relocated.

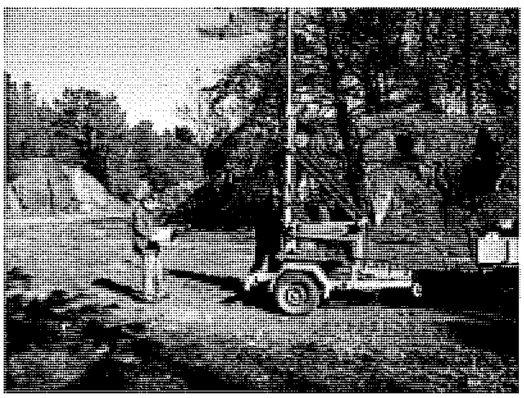
General photographs of the site are presented on the following page.

Photograph 1: West view of crusher area.

Photograph 2: Typical vegetation on the knolls that dominate the quarry.

Photograph 3: Evidence of asbestos sheeting in the dump on the west side of the property.

Photograph 4: View of the brickwork buildings from a typical knoll on the east side of the site.



Photograph 5: Drilling BH 19 into brick fill.

8 Recommendations

Based on the analytical results and field observations Robson Laboratories Pty Ltd recommends the following:

1. In the area adjacent the machine shed (M3) where hydrocarbon contamination was identified, excavate and validate the affected area and resultant stockpile for Sensitive Landuse and waste classification purposes.

2. Undertake further sampling and assessment of the Kiln Sands for heavy metal contamination.

3. Undertake further investigation to enable the confirmation of the location of the Septic Tank and the time of the removal of the Coal and Oil Storage Facility.

4. Implement the remediation of the Asbestos Dump and the removal of Asbestos building materials from structures across the site.

5. Ascertain the future use for the site to allow for the design of the appropriate environmental assessment to enable the sites suitability for a change in land use.

6. Ensure a suitable level of Duty of Care is applied to all demolition and waste removal activities as required under the ACT Occupational Health and Safety Act 1989.

9 References

ACT's Environmental Standards: *Assessment and Classification of Liquid and Non-Liquid Wastes* June 2000.

Australian Standard AS 4482.1-1997 *Guide to the sampling and investigation of potentially contaminated soil – Part 1: Non-volatile and semi-volatile compounds.*

National Environmental Protection Council (NEPC). National Environment Protection (*Assessment of Site Contamination)* Measure 1999.

Connell and Wagner 2001 - Appendix F- Brickworks Contamination Report

NOHSC: 2018 (2005) - Code of Practice for the Management and Control of Asbestos in Workplaces;

NOHSC 2002 (2005) - *Code of Practice for the Safe Removal of Asbestos – 2nd Edition*

NSW EPA (1994) - *Guidelines for Assessing Service Station Sites.*

APPENDICES

APPENDIX 1

Site Location Map and Sampling Location Plans (Figures 1-3)

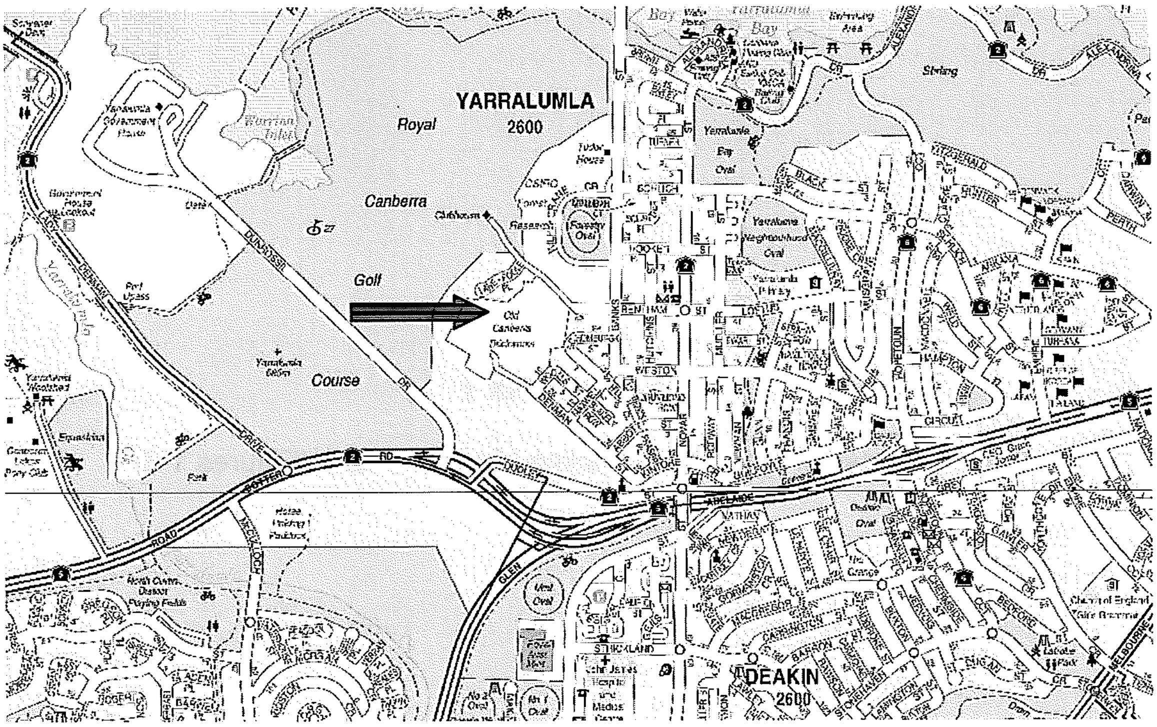


Figure 1.
Site Location Map
Yarralumla Brickworks

Source: Six Cities 2001
UBD on Disk

APPENDIX 2

Aerial Photographs – 1955 and 2004

APPENDIX 3

Borehole Logs (1-21)

APPENDIX 4

Laboratory Test Report and Chain of Custody Forms

APPENDIX 5

Estimated Remediation Costs

Table 6. Estimated Remediation Costs

Item	Action	Estimated Cost ($) (ex GST)
Asbestos Dump	Remediate	[redacted]
Machine Shop Fuel Spill	Further investigation/ remediation – Cost depends on extent of contamination	[redacted]
Kiln sands	Assess extent of heavy metal (lead contamination)	[redacted]
Fill removal across the site	Remove as required i.e. if not suitable as building foundations - Depend on future site use.	[redacted]
Final approval for a change of land use from Environment ACT (includes independent audit)	Further site assessment, remediation and validation.	[redacted]

Estimated Cost: Based on previous quotes or researched cost estimates.

APPENDIX 6

ACT Contaminated Land Search Report

APPENDIX 7

Appendix F- Brickworks Contamination Report
Connell and Wagner 2001

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Environmental Excellence through Experience Endeavour and Evaluation

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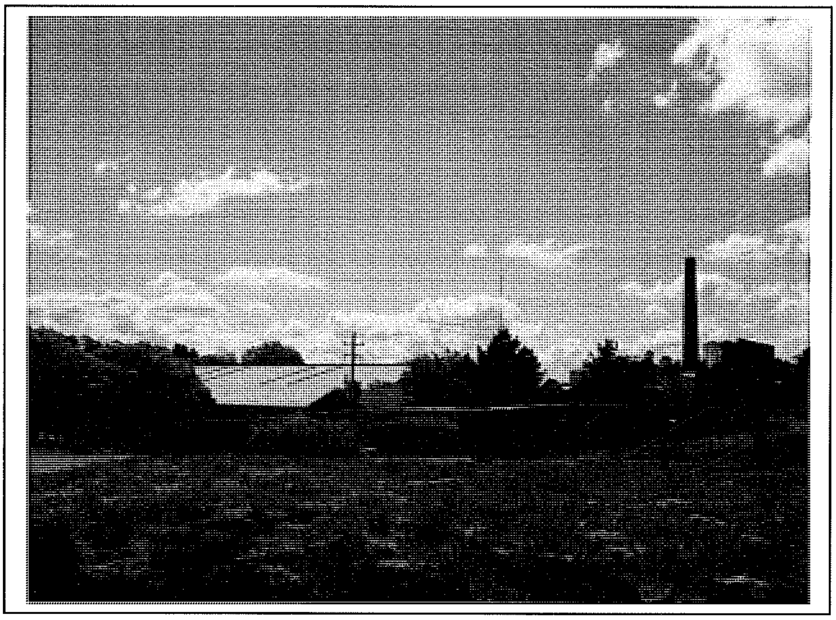
Hazardous Material Survey & Management Plan

Yarralumla Brickworks
Denman St.
Yarralumla
ACT 2600

October 2010



This report MUST NOT be used as a removal specification

Client: LAPS

CERTIFICATE OF APPROVAL FOR ISSUE OF DOCUMENTS

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Yarralumla Brickworks
Denman St.
Yarralumla, ACT 2600

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RELEASE STATUS:

Confidential

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1 PREFACE

This Hazardous Materials Survey and Management Plan (HMSMP) was commissioned by LAPS in order to assure the occupants of Yarralumla Brickworks, Yarralumla the highest standards of occupational health and safety in relation to hazardous materials. The safe removal of hazardous materials must be undertaken by appropriately licensed and skilled personnel prior to the demolition of the premises.

The HMSMP contains sections covering the identification, evaluation and control of hazardous materials including asbestos containing materials (ACM), Lead Paint, Polychlorinated Biphenyls (PCB), Synthetic Mineral Fibre (SMF), Refrigerants and Fuel Storage Facilities (e.g. Underground Storage Tanks).

Robson Environmental Pty Ltd commenced the hazardous material survey on 26th October 2010. The information contained in this document will assist LAPS in fulfilling their obligations under the latest editions of the following regulations/Acts:

- *Code of Practice for the Management and Control of Asbestos in Workplaces* [NOHSC: 2018 (2005)];
- *Code of Practice for the Safe Removal of Asbestos* [NOHSC: 2002 (2005)];
- Dangerous Substances (General) Regulation 2004;
- Work Safety Act 2008;
- ACT WorkCover;
- Dangerous Substances Act 2004;
- *National Code of Practice for the Safe Use of Synthetic Mineral Fibre* [NOHSC:2006(1990)];
- *National Standard for Synthetic Mineral Fibres* [NOHSC:1004(1990)];
- *Guide to Lead Paint Management, Part 2: Residential and Commercial Buildings* Standards Australia, AS 4361.2 - 1998;
- *Identification of PCB-Containing Capacitors; An information Booklet for Electricians and Electrical Contractors* ANZECC 1997; and
- *The Australian Refrigeration and Air-conditioning Code of Good Practice* Standards Australia, HB 40.1 – 2001.

2 EXECUTIVE SUMMARY

2.1 Purpose

This report presents the findings of a Hazardous Materials Survey conducted at Yarralumla Brickworks, Yarralumla. Robson Environmental Pty Ltd commenced this survey on the 26th October 2010 at the request of LAPS. The safe removal of hazardous materials must be undertaken by appropriately licensed and skilled personnel prior to the demolition of the premises.

2.2 Scope

The Hazardous Materials Survey undertaken at Yarralumla Brickworks, Yarralumla was non-destructive and non-intrusive in nature. The extent of the survey was limited to the following areas:

- Interior and exterior of the building; and
- Roof, amenities and immediate surrounding land.
- UST filler points and breather vents.

The survey did not include the inspection or assessment of the following areas:

- Subterranean areas (e.g. infill/soil)
- Concealed cavities
- Formwork and subterranean electrical cable ducts and water pipe ducts

2.3 Survey Methodology

The survey involved a visual inspection of accessible, representative, construction materials and the collection and analysis of materials suspected of being potentially hazardous to human health.

Hazardous materials assessed included asbestos containing materials (ACM), synthetic mineral fibre (SMF), polychlorinated biphenyls (PCB), lead containing paint, ozone depleting substances (ODS) and fuel storage facilities, e.g. underground storage tanks (UST).

The visual site inspection performed by Robson Environmental Pty Ltd, which included the sampling of representative materials suspected of being hazardous, was undertaken in accordance with relevant Standards and Codes. The particular sampling methodology used for each hazardous materials type is provided below:

Asbestos: The asbestos materials survey was conducted in accordance with the *Code of Practice for the Management and Control of Asbestos in Workplaces [NOHSC: 2018 (2005)].* It involved a visual inspection of accessible representative construction materials suspected of containing asbestos. Materials were not sampled from all areas due to the uniformity of the materials used throughout the building(s). Samples were analysed in a National Association of Testing Authorities (NATA) accredited laboratory for the presence of asbestos by polarising light microscopy and/or X-ray diffraction.

Lead (Pb) Based Paints: In accordance with AS4361.2-1998 representative paint samples were collected from various paint coated surfaces identified on site.

A spot sample consisting of a 25mm square of paint coating was removed using a knife to expose the base substrate. All scrapings and portions of the paint from within the square's area were collected and placed in a sealed and marked container. A total of three spot samples were collected for each suspected paint coating.

Samples were analysed for their lead (Pb) content by Envirolab Services Pty Ltd – NATA accreditation number: 2901 using ICP/AES techniques and in-house Method No.4.

Within the same building, wherever a paint coating had a similar surface texture, colour etc. to a paint coating that had already been sampled because of its suspected lead content, it was presumed that these paint coatings were identical.

SMF: Synthetic Mineral Fibre (SMF) materials were visually identified. Where visual identification of the sampled material was unable to determine the presence of SMF, representative sample(s) were collected. The representative samples were analysed in a National Association of Testing Authorities (NATA) accredited laboratory for the presence of SMF by polarising light microscopy and dispersion staining.

PCBs: The information (make, type, capacitance etc.) recorded for each representative fluorescent light fitting capacitor suspected of containing PCB was cross-referenced against *ANZECC Identification of PCB Containing Capacitors – Information Booklet for Electricians and Electrical Contractors - 1997.*

This identification booklet provides a list of electrical equipment that is known to contain PCBs, and a list of electrical equipment known not to contain PCBs. Where the information recorded from the capacitor case(s) correlated exactly with the information listed in the ANZECC Information Booklet for known PCB-containing capacitors it was determined that PCBs were present in the capacitor under analysis.

Wherever a capacitor could not be identified in either list, this was noted in the PCB register as being a capacitor *'Suspected to contain PCBs'* and a recommendation made that an identical capacitor be submitted for analysis to a laboratory NATA registered for PCB analysis.

Ozone Depleting Substances: Visual examination of refrigerant gas labels affixed to representative air-conditioning and refrigeration units. Information concerning the ASHRAE/ARI refrigerant designated R number was noted for later cross-reference to relevant air-conditioning and refrigeration industry Codes of Practice and Guidelines.

In addition, the condition of the plant was noted and comment made as to possible refrigerant or lubricant leaks.

Where refrigerant gas labels are absent from representative air-conditioning and refrigeration plant, an assessment is made as to the likelihood of the plant using an ozone depleting substance, based on its age and condition.

Fuel Storage Facilities: The survey included a visual inspection for above ground storage tanks (AST) and underground storage tank (UST) filler points and breather vents. The inspection included assessing the site for fuel spillage and staining and the presence of hydrocarbon odours.

2.4 Key Findings

Building Construction

The site consists of predominately brick constructions with tin roofs with asbestos cement eaves to a number of buildings. Internally, there open ceiling spaces with timber studs. Asbestos cement sheet and suspended ceiling tiles exist in various locations. Internal walls are brick and the floors throughout are concrete.

Asbestos Findings

The first floor to building K2 contains large amounts of damaged ACM millboard sheeting. ACM sheet debris is located to the ground throughout the entire site. The small building adjacent the car park entrance (building A4) contains damaged ACM wall and ceiling sheet and damaged ACM corrugated roof sheet. Smaller ACM are noted below.

Table 1A: ACM, locations and required actions

TYPE	ACM	Locations	Action to be taken
Friable asbestos	Rope lagging	Rope gasket to ducting at FH1 and FH2 buildings	Encapsulate as soon as practicable
	Sheet	Millboard debris to first floor K2	Conduct regular air monitoring to ensure safety, remove as soon as financially viable
	Presumed asbestos	Presumed asbestos debris to bags of SMF to all kilns	Remove as soon as practicable
Bonded asbestos	Hardened rope	Large brake pad to old brick making machine	Encapsulate as soon as practicable
	Sheet	Ceiling and wall sheet in various locations (refer registry)	Label & maintain, Inspect Annually (change where applicable)
	Sheet	Debris to small chimney at entrance (and throughout site)	Remove as soon as practicable
	Sheet	Sheet debris to soil adjacent FH2 building (and throughout site)	
	Sheet	Electrical switchboards to all buildings	Label & maintain, Inspect Annually (change where applicable)
	Gasket	Gasket adjacent downpipe to corner of building 1	

Refer to Section 2.4 - Table 1B for presumed ACM and Section 3.2 for exclusions

Table 1B: Presumed ACM, concealed locations and required actions

TYPE	ACM	Locations	Action to be taken
The materials listed below while not identified on site, should be presumed to be present until a destructive survey confirms otherwise			
Presumed ACM	Insulation/pipe lagging	Inaccessible ducts, risers and ceiling and wall space cavities	Destructive survey under controlled conditions prior to any refurbishment which is likely to disturb possible ACM in these areas. Until these areas are surveyed they should be presumed to contain asbestos. No access to unauthorised personnel should be given
	Asbestos millboard lining	Interior of air conditioning ductwork adjacent to heater elements	
	Asbestos insulation and gaskets/joints	Within mechanical equipment concealed by outer metal cladding, structure or housing	
	Asbestos vinyl floor tiles, covering, cushioning underlay and adhesive	Found beneath carpets and vinyl flooring	
	Asbestos sheeting	Backing material to ceramic tiles (Roofs, floors and walls) and packers to building construction joints, such as gable end verge under cloaking	
	Asbestos cement sheet formwork and electrical cable duct / water pipe	Subterranean areas	
	Asbestos brake linings	Lift Motor Room and large machinery	

Prior to any planned demolition, refurbishment or maintenance, its effect upon any in situ asbestos must be established by reference to this document including amendments.

Lead Paint

The analytical results of paint sampling at Yarralumla Brickworks, Yarralumla revealed that there **was lead paint (>1.0% Pb)** present.

It should be assumed that all similar paint throughout the building contains comparable percentages of lead.

Lead Content	Location	Paint Colour	Required action
Lead Paint (>1.0% Pb)	Paint to portable AST to building K3	Yellow	Repaint

Synthetic Mineral Fibre (SMF)

SMF was identified in the following locations.

Type	Material	Location & Material	Required action
SMF	Fibreglass	Lose SMF in bags presumed to contain asbestos throughout kilns	Remove as asbestos waste as soon as practicable
	Sisslation	To underside of roofs throughout	Defer action (Leave & maintain) change where applicable
	Fibreglass	SMF as insulation to pipes throughout	
		SMF as insulating batts to various ceiling spaces	

SMF was identified as insulation within ceiling space areas as insulating batts. Sisslation was located to the underside of various roofs and SMF was located to pipes in various locations throughout the site. Bags of lose SMF were located to all of the kilns. It should be assumed that all inaccessible ceiling spaces and wall cavities contain similar SMF.

Polychlorinated Biphenyls (PCB)

PCB containing capacitors were identified to a number of the fluorescent light fittings.

Result	Make - Type	Location	Required action
PCB	**AEE MP – PMN 5417 6µF**	**Former canteen ground floor**	**Leave & maintain (change where applicable)**
	Nichicon 1966 – SFSGLP 6µF	**Building SS1**	
	Dawco metal – BS 4017-1966 3.25µF	**Building A4 1 tube**	
	Ducon metal – APF 265CR 6.5µF	**Building A4 2 Tubes**	
	Ducon metal – APF 260CR 6µF	**Building R1**	
	Ducon metal - APF 280CR 6µF		
Non - PCB	Plessey plastic – 427/1/07503/006 10µF	North end of site	Leave & maintain (change where applicable)
	AEE MP – PMN 5417 12µF	Building R2	
	RIC – LE 1 EB 6µF		
Presumed PCB	**Unknown – Fire damaged**	**Building SS2**	**Remove as soon as practicable**

Ozone Depleting Substances (ODS)

No ozone depleting substances were identified during the survey.

R Number	Location	Total	Required action
Non - Ozone Depleting Substances			
R-410A	To work area adjacent building K1	1	-

Aboveground Storage (AST) & Underground Storage Tanks (UST)

Evidence of a UST and two dip points were located adjacent to building K1. Further investigation is necessary.

A small portable AST was located to building K3. It is empty and appears to be abandoned.

Refer to Section 15.3 Appendix C for the management of fuel storage facilities in the ACT.

2.5 Key Recommendations

Asbestos

- It is highly recommended that the ACM millboard sheet and debris to the 1st floor of building K2 be removed and the area cleaned by an ACT licensed Asbestos Removalist.

- The ACM corrugated roof sheet and damaged wall, ceiling, eave and debris sheet to building A4 should be removed and the area cleaned by an ACT licensed Asbestos Removalist.

- The ACM sheet debris to the entire site should be removed by an ACT licensed Asbestos Removalist.

- All ACM rope lagging to buildings FH1 and FH2 should be encapsulated by an ACT licensed Asbestos Removalist.

- The ACM brake pad to the old brick making machine to building 1 should be encapsulated by an ACT licensed Asbestos Removalist.

- Damaged ACM wall sheet and other various damaged ACM sheeting throughout the site should be removed by an ACT licensed Asbestos Removalist.

- All Asbestos identified in this report that is in a good condition should be inspected on a yearly basis by a Class A asbestos assessor to ensure no deterioration of the ACM has occurred

- **As access could not be gained to all areas of the building, it should be presumed that any similar materials located within these areas could contain asbestos until proven otherwise. Strict controls should be put in place to brief all contractors.**

- Any asbestos containing material requiring removal must be removed by an ACT licensed Asbestos Removalist as per the Code of *Practice for the Safe Removal of Asbestos, 2nd Edition* [NOHSC: 2002 (2005)].

SMF

- If these materials are to be disturbed during refurbishment appropriate PPE should be worn. SMF materials being removed should be done so using effective dust control procedures. Refer to Section 15.3 Appendix C for further general information on SMF.

Lead Paint

- The lead paint is in a fairly poor condition and should be repainted. It should be assumed that all similar paint applications throughout the building would contain similar percentages of lead. Refer to Section 15.3 Appendix C for further general information on lead paint.

PCBs

- Any damaged light fittings containing capacitors with PCBs should be removed and be suitably disposed of in accordance with the ACT regulatory authorities. Refer to Section 15.3 Appendix C for the correct handling and disposal of PCB containing capacitors.

ODS

- All refrigeration and air-conditioning plant should be regularly checked and maintained in accordance with the manufacturer guidelines. Refer to Section 15.3 Appendix C for further general information on ODS.

UST

- A dip point was found during the survey, however further investigation is required to establish whether or not a UST is still in place and its condition.

Legislation and Guidelines (UST): With regards to Section 3.2 of AS4976 (2008) *The Removal and Disposal of Underground Petroleum Storage Tanks*, it is indicated that the out-of-service period for a UST should not exceed that laid down in any applicable regulation and should not normally be greater than twelve (12) months. Also, Section 6 (Decommissioning) of the ACT EPA (2009) *Environmental Guidelines for Service Station Sites and Hydrocarbon Storage* indicates that all decommissioned tanks must be removed unless there are specific operational or structural reasons as to why they must remain. These reasons must be outlined or substantiated by an experienced and competent person.

Demolition: *Robson Environmental Pty Ltd recommends that prior to any demolition, our office be contacted. Our Class A Asbestos Assessor can attend the site to observe the demolition process, advise as necessary and in the event of asbestos or other hazardous materials being located, assist with assessing the extent, type and condition of materials as required.*

Robson Environmental Pty Ltd also provides a range of occupational hygiene services in relation to the removal of asbestos material as well as contaminated land advice in relation to hydrocarbon contamination. To assist with the tendering process Robson Environmental could be engaged to attend the walkthrough to show the extent of ACM and to respond to questions of clarification.

3 INTRODUCTION

The following Hazardous Material Survey and Management Plan (HMSMP) has been designed to address the safe control of hazardous materials identified at Yarralumla Brickworks, Yarralumla. It covers current requirements for asbestos management as at 26th October 2010 only and must therefore be updated to comply with any future changes to legislative requirements. The safe removal of hazardous materials must be undertaken by appropriately licensed and skilled personnel prior to the demolition of the premises.

This HMSMP includes the following:

- a register of all identified hazardous materials;
- extent, form, condition and risks associated with nominated hazardous materials;
- labelling requirements for identified hazardous materials;
- a timetable for managing risks including priorities for removal or control of ACM and for reviewing risk assessments;
- responsibilities of all persons involved in hazardous materials management;
- procedures to address incidents or spillage involving ACM;
- safe work and removal methods; and
- guidelines on reviewing and updating the HMSMP and hazardous materials register.

3.1 Requirements for the HMSMP

This HMSMP must be held on site for ready access. All personnel undertaking any repair or maintenance work must be provided with a copy of the HMSMP before commencement of work.

Maintenance, trade and other personnel must be instructed not to remove or damage identified ACM. If ACM is identified in the area where work will be undertaken it must be removed before work begins.

Removal of ACM must be undertaken by an ACT licensed Asbestos Removalist in accordance with the *Code of Practice for the Safe Removal of Asbestos, 2nd Edition* [NOHSC: 2002 (2005)].

3.2 Exclusions

The HMSMP commissioned by the client was to be non-destructive and non-intrusive in nature. This type of commission limits or restricts access to the building structure, some surfaces and materials.

The survey undertaken was limited to those areas available for access at the time of building inspection. Only the areas accessible to the surveyors at the time of the building inspection are included in this HMSMP.

Unless specifically noted, the survey did not cover exterior ground surfaces and sub-surfaces (e.g. infill/soil) or materials other than normal building fabric such as materials in laboratories or special purpose facilities.

At the time of survey no access was gained to materials and / or void areas located behind, above, or attached to any sampled or assumed ACM.

The HMSMP does not include the areas, locations and equipment items to which the surveyors could not gain access at the time of inspection.

Some other areas which *may* conceal asbestos include:

Material	Location
Asbestos millboard lining	Air conditioning duct work adjacent to heater elements
Asbestos insulation and gaskets/joints	Within mechanical equipment concealed by outer metal cladding
Asbestos insulation	Walls and cavities (e.g. as lagging to hot water pipes set into and sealed within masonry walls)
Vinyl floor tiles and floor covering	Beneath carpets
Sheeting	Backing material to ceramic tiles and as packers to building construction joints
Asbestos cement sheet formwork and electrical cable/water pipe duct	Sub-ground floor slab

No absolute determination can be made regarding the possibility of concealed or inaccessible hazardous materials or items in the areas, locations and equipment listed in the table above until access is gained to allow for inspection.

Materials and equipment in any non-accessed area should therefore be assumed to contain ACM, SMF, lead paint, PCB and ODS (the nominated hazardous materials) and be treated appropriately until assessment and sample analysis confirm otherwise.

Samples were not taken where the act of sampling would endanger the surveyor(s) or affect the structural integrity of the item concerned.

The presence of ACM to pipe work that is not readily visible, or that would require the full removal and replacement of overlying non-asbestos insulation to confirm, has not been investigated.

This HMSMP, although extensive, is not intended for and must not be used as a specification or method statement for any future asbestos removal project. In this instance detailed plans, quantities etc. would be required.

Before any refurbishment or hazardous material removal projects, the contractor(s) carrying out the work must fully acquaint themselves with the extent of the hazardous materials, particularly in those areas which may need full or partial demolition in order to determine the exact extent and location of such materials.

Care should be taken when demolishing or excavating to determine the existence or otherwise of hazardous materials. For example subsurface pipes and drains, revealed through excavation may be constructed of asbestos cement. Wherever a material is uncovered or revealed and it is suspected to be hazardous, it should be assumed to be hazardous and treated appropriately until such time as assessment and sample analysis of the material confirms otherwise.

Until this confirmation occurs the building work must cease in the immediate vicinity of the suspect material and a Class A Asbestos Assessor must issue a Clearance Certificate before the building work can recommence in the affected area.

To ensure contextual integrity, this HMSMP must always be read in its entirety and should never be referred to in part only.

3.3 Limitations

This report is based on the information obtained by Robson Environmental Pty Ltd at the time of building inspection. Robson Environmental Pty Ltd will not update this report; nor take into account any event(s) occurring after the time that its assessment was conducted.

As both the range and use of manufactured products containing asbestos was extremely widespread, Robson Environmental Pty Ltd cannot accept responsibility for any consequential loss or damage that results from non-recognition of a material that may later be established to contain asbestos. For example, certain textured wall and ceiling finishes may contain small traces of asbestos fibre. In situ, textured finishes are often composed of assorted batches of product, or may have been repaired/patched at various times. It is therefore always a possibility that the samples collected may not always be representative of the entire material.

While Robson Environmental Pty Ltd has taken all care and attention to ensure that this report includes the most accurate information available, it has been unable to examine any inaccessible materials or materials hidden from view.

Under normal construction practices some materials are “built in” or “randomly applied”. These materials are therefore not readily accessible and can only be exposed through demolition or damage to the structure or finishes. Access to a material may also be prevented or restricted by “in service” or operational equipment, or where to obtain access contravenes a relevant statutory requirement or code of practice. (e.g. electrical switchboards) Consequently, while all reasonable care and attention was taken in compiling this report no guarantee to its completeness can be given.

Robson Environmental Pty Ltd has taken all care to ensure that this report includes the most accurate information available, where it uses test results prepared by other persons it relies on the accuracy of the test results in preparing this report. In providing this report Robson Environmental Pty Ltd does not warrant the accuracy of such third party test results.

4 ASBESTOS SURVEY RESULTS

4.1 Survey Details

The survey of Yarralumla Brickworks, Yarralumla commenced on 26th October 2010. The survey included all accessible areas of the buildings. For further asbestos management information, refer to Appendix C.

4.2 Survey Methodology

The survey involved a visual inspection and subsequent sampling and analysis of suspect asbestos materials in a National Association of Testing Authorities (NATA) laboratory using polarising light microscopy and/or X-ray diffraction. Samples were a representative selection of materials suspected of containing asbestos. Samples were not taken from all areas due to the uniformity of the materials used throughout the building.

4.3 Sample Analysis

Table 1a: Mineralogical Analysis of Samples for Asbestos using Polarising Light Microscopy

Sample reference	Sample location	Sample type	Composition Asbestos type
2810 - 40 - A1	**Kiln 2 top floor millboard**	**Sheet**	**Chrysotile Asbestos**
2810 - 40 - A2	**Thick insulation to central beam Kiln 2 top floor**	**Insulation**	
2810 - 40 - A3	**Heat exchange gasket Kiln 2 top floor**	**Gasket**	
2810 - 40 - A4	**Fan house 2 duct flange join**	**Gasket**	
2810 - 40 - A5	**Former canteen toilet ceiling sheet**	**Sheet**	
2810 - 40 - A6	1st level walkway floor covering	Covering	no asbestos detected
2810 - 40 - A7	**Building SS3 ceiling sheet**	**Sheet**	**Chrysotile Asbestos**
2810 - 40 - A8	**Building SS4 shower wall sheet**	**Sheet**	
2810 - 40 - A9	**Perimeter eave and soffit sheet (building A4)**	**Sheet**	

Sample reference	Sample location	Sample type	Composition Asbestos type
2810 - 40 - A10	**Switch board backing sheet** (in various locations)**	**Sheet**	**Consistent with ** asbestos materials**
2810 - 40 - A11	**Corrugated roof sheet and debris** (building A3 & Tip area western side)**	**Sheet**	**Removed (07.11.10)**
2810 - 40 - A12	**Ceiling sheet (building A4 & BH)**	**Sheet**	**Consistent with asbestos materials****
2810 - 40 - A13	**External wall sheeting (atop kiln 3)**	**Sheet**	
2810 - 40 - A14	**Scattered sheeting debris (in various locations)**	**Sheet**	
3617 - 103 - A1	**Large brake pad to top of old brick making machine**	**Hardened rope**	**Chrysotile Asbestos**
3617 - 103 – A2	**Debris to small chimney at entrance**	**Sheet**	
3617 - 103 – A3	Window caulking to BH building	Caulking	no asbestos detected
3617 - 103 – A4	**Gasket adjacent downpipe to corner of building 1**	**Gasket**	**Chrysotile Asbestos**
3617 - 103 – A5	**Rope gaskets to ducting at FH1 building**	**Rope gasket**	
3617 - 103 – A6	Mastic to original distribution board to K3 building	Mastic	no asbestos detected
3617 - 103 – A7	**Sheet debris to soil adjacent FH2 building**	**Sheet**	**Chrysotile & Amosite Asbestos**

Chrysotile	=	**white asbestos**
Amosite	=	**grey or brown asbestos**
Crocidolite	=	**blue asbestos**

It should be noted that the above samples were a representative selection of materials suspected of containing asbestos.

Materials were not sampled from all areas due to the consistency of the materials used throughout the premises.

On-site inspections and an examination of the building register within this report should be undertaken prior to the commencement of any asbestos removal programme.

4.4 Risk Assessment

The purpose of the risk assessment is to enable informed decisions to be made concerning the control of ACM.

As per NOHSC: 2018(2005), the risk assessment should take account of the identification information in the Asbestos Register, including:

- type of ACM (bonded or friable)
- condition and location of ACM
- whether the ACM is likely to be disturbed due to its condition and location; and
- the likelihood of exposure

Types of ACM

Bonded ACM	Bonded ACM is any material that contains asbestos bound into a stable matrix. It may consist of cement or various resins/binders and cannot be reduced to a dust by hand pressure. As such it does not present an exposure hazard unless cut, abraded, sanded or otherwise disturbed. Therefore, the exposure risk from bonded ACM is negligible during normal building occupation. *Note: if bonded ACM is damaged or otherwise deteriorated, the risk assessment must be reviewed to reflect a higher potential for exposure to asbestos fibres. A Class A Asbestos Assessor should perform the risk assessment.*
Friable ACM	Friable ACM can be crumbled or reduced to a dust by hand pressure when dry and can represent a significant exposure hazard. Examples of friable asbestos are hot water pipe lagging, severely damaged asbestos cement sheet, limpet spray to structural beams and electrical duct heater millboard.

ACM CONDITION RATING

1	Severe	**Friable:** Readily accessible, deteriorated surface in extremely poor condition
2	Poor	**Friable:** Unstable material that is relatively accessible **Bonded:** Readily accessible, deteriorated surface
3	Normal	**Friable:** Stable asbestos that is relatively inaccessible **Bonded:** Accessible surfaces in fair condition
4	Good	**Bonded:** Well sealed stable surfaces in accessible locations

ACM RISK RATING

A	Very High	**Friable:** Exposure to airborne asbestos as a consequence of extremely minor disturbance
B	High	**Friable:** Exposure to airborne asbestos occurs as a consequence of significant disturbance **Bonded:** Exposure to airborne asbestos likely as a consequence of significant disturbance
C	Medium	**Friable:** Exposure to airborne asbestos unlikely during normal building use **Bonded:** Exposure to airborne asbestos highly unlikely during normal building use
D	Low	**Bonded:** No exposure to airborne asbestos during normal building use

4.5 Asbestos Register

The Asbestos Register details the type, location, risk assessment and action required for all identified ACM. The register should be accessed to inform all decisions made concerning control of ACM. Action taken to control ACM must be recorded in this register in order to comply with the *Code of Practice for the Management and Control of Asbestos in Workplaces [NOHSC: 2018(2005)]*.

Table 2: Asbestos Register

ACM [1]	Sample No.	Photo No.	ACM type	Locations	Condition Rating	Risk Rating	Approx Quantity	Management Option Defer action (Inspect, label & maintain), encapsulate, repair or remove	Action Undertaken	Assessor/ Date assessed
Friable Asbestos	2810 – 40 – A1	1	Sheet	Kiln 2 top floor millboard	1	B	$100m^2$	Conduct regular air monitoring to ensure safety, remove as soon as financially viable		
	2810 – 40 – A2	2	Insulation	Thick insulation to central beam Kiln 2 top floor	2	B	$20m^2$			
Bonded Asbestos	2810 – 40 – A3	3	Gasket	Heat exchange gasket Kiln 2 top floor	3	C	$<1m^2$	Label and maintain		
	2810 – 40 – A4	4		Fan house 2 duct flange joint	3	B	$<1m^2$	Repair, label and maintain		
	2810 – 40 – A5	5	Sheet	Former canteen toilet ceiling sheet	3	C	$20m^2$			
	2810 – 40 – A7	6		Building SS3 ceiling sheet	2	C	$10m^2$	Remove as soon as practicable		
	2810 – 40 – A8	7		Building SS4 shower wall sheet	3	C	$6m^2$	Label and maintain		
	2810 – 40 – A9	8		Perimeter eave and soffit sheet (building A4)	2	C	$20m^2$	Remove as soon as practicable		
	2810 – 40 – A10	9		Switch board backing sheet** (in various locations)	3	D	$20m^2$	Defer action (Inspect, label & maintain)		

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ACM [1]	Sample No.	Photo No.	ACM type	Locations	Condition Rating	Risk Rating	Approx Quantity	Management Option Defer action (Inspect, label & maintain), encapsulate, repair or remove	Action Undertaken	Assessor/ Date assessed
Bonded Asbestos	2810 – 40 – A11	10	Sheet	Corrugated roof sheet and debris** (building A3)	2	B	$15m^2$	**Removed (07.11.10)**		
	2810 – 40 – A11	10	Sheet	Corrugated roof sheet and debris** (Tip area western side)	2	B	debris	Remove as soon as practicable		
	2810 – 40 – A12	11	Sheet	Ceiling sheet** (building A4 & BH)	2	B	$15m^2$			
	2810 – 40 – A13	12	Sheet	External wall sheeting** (atop kiln 3)	2	C	$10m^2$			
	2810 – 40 – A14	13	Sheet	Scattered sheeting debris** (in various locations)	2	C	$10m^2$			
	3617 - 103 – A1	14	Hardened rope	Large brake pad to top of old brick making machine	3	C	$1m^2$	Encapsulate as soon as practicable		
	3617 - 103 – A2	15	Sheet	Debris to small chimney at entrance	2	C	$2m^2$	Remove as soon as practicable		
	3617 - 103 – A4	16	Gasket	Gasket adjacent downpipe to corner of building 1	3	C	$<1m^2$	Defer action (Inspect, label & maintain)		
	3617 - 103 – A5	17	Rope lagging	Rope gaskets to ducting at FH1 building	3	B	$1m^2$	Encapsulate as soon as practicable		

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ACM [1]	Sample No.	Photo No.	ACM type	Locations	Condition Rating	Risk Rating	Approx Quantity	Management Option Defer action (Inspect, label & maintain), encapsulate, repair or remove	Action Undertaken	Assessor/ Date assessed
	3617 - 103 – A7	18	Sheet	Sheet debris to soil adjacent FH2 building and throughout	2	C	$10m^2$	Remove as soon as practicable		
	3617 – 103 – VA1	19	Moulded sheet	Flash guards to distribution boards at K1, K2 and K3	4	D	$1m^2$	Label and maintain		

1. See Section 10 Asbestos management for management options
2. Other mitigation actions only applicable if building is to remain in use
3. VA = Visually assessed material
4. RA = Referred to another sample as being the same material

Refer to Section 2.4 Table 1B for presumed ACM and Section 3.2 for exclusions

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Table 3B: Register of Sampled materials (which have been confirmed as non ACM)

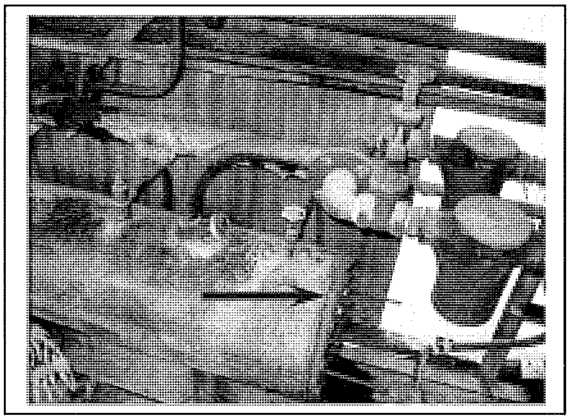
NON ACM SAMPLE REGISTER			
Sample number	**Photo No.**	**Material**	**Locations**
2810 – 40 – A6		Covering	1st level walkway floor covering
3617 – 103 – A3	20	Caulking	Window caulking to BH building
3617 – 103 – A6	21	Mastic	Mastic to original distribution board to K3 building

Refer to Section 2.4 - Table 1B for presumed ACM and Section 3.2 for exclusions

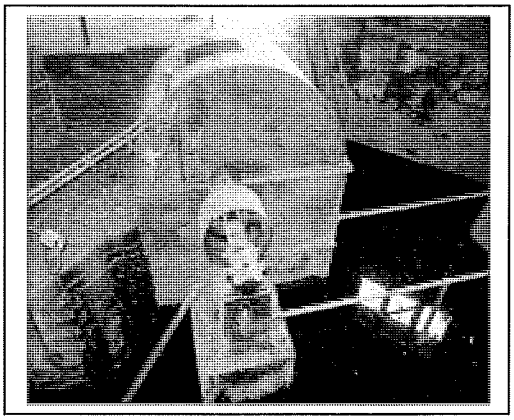
4.6 Photographs of ACM

Photograph 1:
Kiln 2 top floor
Millboard
Refer Sample: 2810 – 40 – A1

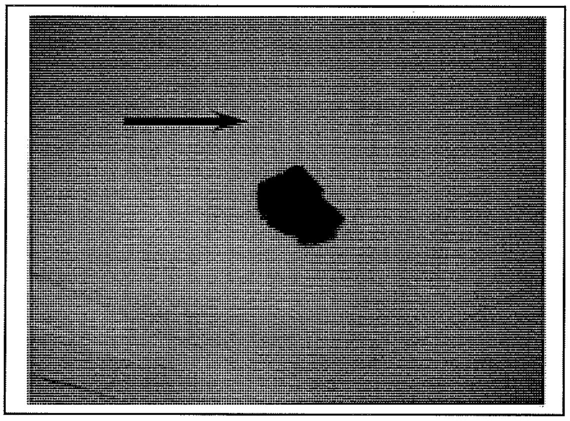
Photograph 2:
Central beam Kiln 2 top floor
Thick insulation
Refer Sample: 2810 – 40 – A2



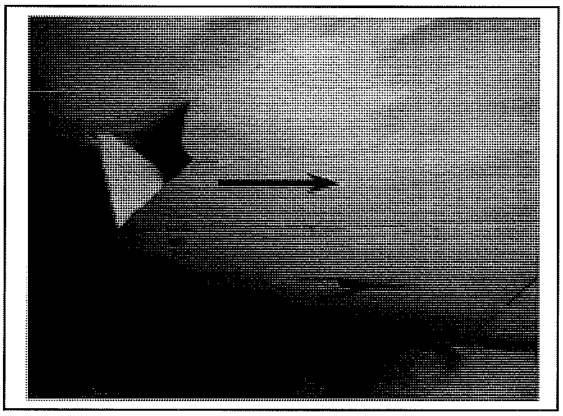
Photograph 3:
Heat exchange gasket Kiln 2 top floor
Gasket
Refer Sample: 2810 – 40 – A3



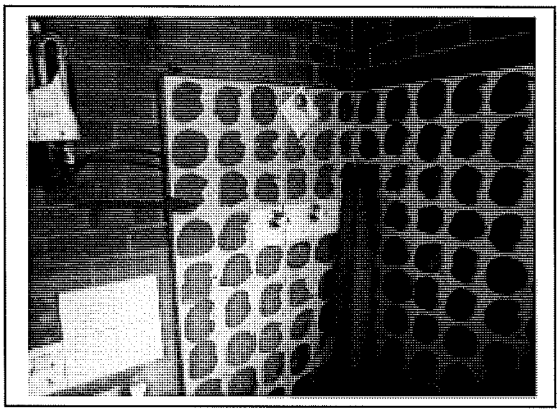
Photograph 4:
Fan house 2 duct
flange joint
Refer Sample: 2810 – 40 – A4



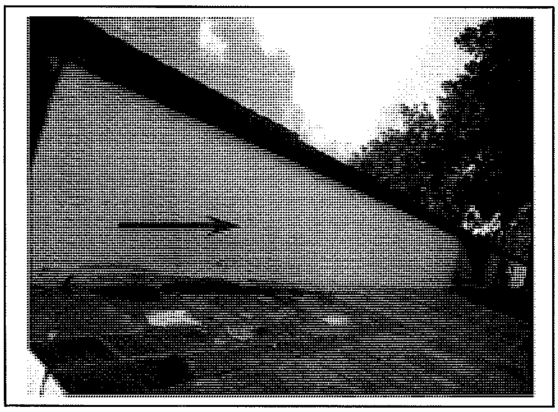
Photograph 5:
Former canteen toilet ceiling
Sheet
Refer Sample: 2810 – 40 – A5



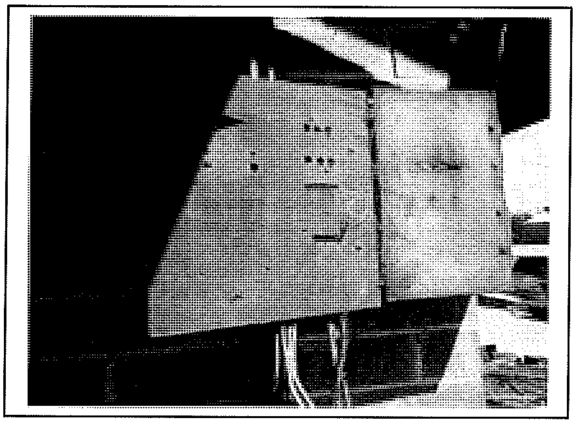
Photograph 6:
Building SS3 ceiling
Sheet
Refer Sample: 2810 – 40 – A7



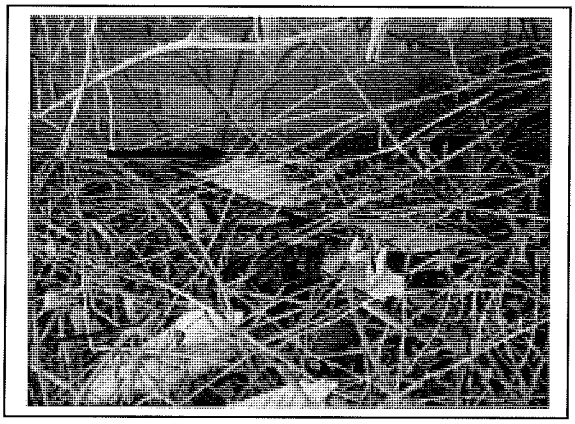
Photograph 7:
Building SS4 shower wall
Sheet
Refer Sample: 2810 – 40 – A8



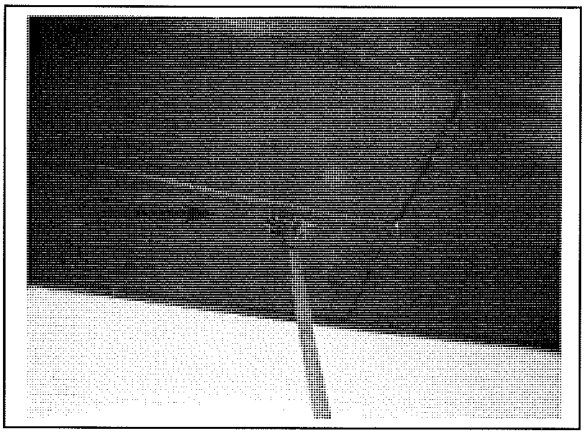
Photograph 8:
Perimeter eave and soffit (building A4)
Sheet
Refer Sample: 2810 – 40 – A9



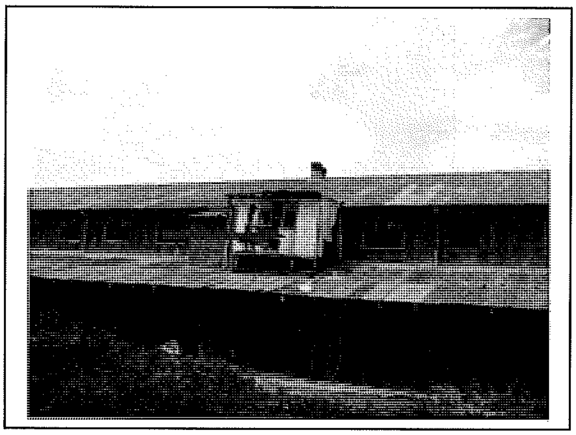
Photograph 9:
Switch board backing sheet**
(in various locations)
Refer Sample: 2810 – 40 – A10



Photograph 10:
Corrugated roof sheet and debris**
(building A3 & Tip area western side)
Refer Sample: 2810 – 40 – A11



Photograph 11:
Ceiling sheet**
(building A4 & BH)
Refer Sample: 2810 – 40 – A12



Photograph 12:
External wall sheeting**
(atop kiln 3)
Refer Sample: 2810 – 40 – A13

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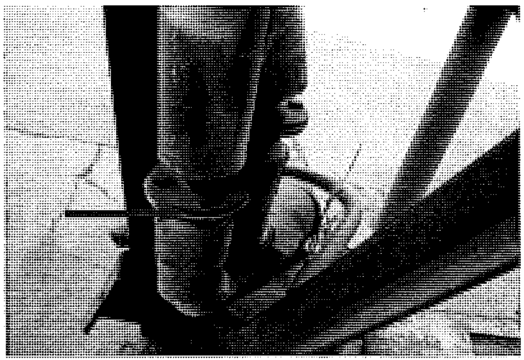
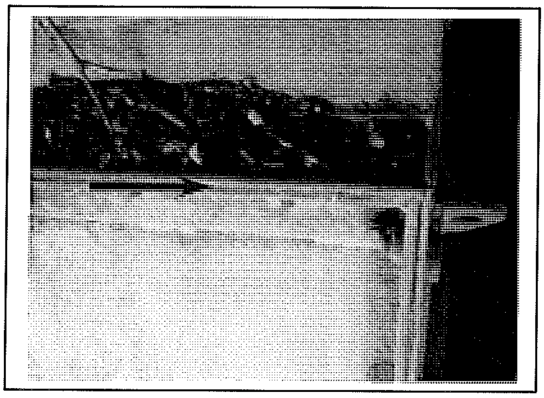
Photograph 13:
Scattered sheeting debris**
(in various locations)
Refer Sample: 2810 – 40 – A14

Photograph 14:
Large brake pad to top of old brick making machine
Refer Sample: 3617 - 103 – A1

Photograph 15:
Debris to small chimney at entrance Sheet
Refer Sample: 3617 - 103 – A2

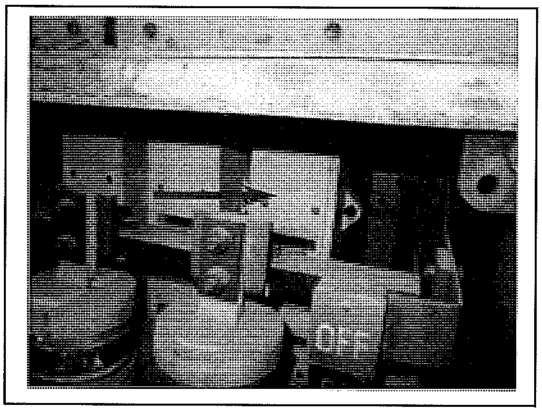


Photograph 16:
Gasket adjacent downpipe to corner of building 1
Refer Sample: 3617 - 103 – A4



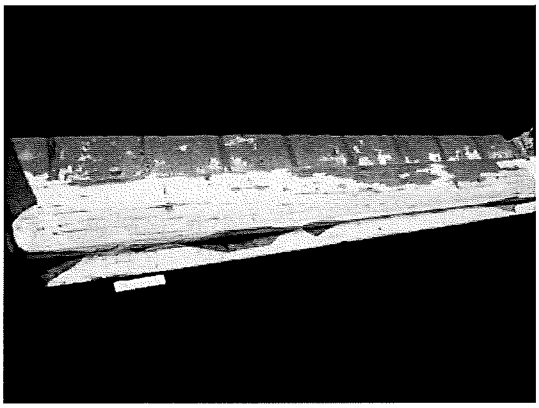
Photograph 17:
Rope gaskets to ducting at FH1 building
Refer Sample: 3617 - 103 – A5

Photograph 18:
Sheet debris to soil adjacent FH2 building *Refer Sample: 3617 - 103 – A7*

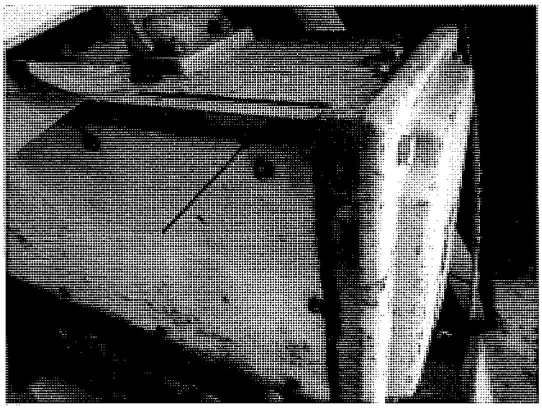


Photograph 19:
Flash guards to distribution boards at K1, K2 and K3
Refer Sample: 3617 - 103 – VA1

4.7 Photographs of non-ACM



Photograph 20:
Window caulking to BH building
Refer Sample: 3617 – 103 – A3
No asbestos detected



Photograph 21:
Mastic to original distribution board to K3 building
Refer Sample: 3617 – 103 – A6
No asbestos detected

5 LEAD PAINT SURVEY RESULTS

5.1 Introduction

Lead paint is defined by the Australian Standard (AS 4361.2 – 1998 *Guide to lead paint management Part 2: Residential and Commercial buildings*) as a paint or component coat of a paint system containing lead or lead compounds, in which the lead content (calculated as lead metal) is in excess of 1.0% by weight of the dry film as determined by laboratory testing.

Further, the Standard for the Uniform Scheduling of Drugs and Poisons (National Drugs and Poisons Schedule Committee July 2000) classifies paints having more than 0.25% lead as First Schedule Paint and prohibits their manufacture, supply or use.

It has been shown that the dust generated from dry sanding or abrasive blast cleaning of paints with a lead concentration of > 0.25% can have sufficient content to produce exposure levels that exceed those that define a 'lead task' in NOHSC 1012.

Therefore, paints with a lead concentration greater than 0.25% (if they are to be removed) must be treated as a lead paint (i.e. subject to the regulations in NOHSC 1012).

5.2 Results

Paint samples were collected from Yarralumla Brickworks and analysed for lead content. Where paints were collected, samples were analysed by Envirolab – NATA accreditation number: 2901.

Table 3 presents lead composition in paints, with results presented as a percentage concentration of lead contained within the sampled materials. Despite the fact that sampling methodologies require that three (3) paint sub-samples be taken for each sampled product, only maximum values are presented below. Due to the inherent heterogeneity of lead concentrations in applied liquids this maximum reading is presented as it represents an upper level of lead concentrations throughout a heterogeneous product and aids in interpretation of risk assessment and management recommendations. For detailed results of analysed paint samples refer to Appendix A.

Table 3: Lead Composition in Paint by Inductively-Coupled Plasma Spectroscopy

Sample No.	Photo No's	Location and Colour of Paint Sample	Colour	Lead in Paint %
3617 - 103 – P1 a,b,c	22	Paint to portable AST to building K3	Yellow	6.4

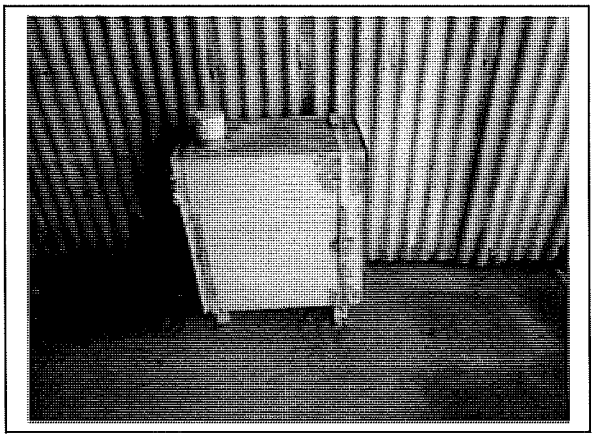
Notes:

Lead Paint (> 1.0% Pb)

First Schedule Paint (> 0.25% Pb)

Lead-free Paint (≤ 0.25% Pb)

5.3 Photographs of Lead Paint



Photograph 22:
Portable AST to building K3
Yellow paint
Refer Sample: 3617 – 103 – P1

5.4 Discussion and Conclusion

The analytical results of paint sampling from Yarralumla Brickworks, Yarralumla, revealed that there **was lead paint** (>1.0% Pb) **present**. It should be assumed that all similar paint throughout the building contains comparable percentages of lead.

The lead paint is in a reasonably poor condition and should be repainted or alternatively the unit should be removed.

Refer to Appendix C for safe lead paint and AST removal procedures.

6 SYNTHETIC MINERAL FIBRE (SMF) SURVEY RESULTS

6.1 Introduction

SMF is a generic term used to collectively describe a number of amorphous (non-crystalline) fibrous materials including glass fibre, mineral wool (Rockwool and Slagwool) and ceramic fibre. Generally referred to as SMF, these materials are also known as 'Man-Made Mineral Fibres' (MMMF).

SMF products are used extensively in commercial and residential buildings for thermal and acoustic insulation, and as a reinforcing agent in cement, plaster and plastic materials. In some specialised instances, SMF materials have also been used as alternatives to asbestos, especially where high temperature insulation properties are required.

There are two basic forms of SMF insulation ***bonded*** and ***unbonded.***

The ***bonded form*** is where adhesives, binding agents, facing/cladding, cement or other sealants have been applied to the SMF before delivery and the SMF product has a specific shape (e.g. a binding or sealing agents hold the SMF in a batt or blanket form). Some bonded SMF materials may also be clad in various coverings on one or more sides (e.g. a silver foil backing).

The ***unbonded form*** has no adhesives, binding agents, facing/cladding or sealants applied, and the SMF is a loose material (e.g. wet spray and loose fill).

6.2 Sample Assessment

Table 4: Visual Assessment of Samples

Sample Reference	Photo No's	Sample Location	Sample Type	Form
3617 – 103 - S1	23	Loose SMF in bags presumed to contain asbestos throughout kilns	Fibreglass	Loose
3617 – 103 – S2	24	To underside of roofs throughout	Sisslation	Bonded
3617 – 103 – S3	25	SMF as insulation to pipes throughout	Fibreglass	Bonded
3617 – 103 – S4	26	SMF as insulating batts to various ceiling spaces	Fibreglass	Bonded

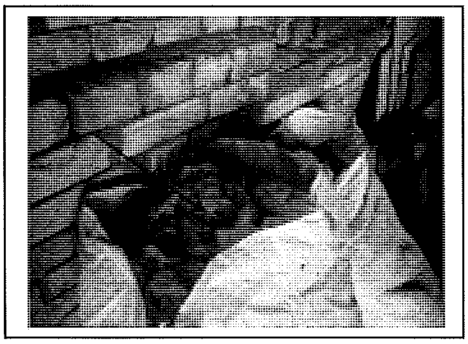
6.3 Results

SMF was identified as insulation within ceiling space areas, as pipe lagging to various pipes throughout the premises and in open bags to all kilns. It should be presumed that similar materials are present to any inaccessible areas.

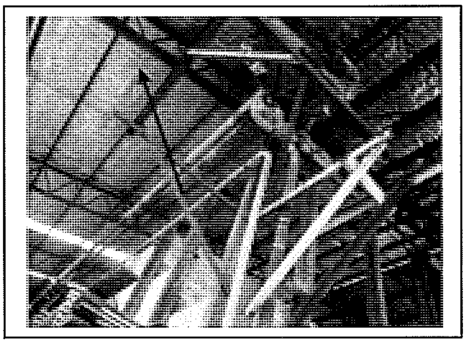
- If building works is likely to significantly disturb the insulation the SMF materials should be removed using effective dust control procedures.
- The bags of loose SMF are presumed to contain asbestos and should be treated as asbestos waste. These bags should be removed by a licensed A class ACT asbestos removalist as soon as practicable.

Refer to section 15.3 Appendix C for safe SMF and asbestos handling and removal procedures.

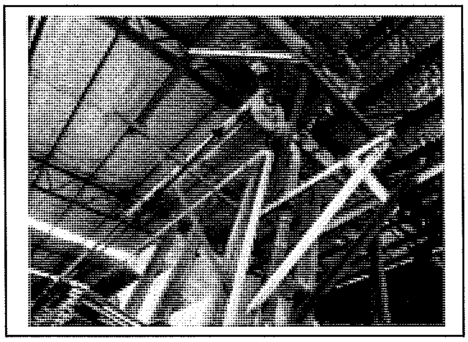
6.4 Photograph of Synthetic Mineral Fibre (SMF)



Photograph 23:
Lose SMF in bags presumed to contain asbestos throughout kilns
Refer Sample: 3617 – 103 – S1



Photograph 24:
To underside of roofs throughout
Refer Sample: 3617 – 103 – S2



Photograph 25:
SMF as insulation to Pipes throughout
Refer Sample: 3617 – 103 – S3

Photograph 26:
SMF as insulating batts to various ceiling spaces
Refer Sample: 3617 – 103 – S4

7 POLYCHLORINATED BIPHENYLS (PCB) SURVEY RESULTS

7.1 Introduction

PCB is the common name for polychlorinated biphenyls. PCBs range in appearance from colourless, oily liquids to more viscous and increasingly darker liquids, to yellow then black resins, depending on the chlorine content of the PCB.

PCBs are chemically stable synthetic compounds that do not degrade appreciably over time or with exposure to high temperatures. The major use of PCBs was as an insulating fluid inside transformers and capacitors. Capacitors containing PCBs were installed in various types of equipment including domestic appliances, motors and fluorescent light fittings during the 1950's, 60's and 70's.

These applications generally do not present an immediate risk to human health or the environment as the equipment is sealed and contains relatively small amounts of PCB. The equipment can continue to be used safely provided that the capacitors do not leak.

The Australian and New Zealand Environment and Conservation Council (ANZECC) in its *PCB Management Plan* of *2003* stipulate cessation dates for the generation of PCB scheduled waste, the use of articles containing PCB scheduled waste, and the disposal of PCB scheduled waste*.

> * PCB scheduled waste means any PCB material that has no further use that contains PCBs at levels at, or in excess of 50mg/kg and is of a quantity of 50g or more.

Small equipment items and capacitors found in households and commercial buildings that contain scheduled PCBs (i.e. at or in excess of 50mg/kg) are to be disposed of as scheduled PCB waste. Where the aggregate weight of the items or capacitors exceeds 10kg, they must be notified to the relevant Commonwealth, State or Territory Government agency prior to their disposal.

7.2 Results

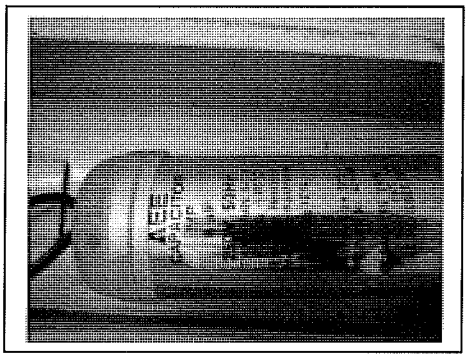
Representative samples of fluorescent light fittings were inspected for PCB capacitors. Six types of confirmed PCB containing capacitors, one presumed PCB containing capacitor and three different types of non-PCB containing capacitors were identified during the survey.

Table 5: PCB and Non-PCB Containing Capacitors Identified During Survey

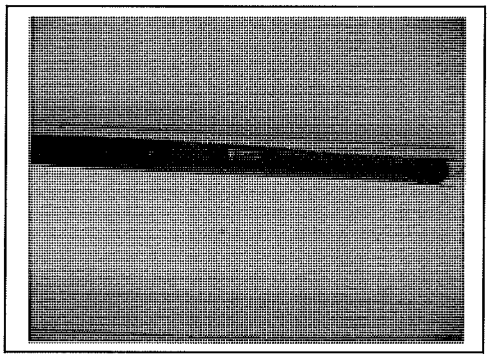
Result	Photo No's	Location	Make - Type	Capacitance (µF)	Remarks	No. of capacitors
PCB	27	Former canteen ground floor	AEE MP – PMN 5417	6	PCB	5+
		Building SS1	Nichicon 1966 - SFSGLP	6	PCB	5+
	28	Building A4 1 Tube	Dawco metal – BS 4017 - 1966	3.25	PCB	1+
		Building A4 2 Tubes	Ducon metal – APF 265CR	6.5	PCB	2+
	29	Building R1	Ducon metal APF 260CR	6	PCB	5+
		Building R1	Ducon metal – APF 280CR	6	PCB	1 +
Non-PCB		North end of site	Plessey plastic – 427/1/07503/006	10	No PCBs	20+
		Building R2	AEE MP – PMN 5417	10	No PCBs	10+
	31	Former canteen	RIC – LE 1 EB	6.5	No PCBs	2+
Presumed PCB	30	Building SS2	Metal – Unidentifiable due to fire damage	Unsure	Presumed PCB	1+

For further PCB management information refer to Appendix C.

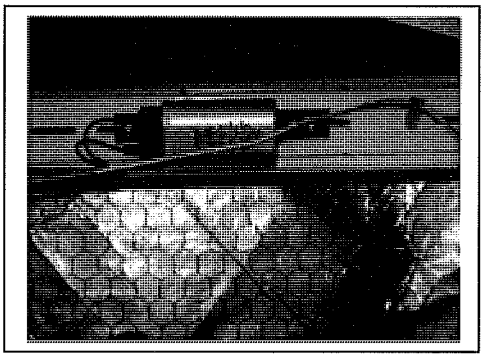
7.3 Photographs of PCB Containing Capacitors



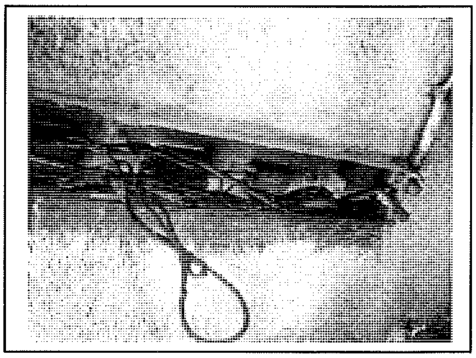
Photograph 27:
Former canteen ground floor
AEE MP – PMN 5417



Photograph 28:
Building A4 1 Tube
Dawco metal – BS 4017 - 1966



Photograph 29:
Building R1
Ducon metal APF 260CR



Photograph 30:
Building SS2
Metal – Unidentifiable due to fire damage

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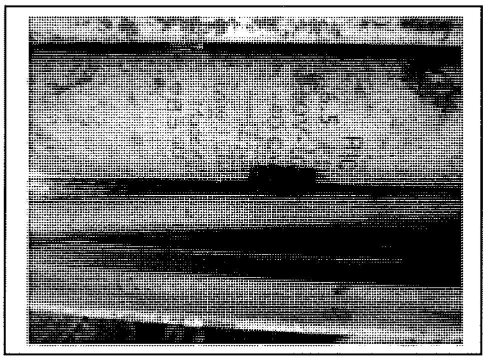
7.4 Photographs of non - PCB Containing Capacitors



Photograph 31:
Former canteen
RIC – LE 1 EB

8 OZONE DEPLETING SUBSTANCES SURVEY RESULTS

The buildings at Yarralumla Brickworks, Yarralumla were surveyed for the presence of air conditioning and refrigeration units that contain ozone depleting substances.

ODS are used for heat transfer in refrigeration and air conditioning systems, absorbing or releasing heat according to vapour pressure. Release of these substances to the atmosphere have the ability to cause long term atmospheric pollution that can lead to ozone depletion, global warming, petrochemical smog and acid rain.

The ozone depletion potential (ODP) of a fluorocarbon refrigerant gas, its global warming potential (GWP) and estimated atmospheric life (EAL) all contribute to its potential to deplete the stratospheric ozone layer and enhance the greenhouse effect (leading to global warming).

Chlorofluorocarbons (CFCs) contain chlorine and possess a large ODP, high GWP and long EAL. They are generally found in refrigeration and air-conditioning systems e.g. Centrifugal Chillers.

Hydrochlorofluorocarbons (HCFCs) are less saturated with chlorine than are CFCs and the hydrogen within these compounds give the HCFCs a much shorter EAL and lower ODP. They are generally found in refrigeration systems that are used for food display, cold stores and self contained, split, multi-split and central plant chillers used for building air-conditioning.

Hydrofluorocarbons (HFCs) are a class of replacement gases for CFCs. They do not contain chlorine or bromine and therefore do not deplete the ozone layer. While all HFCs have an ODP of zero, some do have a high GWP (e.g. R-404A, R-407B, R-125 etc).

Halons are synthetic chemical compounds that contain one or two carbon atoms, bromine and other halogens. They have a long atmospheric lifetime and cause very aggressive ozone depletion when breaking down in the stratosphere. Halons were introduced into Australia as fire-extinguishing agents in the early 1970s and quickly replaced many previously accepted fire-fighting products because of their superior fire-extinguishing characteristics and ease of use.

Halon 1211 was commonly used in portable fire extinguishers, while fixed fire protection systems, such as those that protect computer rooms and ship engine rooms, commonly contained Halon 1301.

Halon 1301 has an ODP that is 10 times greater that of CFCs, while Halon 1211 has an ODP 3 times greater than that of CFCs.

8.1 Results

Ozone Depleting Substances (ODS) were **not** located during the survey at Yarralumla Brickworks, Yarralumla.

Table 6: Chemical Properties of Ozone & non-Ozone Depleting Substances located during survey

R Number	Photo No's	Location	Chemical type and name	ODP	GWP	EAL
Non-Ozone Depleting Substances						
R410A		To workshop adjacent building K1	R410A			

For further refrigerant management information refer to section 15.3 Appendix C.

8.2 Photograph of Ozone Depleting Substances

No Ozone Depleting Substances were found at Yarralumla Brickworks, Yarralumla.

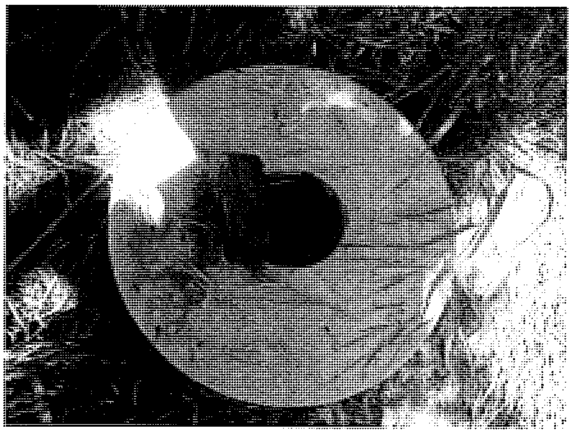
9 FUEL STORAGE FACILITIES & DANGEROUS GOODS RESULTS

It is important to note that prior to the introduction of natural gas in the ACT in the 1980's, commercial premises generally utilised heating systems where boilers were fuelled by diesel or heating oils which were stored in USTs.

9.1 Results

Evidence of an underground storage tank (UST) was identified during the survey suggesting an underground storage tank is present. A dip point was found, refer to plans for location.

Refer to Section 15.3 Appendix C for the management of fuel storage facilities in the ACT.



Photograph 32:
Dip point to probable UST

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10 ASBESTOS MANAGEMENT

10.1 Control Measures

General requirements

- ACM identified as representing an exposure risk (see Table 2 Asbestos Register) should be removed or otherwise controlled.
- Any ACM that is not scheduled for immediate removal should be labelled with appropriate warnings and maintained in good condition.
- The location of ACM must be entered into the Asbestos Register.
- Maintenance and other personnel must be made aware of the location of ACM.
- The Asbestos Register must be freely available.
- Unless they have valid ACT Asbestos Removal licence, maintenance workers, trades or occupants shall not remove or knowingly damage identified ACM.
- Before any planned demolition, refurbishment or maintenance, its effect upon any in situ asbestos must be established by reference to this document, including amendments.

Accidental damage to ACM

If ACM is damaged or degraded through accident, ageing or misuse, the building manager should apply the following protocols.

- Determine if the damage is likely to affect nearby occupants through the release of asbestos dust (this may require advice from a licensed Class A Asbestos Assessor).
- Gently wet down the damaged section and cover with a heavy plastic sheet or equivalent to encapsulate the ACM. Close nearby windows if the ACM is to the exterior.
- If the damage is significant (i.e. the material is shattered or abraded) the ACM should be replaced as soon as is practicable. Minor damage (i.e. small cracks or holes) may be repaired in the short term using a sealant.
  All repairs or removal must be undertaken by a licensed Asbestos Removalist.
- Register the event in the HMSMP.

10.2 Management of ACM

The options for short to medium-term management of ACM are outlined below.

1. Defer action

✓ Appropriate when	✖ Not appropriate when	✓ Advantages	✖ Disadvantages
Negligible risk of exposure ***and*** Asbestos inaccessible and fully contained ***or*** Asbestos stable and not liable to damage	Possibility of deterioration or damage Airborne dust exceeds recommended exposure standard	No initial cost Cost of removal deferred	Hazard remains Need for continuing assessment Asbestos management program required

2. Encapsulate or seal[1]

✓ Appropriate when	✖ Not appropriate when	✓ Advantages	✖ Disadvantages
Removal difficult or not feasible Firm bond to substrate Damage unlikely Short life of structure	Asbestos deteriorating Application of sealant may cause damage to material Water damage likely Large areas of damaged asbestos	Quick and economical for repairs to damaged areas May be an adequate technique to control release of asbestos dust	Hazard remains Cost for large areas may be near removal cost Asbestos management system required Eventual removal may be more difficult and costly

1. Seal through application of paint, lacquer or PVA spray

3. Removal

✓ Appropriate when	✗ Not appropriate when	✓ Advantages	✗ Disadvantages
Surface friable or asbestos poorly bonded to substrate Asbestos is severely water-damaged or liable to further damage or deterioration Located in air conditioning duct Airborne asbestos exceeds recommended exposure standard Other control techniques inappropriate	Located on complex and inaccessible surfaces Removal extremely difficult and other techniques offer satisfactory alternative	Hazard removed No further action required	Increases immediate risk of exposure especially to removal workers Creates major disturbance in building Often highest cost, most complex and time-consuming method Removal may increase fire risk in building; substitute required Possible contamination of whole building if removal is done poorly

10.3 Management Decision Record

Option 1: Defer action

Item no.	ACM and Location	Reason	Authorisation	Date

Option 2: Encapsulate or seal

Item no.	ACM and Location	Reason	Authorisation	Date

Option 3: Removal

Item no.	ACM and Location	Reason	Authorisation	Date

10.4 Timetable for Action

The timetable for action should be administered to ensure management has a clear plan for all works which may affect ACM in the workplace. This includes maintenance work, scheduled removal work and risk assessment reviews, which may impact ACM.

Table 7: Timetable for action

ACM removal/ work	Date of scheduled works	Details	Authorisation	Date
Asbestos review/audit	**Date of scheduled review**	**Details**	**Authorisation**	**Date**

11 RESPONSIBILITIES

11.1 Asbestos - Provision of Information

The building manager must:

- ensure the ACM register and all relevant information pertaining to asbestos in the workplace is freely available upon request
- provide occupants with up-to-date information relating to the condition and relative risk of ACM in the workplace
- provide information on the control measures in place to contain ACM-related risk, and
- provide information to staff and contractors on measures to be taken to ensure that they are not exposed to asbestos in the workplace, either through accident or negligence.

Management Action Record

Record all communication activities undertaken to inform staff/occupants of ACM in the workplace.

Action	Authorisation	Date

11.2 Updating the Risk Assessment

The *Code of Practice for the Management and Control of Asbestos in Workplaces* [NOHSC: 2018 (2005)] Section: 9.3.1 requires:

The register of ACM, including any risk assessments, should be reviewed every 12 months or earlier where:

- **a risk assessment indicates the need for reassessment; or**
- **any ACM has been disturbed or moved**

A visual inspection of identified ACM should be undertaken as part of any review.

The Dangerous Substances (General) Regulations 2004 (R13) requires the review of the Asbestos Survey Management Plan to be carried out by a Class A Asbestos Assessor at intervals determined by the criteria set out in Chapter 3, Part 3.4, Section 326 of the Dangerous Substances (General) Regulations 2004 (R13); the maximum interval being 5 years. The new requirements state that an Asbestos Management Plan and Risk Assessments are required in addition to an Asbestos Register and Survey. Class A Asbestos Assessors at Robson Environmental Pty Ltd are able to produce these documents to comply with your obligations.

Each review should critically assess all asbestos management procedures and their effectiveness in:

- preventing exposure to asbestos fibres
- controlling access to asbestos
- highlighting the need for action to maintain or remove ACM, and
- maintaining the accuracy of the ASMP.

Details of any mitigating actions must be recorded in the Asbestos Register (Refer Table 2a).

11.3 Key Personnel

This section outlines the responsibilities of all persons involved in the safe management of ACM.

1. Building manager

Name:	
Contact details:	
Responsibilities:	*E.g. provision of information*

2. Occupational Health and Safety Representative

Name:	
Contact details:	
Responsibilities:	*E.g. keeping occupants informed of any changes to the status of ACM in the workplace*

3. Facilities Management (if applicable)

Name:	
Contact details:	
Responsibilities:	*E.g. arrange removal and repair works as required; maintaining the HMSMP*

4. Other

Name:	
Contact details:	
Responsibilities:	

12 ASBESTOS REMOVAL WORKS

12.1 Management Responsibilities

Where it has been determined that ACM is to be removed, management or the client must ensure that a risk assessment is performed before the removal work commences and that the removalist takes this risk assessment into account. The risk assessment must include the possibility of uncovering previously concealed ACM, and that concealed ACM is subsequently identified by a Class A Asbestos Assessor.

The client should provide a detailed scope of works prepared by a Class A Asbestos Assessor for the removalist, including potential hazards, details on areas, which contain asbestos and arrangements for clearance inspections and airborne fibre monitoring.

NOHSC: 2018(2005) describes the minimum requirements to be observed during any asbestos removal operation.

12.2 Removalist Responsibilities

Before the commencement of removal work, the licensed removal contractor must:

- Provide a site-specific Asbestos Removal Control Plan(ARCP)
- Ensure the removal is adequately supervised and carried out in a safe manner
- Ensure that the equipment used in the project is appropriate for the task
- Ensure all persons carrying out the removal are competent and trained for the type of work being carried out, and
- Demonstrate that they have a health surveillance program in accordance with the requirements of NOHSC: 2002(2005).

12.3 Licensing Requirements

All Asbestos Removalists in the ACT are licensed by the ACT Planning and Land Authority (ACTPLA).

As a minimum the holder of an ACT Asbestos Removal Licence is required to demonstrate practical experience in the industry for at least three years and possess a full and complete understanding of the requirements of:

- *Code of Practice for the Management and Control of Asbestos in Workplaces* [NOHSC: 2018 (2005)]
- *Code of Practice for the Safe Removal of Asbestos* [NOHSC: 2002 (2005)]

- Work Safety Act 2008 [A2009-49]
- WorkCover requirements
- ACT Dangerous Substances Act A2004-7.

ACTPLA specify requirements for authorising certifiers and builders as well as the respective requirements of ACT WorkCover and ACT NOWaste for the removal and transport of ACM.

12.4 Approval to Begin Asbestos Removal Works

- All removal methods and procedures are required to be undertaken in accordance with NOHSC: 2002(2005).
- Building management in conjunction with a licensed Class A Asbestos Assessor where required, will inform the asbestos removalist of the 'Scope of Works'.
- The licensed Class A Asbestos Assessor will be required to provide a clearance certificate on satisfactory completion of the works.

12.5 Work in Areas Containing Asbestos – Trades Personnel

- Work must not proceed under any circumstance without first contacting the building manager or authorised person.
- Refer to this HMSMP (including amendments) to determine if asbestos material is likely to be encountered in the general work area. If no asbestos is located in the area of intended work, the area may be entered by all relevant personnel on an unrestricted basis.
- Work in areas where asbestos will or is likely to be disturbed will only be given to persons licensed by ACTPLA and all access and works will be undertaken in accordance with the requirements of NOHSC: 2002(2005).

12.6 Emergency Work in Areas Containing Asbestos

- If emergency access is required contact the building manager.
- If the building manager determines that asbestos is likely to be disturbed, all works must be undertaken in accordance with the requirements of NOHSC: 2002(2005) that is, a licensed Asbestos Removalist must be contracted to undertake any asbestos removal works.
- A licensed Class A Asbestos Assessor will be required to provide a clearance certificate on satisfactory completion of the works.

12.7 Monitoring Arrangements

Control air monitoring should be performed when indicated by a Risk Assessment to ensure the control measures are effective.

All air monitoring must be performed by a competent person accredited by the National Association of Testing Authorities (NATA) to perform air sampling for asbestos. Sampling should be performed in accordance with the *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres* [NOHSC: 3003 (2005)].

It is the Asbestos Removalist's responsibility to ensure that the maximum fibre levels throughout asbestos removal and associated works does not equal or exceed the minimum practical detection limit of 0.01 fibres per millilitre of air (F/mL). If the airborne fibre levels are observed at or exceeding those specified below, the licensed Class A Asbestos Assessor will instruct the contractor to take the appropriate control /action as per NOHSC:2002(2005).

Table 8: Control levels and required actions

Control Level (airborne asbestos fibres/mL)	Control/Action
< 0.01	Continue with control measures
≥ 0.01	Review control measures
≥ 0.02	Stop removal work and find the cause

Source: [NOHSC: 2002(2005)]

12.8 Clearance Inspections

Following removal work, a licensed Class A Asbestos Assessor must undertake a clearance inspection before re-occupation of an asbestos work area.

All barriers and warning signs should remain in place until the area has been cleared.

12.9 ACM removal/maintenance record

The Asbestos Register, Section 4.5, Table 2 is to be completed by the building manager after receiving appropriate clearance certification from a licensed Class A Asbestos Assessor.

The 'Work Performed' and 'Asbestos Control Measure' Tables on the following page are required to be completed by the building manager.

1. Work Performed

Company name	Contact details	Date of work + job no.	Scope of work

2. Asbestos Control Measures

Work performed	Air monitoring/ decontamination	Clearance certificate issued	Other

3. Additional Information

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13 SAFE ASBESTOS REMOVAL PROCEDURES

13.1 Friable ACM

The licensed Asbestos Removalist must provide a 'Safe Work Method Statement' (SWMS) and an 'Asbestos Removal Control Plan' (ARCP). An overview of the basic requirements for removal of friable ACM is provided here. Should any removal of friable asbestos be undertaken, specific work practices will be required.

Wet Removal

i. Obtain approval from the building manager to begin asbestos removal works.

ii. Inform the building occupants of intended asbestos removal works.

iii. Relocate all occupants in immediate and adjacent areas affected by the works.

iv. Rope or barricade the area adjacent to the removal area and place appropriate signage at the perimeter of the area for the removal of friable ACM.

v. Set up the removal area with appropriate materials (plastic, tape, etc.) and decontamination area to enable effective control of dust generated during removal of the friable asbestos (i.e. negative air units and wet decontamination facilities would be required for this type of removal).

vi. Protective clothing and a full face Power Air Purifying Respirator (PAPR) with a fitted P3 particulate filter (cartridge) respirator conforming to AS/NZS 1715:2009, a compressor with appropriate filters, airlines and associated equipment must be used during bulk removal of ***dry friable*** ACM. A particulate filter (P2 cartridge) powered air purifying respirator – (PAPR) conforming to AS/NZS 1715:2009 may be worn during wet removal and at the final clean and vacuuming stage.

vii. The ACM must be kept moist with a water mist spray during the removal of the material except where an electrical hazard exists.

viii. Hand tools are preferred over power tools, and high-speed abrasive power tools should not be used. If low-speed power tools are used they should be fitted with local exhaust ventilation dust control. The ARCP must detail the proposed decontamination method when power tools are to be used within the removal area.

ix. Removed asbestos and other materials are to be packed into plastic bags or containers marked as asbestos waste.

x. Asbestos products must not be re-used.

xi. All surfaces within the removal area to be thoroughly vacuumed to remove any asbestos residue.

xii. All surfaces must be Polyvinyl Acetate (PVA) sprayed to seal any microscopic asbestos fibres or wet-wiped (oil/solvent or water-soaked rag) to remove asbestos fibres.

xiii. Remove all asbestos containing material and all asbestos contaminated material from site for disposal in the approved manner.

xiv. Obtain a visual clearance certificate from a licensed Class A Asbestos Assessor.

Note: Air monitoring is required during the removal of friable ACM. The locations and frequency should be determined by a licensed Class A Asbestos Assessor.

13.2 Bonded ACM

The ACT licensed Asbestos Removalist must provide a SWMS and an ARCP. An overview of the basic requirements for removal of bonded ACM is provided here.

i. Obtain approval from the building manager to begin asbestos removal works.

ii. Inform the building occupants of intended asbestos removal works.

iii. Relocate all occupants in immediate and adjacent areas.

iv. Rope or barricade adjacent to the removal area and place appropriate signage at the perimeter.

v. Set up the removal and decontamination areas with appropriate materials (plastic, tape, etc.) to enable effective control of dust generated during removal of bonded ACM.

vi. Using protective clothing and a half face particulate filter (cartridge) respirator conforming to AS/NZS 1715:2009 remove ACM.

vii. Hand tools are preferred over power tools and high-speed abrasive power tools should not be used. If low-speed power tools are used they should be fitted with local exhaust ventilation dust control. Asbestos cement sheeting should be wetted during removal where safe.

viii. Removed contaminated materials are to be packed into disposal crates or wrapped in plastic sheeting.

ix. Asbestos products must not be re-used.

x. All surfaces within the removal area to be thoroughly vacuumed to remove any asbestos residue.

xi. All surfaces must be Polyvinyl Acetate (PVA) sprayed to seal any microscopic asbestos fibres or wet-wiped (oil/solvent or water-soaked rag) to remove asbestos fibres.

xii. Remove all asbestos containing material and all asbestos contaminated material from site for disposal in the approved manner.

xiii. Obtain a visual Clearance from a licensed Class A Asbestos Assessor.

Note: Air monitoring *may* be required during the removal of bonded ACM. The need frequency and location should be determined by a licensed Class A Asbestos Assessor.

14 FURTHER INFORMATION

14.1 Further Reading

Code of Practice for the Management and Control of Asbestos in Workplaces [NOHSC: 2018 (2005)].

Code *of Practice for the Safe Removal of Asbestos 2nd Edition* [NOHSC: 2002(2005)].

Asbestos Legislation Amendment Act 2006 (A2006-16), ACT Parliamentary Counsel.

Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres [NOHSC: 3003(2005)].

Dangerous Substances Act 2004 (A2004-7), Republication No 20, November 2006, ACT Parliamentary Counsel.

Dangerous Substances (General) Regulations 2004 (SL2004-9), Republication No 13, April 2010, ACT Parliamentary Counsel.

Environment Protection Act 1997 (A1997-92), Republication No 15, January 2006, ACT Parliamentary counsel.

Work Safety Act 2008 (A2008-51)

14.2 Related Websites

Legislation www.legislation.act.gov.au

Safe Work Australia Council www.safeworkaustralia.gov.au (for Codes of Practice)

ACT NOWaste www.nowaste.act.gov.au

ORS WorkCover www.workcover.act.gov.au

Commonwealth Government website on asbestos-related diseases www.healthinsite.gov.au/topics/Asbestos_and_Cancer

Safe Work Australia Council www.safeworkaustralia.gov.au

14.3 Useful Contacts

Additional information on asbestos can be obtained from the following organisations and agencies.

ACT Planning & Land Authority (ACTPLA)	Ground floor Mitchell Business Centre 160 Lysaght Street Mitchell ACT 2911 Phone: 02 6207 1923 Internet: www.actpla.act.gov.au Ground floor north Dame Pattie Menzies House 16 Challis Street Dickson ACT 2602 Phone: 02 6207 6309 Internet: www.actpla.act.gov.au
ACT Government	Phone: 13 22 81 Internet: www.asbestos.act.gov.au
ACT WorkCover	Block B, Level 3, Callum Offices, Easty Street Woden Phone: 02 6205 0200 Email: workcover@act.gov.au Internet: www.workcover.act.gov.au
Australian Safety and Compensation Council (formerly NOHSC) and now Safe Work Australia	64 Northbourne Ave Canberra City ACT 2601 Phone: 02 6121 6000 Email: info@ascc.gov.au Internet: www.safeworkaustralia.gov.au
National Association of Testing Authorities (NATA)	PO Box 7507 Silverwater NSW 2128 Phone 02 9736 8222 Email: corpcomm@nata.asn.au Internet: www.nata.asn.au
Robson Environmental Pty Ltd	9 Lyell St Fyshwick ACT 2609 Phone: 02 6239 5656 Email: admin@robsonenviro.com.au
Standards Australia	286 Sussex Street Sydney, NSW, 2000 Phone: 02 8206 6000 Email: sales@sai-global.com Internet: www.saiglobal.com

15 APPENDICES

15.1 APPENDIX A – Laboratory Reports

Asbestos

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

CERTIFICATE OF ANALYSIS 47547

Client:
Robson Environmental Pty Ltd
PO Box 112
Fyshwick
ACT 2609

Attention: Michael Robson / Ged Keane

Sample log in details:

Your Reference:	**3617-103, Yarralumla**
No. of samples:	7 Materials
Date samples received:	28/10/10
Date completed instructions received:	28/10/10

Analysis Details:
Please refer to the following pages for results and methodology summary.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Note, even after disintegration it can be difficult to detect the presence of asbestos in some asbestos -containing bulk materials using PLM and dispersion staining. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.

Report Details:

Date results requested by:	4/11/10
Date of Preliminary Report:	Not Issued
Issue Date:	2/11/10

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Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:

Asbestos was analysed by Approved Identifier:	Matt Mansfield
Asbestos was authorised by Approved Signatory:	Matt Mansfield

Matt Mansfield
Approved Signatory

NATA
ACCREDITED FOR TECHNICAL COMPETENCE

Envirolab Reference: 47547
Revision No: R 00

Client Reference: 3617-103, Yarralumla

Envirolab Ref:	Sample ID:	Date analysed	Sample Description	Asbestos ID in materials
47547-1	3617-103-A1	1/11/2010	4x2.5x1mm Fibrous gasket	Chrysotile asbestos detected
47547-2	3617-103-A2	1/11/2010	42x14x7mm Fibre cement fragment	Chrysotile asbestos detected
47547-3	3617-103-A3	1/11/2010	18x3x2.5mm Compressed mastic	No asbestos detected
47547-4	3617-103-A4	1/11/2010	16x4x1.5mm Fibrous gasket	Chrysotile asbestos detected
47547-5	3617-103-A5	1/11/2010	4x3x1mm Fibrous insulation	Chrysotile asbestos detected
47547-6	3617-103-A6	1/11/2010	10x4x3mm Compressed mastic	No asbestos detected
47547-7	3617-103-A7	1/11/2010	21x14x4mm Fibre cement fragment	Chrysotile asbestos detected Amosite asbestos detected

Client Reference: 3617-103, Yarralumla

Method ID	Methodology Summary
AS4964-2004	Asbestos ID - Qualitative identification of asbestos type fibres in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques.

Envirolab Reference: 47547
Revision No: R 00

NATA ACCREDITED FOR TECHNICAL COMPETENCE

Page 3 of 3

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Lead Paint

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CERTIFICATE OF ANALYSIS 47544

Client:
Robson Environmental Pty Ltd
PO Box 112
Fyshwick
ACT 2609

Attention: Michael Robson

Sample log in details:

Your Reference:	**3617-103,Yarralumla Brick Works**
No. of samples:	3 Paint Samples
Date samples received:	28/10/10
Date completed instructions received:	28/10/10

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by:	4/11/10
Date of Preliminary Report:	Not issued
Issue Date:	3/11/10

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This document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025.
Tests not covered by NATA are denoted with *.

Results Approved By:

Elissa Morgan
Reporting Supervisor

Envirolab Reference: 47544
Revision No: R 00

NATA
TECHNICAL COMPETENCE

Page 1 of 5

Client Reference: **3617-103,Yarralumla Brick Works**

Lead in Paint Our Reference: Your Reference Type of sample	UNITS ——— ———	47544-1 3617-103-P1a Paint	47544-2 3617-103-P1b Paint	47544-3 3617-103-P1c Paint
Lead in paint	%w/w	5.5	6.4	5.9

Envirolab Reference: 47544
Revision No: R 00

NATA
TECHNICAL COMPETENCE

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Client Reference: 3617-103,Yarralumla Brick Works

Method ID	Methodology Summary
Metals.4	Digestion of Paint chips for Metals determination by ICP-AES/MS.

Envirolab Reference: 47544
Revision No: R 00

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Client Reference: 3617-103,Yarralumla Brick Works

QUALITY CONTROL Lead in Paint	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Lead in paint	%w/w	0.05	Metals.4	<0.05	47544-1	5.5 || 5.7 || RPD: 4	LCS-1	98%

Client Reference: 3617-103,Yarralumla Brick Works

Report Comments:

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job
Asbestos counting was analysed by Approved Counter:	@ERROR
Asbestos counting was authorised by Approved Signatory:	@ERROR

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.
Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.
Matrix Spike: A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.
LCS (Laboratory Control Sample): This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.
Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batched of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes and LCS: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable.

Envirolab Reference: 47544
Revision No: R 00

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15.2 APPENDIX B – Plan

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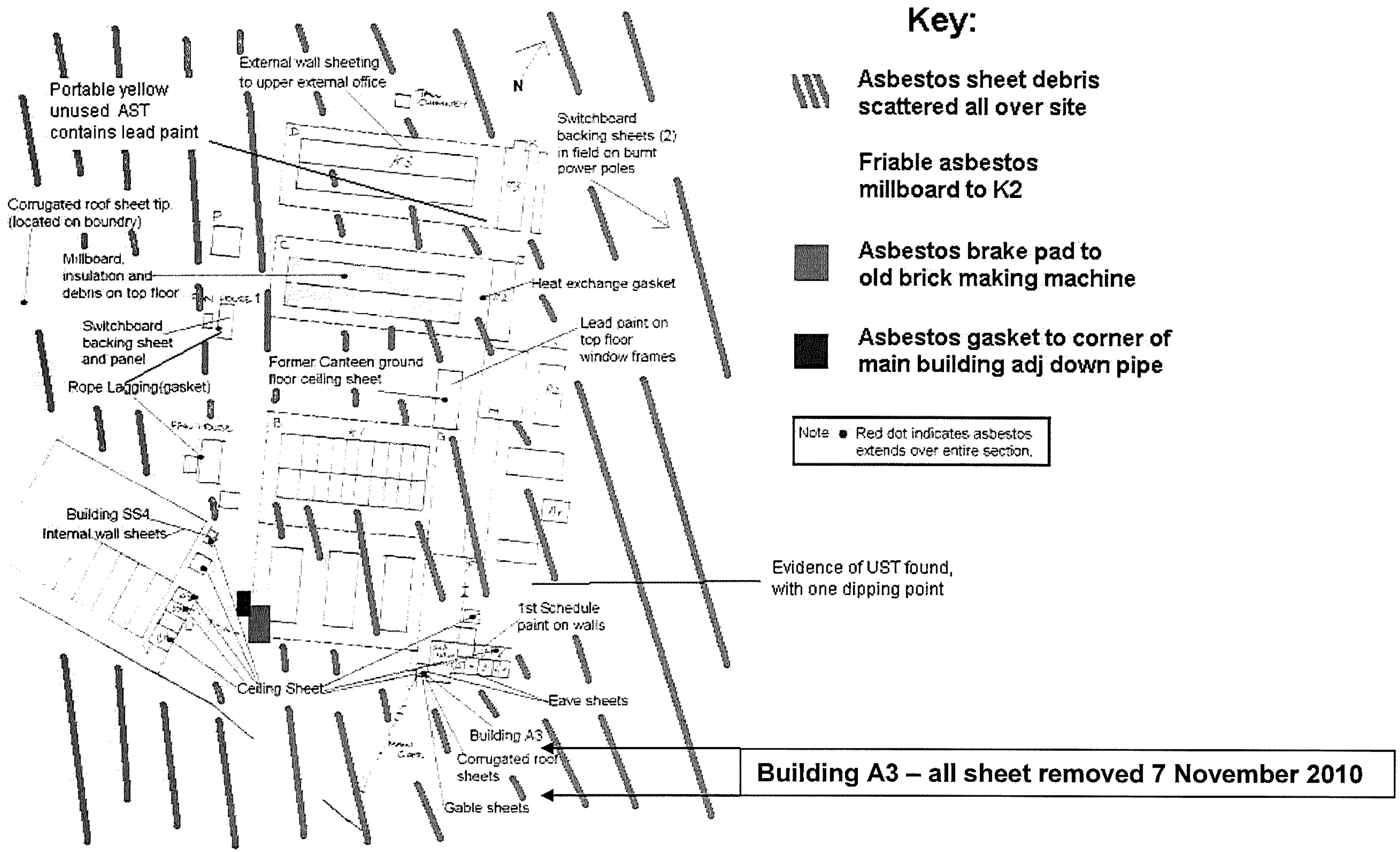
Yarralumla Brickworks



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15.3 APPENDIX C – Hazardous Material Management Information

ASBESTOS

Some 3000 products have been manufactured using asbestos, of which cement sheeting, pipe insulation, textiles, gaskets, vinyl floor tiles and fire door cores are the most commonly encountered. The mineral asbestos (i.e. Crocidolite, Chrysotile and Amosite and other forms) is classified by the National Occupational Health and Safety Commission as a Category 1 carcinogen. If respirable asbestos fibres are inhaled they may cause an inflammatory response, which in turn may lead to asbestosis (scarring of the lung), mesothelioma (cancer of the pleura or peritoneum) or lung cancer.

It is illegal under Commonwealth, State and Territory legislation to manufacture asbestos building materials or to reuse asbestos products.

Asbestos sheeting or 'fibro' is bonded into a stable matrix and as such does not present an exposure hazard unless it is cut, abraded, sanded or otherwise disturbed.

Any type of work on or removal of sheeting has the potential to release asbestos fibres, which in turn can be inhaled. It is therefore critical to maintain the integrity of these materials. If damage is inevitable through physical impact, the asbestos material must be removed or otherwise encapsulated with reference to the *Code of Practice for the Safe Removal of Asbestos* [NOHSC:2002(2005)] and ACT WorkCover and ACT Planning and Land Authority requirements.

LEAD PAINT

Introduction

Lead in paint (as lead carbonate) is found extensively in homes and commercial and industrial buildings built pre-1970. Although Australian industry has generally phased out lead content in paint, levels of below 1 percent are still permitted and industrial application of high-lead paint to residential/commercial dwellings may still continue.

Lead-base paint may be a health issue if it becomes mobile in the environment or if ingested. For this reason sealing or safe removal of paint is strongly recommended particularly where it is flaking or exposed to the elements.

Assessment Criteria

Lead paint is defined by the Australian Standard (AS 4361.2 – 1998 *Guide to lead paint management Part 2: Residential and Commercial buildings*) as a paint or component coat of a paint system containing lead or lead compounds, in which the lead content (calculated as lead metal) is in excess of 1.0% by weight of the dry film as determined by laboratory testing.
Further, the Standard for the Uniform Scheduling of Drugs and Poisons (National Drugs and Poisons Schedule Committee July 2000) classifies paints having more than 0.25% lead as First Schedule Paint and prohibits their manufacture, supply or use.

It has been shown that the dust generated from dry sanding or abrasive blast cleaning of paints with a lead concentration of 0.25% can have sufficient content to produce exposure levels that exceed those that define a 'lead task' in NOHSC 1012.

Therefore paints with a lead concentration greater than 0.25% (if they are to be removed) must be treated as a lead paint (i.e. subject to the regulations in NOHSC 1012).

Lead Paint Management and Recommendations

The following information uses Australian Standard (AS 4361.2 – 1998) as the primary reference. Lead paint and first schedule paints in residential and commercial premises may be managed in one of four ways:

- Leave undisturbed;
- Stabilised (i.e. over painting or encapsulation);
- Abated (i.e. removed); or
- A combination of the three management options may be required.

Should removal be chosen, a high degree of skill, preparation and risk minimisation is required to avoid lead exposure, as dry sanding of lead levels as low as 0.25% can generate high lead dust. Therefore the Wet Scraping and Wet Sanding methods are amongst the safest methods available.

Strict adherence to the guidelines described in AS 4361.2 – 1998 will best ensure minimisation of risk. During this process personal protective equipment and waste containment equipment is essential and children, pregnant women and persons not directly engaged in the process should not be present. General workers may undertake this process providing they adhere strictly to the guidelines, however, a specialist lead paint removal contractor is recommended for extensive paint removal works.

Where remediation is required it is important to minimise ongoing maintenance costs by ensuring that the works are undertaken by a professional who is able to give a significant time guarantee of the painted surfaces at the completion of the works. The following website lists contactors by postcodes that have been included based on their indicated skills and training in working safely with lead paint. http://www.lead.org.au/paintersall.html These contractors should however be assessed by current performance prior to engagement.

Lead Paint Removal and Containment

- Avoid dry sanding or any actions which create dust;
- Place ground sheets around the work area ensuring all paint debris are contained. Remove accumulated debris frequently to prevent its spread into surrounding areas using a vacuum cleaner fitted with a HEPA filter;
- Minimise the spread of debris, dust and fumes by avoiding dust-generating activities during windy conditions. Seal all windows and heating/cooling system duct registers to prevent dust or fumes from contaminating adjacent areas. Use negative air pressure for interior work;
- Use personal respirators according to AS/NZS 1715 [2009];
- Use disposable clothing; and
- Wipe down all surfaces using a wet cloth and dispose of all clothing, equipment and plastic used during paint removal as Hazardous Waste.

Responsibilities of Owners and Contractors

According to AS 4361.2 – 1998 owners of residences or commercial buildings that may contain lead should:

- Manage the property in such a manner as to effectively control any health risk to occupants, contractors or others;

- Ensure occupants are sufficiently informed about and protected from the hazards associated with lead paint; and

- If management work is to be undertaken, inform immediate neighbours about the nature of the work.

Contractors should:

- Obtain appropriate accreditation to undertake the proposed level of remedial work involving lead paint and have the required level of specialized training; and

- Undertake the contracted work in such a way as to protect the health and safety of employees, tenants and the general public.

SYNTHETIC MINERAL FIBRE

SMF refers to man-made mineral fibrous materials commonly used for their insulating and reinforcing properties. The amorphous (non-crystalline) materials include glass fibre, mineral wool and ceramic fibre products.

Discussion

Although glass fibre is classified as an irritant, levels of airborne fibreglass during routine occupation of the premises would be insignificant. During any large-scale installation or removal of fibreglass insulation, providing SMF fibre suppression measures as defined below are employed, exposure standards for SMF fibre would not normally be exceeded.

The following Risk Assessment is based on the requirements of the document:

- Worksafe Australia, Worksafe Australia, Sydney 1990, *Synthetic Mineral Fibres: National Standard and National Code of Practice.*

SMF Risk Assessment

According to Worksafe Australia 1990 (p 9) health risks associated with SMF are "significantly less potent ... than white asbestos (Chrysotile) fibres" and that "...the possibility of lung cancer is eliminated at an exposure standard (time weighted average) of 0.5 respirable fibres per millilitre of air for all types of synthetic mineral fibres...." (p. V).

To reduce the possibility of skin, eye and upper respiratory tract irritation a maximum exposure standard of 2 milligrams per cubic metre of inspirable dust is recommended. These two standards are designed principally for the manufacture and end user industries in which significant dust clouds would be generated.

The same document also states: "The overall conclusion based on available animal experiments and epidemiology is that provided work is carried out in accordance with (NOHSC 1990), and compliance is maintained with the exposure standards, then there is a negligible health risk associated with exposure to SMF under present-day manufacturing and usage patterns."

Recommendations

Although of negligible health risk if undisturbed, it is strongly recommended that if fibreglass is to be removed or otherwise disturbed the following procedures and safety measures should be adopted.

- Workers wear personal protective equipment to minimise dust inhalation and irritation to eyes and skin. The correct use of filter masks, goggles, gloves and disposable coveralls should prevent significant irritation;

- Care should be taken to ensure minimal SMF or nuisance dust enters the occupied areas below the work area;

- If significant contamination of the occupied areas is likely, dust control measures such as the use of plastic screens and an effective extraction fan should be positioned to prevent such an occurrence; and

- Disposable suits and any removed insulation are to be appropriately bagged and disposed of as general waste.

PCBs

PCB is the common name for Polychlorinated Biphenyls. PCBs range in appearance from colourless, oily liquids to more viscous and increasingly darker liquids, to yellow then black resins, depending on chlorine content of the PCB.

Discussion

The major use of PCBs in the electrical industry has been as an insulating fluid inside transformers and capacitors. These transformers and capacitors have ranged in size from the very large transformers typically used by electrical supply companies, to the small capacitors used in commercial products. Capacitors containing PCBs were installed in various types of equipment including fluorescent light fittings during the 1950's, 60's and 70's.

Risk Assessment

Small quantities of PCBs are usually found in sealed containers known as capacitors. PCB-containing capacitors are unlikely to pose a health risk, unless they become damaged and leak.

PCBs can enter the body in three ways:

- absorption through the skin
- inhalation of PCB vapour
- ingestion, e.g. by contamination of food or drink

The most commonly observed symptom in people exposed to high levels of PCBs is a condition known as chloracne. This is a severe, persistent acne-like rash due to repeated and prolonged contact of PCBs with skin. This condition has also occurred in people who have accidentally ingested PCBs orally.

Very high exposure to PCBs may also cause liver damage and damage to the nervous system.

There is the possibility that PCBs may cause cancers.

The likelihood of becoming sick from PCB exposure increases with the length of time and the amount of material that a person might come in contact with.

Recommendations

Care must be taken when handling damaged capacitors to ensure that spillage does not occur. The person handling the damaged capacitor should take the following precautions:

- put on personal protective equipment and clothing before removing damaged or leaking components
- wear gloves that are made of materials that are resistant to PCBs, such as Viton, polyethylene, polyvinyl alcohol (PVA), polytetrafluoroethylene (PTFE), butyl rubber, nitrile rubber, or neoprene
- **do not** use gloves made of polyvinyl chloride (PVC) or natural rubber (latex)
- use disposable gloves
- wear disposable overalls made of Tyvek or made of materials with similar chemical resistant properties
- when working with overhead equipment (e.g. Fluorescent light fixtures), wear a full face shield and appropriate hair protection
- wash any non-disposable contaminated equipment with kerosene and collect the kerosene for disposal as a PCB contaminated solvent
- if PCB vapours are suspected (e.g. PCB leaks onto a hot surface in a confined space), wear a twin cartridge type respirator suitable for chlorinated vapours
- always ensure adequate ventilation
- Note: PCBs do not vapourise readily at room temperature
- do not smoke
- after handling PCBs, employ good personal hygiene practices, including washing hands in warm, soapy water before eating, drinking, smoking, handling food, or using the toilet

Disposal

It is advisable to check the current regulations in effect with the authority responsible for environmental protection authority in your State or Territory. In the ACT this is WorkCover ACT and Environment Protection and Heritage.

Note: The absence of a capacitor from the ANZECC information booklet is not a guarantee that the capacitor does not contain PCBs: If there is any doubt as to whether a capacitor or any electrical equipment contains PCBs, treat the equipment as if it does contain PCBs

OZONE DEPLETING SUBSTANCES

Introduction

Ozone depleting substances (ODS) are compounds that contribute to stratospheric ozone depletion. They are widely used in refrigerators, air-conditioners, fire extinguishers, in dry cleaning, as solvents for cleaning, electronic equipment and as agricultural fumigants.

Ozone depleting substances (ODS) include:

- Bromochloromethane (BCM)
- Carbontetrachloride (CCl_4)
- Chlorofluorocarbons (CFCs)
- Halons
- Hydrobromofluorocarbons (HBFCs),
- Hydrochlorofluorocarbons (HCFCs),
- Methylbromide (CH_3Br)
- Methylchloroform (CH_3CCl_3)

ODS are generally very stable in the troposphere and only degrade under intense ultraviolet light in the stratosphere. When they break down, they release chlorine or bromine atoms, which then deplete the ozone.

Ozone Protection Strategy

The Australian Strategy for Ozone Protection calls for personnel who handle, install, service, commission and decommission and maintain commercial and industrial refrigeration and air-conditioning equipment to be accredited, licensed, registered to work with ozone depleting substances.

Best Management Practices

In Australia a 'Code of Good Practice' has been drawn up with the objective of assisting the reduction of emissions into the atmosphere of substances that deplete the ozone layer and contribute to global warming.

The Australian Refrigeration and Air-conditioning Code of Good Practice (HB 40.1 – 2001) recommends best practice for the maintenance, design, servicing, labelling and manufacture of refrigeration and air conditioning systems towards this objective.

Legislation

Under the Federal Government's *Ozone Protection and Synthetic Gas Management Act 1989* and its *Ozone Protection and Synthetic Gas Legislation Amendment Bill 2003* it is illegal to vent an ODS (Scheduled Substances) to the atmosphere.

General Maintenance

- All refrigeration and air-conditioning plant should be regularly inspected for traces of leaking refrigerant and/or oil, and for signs of leak-indicating dye.
- Whenever a system is charged with refrigerant and/or lubricant, the service person must clearly label the system with the refrigerant/lubrication type; name of service organization; and date of service. In addition, the ASHRAE/ARI refrigerant designated R number shall be clearly displayed.
- A service person should be aware of the possibility that a refrigeration or air-conditioning system may have been incorrectly charged or incorrectly labelled. The type of refrigerant contained in the system must therefore be first established by checking the temperature/pressure relationship or by using other tests to verify that the labelling is correct.

Advice to Equipment Users

- Users are advised that persons who service refrigeration and air-conditioning equipment are required by legislation to observe the Code of Good Practice and not to 'top-up' or 'charge' systems known to be leaking refrigerant, or to service equipment unless it can be returned into service in a leak-free condition.
- If a user does not have trained staff to undertake service or maintenance work, then it is recommended that a routine maintenance agreement for their plant be undertaken with a reputable service organization.
- All users should monitor the operation of their installation weekly and call the service person immediately if any abnormal condition is found.
- When a refrigeration system contains in excess of 50 kg of refrigerant, that system should be leak tested on a quarterly basis.

Leak Testing

- Various methods may be used for leak-testing, e.g. electronic leak detectors, halide lamp and or ultraviolet lamp.
- Only a non-controlled refrigerant mixed with a pressurising substance such as dry nitrogen should be used to leak test refrigeration and air-conditioning systems.
- Where an air-conditioning or refrigeration system is found to be leaking and needs to be repaired, the vapour and/or liquid must first be recovered from the leaking system.

- Where pressurisation testing has determined that an air-conditioning or refrigeration system is not leaking, moisture and non-condensables must be evacuated from the system using dry nitrogen as the moisture absorber and either the deep or triple evacuation methods.

- All refrigerants shall be recovered and either recycled, reclaimed or held for disposal in an approved manner.

- It is highly recommended that a refrigerant charge monitor or leak detector be installed to alert equipment owners/operators of a refrigerant leak.

Recovery, Recycling and Disposal of Refrigerants

- It is highly recommended, and in some cases mandatory, for recovery and/or recycling equipment to be used for the removal and recovery of refrigerant during service.

- To avoid the danger of mixing different refrigerant types, the receiving containers shall be identified by the correct colour coding and labelling and shall only be used for the refrigerant type that is being transferred. The recovery containers shall conform to AS 4484-2004, *'Gas Cylinders for Industrial, Scientific and Refrigerant use – labelling and colour coding'.*

- As chillers have large internal volume, it is important that all refrigerant vapour be recovered. A chiller at atmospheric pressure can still hold many kilograms of refrigerant vapour after the liquid has been removed.

- When recovering refrigerant from a chiller the refrigerant should be recovered until the internal system pressure is reduced to 3 kPa absolute for low-pressure systems (e.g., R-11) and 70 kPa absolute for positive pressure systems (e.g., R-12 and R-22). The internal pressure should then be taken up to atmospheric pressure with dry nitrogen if the chiller is to be opened. This will prevent moisture–laden air entering the system, which could lead to contamination and corrosion.

Disposal of Refrigerants

- Unusable or surplus fluorocarbon refrigerant shall not be discharged to the atmosphere, but shall be returned to a supplier.

- Empty residual refrigerant in a disposable container shall be recovered and the container disposed of at a recycling centre.

- The utmost care must be taken to avoid mixing different types of refrigerants, as separation may be impossible and large quantities of refrigerant may be rendered unusable.

Handling and Storage

Losses of refrigerant to the atmosphere can occur during the handling and storage of refrigerant containers. Service persons have a duty of care to avoid such losses.

- There are numerous hazards associated with the storage of refrigerant. These include asphyxiation in confined space due to leakage from refrigerant containers; and fire, which may overheat and explode refrigerant containers or decompose refrigerant into toxic substances.

Alternative Refrigerants and Lubricants

- With the introduction of HFC alternative refrigerants, alternative lubricants need to be considered to ensure system reliability. Some of these alternative lubricants tend to exhibit greater hygroscopicity than mineral oils, so care must be taken to ensure they are kept in sealed containers at all times.

- Care must be taken to ensure that all components used in the refrigeration/air-conditioning system are compatible with the new refrigerant and lubricant.

Recovery of Fluorocarbons Mixed with other Refrigerants

A number of different refrigerants and refrigeration mixtures have been used to replace or to 'top up' fluorocarbon based refrigerants in refrigeration and air-conditioning systems.

In many cases the equipment in question may not be labelled to indicate that hydrocarbon or hydrocarbon mixtures have been used and as the operating pressures of these replacement refrigerants are usually similar to those of the original refrigerant, their identification in the field is extremely difficult.

- It is not safe therefore to recover flammable refrigerant (hydrocarbon) using equipment designed only for non-flammable refrigerants such as R-12 and R-134a.

- Should it be suspected that refrigeration or air-conditioning system contains an unidentified mixture or, if on asking the owner, examining the labels, and/or detecting instruments indicate that a hydrocarbon/fluorocarbon mixture or any other non-standard mixture of refrigerant may be present; the following procedure should be followed:

- If a hydrocarbon or flammable mixture that contains hydrocarbon is suspected, use only equipment designed for the recovery of flammable gasses and recover the refrigerant into a specially marked container.

- In the case of refrigerant mixtures, it is not advisable to use recovery equipment as many mixtures have very high condensing pressures, which could result in equipment failure and/or injury to persons operating, or near the equipment.
- The safest method of recovery is to use an evacuated and preferably chilled container to depressurise the system.
- Label the container to show that it contains a mixture or the suspected composition, if known, and deliver it to a supplier for recycling.
- Purge the residual gas from the system with dry nitrogen before proceeding with any repairs

Health Effects

In addition to causing environmental degradation certain ozone depleting substances may present a risk to human health when they are improperly handled or released in to a poorly ventilated area.

Inhalation

The most significant exposure route for humans is through inhalation. Refrigerant gases displace oxygen in the air making breathing difficult.

Overexposure can cause central nervous system depression and oxygen deficiency. Effects of overexposure may include light-headedness, giddiness, shortness-of-breath, headaches, and in extreme cases, irregular heartbeats, cardiac arrest, asphyxiation and death.

Symptoms of overexposure at lower concentrations may include transient eye, nose and throat irritation.

Skin Contact

Contact with rapidly released refrigerant gas may cause frostbite. Symptoms of frostbite may include changes in skin colour to white or greyish yellow.

Other direct dermal contact may result in skin de-fatting, dryness, irritation or contact dermatitis.

Standard work clothes provide adequate protection of the skin but it is recommended that lined butyl gloves and goggles be used whenever handling liquid refrigerants.

Eye Contact

Eye contact with rapidly released refrigerant or air-conditioning gas may cause severe frostbite damage to eyes and eyelids. Eye irritation may occur if exposure occurs at lower concentrations.

FUEL STORAGE FACILITIES

In the ACT the management of fuel storage tanks is regulated by ACT WorkCover who administers the *Dangerous Substances Act 2004* and the *Dangerous Substances (General) Regulation 2004.*

Heating oil and other petroleum products are classified as a Dangerous Substance under the ACT Dangerous Substances Act 2004.

The Dangerous Substances (General) Regulation 2004 – Division 2.4.2-233 *Decommissioning* (applies to a container used to store a dangerous substance) states the following:

'The container is thoroughly cleaned so that the container is in the condition it would be in if it had never contained the substance';

This would be difficult to achieve therefore it is advantageous to remove the tank.

In the ACT, Environment Protection and Heritage prefers underground fuel storage tanks be removed once they are no longer in use, unless there are extenuating circumstances i.e. their removal undermines permanent infrastructure. This is also emphasized in the Code of Practice for *The Removal and Disposal of Underground Petroleum Storage Tanks* (Australian Institute of Petroleum CP22 –1994).

Further, the ACT Environment Protection Authority (Environment Protection and Heritage) which administers the Environment Protection Act 1997 which contains contaminated land provisions responsible for the development of policy and guidelines to facilitate best practice when it comes to the management of contaminated land.

Environment Protection and Heritage deems all sites known to have had fuel storage facilities as potentially contaminated until investigated and assessed and shown to be free of contamination.

Based on this information and for the long-term management of the sites with fuel storage tanks, Robson Environmental Pty Ltd recommends that the USTs be removed in accordance with the requirements of ACT WorkCover and Environment Protection and Heritage.

Removal of the UST does require approvals from relevant ACT Government agencies which include:

- ACT Planning and Land Authority (ACTPLA)
- ACT WorkCover - Dangerous Goods Unit.

15.4 APPENDIX D – Clearance Certificate & Air Monitoring Results

Environmental Excellence through Experience Endeavour and Evaluation Robson ENVIRONMENTAL

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www.robsonenviro.com.au
ABN 55 008 660 900

CLEARANCE CERTIFICATE

PROJECT/LOCATION: Yarralumla Brickworks

REF: 6474

DATE: 7 November 2010

Description of work: **Small building adjacent inner entrance to the site**: Removal of asbestos corrugated roof and ceiling sheeting, gable and eave sheeting and surface debris to the southern side of the building.

Asbestos Removalist: Ozbestos

Certification:

It should be noted that this clearance certificate relates only to the exact areas specified above. John Robson licensed Class A Asbestos Assessor (ACTPLA)[1], visually inspected the areas of the above described work following the completion of works.

The areas can be safely reoccupied as the removal has been successfully completed. A visual inspection of the building areas revealed no accessible asbestos containing materials (ACM). Airborne fibre monitoring undertaken during the removal produced results which were satisfactory as the airborne fibre concentrations were below the minimum practical detection limit of 0.01 fibres per mL. Refer to the result sheet dated 7 November 2010.

Note: A stockpile of loose soil remains against the southern side of the building contains fragments of asbestos sheeting. This material should be removed prior to the demolition of the building. The surface fragments were removed however ACM remains at depth . Disturbance of the stockpile may bring ACM fragments to the surface.

Authorized by:

John Robson

John Robson B.Sc., Grad. Dip. Occ. Hyg.
Class A Asbestos Assessor (ACTPLA)
Occupational Hygienist
Managing Director
Robson Environmental Pty Ltd

[1] Australian Capital Territory Planning & Land Authority

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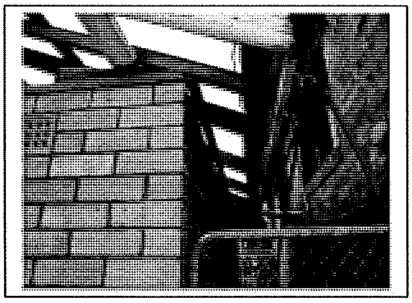
Robson ENVIRONMENTAL

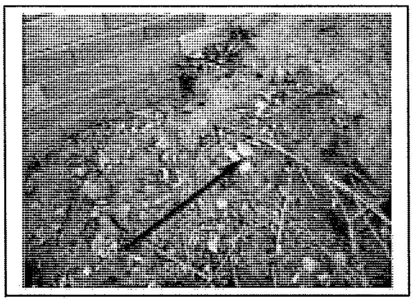
Photograph 1: Building prior to commencement of asbestos removal.

Photograph 2: Building at the completion of asbestos removal works.

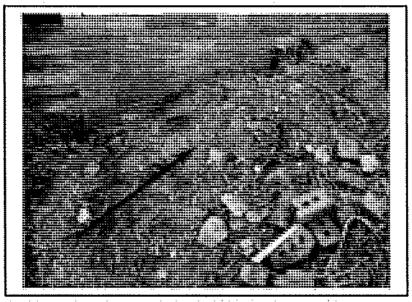
Photograph 3: Building at the completion of asbestos removal works.



Photograph 4: Building at the completion of asbestos removal works.



Photograph 5: Stockpile showing ACM surface fragments.



Photograph 6: Stockpile following the removal of ACM surface fragments.

6474_ClearCert_Small Building_YarralumlaBrickworks_20101107 Page 2 of 2

Robson ENVIRONMENTAL

NATA ENDORSED TEST REPORT
Accredited for compliance with ISO/IEC 17025
Sampling not covered by Scope of Accreditation Total Pages – 1
NATA Accredited Laboratory Number: 3181 Proforma document No 3.06
This document is issued in accordance with NATA's accreditation requirements

Environmental Excellence through Experience, Endeavour and Evaluation

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Airborne Fibre Monitoring Results at **Yarralumla Brickworks**

As per the National Occupational Health & Safety Commissions "Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition"' NOHSC: 3003(2005)' Canberra April 2005, and Robson Environmental Pty Ltd Method No. 1

Sampling Date	**7 November 2010**	Removal Contractor	**Ozbestos**
Contract Reference	**6474**	Report Issue Date	**7 November 2010**
		Client	**LAPS**

Sample No.	Location	Time On	Time Off	Flow Av mL/min	Fields	Fibres	F/mL
6474-1	South-west adjacent corner of building	0801	1206	2000	100	1	<0.01
6474-2	North-east adjacent corner of building	0805	1204	2000	100	4	<0.01
6474-3	West of building	0810	1202	2000	100	4	<0.01
6474-4	Blank				100	0	

Work in progress: **Small building adjacent inner entrance to the site:** Removal of asbestos corrugated roof and ceiling sheeting, gable and eave sheeting and surface debris to the southern side of the building.

Negative air exhaust and blank filter results expressed as fibre count only.

All results are below the minimum practical detection limit.

John Robson

John Robson

NATA APPROVED SIGNATORY NATA APPROVED COUNTER

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16 GLOSSARY

ACM	*See asbestos containing material*
Air monitoring[1]	Air Monitoring means airborne asbestos fibre sampling to assist in assessing exposures and the effectiveness of control measures. Air monitoring includes exposure monitoring, control monitoring and clearance monitoring. *Note: Air monitoring should be undertaken in accordance with the Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres [NOHSC:3003 (2005)]*
Airborne asbestos fibres[2]	Any fibres of asbestos small enough to be made airborne. For the purposes of monitoring airborne asbestos fibres, only respirable asbestos fibres (those less than 3µm wide, more than 5µm long and with a length to width ratio of more than 3 to 1) are counted.
Amosite	Grey or brown asbestos
AR	*See Asbestos Register*
Asbestos Containing Material	Any material, object, product or debris that contains asbestos.
Asbestos Register	Inventory of ACM by type, form, location, risk and required action.
Asbestos Removalist[2]	A competent person who performs asbestos removal work. *Note: an asbestos removal licence is required in all State and Territory jurisdictions for friable ACM.*
Asbestos Survey and Management Plan	Document covering the identification, risk evaluation, control and management of identified asbestos hazards, developed in accordance with NOHSC: 2018(2005).
Asbestos[2]	The fibrous form of mineral silicates belonging to the serpentine and amphibole groups of rock-forming minerals, including actinolite, amosite, anthophyllite, chrysotile, crocidolite, tremolite or any mixture containing one or more of the mineral silicates belonging to the serpentine and amphibole groups.
Asbestos–cement (AC)[2]	Products consisting of sand aggregate and cement reinforced with asbestos fibres (e.g. asbestos cement pipes and flat or corrugated asbestos cement sheets).
ASCC	*See Safe Work Australia Council*
Bonded asbestos	ACM that is bonded into a stable matrix and cannot be reduced to a dust by hand pressure.
Chrysotile	White asbestos
Clearance inspection[2]	An inspection, carried out by a competent person, to verify that an asbestos work area is safe to be returned to normal use after work involving the disturbance of ACM has taken place. A clearance inspection must include a visual inspection, and may also include clearance monitoring and/or settled dust sampling.

Clearance monitoring[2]	Air monitoring using static or positional samples to measure the level of airborne asbestos fibres in an area following work on ACM. An area is 'cleared' when the level of airborne asbestos fibres is measured as being below 0.01 fibres/mL.
Competent person[2]	A person possessing adequate qualifications, such as suitable training and sufficient knowledge, experience and skill, for the safe performance of the specific work.
Control monitoring[2]	Air monitoring, using static or positional to measure the level of airborne asbestos fibres in an area during work on ACM. Control monitoring is designed to assist in assessing the effectiveness of control measures. Its results are not representative of actual occupational exposures, and should not be used for that purpose.
Crocidolite	Blue asbestos
Exposure monitoring	Air monitoring in the breathing zone to determine a person's likely exposure to a hazardous substance. Exposure monitoring is designed to reliably estimate the person's exposure, so that it may be compared with the National Exposure Standard.
HMSMP	*See hazardous material survey and management plan*
In situ[2]	Fixed or installed in its original position, not having been removed.
Inaccessible areas	Areas which are difficult to access, such as wall cavities and the interiors of plant and equipment.
Licensed Class A Asbestos Assessor	Person who is qualified to undertake the identification and assessment of asbestos and provide recommendations on its safe management.
Licensed Class B Asbestos Assessor	Person who is qualified to undertake the identification of asbestos.
Membrane	A flexible or semi-flexible material, which functions as the waterproofing component in a roofing or waterproofing assembly.
NATA	National Association of Testing Authorities (NATA)
NOHSC *(now SWA)*	National Occupational Health and Safety Commission (*now known as Safe Work Australia)*
Safe Work Australia Council (SWAC)	A council that provides a national forum for State and Territory governments, employers and employees to consult and participate in the development of policies relating to OHS and workers' compensation matters, and promote national consistency in the OHS and workers' compensation regulatory framework.
SWMS	Safe Work Method Statement
UST	Underground Storage Tank (fuel)

1. *Definition sourced from: NOHSC: 2018(2005).*
2. *Definition sourced from: NOHSC: 2002(2005).*

17 REFERENCES

Australian Capital Territory Parliamentary Counsel (2006), *Asbestos Legislation Amendment Act 2006 [A2006-16]*, Canberra, Australia.

ANZECC 1997, *Identification of PCB-Containing Capacitors; An information Booklet for Electricians and Electrical Contractors;*

Code of Practice for the Management and Control of Asbestos in Workplaces [NOHSC: 2018 (2005)];

Dangerous Substances Act 2004 A2004-7.

Standards Australia, AS 4361.2 - 1998 *Guide to lead paint management, Part 2: Residential and Commercial Buildings*;

Standards Australia, HB 40.1 – 2001 *The Australian Refrigeration and Air-conditioning Code of Good Practice*; and

Work Safe Australia, Sydney 1990, *Synthetic Mineral Fibres: National Standard and National Code of Practice;*

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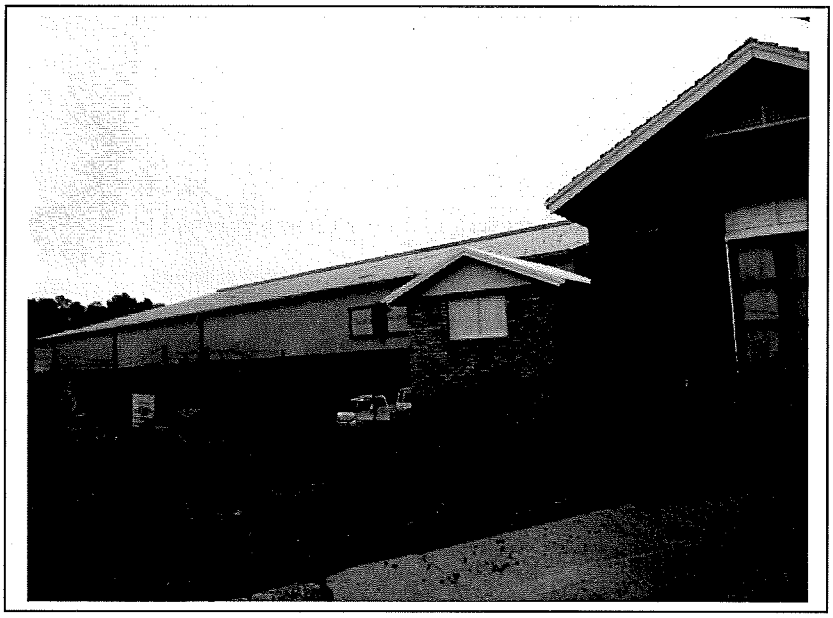
Hazardous Material Survey & Management Plan

Canberra Brickworks
Yarralumla ACT 2600

February 2012



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Client: ACT Property Group

CERTIFICATE OF APPROVAL FOR ISSUE OF DOCUMENTS

Document No: 7504-23_HM_HMSMP_Canberra Brickworks_20120312

Revision Status: A1

Title: Hazardous Materials Survey& Management Plan
Canberra Brickworks
Yarralumla ACT 2600

Date of Issue: 23/05/2012

Client: ACT Property Group

Copy No: One

	Name	Position	Signature	Date
Prepared by:	**Michael Robson**	**Hazardous Materials Consultant**		**23/05/2012**
Released by:	**Ged Keane**	**Hazmat Manager**		**23/05/2012**
Approved by:	**John Robson**	**Managing Director**		**23/05/2012**

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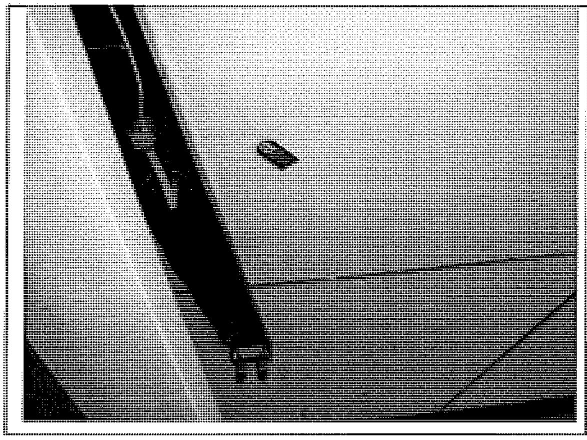
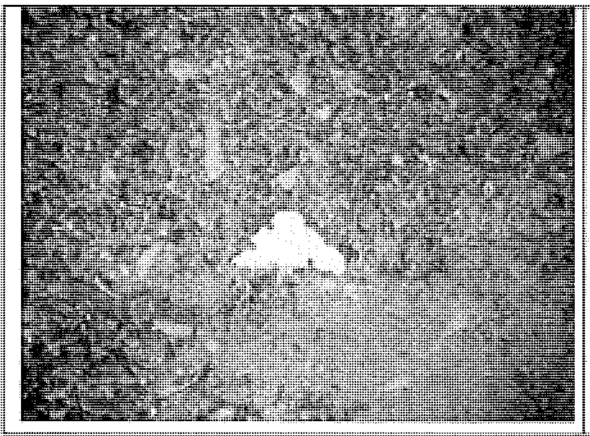
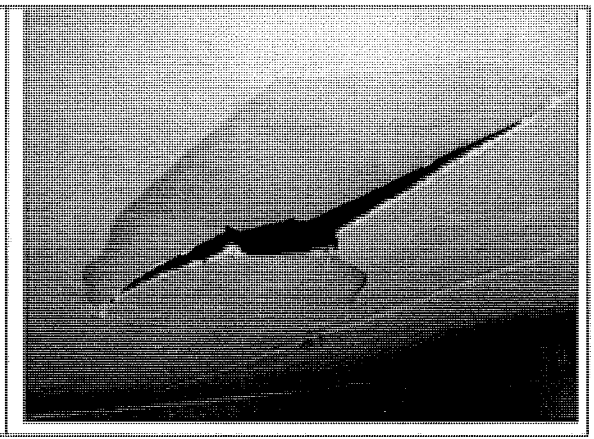


Photograph 13:
SS4 - Ceiling sheet
Refer Sample: RA M0102

Photograph 14:
Adjacent bridge to K2 - Debris to ground
Refer Sample: M0099 (b)



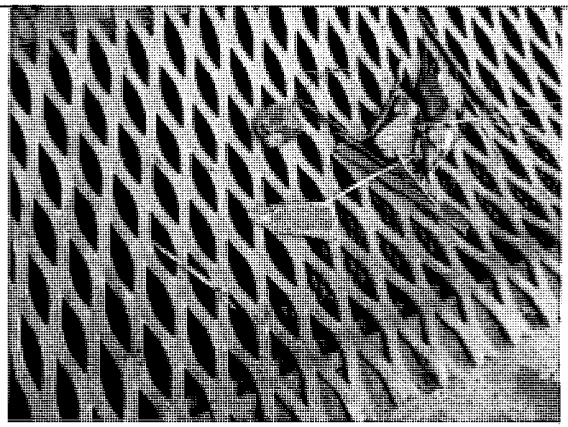
Photograph 15:
K2 - Top floor, debris to top floor
(small amount left post removal)
Refer Sample: M0100



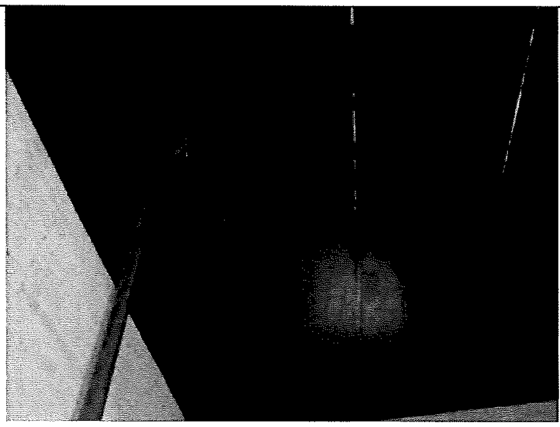
Photograph 16:
SS1 - Ceiling sheet
Refer Sample: M0101

799

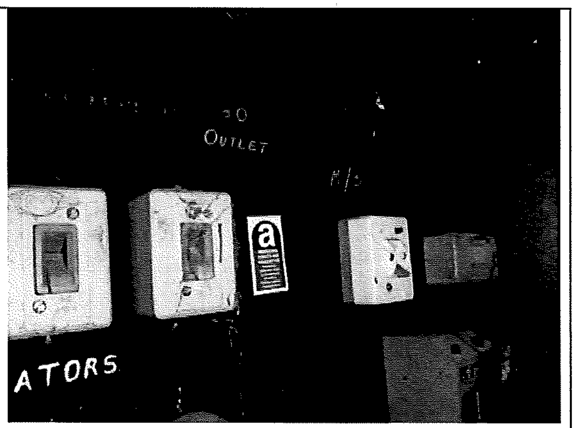
Photograph 17:
Between tall chimney & K3 –
Debris to ground & scattered throughout site
Sheet
Refer Sample: M0102



Photograph 18:
Front of B - Moulded sheet debris to ground & throughout site
Refer Sample: M0103

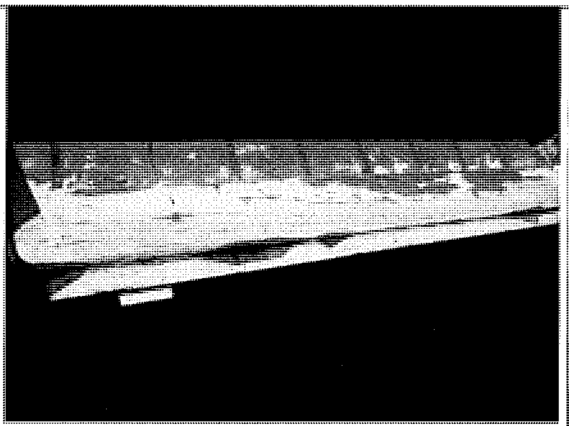


Photograph 19:
BH & SS2 - Ceiling sheet
Refer Sample: RA M0102

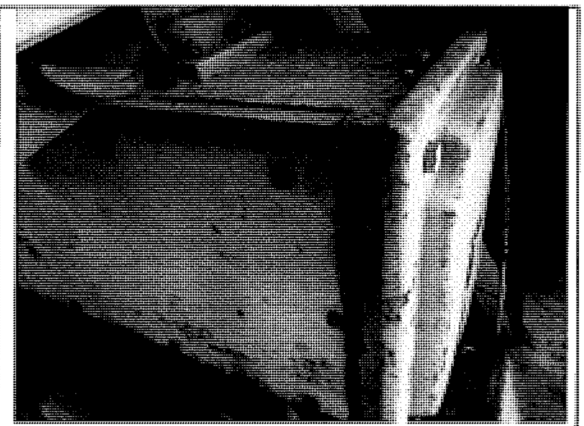


Photograph 20:
All switchboard backing sheets throughout site
Refer Sample: 7504 – 23 - VA12

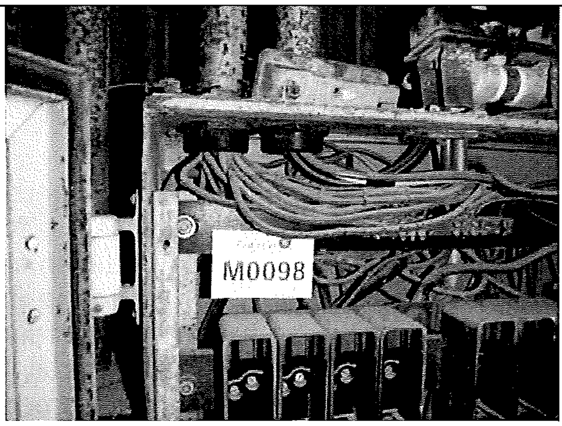
4.7 Photographs of NON ACM



Photograph 21:
BH - Window caulking
Refer Sample: 3617 – 103 – A3



Photograph 22:
M3 - Mastic to original distribution board
Refer Samples: 3617 – 103 – A6



Photograph 23:
M3 - Switch board backing sheet strip
(above switchboard backing sheet)
Refer Sample: M0098

5 LEAD PAINT SURVEY RESULTS

5.1 Introduction

Lead paint is defined by the Australian Standard (AS 4361.2 – 1998 *Guide to lead paint management Part 2: Residential and Commercial buildings*) as a paint or component coat of a paint system containing lead or lead compounds, in which the lead content (calculated as lead metal) is in excess of 1.0% by weight of the dry film as determined by laboratory testing.

Further, the Standard for the Uniform Scheduling of Drugs and Poisons (National Drugs and Poisons Schedule Committee July 2000) classifies paints having more than 0.25% lead as First Schedule Paint and prohibits their manufacture, supply or use.

It has been shown that the dust generated from dry sanding or abrasive blast cleaning of paints with a lead concentration of > 0.25% can have sufficient content to produce exposure levels that exceed those that define a 'lead task' in NOHSC 1012.

Therefore, paints with a lead concentration greater than 0.25% (if they are to be removed) must be treated as a lead paint (i.e. subject to the regulations in NOHSC 1012).

5.2 Results

Paint samples were collected from Canberra Brickworks, Yaral and analysed for lead content. Where paints were collected, samples were analysed by Envirolab – NATA accreditation number: 2901.

Table 4 presents lead composition in paints, with results presented as a percentage concentration of lead contained within the sampled materials. Despite the fact that sampling methodologies require that three (3) paint sub-samples be taken for each sampled product, only maximum values are presented below. Due to the inherent heterogeneity of lead concentrations in applied liquids this maximum reading is presented as it represents an upper level of lead concentrations throughout a heterogeneous product and aids in interpretation of risk assessment and management recommendations. For detailed results of analysed paint samples refer to Appendix A.

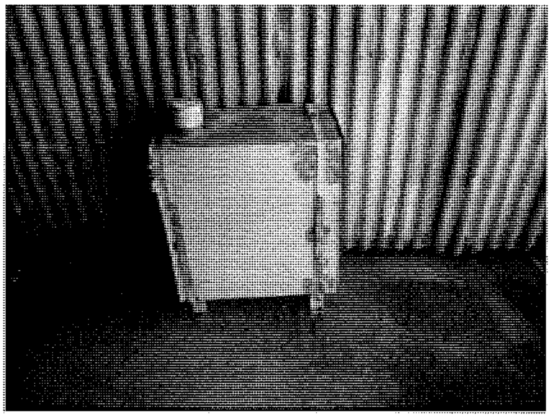
Table 4: Lead Composition in Paint by Inductively-Coupled Plasma Spectroscopy

Sample No.	Photo No's	Location and Colour of Paint Sample	Colour	Lead in Paint %
3617 - 103 – P1 a,b,c	24	Paint to portable AST to building M3	Yellow	6.4

Notes:

Lead Paint	**(> 1.0% Pb)**
First Schedule Paint	**(> 0.25% Pb)**
Lead-free Paint	**(≤ 0.25% Pb)**

5.3 Photographs of Lead Paint



Photograph 24:
Portable AST to building M3
Yellow paint
Refer Sample: 3617 – 103 – P1

5.4 Discussion and Conclusion

The analytical results of paint sampling from Yarralumla Brickworks, Yarralumla, revealed that there **was lead paint** (>1.0% Pb) **present**. It should be assumed that all similar paint throughout the building contains comparable percentages of lead.

The lead paint is in a reasonably poor condition and should be repainted or the unit should be disposed of as hazardous waste.

Refer to Appendix C for safe lead paint and AST removal procedures.

6 SYNTHETIC MINERAL FIBRE (SMF) SURVEY RESULTS

6.1 Introduction

SMF is a generic term used to collectively describe a number of amorphous (non-crystalline) fibrous materials including glass fibre, mineral wool (Rockwool and Slagwool) and ceramic fibre. Generally referred to as SMF, these materials are also known as 'Man-Made Mineral Fibres' (MMMF).

SMF products are used extensively in commercial and residential buildings for thermal and acoustic insulation, and as a reinforcing agent in cement, plaster and plastic materials. In some specialised instances, SMF materials have also been used as alternatives to asbestos, especially where high temperature insulation properties are required.

There are two basic forms of SMF insulation ***bonded*** and ***unbonded.***

The ***bonded form*** is where adhesives, binding agents, facing/cladding, cement or other sealants have been applied to the SMF before delivery and the SMF product has a specific shape (e.g. a binding or sealing agents hold the SMF in a batt or blanket form). Some bonded SMF materials may also be clad in various coverings on one or more sides (e.g. a silver foil backing).

The ***unbonded form*** has no adhesives, binding agents, facing/cladding or sealants applied, and the SMF is a loose material (e.g. wet spray and loose fill).

6.2 Sample Assessment

Table 5: Visual Assessment of Samples

Sample Reference	Photo No's	Sample Location	Sample Type	Form
3617 – 103 – S2	25	To underside of roofs throughout	Sisslation	Bonded
3617 – 103 – S3	26	SMF as insulation to pipes throughout	Fibreglass	Bonded
3617 – 103 – S4	27	SMF as insulating batts to various ceiling spaces	Fibreglass	Bonded

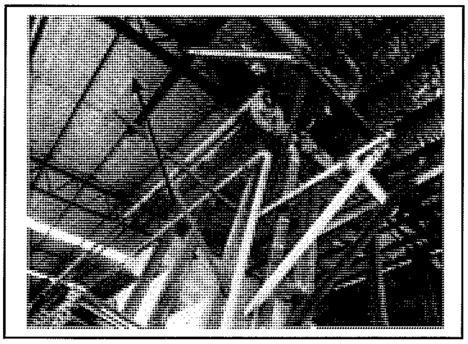
6.3 Results

SMF was identified as insulation within ceiling space areas & as pipe lagging to various pipes throughout the premises. It should be presumed that similar materials are present to any inaccessible areas.

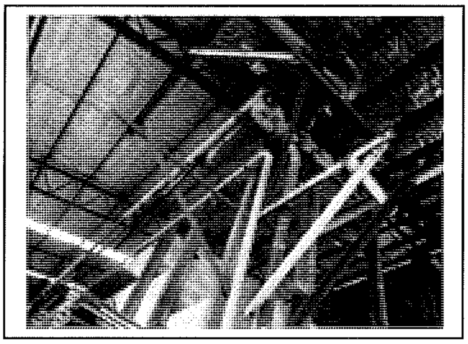
- If building works is likely to significantly disturb the insulation the SMF materials should be removed using effective dust control procedures.

Refer to section Appendix C for safe SMF and asbestos handling and removal procedures.

6.4 Photograph of Synthetic Mineral Fibre (SMF)



Photograph 25:
To underside of roofs throughout
Refer Sample: 3617 – 103 – S2



Photograph 26:
SMF as insulation to
Pipes throughout
Refer Sample: 3617 – 103 – S3

Photograph 27:
SMF as insulating batts to
various ceiling spaces
Refer Sample: 3617 – 103 – S4

7 POLYCHLORINATED BIPHENYLS (PCB) SURVEY RESULTS

7.1 Introduction

PCB is the common name for polychlorinated biphenyls. PCBs range in appearance from colourless, oily liquids to more viscous and increasingly darker liquids, to yellow then black resins, depending on the chlorine content of the PCB.

PCBs are chemically stable synthetic compounds that do not degrade appreciably over time or with exposure to high temperatures. The major use of PCBs was as an insulating fluid inside transformers and capacitors. Capacitors containing PCBs were installed in various types of equipment including domestic appliances, motors and fluorescent light fittings during the 1950's, 60's and 70's.

These applications generally do not present an immediate risk to human health or the environment as the equipment is sealed and contains relatively small amounts of PCB. The equipment can continue to be used safely provided that the capacitors do not leak.

The Australian and New Zealand Environment and Conservation Council (ANZECC) in its *PCB Management Plan* of *2003* stipulate cessation dates for the generation of PCB scheduled waste, the use of articles containing PCB scheduled waste, and the disposal of PCB scheduled waste*.

> * PCB scheduled waste means any PCB material that has no further use that contains PCBs at levels at, or in excess of 50mg/kg and is of a quantity of 50g or more.

Small equipment items and capacitors found in households and commercial buildings that contain scheduled PCBs (i.e. at or in excess of 50mg/kg) are to be disposed of as scheduled PCB waste. Where the aggregate weight of the items or capacitors exceeds 10kg, they must be notified to the relevant Commonwealth, State or Territory Government agency prior to their disposal.

7.2 Results

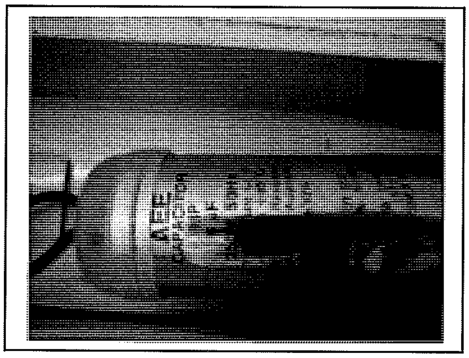
Representative samples of fluorescent light fittings were inspected for PCB capacitors. Six types of confirmed PCB containing capacitors, two presumed PCB containing capacitor and three different types of non-PCB containing capacitors were identified during the survey.

Table 6: PCB and Non-PCB Containing Capacitors Identified During Survey

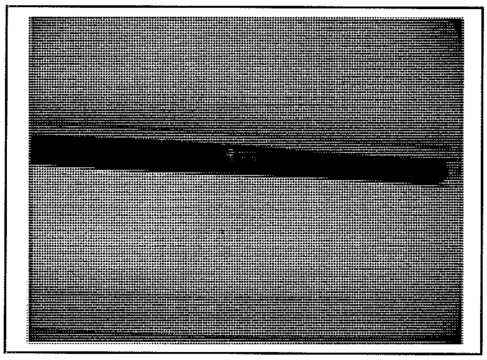
Result	Photo No's	Location	Make - Type	Capacitance (µF)	Remarks	No. of capacitors
PCB	28	Former canteen ground floor	AEE MP – PMN 5417	6	PCB	5+
	-	Building SS1	Nichicon 1966 - SFSGLP	6	PCB	5+
	29	Building A4 1 Tube	Dawco metal – BS 4017 - 1966	3.25	PCB	1+
	-	Building A4 2 Tubes	Ducon metal – APF 265CR	6.5	PCB	2+
	30	Building R1	Ducon metal APF 260CR	6	PCB	5+
	-	Building R1	Ducon metal – APF 280CR	6	PCB	1+
Non-PCB	-	North end of site	Plessey plastic – 427/1/07503/006	10	No PCBs	20+
	-	Building R2	AEE MP – PMN 5417	10	No PCBs	10+
	33	Former canteen	RIC – LE 1 EB	6.5	No PCBs	2+
Presumed PCB	31	Building SS2	Metal – Unidentifiable due to fire damage	Unsure	Presumed PCB	1+
	32	Building H	Inaccessible	Unsure	Presumed PCB	1+

For further PCB management information refer to Appendix C.

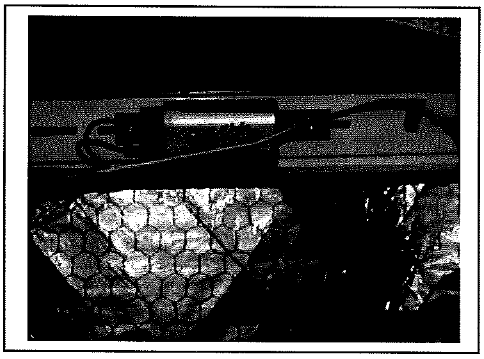
7.3 Photographs of PCB and Presumed PCB Containing Capacitors



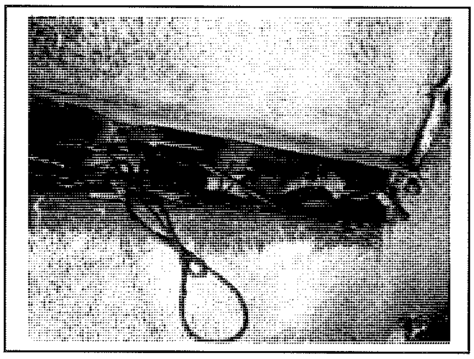
Photograph 28:
Former canteen ground floor
AEE MP – PMN 5417



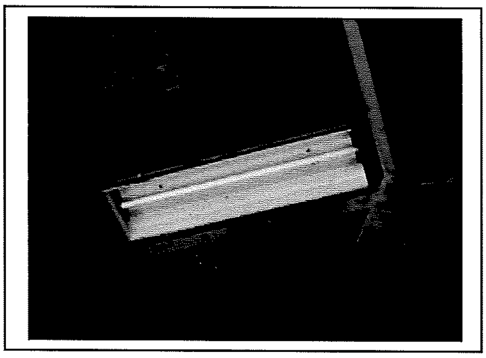
Photograph 29:
Building A4 1 Tube
Dawco metal – BS 4017 - 1966



Photograph 30:
Building R1
Ducon metal APF 260CR



Photograph 31:
Building SS2
Metal – Unidentifiable due to fire damage



Photograph 32:
Building H
Inaccessible

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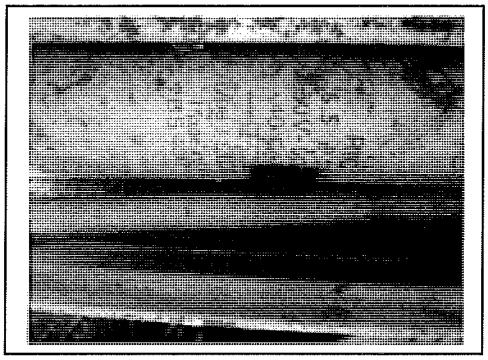
7.4 Photographs of NON PCB Containing Capacitors



Photograph 33:
Former canteen
RIC – LE 1 EB

8 OZONE DEPLETING SUBSTANCES SURVEY RESULTS

The buildings at Canberra Brickworks, Yarralumla were surveyed for the presence of air conditioning and refrigeration units that contain ozone depleting substances.

ODS are used for heat transfer in refrigeration and air conditioning systems, absorbing or releasing heat according to vapour pressure. Release of these substances to the atmosphere have the ability to cause long term atmospheric pollution that can lead to ozone depletion, global warming, petrochemical smog and acid rain.

The ozone depletion potential (ODP) of a fluorocarbon refrigerant gas, its global warming potential (GWP) and estimated atmospheric life (EAL) all contribute to its potential to deplete the stratospheric ozone layer and enhance the greenhouse effect (leading to global warming).

Chlorofluorocarbons (CFCs) contain chlorine and possess a large ODP, high GWP and long EAL. They are generally found in refrigeration and air-conditioning systems e.g. Centrifugal Chillers.

Hydrochlorofluorocarbons (HCFCs) are less saturated with chlorine than are CFCs and the hydrogen within these compounds give the HCFCs a much shorter EAL and lower ODP. They are generally found in refrigeration systems that are used for food display, cold stores and self contained, split, multi-split and central plant chillers used for building air-conditioning.

Hydrofluorocarbons (HFCs) are a class of replacement gases for CFCs. They do not contain chlorine or bromine and therefore do not deplete the ozone layer. While all HFCs have an ODP of zero, some do have a high GWP (e.g. R-404A, R-407B, R-125 etc).

Halons are synthetic chemical compounds that contain one or two carbon atoms, bromine and other halogens. They have a long atmospheric lifetime and cause very aggressive ozone depletion when breaking down in the stratosphere. Halons were introduced into Australia as fire-extinguishing agents in the early 1970s and quickly replaced many previously accepted fire-fighting products because of their superior fire-extinguishing characteristics and ease of use.

Halon 1211 was commonly used in portable fire extinguishers, while fixed fire protection systems, such as those that protect computer rooms and ship engine rooms, commonly contained Halon 1301.

Halon 1301 has an ODP that is 10 times greater that of CFCs, while Halon 1211 has an ODP 3 times greater than that of CFCs.

8.1 Results

Ozone Depleting Substances (ODS) were **not** located during the survey at Yarralumla Brickworks, Yarralumla.

Table 7: Chemical Properties of Ozone & non-Ozone Depleting Substances located during survey

R Number	Photo No's	Location	Chemical type and name	ODP	GWP	EAL
Non-Ozone Depleting Substances						
R410A		To workshop adjacent building F	R410A			

For further refrigerant management information refer to section Appendix C.

9 FUEL STORAGE FACILITIES & DANGEROUS GOODS RESULTS

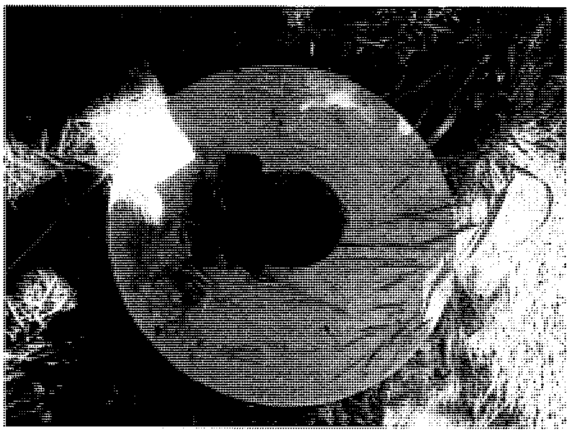
It is important to note that prior to the introduction of natural gas in the ACT in the 1980's, commercial premises generally utilised heating systems where boilers were fuelled by diesel or heating oils which were stored in USTs.

9.1 Results

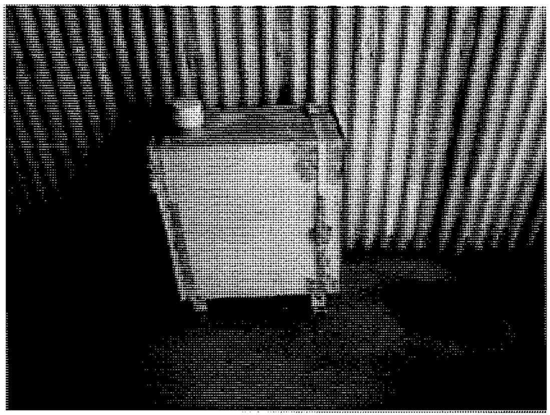
Evidence of an underground storage tank (UST) was identified during the survey suggesting an underground storage tank is present. A dip point was found, refer to plans for location.

An AST was located and should be disposed of as hazardous waste.

Refer to Section Appendix C for the management of fuel storage facilities in the ACT.



Photograph 34:
Dip point to probable UST



Photograph 35:
Portable AST to building M3

10 ASBESTOS MANAGEMENT

10.1 Control Measures

General requirements

- ACM identified as representing an exposure risk (see Table 3A Asbestos Register) should be removed or otherwise controlled.
- Any ACM that is not scheduled for immediate removal should be labelled with appropriate warnings and maintained in good condition.
- The location of ACM must be entered into the Asbestos Register.
- Maintenance and other personnel must be made aware of the location of ACM.
- The Asbestos Register must be freely available.
- Unless they have valid ACT Asbestos Removal licence, maintenance workers, trades or occupants shall not remove or knowingly damage identified ACM.
- Before any planned demolition, refurbishment or maintenance, its effect upon any in situ asbestos must be established by reference to this document, including amendments.

Accidental damage to ACM

If ACM is damaged or degraded through accident, ageing or misuse, the building manager should apply the following protocols.

- Determine if the damage is likely to affect nearby occupants through the release of asbestos dust (this may require advice from a licensed Class A Asbestos Assessor).
- Gently wet down the damaged section and cover with a heavy plastic sheet or equivalent to encapsulate the ACM. Close nearby windows if the ACM is to the exterior.
- If the damage is significant (i.e. the material is shattered or abraded) the ACM should be replaced as soon as is practicable. Minor damage (i.e. small cracks or holes) may be repaired in the short term using a sealant.
  All repairs or removal must be undertaken by a licensed Asbestos Removalist.
- Register the event in the HMSMP.

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10.2 Management of ACM

The options for short to medium-term management of ACM are outlined below.

1. Defer action

✓ Appropriate when	✗ Not appropriate when	✓ Advantages	✗ Disadvantages
Negligible risk of exposure ***and*** Asbestos inaccessible and fully contained ***or*** Asbestos stable and not liable to damage	Possibility of deterioration or damage Airborne dust exceeds recommended exposure standard	No initial cost Cost of removal deferred	Hazard remains Need for continuing assessment Asbestos management program required

2. Encapsulate or seal[1]

✓ Appropriate when	✗ Not appropriate when	✓ Advantages	✗ Disadvantages
Removal difficult or not feasible Firm bond to substrate Damage unlikely Short life of structure	Asbestos deteriorating Application of sealant may cause damage to material Water damage likely Large areas of damaged asbestos	Quick and economical for repairs to damaged areas May be an adequate technique to control release of asbestos dust	Hazard remains Cost for large areas may be near removal cost Asbestos management system required Eventual removal may be more difficult and costly

1. Seal through application of paint, lacquer or PVA spray

3. Removal

✓ Appropriate when	✗ Not appropriate when	✓ Advantages	✗ Disadvantages
Surface friable or asbestos poorly bonded to substrate Asbestos is severely water-damaged or liable to further damage or deterioration Located in air conditioning duct Airborne asbestos exceeds recommended exposure standard Other control techniques inappropriate	Located on complex and inaccessible surfaces Removal extremely difficult and other techniques offer satisfactory alternative	Hazard removed No further action required	Increases immediate risk of exposure especially to removal workers Creates major disturbance in building Often highest cost, most complex and time-consuming method Removal may increase fire risk in building; substitute required Possible contamination of whole building if removal is done poorly

10.3 Management Decision Record

Option 1: Defer action

Item no.	ACM and Location	Reason	Authorisation	Date

Option 2: Encapsulate or seal

Item no.	ACM and Location	Reason	Authorisation	Date

Option 3: Removal

Item no.	ACM and Location	Reason	Authorisation	Date

10.4 Timetable for Action

The timetable for action should be administered to ensure management has a clear plan for all works which may affect ACM in the workplace. This includes maintenance work, scheduled removal work and risk assessment reviews, which may impact ACM.

Table 8: Timetable for action

ACM removal/ work	Date of scheduled works	Details	Authorisation	Date
Asbestos review/audit	**Date of scheduled review**	**Details**	**Authorisation**	**Date**

11 RESPONSIBILITIES

11.1 Asbestos - Provision of Information

The building manager must:

- ensure the ACM register and all relevant information pertaining to asbestos in the workplace is freely available upon request
- provide occupants with up-to-date information relating to the condition and relative risk of ACM in the workplace
- provide information on the control measures in place to contain ACM-related risk, and
- provide information to staff and contractors on measures to be taken to ensure that they are not exposed to asbestos in the workplace, either through accident or negligence.

Management Action Record

Record all communication activities undertaken to inform staff/occupants of ACM in the workplace.

Action	Authorisation	Date

11.2 Updating the Risk Assessment

The *Code of Practice for the Management and Control of Asbestos in Workplaces* [NOHSC: 2018 (2005)] Section: 9.3.1 requires:

The register of ACM, including any risk assessments, should be reviewed every 12 months or earlier where:

- **a risk assessment indicates the need for reassessment; or**
- **any ACM has been disturbed or moved**

A visual inspection of identified ACM should be undertaken as part of any review.

The Dangerous Substances (General) Regulations 2004 requires the review of the Asbestos Survey Management Plan to be carried out, at intervals determined by the criteria set out in Chapter 3, Part 3.4, Section 326 of the Dangerous Substances (General) Regulations 2004; the maximum interval being 5 years. The new requirements state that an Asbestos Management Plan and Risk Assessments are required in addition to an Asbestos Register and Survey. Class A Asbestos Assessors at Robson Environmental Pty Ltd are able to produce these documents to comply with your obligations.

Each review should critically assess all asbestos management procedures and their effectiveness in:

- preventing exposure to asbestos fibres
- controlling access to asbestos
- highlighting the need for action to maintain or remove ACM, and
- maintaining the accuracy of the ASMP.

Details of any mitigating actions must be recorded in the Asbestos Register (Refer Table 3A).

11.3 Key Personnel

This section outlines the responsibilities of all persons involved in the safe management of ACM.

1. Building manager

Name:	
Contact details:	
Responsibilities:	*e.g. provision of information*

2. Occupational Health and Safety Representative

Name:	
Contact details:	
Responsibilities:	*e.g. keeping occupants informed of any changes to the status of ACM in the workplace*

3. Facilities Management (if applicable)

Name:	
Contact details:	
Responsibilities:	*e.g. arrange removal and repair works as required; maintaining the HMSMP*

4. Other

Name:	
Contact details:	
Responsibilities:	

12 ASBESTOS REMOVAL WORKS

12.1 Management Responsibilities

Where it has been determined that ACM is to be removed, management or the client must ensure that a risk assessment is performed before the removal work commences and that the removalist takes this risk assessment into account. The risk assessment must include the possibility of uncovering previously concealed ACM, and that concealed ACM is subsequently identified by a Class A Asbestos Assessor.

The client should provide a detailed scope of works prepared by a Class A Asbestos Assessor for the removalist, including potential hazards, details on areas, which contain asbestos and arrangements for clearance inspections and airborne fibre monitoring.

NOHSC: 2018(2005) describes the minimum requirements to be observed during any asbestos removal operation.

12.2 Removalist Responsibilities

Before the commencement of removal work, the licensed removal contractor must:

- Provide a site-specific Asbestos Removal Control Plan(ARCP)
- Ensure the removal is adequately supervised and carried out in a safe manner
- Ensure that the equipment used in the project is appropriate for the task
- Ensure all persons carrying out the removal are competent and trained for the type of work being carried out, and
- Demonstrate that they have a health surveillance program in accordance with the requirements of NOHSC: 2002(2005).

12.3 Licensing Requirements

All Asbestos Removalists in the ACT are licensed by the ACT Planning and Land Authority (ACTPLA).

As a minimum the holder of an ACT Asbestos Removal Licence is required to demonstrate practical experience in the industry for at least three years and possess a full and complete understanding of the requirements of:

- *Code of Practice for the Management and Control of Asbestos in Workplaces* [NOHSC: 2018 (2005)];
- *Code of Practice for the Safe Removal of Asbestos* [NOHSC: 2002 (2005)];

- Work Health and Safety Act 2011;
- Work Health and Safety Regulations 2011;
- Dangerous Substances Act 2004;
- Dangerous Substances (General) Regulation 2004;

ACTPLA specify requirements for authorising certifiers and builders as well as the respective requirements of ACT WorkSafe and ACT NOWaste for the removal and transport of ACM.

12.4 Approval to Begin Asbestos Removal Works

- All removal methods and procedures are required to be undertaken in accordance with NOHSC: 2002(2005).
- Building management in conjunction with a licensed Class A Asbestos Assessor where required, will inform the asbestos removalist of the 'Scope of Works'.
- The licensed Class A Asbestos Assessor will be required to provide a clearance certificate on satisfactory completion of the works.

12.5 Work in Areas Containing Asbestos – Trades Personnel

- Work must not proceed under any circumstance without first contacting the building manager or authorised person.
- Refer to this HMSMP (including amendments) to determine if asbestos material is likely to be encountered in the general work area. If no asbestos is located in the area of intended work, the area may be entered by all relevant personnel on an unrestricted basis.
- Work in areas where asbestos will or is likely to be disturbed will only be given to persons licensed by ACTPLA and all access and works will be undertaken in accordance with the requirements of NOHSC: 2002(2005).

12.6 Emergency Work in Areas Containing Asbestos

- If emergency access is required contact the building manager.
- If the building manager determines that asbestos is likely to be disturbed, all works must be undertaken in accordance with the requirements of NOHSC: 2002(2005) that is, a licensed Asbestos Removalist must be contracted to undertake any asbestos removal works.
- A licensed Class A Asbestos Assessor will be required to provide a clearance certificate on satisfactory completion of the works.

12.7 Monitoring Arrangements

Control air monitoring should be performed when indicated by a Risk Assessment to ensure the control measures are effective.

All air monitoring must be performed by a competent person accredited by the National Association of Testing Authorities (NATA) to perform air sampling for asbestos. Sampling should be performed in accordance with the *Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres* [NOHSC: 3003 (2005)].

It is the Asbestos Removalist's responsibility to ensure that the maximum fibre levels throughout asbestos removal and associated works does not equal or exceed the minimum practical detection limit of 0.01 fibres per millilitre of air (F/mL). If the airborne fibre levels are observed at or exceeding those specified below, the licensed Class A Asbestos Assessor will instruct the contractor to take the appropriate control /action as per NOHSC:2002(2005).

Table 9: Control levels and required actions

Control Level (airborne asbestos fibres/mL)	Control/Action
< 0.01	Continue with control measures
≥ 0.01	Review control measures
≥ 0.02	Stop removal work and find the cause

Source: [NOHSC: 2002(2005)]

12.8 Clearance Inspections

Following removal work, a licensed Class A Asbestos Assessor must undertake a clearance inspection before re-occupation of an asbestos work area.

All barriers and warning signs should remain in place until the area has been cleared.

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12.9 ACM removal/maintenance record

The Asbestos Register, Section 4.5, Table 3A is to be completed by the building manager after receiving appropriate clearance certification from a licensed Class A Asbestos Assessor.

The 'Work Performed' and 'Asbestos Control Measure' Tables on the following page are required to be completed by the building manager.

1. Work Performed

Company name	Contact details	Date of work + job no.	Scope of work

2. Asbestos Control Measures

Work performed	Air monitoring/ decontamination	Clearance certificate issued	Other

3. Additional Information

13 SAFE ASBESTOS REMOVAL PROCEDURES

13.1 Friable ACM

The licensed Asbestos Removalist must provide a 'Safe Work Method Statement' (SWMS) and an 'Asbestos Removal Control Plan' (ARCP). An overview of the basic requirements for removal of friable ACM is provided here. Should any removal of friable asbestos be undertaken, specific work practices will be required.

Wet Removal

i. Obtain approval from the building manager to begin asbestos removal works.

ii. Inform the building occupants of intended asbestos removal works.

iii. Relocate all occupants in immediate and adjacent areas affected by the works.

iv. Rope or barricade the area adjacent to the removal area and place appropriate signage at the perimeter of the area for the removal of friable ACM.

v. Set up the removal area with appropriate materials (plastic, tape, etc.) and decontamination area to enable effective control of dust generated during removal of the friable asbestos (i.e. negative air units and wet decontamination facilities would be required for this type of removal).

vi. Protective clothing and a full face Power Air Purifying Respirator (PAPR) with a fitted P3 particulate filter (cartridge) respirator conforming to AS/NZS 1715:2009, a compressor with appropriate filters, airlines and associated equipment must be used during bulk removal of ***dry friable*** ACM. A particulate filter (P2 cartridge) powered air purifying respirator – (PAPR) conforming to AS/NZS 1715:2009 may be worn during wet removal and at the final clean and vacuuming stage.

vii. The ACM must be kept moist with a water mist spray during the removal of the material except where an electrical hazard exists.

viii. Hand tools are preferred over power tools, and high-speed abrasive power tools should not be used. If low-speed power tools are used they should be fitted with local exhaust ventilation dust control. The ARCP must detail the proposed decontamination method when power tools are to be used within the removal area.

ix. Removed asbestos and other materials are to be packed into plastic bags or containers marked as asbestos waste.

x. Asbestos products must not be re-used.

xi. All surfaces within the removal area to be thoroughly vacuumed to remove any asbestos residue.

xii. All surfaces must be Polyvinyl Acetate (PVA) sprayed to seal any microscopic asbestos fibres or wet-wiped (oil/solvent or water-soaked rag) to remove asbestos fibres.

xiii. Remove all asbestos containing material and all asbestos contaminated material from site for disposal in the approved manner.

xiv. Obtain a visual clearance certificate from a licensed Class A Asbestos Assessor.

Note: Air monitoring is required during the removal of friable ACM. The locations and frequency should be determined by a licensed Class A Asbestos Assessor.

13.2 Bonded ACM

The ACT licensed Asbestos Removalist must provide a SWMS and an ARCP. An overview of the basic requirements for removal of bonded ACM is provided here.

i. Obtain approval from the building manager to begin asbestos removal works.

ii. Inform the building occupants of intended asbestos removal works.

iii. Relocate all occupants in immediate and adjacent areas.

iv. Rope or barricade adjacent to the removal area and place appropriate signage at the perimeter.

v. Set up the removal and decontamination areas with appropriate materials (plastic, tape, etc.) to enable effective control of dust generated during removal of bonded ACM.

vi. Using protective clothing and a half face particulate filter (cartridge) respirator conforming to AS/NZS 1715:2009 remove ACM.

vii. Hand tools are preferred over power tools and high-speed abrasive power tools should not be used. If low-speed power tools are used they should be fitted with local exhaust ventilation dust control. Asbestos cement sheeting should be wetted during removal where safe.

viii. Removed contaminated materials are to be packed into disposal crates or wrapped in plastic sheeting.

ix. Asbestos products must not be re-used.

x. All surfaces within the removal area to be thoroughly vacuumed to remove any asbestos residue.

xi. All surfaces must be Polyvinyl Acetate (PVA) sprayed to seal any microscopic asbestos fibres or wet-wiped (oil/solvent or water-soaked rag) to remove asbestos fibres.

xii. Remove all asbestos containing material and all asbestos contaminated material from site for disposal in the approved manner.

xiii. Obtain a visual Clearance from a licensed Class A Asbestos Assessor.

Note: Air monitoring *may* be required during the removal of bonded ACM. The need frequency and location should be determined by a licensed Class A Asbestos Assessor.

14 FURTHER INFORMATION

14.1 Further Reading

Code of Practice for the Management and Control of Asbestos in Workplaces [NOHSC: 2018 (2005)].

Code *of Practice for the Safe Removal of Asbestos 2nd Edition* [NOHSC: 2002(2005)].

Asbestos Legislation Amendment Act 2006 (A2006-16), ACT Parliamentary Counsel.

Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres [NOHSC: 3003(2005)].

Dangerous Substances Act 2004 (A2004-7), Republication No 20, November 2006, ACT Parliamentary Counsel.

Dangerous Substances (General) Regulations 2004 (SL2004-9), Republication No 13, April 2010, ACT Parliamentary Counsel.

Environment Protection Act 1997 (A1997-92), Republication No 15, January 2006, ACT Parliamentary counsel.

Work Health and Safety Act 2011

14.2 Related Websites

Legislation www.legislation.act.gov.au

Safe Work Australia Council www.safeworkaustralia.gov.au (for Codes of Practice)

ACT NOWaste www.nowaste.act.gov.au

WorkSafe ACT www.worksafe.act.gov.au

Commonwealth Government website on asbestos-related diseases
www.healthinsite.gov.au/topics/Asbestos_and_Cancer

14.3 Useful Contacts

Additional information on asbestos can be obtained from the following organisations and agencies.

ACT Planning & Land Authority (ACTPLA)	Ground floor north Dame Pattie Menzies House 16 Challis Street Dickson ACT 2602 Phone: 02 6207 6309 Internet: www.actpla.act.gov.au
ACT Government	Phone: 13 22 81 Internet: www.asbestos.act.gov.au
ACT WorkSafe	255 Canberra Ave Fyshwick ACT 2609 Phone: 02 6205 0200 Email: worksafe@act.gov.au Internet: www.worksafe.act.gov.au
Australian Safety and Compensation Council (formerly NOHSC) and now Safe Work Australia	64 Northbourne Ave Canberra City ACT 2601 Phone: 02 6121 6000 Email: info@ascc.gov.au Internet: www.safeworkaustralia.gov.au
National Association of Testing Authorities (NATA)	PO Box 7507 Silverwater NSW 2128 Phone 02 9736 8222 Email: corpcomm@nata.asn.au Internet: www.nata.asn.au
Robson Environmental Pty Ltd	Unit 1, 140 Gladstone St Fyshwick ACT 2609 Phone: 02 6239 5656 Email: admin@robsonenviro.com.au
Standards Australia	286 Sussex Street Sydney, NSW, 2000 Phone: 02 8206 6000 Email: sales@sai-global.com Internet: www.saiglobal.com

15 APPENDICES

15.1 APPENDIX A – Laboratory Reports

Asbestos

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

CERTIFICATE OF ANALYSIS 47547

Client:
Robson Environmental Pty Ltd
PO Box 112
Fyshwick
ACT 2609

Attention: Michael Robson / Ged Keane

Sample log in details:

Your Reference:	**3617-103, Yarralumla**
No. of samples:	7 Materials
Date samples received:	28/10/10
Date completed instructions received:	28/10/10

Analysis Details:
Please refer to the following pages for results and methodology summary.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Note, even after disintegration it can be difficult to detect the presence of asbestos in some asbestos -containing bulk materials using PLM and dispersion staining. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.

Report Details:

Date results requested by:	4/11/10
Date of Preliminary Report:	Not Issued
Issue Date:	2/11/10

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This document is issued in accordance with NATA's accreditation requirements.
Accredited for compliance with ISO/IEC 17025. **Tests not covered by NATA are denoted with *.**

Results Approved By:

Asbestos was analysed by Approved Identifier:	Matt Mansfield
Asbestos was authorised by Approved Signatory:	Matt Mansfield

Matt Mansfield
Approved Signatory

NATA
Accredited for
TECHNICAL COMPETENCE

Envirolab Reference: 47547
Revision No: R 00

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Client Reference: 3617-103, Yarralumla

Envirolab Ref:	Sample ID:	Date analysed	Sample Description	Asbestos ID in materials
47547-1	3617-103-A1	1/11/2010	4x2.5x1mm Fibrous gasket	Chrysotile asbestos detected
47547-2	3617-103-A2	1/11/2010	42x14x7mm Fibre cement fragment	Chrysotile asbestos detected
47547-3	3617-103-A3	1/11/2010	18x3x2.5mm Compressed mastic	No asbestos detected
47547-4	3617-103-A4	1/11/2010	16x4x1.5mm Fibrous gasket	Chrysotile asbestos detected
47547-5	3617-103-A5	1/11/2010	4x3x1mm Fibrous insulation	Chrysotile asbestos detected
47547-6	3617-103-A6	1/11/2010	10x4x3mm Compressed mastic	No asbestos detected
47547-7	3617-103-A7	1/11/2010	21x14x4mm Fibre cement fragment	Chrysotile asbestos detected Amosite asbestos detected

Envirolab Reference: 47547
Revision No: R 00

NATA TECHNICAL COMPETENCE

Page 2 of 3

Client Reference: 3617-103, Yarralumla

Method ID	Methodology Summary
AS4964-2004	Asbestos ID - Qualitative identification of asbestos type fibres in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques.

Envirolab Reference: 47547
Revision No: R 00

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Robson ENVIRONMENTAL
Effective Environmental Solutions

Unit 1, 140 Gladstone Street
Fyshwick ACT 2609
P: 02 6239 5656 F:02 6239 5669
E: fibreid@robsonenviro.com.au
W: www.robsonenviro.com.au

Fibre Identification Certificate of Analysis

Report Number: 7504-23 Date of Report: 28.02.2012 Samples Taken by: Robson Environmental Page 1 of 2

Client Details	Laboratory Details
Client: ACT Property Group	Address: 140 Gladstone Street, Fyshwick, Canberra 2609
Attention: Peter Ozols	Manager: Ian Welsh
Received: 27/02/2012	Telephone: 02 6239 5656
Client Reference: Canberra Brickworks	Fax: 02 6239 5669
Email/Tel.No:	Email: fibreid@robsonenviro.com

Test Specification(s) Employed: AS4964 (2004) & In-House Procedure No.2

Methodology Summary

Samples of material are examined to determine the presence of asbestos fibres using AS4964 (2004) & In-House Procedure No.2 i.e. Qualitative identification of chrysotile, amosite and crocidolite in bulk samples by **Polarised Light Microscopy (PLM)** in conjunction with **Dispersion Staining (DS)**. Unequivocal identification of asbestos minerals present is made by assessing fibre properties to see whether the values are typical and consistent with published data. This provides a reasonable degree of certainty to determine whether a fibre under investigation is asbestiform or not. Careful application of the test procedure provides sufficient diagnostic clues to allow unequivocal identification of asbestos types, and so, to determine whether a sample contains asbestos or not. If sufficient diagnostic clues are absent, then positive identification of fibrous asbestos is not possible.

Client Supplied Samples

Robson Environmental is not responsible for the accuracy or competence of sampling carried by third parties. Sample location(s) and/or sample type(s) of third party samples delivered to the laboratory are given by the client at the time of delivery. Under these circumstances, Robson Environmental cannot be held responsible for the interpretation of the results shown. When the test certificate indicates that bulk samples were taken by the client, they are outside the scope of our NATA Accreditation for sampling. Robson Environmental takes responsibility of information reported only when a staff member takes the sample(s).

Reporting of Results

'Asbestos Detected': Asbestos detected by **Polarised Light Microscopy (PLM)**, including **Dispersion Staining (DS)**
'No Asbestos Detected': No Asbestos detected by **Polarised Light Microscopy (PLM)**, including **Dispersion Staining (DS)**
'UMF Detected': Mineral fibres of unknown type detected by **Polarised Light Microscopy (PLM)**, including **Dispersion Staining (DS)**. Confirmation by another independent analytical technique may be necessary.
"Hand-picked" refers to small discrete amounts of asbestos unevenly distributed in a large body of non-asbestos material.

Limit of Detection & Reporting Limit

Known limitations of the test procedure using **Polarised Light Microscopy (PLM)** are:

- **PLM** is a qualitative technique only;
- It does not cover identification of airborne or water-borne asbestos;
- The less encountered asbestos mineral fibres actinolite, anthophyllite and tremolite exhibit a wide range of optical properties that preclude unequivocal identification by **PLM** and **Dispersion Staining** (DS). Thus, the method is used to positively identify the three major asbestos minerals: amosite ("brown"), chrysotile ("white") and crocidolite ("blue");
- Valid identification requires that the sample material contains a sufficient quantity of the unknown fibres in excess of the practical detection limit used (in this case, **PLM** and **Dispersion Staining**, which has a calculated practical detection limit of 0.01-0.1% equivalent to 0.1-1g/kg (*AS4946-2004:App.A4*).

Results relate only to the sample(s) submitted for testing.
Test report must not be reproduced except in full.
Test report issued in accordance with NATA's accreditation requirements and compliance with ISO/IEC 17025.

Sample No.	Client Ref.	Location	Physical Structure	Sample Description	Analysis of Fibrous Content
M0097	-	Opposite canteen – debris	Sheet material	<1g	No Asbestos Detected
M0098	-	K3 – switchboard backing	Tar board	<1g	No Asbestos Detected
M0099a	-	Small shed – debris	Fibrous sheet material (pink)	20g	No Asbestos Detected
M0099b	-	Small shed – debris	Fibrous sheet material	30g	Chrysotile Asbestos
M0100	-	K2 – top floor debris	Fibrous sheet material	8g	Chrysotile Asbestos
M0101	-	Shed – ceiling sheet	Fibrous sheet material	3g	Chrysotile Asbestos

K. Hulme

Kyle Hulme
Approved Identifier

NATA
No. 3181

K. Hulme

Kyle Hulme
Approved Signatory

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Fibre Identification Certificate of Analysis

Laboratory Report Number: 7504-23 **Analyst:** Kyle Hulme **Page 2 of 2**

M0102	-	Between chimney & K3 Debris	Cement sheet material	9g	Crocidolite Asbestos Amosite Asbestos Chrysotile Asbestos
M0103	-	Front of main building Debris	Cement sheet material	>15g	Crocidolite Asbestos Amosite Asbestos Chrysotile Asbestos

K. Hulme

Kyle Hulme
Approved Identifier

NATA
No. 3181

K. Hulme

Kyle Hulme
Approved Signatory

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7504-23_Fibre ID res_20120128 Page 2 of 2

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Lead Paint

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

CERTIFICATE OF ANALYSIS 47544

Client:
Robson Environmental Pty Ltd
PO Box 112
Fyshwick
ACT 2609

Attention: Michael Robson

Sample log in details:

Your Reference:	3617-103,Yarralumla Brick Works
No. of samples:	3 Paint Samples
Date samples received:	28/10/10
Date completed instructions received:	28/10/10

Analysis Details:
Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by:	4/11/10
Date of Preliminary Report:	Not issued
Issue Date:	3/11/10

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Accredited for compliance with ISO/IEC 17025.
Tests not covered by NATA are denoted with *.

Results Approved By:

Rhian Morgan
Reporting Supervisor

Envirolab Reference: 47544
Revision No: R 00

NATA
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Client Reference: **3617-103,Yarralumla Brick Works**

Lead in Paint				
Our Reference:	UNITS	47544-1	47544-2	47544-3
Your Reference	-------	3617-103-P1a	3617-103-P1b	3617-103-P1c
Type of sample	-------	Paint	Paint	Paint
Lead in paint	%w/w	5.5	6.4	5.9

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Client Reference: 3617-103,Yarralumla Brick Works

Method ID	Methodology Summary
Metals.4	Digestion of Paint chips for Metals determination by ICP-AES/MS.

Envirolab Reference: 47544
Revision No: R 00

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Client Reference: 3617-103,Yarralumla Brick Works

QUALITY CONTROL Lead in Paint	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Lead in paint	%w/w	0.05	Metals.4	<0.05	47544-1	5.5 || 5.7 || RPD: 4	LCS-1	98%

Client Reference: 3617-103,Yarralumla Brick Works

Report Comments:

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job
Asbestos counting was analysed by Approved Counter:	@ERROR
Asbestos counting was authorised by Approved Signatory:	@ERROR

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NA: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike: A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample): This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

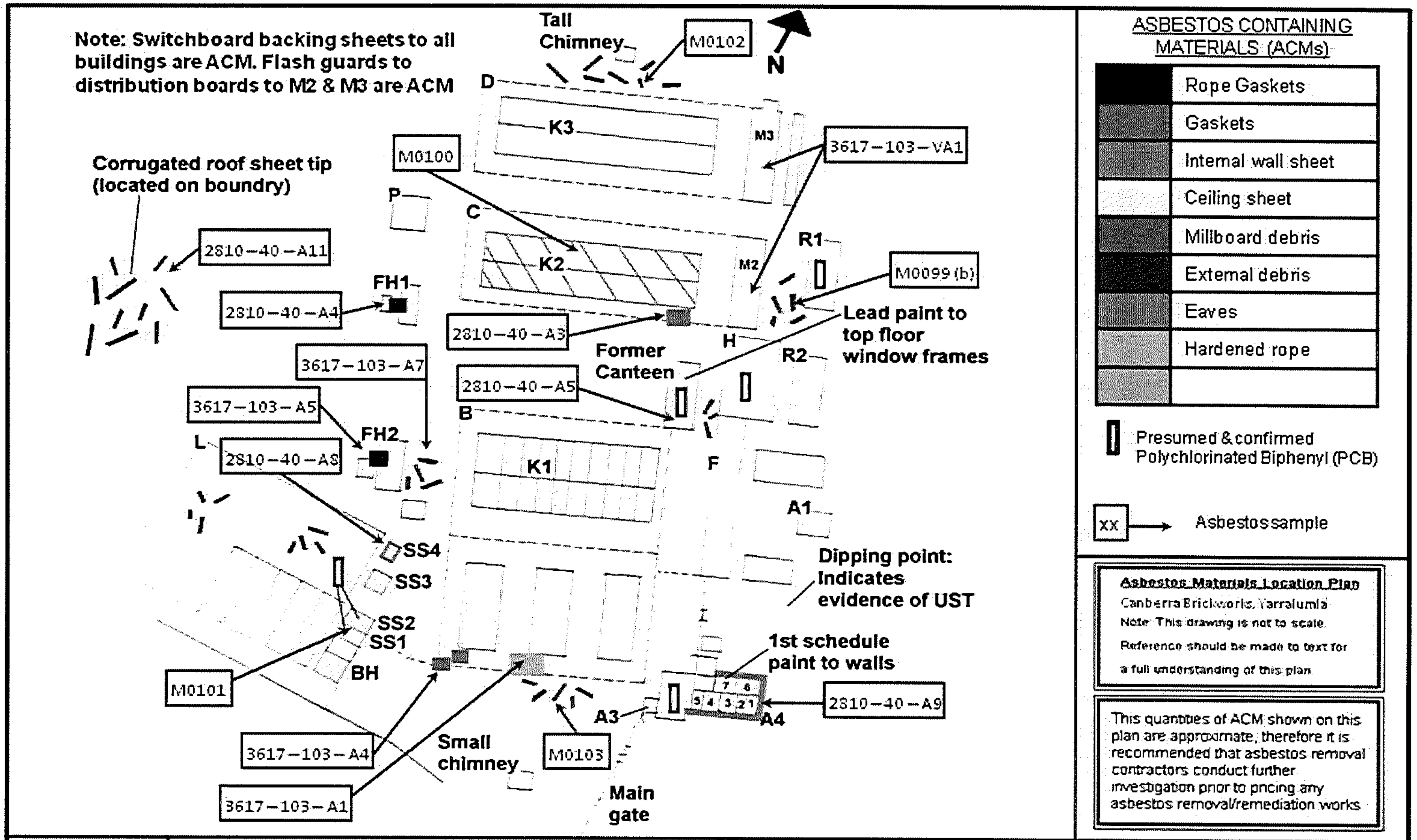
Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batched of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes and LCS: Generally 70-130% for inorganics/metals; 60-140% for organics and 10-140% for SVOC and speciated phenols is acceptable.

Envirolab Reference: 47544
Revision No: R 00

NATA TECHNICAL COMPETENCE

15.2 APPENDIX B – Plans



SITE ADDRESS	Canberra Brickworks, Yarralumla, ACT 2600			Refer to Section 2.4 - Table 1B for presumed ACMs and Section 3.2 for exclusions
SURVEY DATE	27 February 2012	FLOOR	Ground & first floor	
CLIENT	ACT Property Group			

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15.3 APPENDIX C – Hazardous Material Management Information

ASBESTOS

Some 3000 products have been manufactured using asbestos, of which cement sheeting, pipe insulation, textiles, gaskets, vinyl floor tiles and fire door cores are the most commonly encountered. The mineral asbestos (i.e. Crocidolite, Chrysotile and Amosite and other forms) is classified by the National Occupational Health and Safety Commission as a Category 1 carcinogen. If respirable asbestos fibres are inhaled they may cause an inflammatory response, which in turn may lead to asbestosis (scarring of the lung), mesothelioma (cancer of the pleura or peritoneum) or lung cancer.

It is illegal under Commonwealth, State and Territory legislation to manufacture asbestos building materials or to reuse asbestos products.

Asbestos sheeting or 'fibro' is bonded into a stable matrix and as such does not present an exposure hazard unless it is cut, abraded, sanded or otherwise disturbed.

Any type of work on or removal of sheeting has the potential to release asbestos fibres, which in turn can be inhaled. It is therefore critical to maintain the integrity of these materials. If damage is inevitable through physical impact, the asbestos material must be removed or otherwise encapsulated with reference to the *Code of Practice for the Safe Removal of Asbestos* [NOHSC:2002(2005)] and ACT WorkSafe and ACT Planning and Land Authority requirements.

LEAD PAINT

Introduction

Lead in paint (as lead carbonate) is found extensively in homes and commercial and industrial buildings built pre-1970. Although Australian industry has generally phased out lead content in paint, levels of below 1 percent are still permitted and industrial application of high-lead paint to residential/commercial dwellings may still continue.

Lead-base paint may be a health issue if it becomes mobile in the environment or if ingested. For this reason sealing or safe removal of paint is strongly recommended particularly where it is flaking or exposed to the elements.

Assessment Criteria

Lead paint is defined by the Australian Standard (AS 4361.2 – 1998 *Guide to lead paint management Part 2: Residential and Commercial buildings*) as a paint or component coat of a paint system containing lead or lead compounds, in which the lead content (calculated as lead metal) is in excess of 1.0% by weight of the dry film as determined by laboratory testing.
Further, the Standard for the Uniform Scheduling of Drugs and Poisons (National Drugs and Poisons Schedule Committee July 2000) classifies paints having more than 0.25% lead as First Schedule Paint and prohibits their manufacture, supply or use.

It has been shown that the dust generated from dry sanding or abrasive blast cleaning of paints with a lead concentration of 0.25% can have sufficient content to produce exposure levels that exceed those that define a 'lead task' in NOHSC 1012.

Therefore paints with a lead concentration greater than 0.25% (if they are to be removed) must be treated as a lead paint (i.e. subject to the regulations in NOHSC 1012).

Lead Paint Management and Recommendations

The following information uses Australian Standard (AS 4361.2 – 1998) as the primary reference. Lead paint and first schedule paints in residential and commercial premises may be managed in one of four ways:

- Leave undisturbed;
- Stabilised (i.e. over painting or encapsulation);
- Abated (i.e. removed); or
- A combination of the three management options may be required.

Should removal be chosen, a high degree of skill, preparation and risk minimisation is required to avoid lead exposure, as dry sanding of lead levels as low as 0.25% can generate high lead dust. Therefore the Wet Scraping and Wet Sanding methods are amongst the safest methods available.

Strict adherence to the guidelines described in AS 4361.2 – 1998 will best ensure minimisation of risk. During this process personal protective equipment and waste containment equipment is essential and children, pregnant women and persons not directly engaged in the process should not be present. General workers may undertake this process providing they adhere strictly to the guidelines, however, a specialist lead paint removal contractor is recommended for extensive paint removal works.

Where remediation is required it is important to minimise ongoing maintenance costs by ensuring that the works are undertaken by a professional who is able to give a significant time guarantee of the painted surfaces at the completion of the works. The following website lists contactors by postcodes that have been included based on their indicated skills and training in working safely with lead paint. http://www.lead.org.au/paintersall.html These contractors should however be assessed by current performance prior to engagement.

Lead Paint Removal and Containment

- Avoid dry sanding or any actions which create dust;
- Place ground sheets around the work area ensuring all paint debris are contained. Remove accumulated debris frequently to prevent its spread into surrounding areas using a vacuum cleaner fitted with a HEPA filter;
- Minimise the spread of debris, dust and fumes by avoiding dust-generating activities during windy conditions. Seal all windows and heating/cooling system duct registers to prevent dust or fumes from contaminating adjacent areas. Use negative air pressure for interior work;
- Use personal respirators according to AS/NZS 1715 [2009];
- Use disposable clothing; and
- Wipe down all surfaces using a wet cloth and dispose of all clothing, equipment and plastic used during paint removal as Hazardous Waste.

Responsibilities of Owners and Contractors

According to AS 4361.2 – 1998 owners of residences or commercial buildings that may contain lead should:

- Manage the property in such a manner as to effectively control any health risk to occupants, contractors or others;
- Ensure occupants are sufficiently informed about and protected from the hazards associated with lead paint; and
- If management work is to be undertaken, inform immediate neighbours about the nature of the work.

Contractors should:

- Obtain appropriate accreditation to undertake the proposed level of remedial work involving lead paint and have the required level of specialized training; and

- Undertake the contracted work in such a way as to protect the health and safety of employees, tenants and the general public.

SYNTHETIC MINERAL FIBRE

SMF refers to man-made mineral fibrous materials commonly used for their insulating and reinforcing properties. The amorphous (non-crystalline) materials include glass fibre, mineral wool and ceramic fibre products.

Discussion

Although glass fibre is classified as an irritant, levels of airborne fibreglass during routine occupation of the premises would be insignificant. During any large-scale installation or removal of fibreglass insulation, providing SMF fibre suppression measures as defined below are employed, exposure standards for SMF fibre would not normally be exceeded.

The following Risk Assessment is based on the requirements of the document:

- Worksafe Australia, Worksafe Australia, Sydney 1990, *Synthetic Mineral Fibres: National Standard and National Code of Practice.*

SMF Risk Assessment

According to Worksafe Australia 1990 (p 9) health risks associated with SMF are "significantly less potent ... than white asbestos (Chrysotile) fibres" and that "...the possibility of lung cancer is eliminated at an exposure standard (time weighted average) of 0.5 respirable fibres per millilitre of air for all types of synthetic mineral fibres...." (p V).

To reduce the possibility of skin, eye and upper respiratory tract irritation a maximum exposure standard of 2 milligrams per cubic metre of inspirable dust is recommended. These two standards are designed principally for the manufacture and end user industries in which significant dust clouds would be generated.

The same document also states: "The overall conclusion based on available animal experiments and epidemiology is that provided work is carried out in accordance with (NOHSC 1990), and compliance is maintained with the exposure standards, then there is a negligible health risk associated with exposure to SMF under present-day manufacturing and usage patterns."

Recommendations

Although of negligible health risk if undisturbed, it is strongly recommended that if fibreglass is to be removed or otherwise disturbed the following procedures and safety measures should be adopted.

- Workers wear personal protective equipment to minimise dust inhalation and irritation to eyes and skin. The correct use of filter masks, goggles, gloves and disposable coveralls should prevent significant irritation;

- Care should be taken to ensure minimal SMF or nuisance dust enters the occupied areas below the work area;

- If significant contamination of the occupied areas is likely, dust control measures such as the use of plastic screens and an effective extraction fan should be positioned to prevent such an occurrence; and

- Disposable suits and any removed insulation are to be appropriately bagged and disposed of as general waste.

PCBs

PCB is the common name for Polychlorinated Biphenyls. PCBs range in appearance from colourless, oily liquids to more viscous and increasingly darker liquids, to yellow then black resins, depending on chlorine content of the PCB.

Discussion

The major use of PCBs in the electrical industry has been as an insulating fluid inside transformers and capacitors. These transformers and capacitors have ranged in size from the very large transformers typically used by electrical supply companies, to the small capacitors used in commercial products. Capacitors containing PCBs were installed in various types of equipment including fluorescent light fittings during the 1950's, 60's and 70's.

Risk Assessment

Small quantities of PCBs are usually found in sealed containers known as capacitors. PCB-containing capacitors are unlikely to pose a health risk, unless they become damaged and leak.

PCBs can enter the body in three ways:

- absorption through the skin
- inhalation of PCB vapour
- ingestion, e.g. by contamination of food or drink

The most commonly observed symptom in people exposed to high levels of PCBs is a condition known as chloracne. This is a severe, persistent acne-like rash due to repeated and prolonged contact of PCBs with skin. This condition has also occurred in people who have accidentally ingested PCBs orally.

Very high exposure to PCBs may also cause liver damage and damage to the nervous system.

There is the possibility that PCBs may cause cancers.

The likelihood of becoming sick from PCB exposure increases with the length of time and the amount of material that a person might come in contact with.

Recommendations

Care must be taken when handling damaged capacitors to ensure that spillage does not occur. The person handling the damaged capacitor should take the following precautions:

- put on personal protective equipment and clothing before removing damaged or leaking components
- wear gloves that are made of materials that are resistant to PCBs, such as Viton, polyethylene, polyvinyl alcohol (PVA), polytetrafluoroethylene (PTFE), butyl rubber, nitrile rubber, or neoprene
- **do not** use gloves made of polyvinyl chloride (PVC) or natural rubber (latex)
- use disposable gloves
- wear disposable overalls made of Tyvek or made of materials with similar chemical resistant properties
- when working with overhead equipment (e.g. Fluorescent light fixtures), wear a full face shield and appropriate hair protection
- wash any non-disposable contaminated equipment with kerosene and collect the kerosene for disposal as a PCB contaminated solvent
- if PCB vapours are suspected (e.g. PCB leaks onto a hot surface in a confined space), wear a twin cartridge type respirator suitable for chlorinated vapours
- always ensure adequate ventilation
- Note: PCBs do not vapourise readily at room temperature
- do not smoke
- after handling PCBs, employ good personal hygiene practices, including washing hands in warm, soapy water before eating, drinking, smoking, handling food, or using the toilet

Disposal

It is advisable to check the current regulations in effect with the authority responsible for environmental protection authority in your State or Territory. In the ACT this is WorkSafe ACT and Environment Protection and Heritage.

Note: The absence of a capacitor from the ANZECC information booklet is not a guarantee that the capacitor does not contain PCBs: If there is any doubt as to whether a capacitor or any electrical equipment contains PCBs, treat the equipment as if it does contain PCBs.

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OZONE DEPLETING SUBSTANCES

Introduction

Ozone depleting substances (ODS) are compounds that contribute to stratospheric ozone depletion. They are widely used in refrigerators, air-conditioners, fire extinguishers, in dry cleaning, as solvents for cleaning, electronic equipment and as agricultural fumigants.

Ozone depleting substances (ODS) include:

- Bromochloromethane (BCM)
- Carbontetrachloride (CCl_4)
- Chlorofluorocarbons (CFCs)
- Halons
- Hydrobromofluorocarbons (HBFCs),
- Hydrochlorofluorocarbons (HCFCs),
- Methylbromide (CH_3Br)
- Methylchloroform (CH_3CCl_3)

ODS are generally very stable in the troposphere and only degrade under intense ultraviolet light in the stratosphere. When they break down, they release chlorine or bromine atoms, which then deplete the ozone.

Ozone Protection Strategy

The Australian Strategy for Ozone Protection calls for personnel who handle, install, service, commission and decommission and maintain commercial and industrial refrigeration and air-conditioning equipment to be accredited, licensed, registered to work with ozone depleting substances.

Best Management Practices

In Australia a 'Code of Good Practice' has been drawn up with the objective of assisting the reduction of emissions into the atmosphere of substances that deplete the ozone layer and contribute to global warming.

The Australian Refrigeration and Air-conditioning Code of Good Practice (HB 40.1 – 2001) recommends best practice for the maintenance, design, servicing, labelling and manufacture of refrigeration and air conditioning systems towards this objective.

Legislation

Under the Federal Government's *Ozone Protection and Synthetic Gas Management Act 1989* and its *Ozone Protection and Synthetic Gas Legislation Amendment Bill 2003* it is illegal to vent an ODS (Scheduled Substances) to the atmosphere.

General Maintenance

- All refrigeration and air-conditioning plant should be regularly inspected for traces of leaking refrigerant and/or oil, and for signs of leak-indicating dye.
- Whenever a system is charged with refrigerant and/or lubricant, the service person must clearly label the system with the refrigerant/lubrication type; name of service organization; and date of service. In addition, the ASHRAE/ARI refrigerant designated R number shall be clearly displayed.
- A service person should be aware of the possibility that a refrigeration or air-conditioning system may have been incorrectly charged or incorrectly labelled. The type of refrigerant contained in the system must therefore be first established by checking the temperature/pressure relationship or by using other tests to verify that the labelling is correct.

Advice to Equipment Users

- Users are advised that persons who service refrigeration and air-conditioning equipment are required by legislation to observe the Code of Good Practice and not to 'top-up' or 'charge' systems known to be leaking refrigerant, or to service equipment unless it can be returned into service in a leak-free condition.
- If a user does not have trained staff to undertake service or maintenance work, then it is recommended that a routine maintenance agreement for their plant be undertaken with a reputable service organization.
- All users should monitor the operation of their installation weekly and call the service person immediately if any abnormal condition is found.
- When a refrigeration system contains in excess of 50 kg of refrigerant, that system should be leak tested on a quarterly basis.

Leak Testing

- Various methods may be used for leak-testing, e.g. electronic leak detectors, halide lamp and or ultraviolet lamp.
- Only a non-controlled refrigerant mixed with a pressurising substance such as dry nitrogen should be used to leak test refrigeration and air-conditioning systems.
- Where an air-conditioning or refrigeration system is found to be leaking and needs to be repaired, the vapour and/or liquid must first be recovered from the leaking system.

- Where pressurisation testing has determined that an air-conditioning or refrigeration system is not leaking, moisture and non-condensables must be evacuated from the system using dry nitrogen as the moisture absorber and either the deep or triple evacuation methods.

- All refrigerants shall be recovered and either recycled, reclaimed or held for disposal in an approved manner.

- It is highly recommended that a refrigerant charge monitor or leak detector be installed to alert equipment owners/operators of a refrigerant leak.

Recovery, Recycling and Disposal of Refrigerants

- It is highly recommended, and in some cases mandatory, for recovery and/or recycling equipment to be used for the removal and recovery of refrigerant during service.

- To avoid the danger of mixing different refrigerant types, the receiving containers shall be identified by the correct colour coding and labelling and shall only be used for the refrigerant type that is being transferred. The recovery containers shall conform to AS 4484-2004, *'Gas Cylinders for Industrial, Scientific and Refrigerant use – labelling and colour coding'*.

- As chillers have large internal volume, it is important that all refrigerant vapour be recovered. A chiller at atmospheric pressure can still hold many kilograms of refrigerant vapour after the liquid has been removed.

- When recovering refrigerant from a chiller the refrigerant should be recovered until the internal system pressure is reduced to 3 kPa absolute for low-pressure systems (e.g., R-11) and 70 kPa absolute for positive pressure systems (e.g., R-12 and R-22). The internal pressure should then be taken up to atmospheric pressure with dry nitrogen if the chiller is to be opened. This will prevent moisture–laden air entering the system, which could lead to contamination and corrosion.

Disposal of Refrigerants

- Unusable or surplus fluorocarbon refrigerant shall not be discharged to the atmosphere, but shall be returned to a supplier.

- Empty residual refrigerant in a disposable container shall be recovered and the container disposed of at a recycling centre.

- The utmost care must be taken to avoid mixing different types of refrigerants, as separation may be impossible and large quantities of refrigerant may be rendered unusable.

Handling and Storage

Losses of refrigerant to the atmosphere can occur during the handling and storage of refrigerant containers. Service persons have a duty of care to avoid such losses.

- There are numerous hazards associated with the storage of refrigerant. These include asphyxiation in confined space due to leakage from refrigerant containers; and fire, which may overheat and explode refrigerant containers or decompose refrigerant into toxic substances.

Alternative Refrigerants and Lubricants

- With the introduction of HFC alternative refrigerants, alternative lubricants need to be considered to ensure system reliability. Some of these alternative lubricants tend to exhibit greater hygroscopicity than mineral oils, so care must be taken to ensure they are kept in sealed containers at all times.

- Care must be taken to ensure that all components used in the refrigeration/air-conditioning system are compatible with the new refrigerant and lubricant.

Recovery of Fluorocarbons Mixed with other Refrigerants

A number of different refrigerants and refrigeration mixtures have been used to replace or to 'top up' fluorocarbon based refrigerants in refrigeration and air-conditioning systems.

In many cases the equipment in question may not be labelled to indicate that hydrocarbon or hydrocarbon mixtures have been used and as the operating pressures of these replacement refrigerants are usually similar to those of the original refrigerant, their identification in the field is extremely difficult.

- It is not safe therefore to recover flammable refrigerant (hydrocarbon) using equipment designed only for non-flammable refrigerants such as R-12 and R-134a.

- Should it be suspected that refrigeration or air-conditioning system contains an unidentified mixture or, if on asking the owner, examining the labels, and/or detecting instruments indicate that a hydrocarbon/fluorocarbon mixture or any other non-standard mixture of refrigerant may be present; the following procedure should be followed:

- If a hydrocarbon or flammable mixture that contains hydrocarbon is suspected, use only equipment designed for the recovery of flammable gasses and recover the refrigerant into a specially marked container.

- In the case of refrigerant mixtures, it is not advisable to use recovery equipment as many mixtures have very high condensing pressures, which could result in equipment failure and/or injury to persons operating, or near the equipment.

- The safest method of recovery is to use an evacuated and preferably chilled container to depressurise the system.
- Label the container to show that it contains a mixture or the suspected composition, if known, and deliver it to a supplier for recycling.
- Purge the residual gas from the system with dry nitrogen before proceeding with any repairs

Health Effects

In addition to causing environmental degradation certain ozone depleting substances may present a risk to human health when they are improperly handled or released in to a poorly ventilated area.

Inhalation
The most significant exposure route for humans is through inhalation. Refrigerant gases displace oxygen in the air making breathing difficult.

Overexposure can cause central nervous system depression and oxygen deficiency. Effects of overexposure may include light-headedness, giddiness, shortness-of-breath, headaches, and in extreme cases, irregular heartbeats, cardiac arrest, asphyxiation and death.

Symptoms of overexposure at lower concentrations may include transient eye, nose and throat irritation.

Skin Contact
Contact with rapidly released refrigerant gas may cause frostbite. Symptoms of frostbite may include changes in skin colour to white or greyish yellow.

Other direct dermal contact may result in skin de-fatting, dryness, irritation or contact dermatitis.

Standard work clothes provide adequate protection of the skin but it is recommended that lined butyl gloves and goggles be used whenever handling liquid refrigerants.

Eye Contact
Eye contact with rapidly released refrigerant or air-conditioning gas may cause severe frostbite damage to eyes and eyelids. Eye irritation may occur if exposure occurs at lower concentrations.

FUEL STORAGE FACILITIES

In the ACT the management of fuel storage tanks is regulated by ACT WorkSafe who administers the *Dangerous Substances Act 2004* and the *Dangerous Substances (General) Regulation 2004.*

Heating oil and other petroleum products are classified as a Dangerous Substance under the ACT Dangerous Substances Act 2004.

The Dangerous Substances (General) Regulation 2004 – Division 2.4.2-233 *Decommissioning* (applies to a container used to store a dangerous substance) states the following:

'The container is thoroughly cleaned so that the container is in the condition it would be in if it had never contained the substance';

This would be difficult to achieve therefore it is advantageous to remove the tank.

In the ACT, Environment Protection and Heritage prefers underground fuel storage tanks be removed once they are no longer in use, unless there are extenuating circumstances i.e. their removal undermines permanent infrastructure. This is also emphasized in the Code of Practice for *The Removal and Disposal of Underground Petroleum Storage Tanks* (Australian Institute of Petroleum CP22 –1994).

Further, the ACT Environment Protection Authority (Environment Protection and Heritage) which administers the Environment Protection Act 1997 which contains contaminated land provisions responsible for the development of policy and guidelines to facilitate best practice when it comes to the management of contaminated land.

Environment Protection and Heritage deems all sites known to have had fuel storage facilities as potentially contaminated until investigated and assessed and shown to be free of contamination.

Based on this information and for the long-term management of the sites with fuel storage tanks, Robson Environmental Pty Ltd recommends that the USTs be removed in accordance with the requirements of ACT WorkSafe and Environment Protection and Heritage.

Removal of the UST does require approvals from relevant ACT Government agencies which include:

- ACT Planning and Land Authority (ACTPLA)
- ACT WorkSafe - Dangerous Goods Unit.

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16 GLOSSARY

ACM	*See asbestos containing material*
Air monitoring[1]	Air Monitoring means airborne asbestos fibre sampling to assist in assessing exposures and the effectiveness of control measures. Air monitoring includes exposure monitoring, control monitoring and clearance monitoring. *Note: Air monitoring should be undertaken in accordance with the Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres [NOHSC:3003 (2005)]*
Airborne asbestos fibres[2]	Any fibres of asbestos small enough to be made airborne. For the purposes of monitoring airborne asbestos fibres, only respirable asbestos fibres (those less than 3µm wide, more than 5µm long and with a length to width ratio of more than 3 to 1) are counted.
Amosite	Grey or brown asbestos
AR	*See Asbestos Register*
Asbestos Containing Material	Any material, object, product or debris that contains asbestos.
Asbestos Register	Inventory of ACM by type, form, location, risk and required action.
Asbestos Removalist[2]	A competent person who performs asbestos removal work. *Note: an asbestos removal licence is required in all State and Territory jurisdictions for friable ACM.*
Asbestos Survey and Management Plan	Document covering the identification, risk evaluation, control and management of identified asbestos hazards, developed in accordance with NOHSC: 2018(2005).
Asbestos[2]	The fibrous form of mineral silicates belonging to the serpentine and amphibole groups of rock-forming minerals, including actinolite, amosite, anthophyllite, chrysotile, crocidolite, tremolite or any mixture containing one or more of the mineral silicates belonging to the serpentine and amphibole groups.
Asbestos–cement (AC)[2]	Products consisting of sand aggregate and cement reinforced with asbestos fibres (e.g. asbestos cement pipes and flat or corrugated asbestos cement sheets).
ASCC	*See Safe Work Australia Council*
Bonded asbestos	ACM that is bonded into a stable matrix and cannot be reduced to a dust by hand pressure.
Chrysotile	White asbestos
Clearance inspection[2]	An inspection, carried out by a competent person, to verify that an asbestos work area is safe to be returned to normal use after work involving the disturbance of ACM has taken place. A clearance inspection must include a visual inspection, and may also include clearance monitoring and/or settled dust sampling.

Clearance monitoring[2]	Air monitoring using static or positional samples to measure the level of airborne asbestos fibres in an area following work on ACM. An area is 'cleared' when the level of airborne asbestos fibres is measured as being below 0.01 fibres/mL.
Competent person[2]	A person possessing adequate qualifications, such as suitable training and sufficient knowledge, experience and skill, for the safe performance of the specific work.
Control monitoring[2]	Air monitoring, using static or positional to measure the level of airborne asbestos fibres in an area during work on ACM. Control monitoring is designed to assist in assessing the effectiveness of control measures. Its results are not representative of actual occupational exposures, and should not be used for that purpose.
Crocidolite	Blue asbestos
Exposure monitoring	Air monitoring in the breathing zone to determine a person's likely exposure to a hazardous substance. Exposure monitoring is designed to reliably estimate the person's exposure, so that it may be compared with the National Exposure Standard.
HMSMP	*See hazardous material survey and management plan*
In situ[2]	Fixed or installed in its original position, not having been removed.
Inaccessible areas	Areas which are difficult to access, such as wall cavities and the interiors of plant and equipment.
Licensed Class A Asbestos Assessor	Person who is qualified to undertake the identification and assessment of asbestos and provide recommendations on its safe management.
Licensed Class B Asbestos Assessor	Person who is qualified to undertake the identification of asbestos.
Membrane	A flexible or semi-flexible material, which functions as the waterproofing component in a roofing or waterproofing assembly.
NATA	National Association of Testing Authorities (NATA)
NOHSC *(now SWA)*	National Occupational Health and Safety Commission (*now known as Safe Work Australia)*
Safe Work Australia Council (SWAC)	A council that provides a national forum for State and Territory governments, employers and employees to consult and participate in the development of policies relating to OHS and workers' compensation matters, and promote national consistency in the OHS and workers' compensation regulatory framework.
SWMS	Safe Work Method Statement
UST	Underground Storage Tank (fuel)

1. Definition sourced from: NOHSC: 2018(2005).
2. Definition sourced from: NOHSC: 2002(2005).

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17 REFERENCES

Australian Capital Territory Parliamentary Counsel (2006), *Asbestos Legislation Amendment Act 2006 [A2006-16]*, Canberra, Australia.

ANZECC 1997, *Identification of PCB-Containing Capacitors; An information Booklet for Electricians and Electrical Contractors;*

Code of Practice for the Management and Control of Asbestos in Workplaces [NOHSC: 2018 (2005)];

Dangerous Substances Act 2004;

Standards Australia, AS 4361.2 - 1998 *Guide to lead paint management, Part 2: Residential and Commercial Buildings*;

Standards Australia, HB 40.1 – 2001 *The Australian Refrigeration and Air-conditioning Code of Good Practice*; and

Work Safe Australia, Sydney 1990, *Synthetic Mineral Fibres: National Standard and National Code of Practice;*

Environmental Excellence through Experience, Endeavour and Evaluation.

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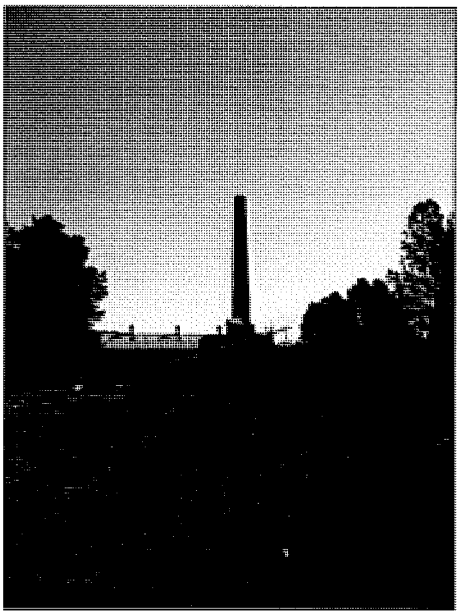
Ref: Q314404_EAR_Phase 1_20100518.docx

Proposal for a Phase 1 Environmental Site Assessment

Yarralumla Brickworks
Yarralumla ACT 2600
(Block 1 Section 102, Yarralumla)

May 2010



Client: Land and Property Services – ACT Government
GPO Box 777
Fyshwick ACT 2609

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LIST OF ATTACHMENTS

Attachment A: Work Order and Terms and Conditions

1 INTRODUCTION

Robson Environmental Pty Ltd (Robson) is pleased to submit this proposal to Land and Property Services (LAPS) to undertake a Phase 1 Environmental Site Assessment (ESA) of the Yarralumla Brick Works, Yarralumla, ACT (Block 1 Section 102, Yarralumla), herein referred to as 'the site'.

2 BACKGROUND

Robson understands that the ACT Government is considering the redevelopment of the site for medium to high density residential purposes. The site has previously been used as a brickworks with associated quarry between 1913 to 1976. Since then the site has been used periodically as a tourist attraction (e.g. fire brigade display, veteran cars, train rides and an antique market) and more recently, occupied by tenants including, Thor's Hammer (a supplier of recycled and environmentally sustainable timbers) and artists.

Several previous environmental assessment reports have been prepared for the site including:

- Connell Wagner (2001) *The Old Canberra Brickworks and Environs Development Control Plan, Appendix F – Brickworks Contamination Report.* Connell Wagner reference C015 Final DCP Appendix F, dated 8 February 2001.
- Robson (2006) *Environmental Investigation – Audit Report, Yarralumla Brickworks, Sandford Street Complex, Block 1 Section 102 Yarralumla, Canberra Central ACT.* Robson report reference 3144_CL_EI Final_20061026, dated October 2006.
- Robson (2006) *Remediation Action Plan (Draft), Asbestos Dump, Yarralumla Brickworks, Block 1 Section 102 Yarralumla, Canberra Central ACT.* Robson report reference 3144_CL_RAP_20061109, dated November 2006.

More recently, Robson prepared a review of past site works and indicative costings for further assessment and remediation at the site which was presented in a report titled *Yarralumla Brickworks, Yarralumla ACT 2600 (Block 1 Section 102, Yarralumla) – Review of Past Site Works and Indicative Costings for Further Assessment and Remediation* (Robson report reference 314403_EAR_ESA Recs_20100512, dated 12 May 2010). In that report it was recommended that though a Preliminary (Phase 1) ESA had already been prepared by Connell Wagner in 2001, a new Phase 1 report would likely need to be prepared to satisfy the requirements of an Environmental Auditor for the following reasons:

- A new ESA would update the present understanding of site contamination considering the changes in site activities and potential environmental conditions since 2001; and
- To meet the specific requirements of NSW EPA (2000) *Guidelines for Consultants Reporting on Contaminated Sites.*

3 OBJECTIVES

The objectives of the project are to assess whether the activities conducted on the site have introduced contamination and provide comment on the suitability of the site for future use.

To achieve the above objective, Robson propose to undertake a Phase 1 ESA. The scope of work for the project is presented in Section 5.

4 DEFINITION OF A PHASE 1 ESA

An environmental assessment process is generally undertaken in investigative stages defined as Phases e.g. Phase 1, Phase 2 etc.

In simple terms, the Phase 1 assessment aims to define areas of the site (if any) that may require an intrusive investigation to further characterise the site for potential contamination.

The Phase 1 ESA for the site would be undertaken in accordance with the following ACT Environment Protection Authority (EPA) endorsed legislation and guidelines:

- ACT *Environment Protection Act 1997*;
- ACT *Environment Protection Regulation 2005*;
- ACT EPA (2009) *Contaminated Sites – Environment Protection Policy*;
- Australian and New Zealand Environment and Conservation Council (ANZECC 1992) *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites*;
- National Environment Protection Council (1999) *National Environment Protection (Assessment of Site Contamination) Measure 1999*; and
- NSW EPA (2000) *Guidelines for Consultants Reporting on Contaminated Sites*.

These guidelines make reference to Australian Standards and NSW EPA guidelines, which are specific to certain aspects of contaminated site assessment(s) e.g. waste and fuel tank assessment, and which may be applicable during the course of the proposed assessment.

5 PROPOSED SCOPE OF WORKS

Based on the available site background information, the Phase 1 ESA would include a site history review, followed by the preparation of an environmental report. Further detail of the proposed scope of works is presented in the following sections.

5.1 Site History Review

It is proposed that the site history review for the Phase 1 ESA would comprise the following:

- Title Search of current and historical records to identify past and present land uses which may identify potential contamination sources;
- Development Application review;
- A search of records held by the Office of Regulatory Services (ORS). These records may hold information regarding dangerous goods, dangerous substances, underground storage tanks (USTs) and licencing history;
- A 'Contaminated Land' search of the ACT EPA maintained Contaminated Sites Management Database (CSMD) and Contaminated Sites Geographic Information System (GIS);
- A Groundwater bore search;
- Review of underground services through the 'Dial before you Dig' service;
- A review of historical aerial photographs over the past fifty to sixty years;
- A review of available geological and hydrogeological maps;
- Interview persons who may be familiar with the site;
- A site walk-over; and

- A review of available previous environmental assessment reports.

5.2 Reporting

A Phase 1 ESA report would be prepared in accordance with the relevant sections of the NSW EPA (2000) *Guidelines for Consultants Reporting on Contaminated Sites*. The results of the Phase 1 ESA would include the identification of areas of environmental concern and the associated chemicals of potential concern. Recommendations for further assessment works if required would be presented.

6 TIMING

Robson is able to proceed with the Phase 1 ESA within five (5) days upon receipt of your written approval.

The Phase 1 ESA report would be available two (2) weeks after receipt of the search results. Please note that the ACT EPA database search normally takes five (5) working days, and the ACT ORS database search can take up to 28 working days.

7 PAYMENT SCHEDULE

Robson requires progress payments to be made against completed work and invoices clients on a fortnightly basis. Based on this, it is anticipated that an invoice would be issued at the completion of the historical searches, and following submission of the final report at the completion of the project.

8 COST ESTIMATE

Robson's cost estimate to undertake the proposed scope of work is [redacted] (excluding GST). A breakdown of the cost estimate is presented below and should be read in conjunction with Robson's *Terms and Conditions*, a copy of which are attached with this proposal.

Breakdown of Project Costs	[redacted]
Project Initiation and Project Management	
History Searches and Data Review	
(incl. aerial photographs, contaminated land search etc.)	
Field Work	
(Site inspection)	
Reporting	
Phase 1 ESA Report	
Total Fee (GST Exclusive)	

The cost estimate provided above is based on the following assumptions:

- Unrestricted access to the site can be obtained at the agreed time and without delay by Robson. Should delays outside of the control of Robson be incurred, then additional costs for standby and additional travel to the site would apply at Robson's standard schedule of rates which are as follows:

Principal Scientist	[redacted]
Senior Scientist / Engineer	

Project Scientist [redacted]

Environmental Scientist

Additional Costs

- The cost estimate allows for one (1) day of site time;
- Additional site time will not be undertaken without written approval from LAPS;
- All meeting attendance and additional follow up work out side the scope of this proposal will be charged at Robson's standard schedule of rates;
- This proposal remains valid for 90 days from time of issue;
- Interim reporting is not required; and
- Robson will provide one bound hardcopy and one electronic copy (on CD) of the final report to the client at the completion of the project.

9 CLOSING

Robson trusts that this proposal meets the requirements of Land and Property Services and we look forward to working with you on this project. Should you wish to engage Robson, please complete and forward the Work Order in Appendix 1 to Robson. If you have any questions regarding this proposal, please do not hesitate to contact the undersigned.

For and on behalf of Robson Environmental Pty Ltd

S McElroy

Stuart McElroy
Senior Environmental Scientist

Attachments
Attachment A: Work Order & Terms and Conditions

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Attachment A

Work Order and Terms and Conditions

WORK ORDER

Quote/Job Number	Q314404	**Total Amount (excluding GST)**	[redacted]
Client (including account number if applicable)	Land and Property Services		
Billing Address	GPO Box 777, Fyshwick, ACT 2609 Client PO:		
Phone			
Mobile			
Fax			
Email			
Description of works (the services)	Phase1 ESA		
Date of works			
Time			
Location of works	Yarralumla Brickworks Block 1 Section 102, Yarralumla		
Site contact (Name and Phone)			

I .... of .... authorise the above services in accordance with Robson Environmental Pty Ltd Quotation No.................... and I authorise payment of all bills related to such services up to but not exceeding the amount specified above. Please contact me directly at .... for authorisation of services that exceeds the amount specified above.

Signature:

Payment Terms: 14 Days from Date of Invoice

All costs incurred recovering monies owed will be at the Debtors expense.

Please refer to attached Terms and Conditions, with special reference to Item 3 "Terms of Payment"

Please return by Fax to 02 6239 5669 to ensure prompt commencement of services

Office Use Only			
Credit approved by		Authority to release report	
Date		Date	

Terms and Conditions

These are the *Terms and Conditions* upon which Robson Environmental Pty. Ltd. ("Robson") (as named below in Section 1.1(k) below) will quote and sell services.

1. Definitions and Interpretation

1.1 Definitions

In these *Terms and Conditions*, unless the context otherwise requires:

(a) "Application" in relation to a Client means the Thirty Day Commercial Credit Account Application signed by the Client, which refers to these *Terms and Conditions*.

(b) "Client" means the person named in the relevant Sales Invoice or Quotation.

(c) "GST" means the goods and services tax as imposed by the GST Law together with any related interest, penalties, fines or other charge.

(d) "GST Amount" means any Payment (or the relevant part of that payment) multiplied by the appropriate rate of GST.

(e) "GST Law" has the meaning given to that term in *A New Tax System (Goods and Services TAX) Act 1999*, or, if that Act does not exist for any reason, means any Act imposing or relating to the imposition or administration of a goods and services tax in Australia and any regulation made under that Act.

(f) "Payment" means any amount payable under or in connection with a Quotation or Sales Invoice including any amount payable by way of indemnity, reimbursement or otherwise (other than a GST Amount) and includes the provision of any non-monetary consideration.

(g) "Person" includes an individual, the estate of an individual, a body politic, a corporation, an association (incorporated or unincorporated) and a statutory or other authority.

(h) "Purchase Price" means the price for the goods set out in the relevant Quotation or Sales Invoice.

(i) "Quotation" means the form of Quotation submitted by "Robson" to the Client in which these *Terms and Conditions* are deemed to be incorporated.

(j) "Sales Invoice" means the sales invoice issued by "Robson" to the Client in which these *Terms and Conditions* are or are deemed to be incorporated.

(k) "Robson" in relation to any Quotation or Sales Invoice means Robson Environmental Pty. Ltd. ABN 55 008 660 900.

(l) "Tax Invoice" has the meaning given to that term by the GST Law.

(m) "Taxable Supply" has the meaning given to that term by the GST Law.

1.2 Interpretation

(n) Any special conditions specified on a Quotation or Sales Invoice shall, to the extent they are inconsistent with these *Terms and Conditions*, take precedence over these *Terms and Conditions*.

(o) Words importing the singular shall include the plural (and vice versa).

2. Governing Terms and Conditions

These are the only Terms and Conditions that are binding upon "Robson" with the exception of those otherwise agreed in writing by "Robson" that are imposed by a statute and which cannot be excluded.

3. Terms of Payment

Payment by the Client for services delivered and accepted is due within 14 days of the invoice date. If the Client fails to make payment in accordance with this clause, all amounts owing by the Client to Robson as provided in the Sales Invoice shall immediately become due and payable. Each outstanding amount shall bear interest at the rate of 5% per month calculated from the point 30 days after which the invoice falls due until the day it is paid.

4. Inspection and Acceptance

The Client shall review all services upon delivery and shall within 48 hours of delivery give notice to "Robson" of any matter or thing by which the Client alleges that the services are not in accordance with the Client's order. Failing such notice, subject to any non-excludable condition implied by law, such as those in the *Trade Practices ACT 1974* (Cwth), the services shall be deemed to have been delivered to and accepted by the Client.

5. Quotations

(a) Unless previously withdrawn, a quotation is valid for 30 days or such period as stated in it. A quotation is not to be construed as an obligation to supply services but merely an invitation to treat and no contractual relationship shall arise from it until the Client's order has been accepted in writing by "Robson".

(b) "Robson" shall **NOT** be bound by any conditions attaching to the Client's order or acceptance of a quotation and, unless such conditions are expressly accepted by "Robson" in writing, the Client acknowledges that such conditions are expressly negatived.

(c) Every quotation is subject to and conditional upon obtaining any necessary import, export or other license.

6. GST

The parties agree that:

(a) Each party will comply with its obligations under the Trade Practices Act 1974 when calculating the amount of any payment and the amount of any relevant Payments will be adjusted accordingly.

(b) If the whole or any part of any Payment is the consideration for a Taxable Supply for which the payee is liable to GST, the payer must pay to the payee an additional amount equal to the GST Amount, either concurrently with that Payment or as otherwise agreed in writing.

7. Passing of Property and Risk

(a) Property in the services supplied by "Robson" to the Client under these *Terms and Conditions* shall not pass to the Client until those services have been paid in full.

(c) The Client and "Robson" agree that the provisions of this clause apply notwithstanding any arrangement under which "Robson" grants credit to the Client.

8. Supply

"Robson" reserves the right to suspend or discontinue services to the Client without being obliged to give any reason for its action.

9. Part Deliveries

"Robson" reserves the right to make part delivery of any order and each part delivery shall constitute a separate sale of services upon these *Terms and Conditions*. A part delivery of an order shall not invalidate the balance of an order.

10. Manufacturers' Changes

Where "Robson" is acting as an agent for a Manufacturer or Supplier, "Robson" shall not be liable for any alteration or variation in the goods made by this manufacturer or the supplier.

11. Contingencies

Any charge, duty, impost or other expenditure which is not applicable at the date of Quotation or Sales Invoice but which is subsequently levied upon "Robson" in relation to a Quotation or Sales Invoice as a result of the introduction of any legislation, regulation or governmental policy, shall be to the Client's account.

12. Force Majeure

If the performance or observance of any obligations of "Robson" is prevented, restricted or affected by reason of a force majeure event including strike, lock out, industrial dispute or any other cause beyond the reasonable control of "Robson", "Robson" may, at its absolute discretion give prompt notice of that cause to the Client. On delivery of that notice "Robson" is excused from such performance or observance to the extent of the relevant prevention, restriction of affection.

13. Events Beyond Robson Control

Stand down time due to inclement weather, progress of services by others or any other situation beyond our control will be charged at our normal or quoted daily rate. All incidental costs incurred during stand down time due to events beyond our control will also be passed on to the Client at our normal rate.

14. Default of the Client

If these *Terms and Conditions* are not strictly observed by the Client, "Robson" may at its absolute discretion, refuse to supply services to the Client and "Robson" shall not be liable to the Client for any loss the Client may sustain as a result of such refusal.

The cost of collection of any monies due and payable by the Client, including the fees of any mercantile agent or lawyer engaged by "Robson" shall be payable by the Client.

15. Clients Cancellation

Unless otherwise agreed in writing, the Client shall have no right to cancel an order that has been accepted by "Robson". If a right of cancellation is expressly reserved to the Client, such right of cancellation must be exercised by notice in writing from the Client to Robson not later than 7 days prior to the estimated date of service. Unless otherwise agreed between the Client and Robson, upon cancellation prior to supply any deposit paid by the Client shall be forfeited to Robson.

16. Liability of Robson

Robson excludes all liability to the Client in negligence for acts or omissions of Robson, its employees, agents and contractors and all liability to the Client in contract for consequential or indirect loss arising out of or in connection with this Agreement.

1. The client acknowledges that:

a. Robson gives no warranty, condition, description, or representation in relation to the provision of services under this contract, expressly or implied by this contract or outside this contract; and

b. All warranties, terms and conditions in relation to the quality fitness of the services to be provided under this contract and of every other kind whether express or implied by use, statute or otherwise are, to the extent permitted by law, excluded.

2. Robson is not liable to the Client (or any third party) in contract or in tort or in any other way arising out of, or in connection with, or relating to:
   (a) The provision of services under this contract or any breach of these Terms and Conditions; or
   (b) Any fact, matter or thing relating to the provision of the services under this contract; or
   (c) Any error (whether negligent or in breach of contract or not) in information supplied to the client before or after the date of any report or advice provided to the client.

3. In the event that Robson is liable to the Client (or any third party) the total liability of Robson for loss or damage of every kind (including but not limited to any legal costs);
   (a) whether arising pursuant to this contract; or
   (b) out of or in relation to the provision of services under this contract, in tort or contract or in any other cause of action or in any way whatsoever,

   is limited to:
   (c) the amount paid by the Client to Robson under this contract at the date when such liability arises; or
   (d) the sum of A$ 50,000;

   whichever is the greater amount.

4. Robson is not liable to the Client (or any third party) for any economic loss or for any special or consequential damages, such loss or damage including but not limited to, losses or damage caused by delay, disruption, loss of product, loss of anticipated profit or revenue, loss of use of equipment or system, non-operation or increased expense of operation of other equipment or system, cost of capital, or cost of purchase or replacement equipment, services or power.

17. Alterations to Conditions

Robson may, at any time and from time to time, alter these *Terms and Conditions*.

18. Governing Law

These *Terms and Conditions* and any contract including them shall be governed by and construed in accordance with the laws of the Australian Capital Territory, and Robson and the Client submit to the non-exclusive jurisdiction of the Courts of the Australian Capital Territory.

19. Variations/Out of Scope Works

In the event that it becomes necessary for Robson to provide services beyond that originally anticipated by the parties, the parties agree that:

(a) any additional services so provided will be subject to the "Report Terms and Conditions";
(b) where possible, the parties will reduce the variation to writing;
(c) the services to be provided under the variation will be subject to the "Report Terms and Conditions" and Robson will be entitled to be paid for any additional work, whether or not the variation is in fact reduced to writing.

20. Reports

Annexed hereto and marked "Report Terms and Conditions" is a document that sets out the basis upon which a written report will be provided to you. These clauses form part of the contract between you and Robson.

Report Terms and Conditions

Hazardous Materials Report

1. While Robson has taken all care to ensure that this report includes the most accurate information available, it has been unable to examine any inaccessible material or material hidden from view. This report does not address any hazardous material that was inaccessible or hidden from view.

2. This report is based on the information obtained by Robson at the time of the building inspection. Robson Environmental will not update this report; nor take into account any event(s) occurring after or before the time that its assessment was conducted.

3. The report is limited by the physical constraints of the structure. Under normal construction practices some materials get "built in" or "randomly applied". These materials are therefore not readily accessible and can only

be exposed through demolition or damage to the structure or finishes. Access to a material may also be prevented or restricted by "in-service" or "operational equipment", or where to obtain access contravenes a relevant statutory requirement or code of practice. Consequently, while all reasonable care was taken in compiling this report no guarantee to its completeness can be given.

4. As both the range and use of manufactured products containing asbestos was extremely widespread, Robson cannot accept responsibility for any consequential loss or damage that results from non-recognition of a material that may later be established to contain asbestos fibre. For example, certain textured wall and ceiling finishes may contain small traces of asbestos fibre. *In situ,* textured finishes are often composed of assorted batches of product, or may have been repaired/patched at various times. It is therefore always a possibility that the textured finish samples collected may not always be representative of the entire texture finish coating.

5. Where hazardous material that is the subject of this report has been disposed of in a jurisdiction that does not have any known standard for the safe disposal of such material, Robson is unable to provide advice about compliance with safety standards.

Air Quality Report

1. While Robson has taken all care to ensure that this report includes the most accurate information available, samples were taken at certain times on the day or days indicated within the report and Robson is unable to comment on the air quality at other times.

2. The report is based on the information that Robson obtained from the sampling undertaken at the time(s) and day(s) stated. Robson will not update this report; nor take into account any event(s) occurring after or before the time that this assessment was conducted.

Contaminated Site Report

1. While Robson has taken all care to ensure that this report includes the most accurate information available, samples were taken from the location indicated within the report and Robson is unable to comment on the existence or otherwise of any contaminants otherwise within the site.

Report Reproduction

1. This report remains the property of Robson Environmental Pty Ltd ('Robson'). The person commissioning the report ('the client') is entitled to retain possession of it upon payment of Robson's fees or upon arrangements as to payment satisfactory to Robson having been made. The client may not photocopy or otherwise reproduce all or any part of this document without the prior written consent of Robson.

2. In the event that the client photocopies or otherwise reproduces all or any part of this report without the prior written consent of Robson then the client:

a) must immediately upon demand of Robson return to Robson the original (or, if more than one , all originals) and all photocopies or other reproductions of the report;
b) agrees to pay Robson any loss or damage suffered as a result of the breach by the client of this provision; and
c) agrees to indemnify Robson against any liability arising from the breach by the client of this provision.

Third Party Laboratories

While Robson has taken all care to ensure that this report includes the most accurate information available, where it uses test results prepared by other persons it relies on the accuracy of the test results in preparing this report. In providing this report Robson does not warrant the accuracy of such third party test results

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Environmental Excellence through Experience, Endeavour and Evaluation.

Robson Environmental Pty Ltd
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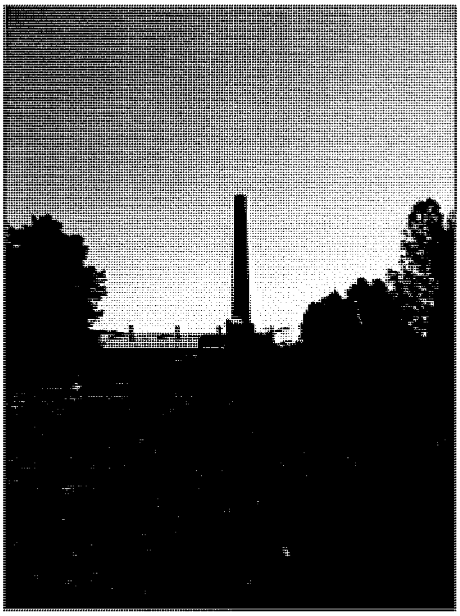
Ref: 314403_EAR_ESA Recs_20100512

Yarralumla Brickworks
Yarralumla ACT 2600
(Block 1 Section 102, Yarralumla)

Review of Past Site Works and Indicative Costings for Further Assessment and Remediation

May 2010



Client: Land and Property Services – ACT Government
GPO Box 777
Fyshwick ACT 2609

CERTIFICATE OF APPROVAL FOR ISSUE OF DOCUMENTS

Document No: 314403_EAR_ESA Recs_20100512 **Revision Status:** A1

Title: Yarralumla Brickworks
Yarralumla ACT 2600
(Block 1 Section 102, Yarralumla)
Review of Past Site Works and Indicative Costings
for Further Assessment and Remediation

Date of Issue: 12 May 2010

Client: Land and Property Services – ACT Government **Copy No:** One

	Name	Position	Signature	Date
Prepared by:	Stuart McElroy	Snr Environmental Engineer	S. McElroy	**12/05/2010**
Reviewed by:	Ben Kendon	Manager – EA&R Section	Ben Kendon	**12/05/2010**
Approved by:	John Robson	Director	John Robson	**12/05/2010**

RELEASE STATUS:

Confidential

DISTRIBUTION (Add additional pages as required)

Organisation	Attention	Copy No.	Actioned [1]
Land and Property Services – ACT Government	Peter Ozols	1	JR(**12/05/2010**) JR
Robson Environmental Pty Ltd	Ben Kendon	2	JR(**12/05/2010**) JR

[1] To be initialled and dated by the person who approves the issue of the documents.

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Figures

Figure 1: Site Locality Map
Figure 2: Detailed Site Plan

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Appendix A: Indicative Costings

EXECUTIVE SUMMARY

Mr Peter Ozols of Land and Property Services – ACT Government, commissioned Robson Environmental Pty Ltd (Robson) to prepare a brief of indicative recommendations and costings for further assessment and remedial works which may be required to make the site (Yarralumla Brickworks, Block 1 Section 102, Yarralumla) suitable (from an environmental perspective) for redevelopment for medium to high density residential purposes.

The Environment Protection Unit (EPU) has indicated that the site is potentially contaminated due to the past activities, and for redevelopment of the site for more sensitive land uses, would require further assessment, remediation, validation and independent environmental auditing.

Likely steps for the assessment, remediation and validation of the site would comprise the following:

- Undertake Preliminary (Phase 1) ESA and Reporting (1);
- Undertake a Hazardous Materials (HAZMAT) survey for the buildings and structures on the site (1);
- Review of Preliminary (Phase 1) ESA and HAZMAT survey (2);
- Preparation of Sampling and Analysis Quality Plan (SAQP) for the Detailed (Phase 2) ESA (1);
- Review of SAQP (2);
- Undertake Detailed (Phase 2) ESA and Reporting (1);
- Review of Detailed (Phase 2) ESA Works and Recommendations (2);
- Preparation of Remediation Action Plan (RAP) (1);
- Review of RAP (2);
- Undertake Remediation, Validation and Reporting (1);
- Review of Remediation and Validation Works (2);
- Preparation of Contaminant Management Plan (CMP) (if necessary) (1);
- Review of CMP (2);
- Preparation of Summary Site Audit Report (SSAR) and Site Audit Statement (SAS) (2);
- Review of SSAR and Site Audit Statement SAS (3); and
- Finalisation of SSAR and SAS (2).

Notes: (1) – Environmental assessor, (2) – Environmental Auditor, (3) – ACT EPA

A summary of the indicative activities, costings and timeframes for the assessment, remediation and validation of the site is provided in Table 1 on page 6.

Table 1: Indicative Activities, Costings and Timeframes for the Assessment and Remediation of the Yarralumla Brickworks

Item	Estimated Cost (Ex GST)	Estimated Timeframe
Preliminary (Phase 1) Assessment	[redacted]	6 weeks
HAZMAT Survey		6 weeks
Sampling and Analysis Quality Plan (SAQP)		2 to 3 weeks
Detailed (Phase 2) Assessment		6 to 10 weeks
Remediation Action Plan (RAP)		Up to 3 months
Remediation, Validation and Reporting		6 to 12 months
Contaminant Management Plan (CMP)		2 to 3 weeks
Environmental Auditing		Duration of project

1 INTRODUCTION

1.1 Background

Robson Environmental Pty Ltd (Robson) was commissioned by Mr Peter Ozols, on behalf of Land and Property Services – ACT Government, to provide a review of past site works and indicative costings for further assessment and remediation for the Yarralumla Brickworks, located in Yarralumla, ACT, 2600 (herein referred to as 'the site').

As requested, the objective of this report is to provide a summary of the previous environmental assessments undertaken on the site and, based upon the review, to provide indicative costings for further assessment and remedial works which would likely be required to make the site suitable (from an environmental perspective) for redevelopment for medium to high density residential purposes.

1.2 Site Identification and Land Uses

The legal property description for the site is recorded on the Australian Capital Territory Planning and Land Authority (ACTPLA) Land Divisions Map as Block 1 Section 102, Yarralumla, ACT. The location of the site is shown in **Figure 1**.

The site is zoned as 'CZ6 – Leisure and Accommodation Zone' as defined by the Territory Plan which is administered by ACTPLA. The site is currently partially occupied by Thor's Hammer, a supplier of recycled and environmentally sustainable timbers.

1.3 Site Description

The site is located on an approximately 9.6 hectare block and has two distinct areas – the eastern side which is defined by the area of the former quarry, and the western side which is defined by the area containing the former brickwork kiln and workshop buildings and other associated facilities. The location of the areas are shown in **Figure 2**.

The site is bounded by following:

- Lane Poole Place and Bentham Street to the north;
- Schomburgk Street and Woollis Street to the east and south; and
- The Royal Canberra Golf Course to the west.

In addition to the above, residential properties are located to the north and east of the site.

The site slopes to the west. It is understood that large areas of the site have been filled with either quarry tailings or brick waste generated from the brick manufacturing process.

1.4 Brief Site History

Prior to 1913, the site was rural land and formed part of the 'Yarralumla' property.

From 1913 to 1976 the site has been used as a brickworks facility – commonly referred to as the Yarralumla Brickworks and the Old Canberra Brickworks. In general, the brickworks have comprised a quarry in the eastern half of the site, and kilns and associated production facilities in the western half of the site. Several redevelopments of the site have occurred during the sites period of operation as a brickworks including demolition of old facilities, expansion works, construction of new kilns, construction of railway line in 1923, and conversion of kilns from coal to oil firing in 1967-1970.

From 1979 onwards the site has periodically been used as a tourist attraction (e.g. fire brigade display, veteran cars, train rides, antique markets) and occupied by tenants including, most recently, Thor's Hammer (a supplier of recycled and environmentally sustainable timbers) and artists.

2 PREVIOUS ENVIRONMENTAL SITE ASSESSMENTS

It is understood that the following environmental assessment reports have been prepared for the site:

- Connell Wagner (2001) *The Old Canberra Brickworks and Environs Development Control Plan, Appendix F – Brickworks Contamination Report*. Connell Wagner reference C015 Final DCP Appendix F, dated 8 February 2001.
- Robson (2006) *Environmental Investigation – Audit Report, Yarralumla Brickworks, Sandford Street Complex, Block 1 Section 102 Yarralumla, Canberra Central ACT*. Robson report reference 3144_CL_EI Final_20061026, dated October 2006.
- Robson (2006) *Remediation Action Plan (Draft), Asbestos Dump, Yarralumla Brickworks, Block 1 Section 102 Yarralumla, Canberra Central ACT*. Robson report reference 3144_CL_RAP_20061109, dated November 2006.

A summary of the assessment reports is provided below.

2.1 Connell Wagner (2001) – Brickworks Contamination Report

In 2001, Connell Wagner prepared a preliminary (Phase 1) environment assessment report which was titled *The Old Canberra Brickworks and Environs Development Control Plan, Appendix F – Brickworks Contamination Report* (Connell Wagner reference C015 Final DCP Appendix F, dated 8 February 2001).

The stated objectives of the Connell Wagner assessment were to:

- Determine the likely contaminating activities which have historically occurred on the site;
- The location, type and extent of contamination; and
- To recommend actions for additional studies to further assess the site contamination.

The assessment was based upon a desktop review of available historic information, a site walk-over, and interviews with persons who worked on the brickworks.

At the time of the assessment there were approximately 48 buildings and structures present on the site. These included brick firing kilns, chimney stacks, power house, sheds, fan-houses and workshops, many of which were in a dilapidated condition. No visible signs of plant stress, odour, disturbed or discoloured soil which may have been attributed to contamination were observed. Bare patches of soil were observed but these were attributed to be from other activities such as site vehicle movements and cleared areas.

The assessment identified a number Areas of Environmental Concern (AECs) on the site which were considered to be sources of on-site contamination, but did not identify any off-site contamination sources. The identified on-site AECs included:

- Coal and oil storage bunkers (NE5). This area was also initially used for the storage of coal and later the above ground storage of oil;
- Forklift shed (A6). This area was identified as a location for a 1000L underground storage tank (UST) and no records were available to suggest that the UST had been removed;
- Model railway workshops (M1 – M3). This area was also initially used for the storage of coal and later the above ground storage of oil;
- Septic tank (ST);
- Blacksmiths shop (M1 – M3);

- Explosive storage area (ES); and
- General fill on the site, potentially including imported fill and ash from the kilns, which may have been buried on site and possibly beneath site buildings; and
- An asbestos dump located in the west of the site near the septic tank.

The locations of the identified AECs are shown in **Figure 2**.

The assessment also identified the following above ground contaminants which were likely to exist:

- Asbestos building materials (e.g. roof sheeting, eaves, asbestos skin attached to kiln doors, electrical switchboards and insulation materials);
- Synthetic mineral fibre (SMF) used as insulation material for pipe-work;
- Polychlorinated Biphenyls (PCBs) in electrical transformers (particularly in the power house and workshop/machine bay area) and light fitting capacitors throughout the buildings;
- Lead-based paints applied to walls and ceilings of buildings; and
- Potentially contaminated site runoff water.

The identified potential contaminants of concern associated with the AECs were assessed to be hydrocarbons, BTEX (benzene, toluene, ethylbenzene and xylenes), polycyclic aromatic hydrocarbons (PAHs), phenols, metals, PCBs, asbestos, and explosives and associated chemicals.

The report also identified the potential for a former sheep dip to be present, but considered it likely that the location of sheep dips would be in the vicinity of the Yarralumla Woolshed (approximately 2km to the southwest), rather than being present on the site.

The report concluded that the site is probably suitable for a proposed commercial and recreational land-use provided the potential sources of contamination are investigated in accordance with regulatory requirements.

2.2 Robson (2006) – Environmental Investigation Report

In 2006, Robson prepared an environmental assessment report titled *Environmental Investigation – Audit Report, Yarralumla Brickworks, Sandford Street Complex, Block 1 Section 102 Yarralumla, Canberra Central ACT.* Robson report reference 3144_CL_EI Final_20061026, dated October 2006. The purpose of the investigation was to assess the potential environmental impact from the past site uses, and to establish budget requirements for environmental remediation and hazard abatement. Note that the reference to Sandford Street in the report's title is incorrect and should not have been included.

As part of the site history enquiries, Robson engaged the Environment Protection Unit (EPU) to undertake a 'Contaminated Land Search' of their records. The EPU noted that they had received and reviewed a copy of the Connell Wagner (2001) assessment report and supported the consultants recommendations that further assessment, remediation and validation would be required at the site, and that any further assessment would require an independent audit by an accredited third party environmental auditor. EPU also noted that the site is recorded on the Contaminated Sites Management Database (CSMD) and Geographic Information System (GIS) as a potentially contaminated site due to the past activities undertaken on the site. In addition, EPU advised that the site is not recorded on the Register of Contaminated Sites under Section 21(A) of the *Environment Protection Act 1997.*

The assessment also included the targeting of the AECs identified by the Connell Wagner (2001) assessment including:

- Explosive store (ES): 2 boreholes with 3 soil samples analysed for potential contaminants including metals (As, Cd, Cr, Cu, Hg, Pb, Ni and Zn), pH and explosive screen;
- Adjacent to the asbestos dump (AD): 3 boreholes with 4 soil samples analysed for potential contaminants including metals (As, Cd, Cr, Cu, Hg, Pb, Ni and Zn), PAH and asbestos;
- The forklift shed (A6): 2 boreholes with 2 soil samples analysed for potential contaminants including TPH, PAH and metals (As, Cd, Cr, Cu, Hg, Pb, Ni and Zn);
- The coal and oil storage area (NE5): 1 borehole and 1 soil sample analysed for potential contaminants including TPH, PAH and metals (As, Cd, Cr, Cu, Hg, Pb, Ni and Zn);
- Machinery and blacksmith shop areas (M1 – M3): 2 boreholes and 3 soil samples analysed for potential contaminants including TPH, BTEX and lead;
- Quarry tailing dump areas: 4 boreholes with 4 soil samples analysed for potential contaminants including TPH, PAH, OCPs, PCBs and metals (As, Cd, Cr, Cu, Hg, Pb, Ni and Zn);
- General areas: 7 boreholes and 7 soil samples analysed for potential contaminants including TPH, PAH, OCPs, PCBs and metals (As, Cd, Cr, Cu, Hg, Pb, Ni and Zn); and
- Kiln sand: 1 borehole and 1 soil sample analysed for potential contaminants including PAH and metals (As, Cd, Cr, Cu, Hg, Pb, Ni and Zn).

Note that the sampling plan implemented was of a limited scope only designed to assess potential environmental impacts from past uses, and does not meet the EPA requirements for a detailed site suitability assessment.

The results of the assessment included the following:

- Fill material was encountered at most sample locations across the site, with the fill containing brick fragments, minor slag and coal, and gravel material. The fill was variable in thickness with thicker sequences (2m to greater than 3m in thickness) being encountered in the area of the asbestos dump and in some of the sample locations in the quarry area. Robson noted that such fill may present a geotechnical challenge for any major redevelopment and therefore may have to be removed (or at least relocated);
- Petroleum hydrocarbon odours were noted to a depth of approximately 3m below ground level (m bgl) in borehole BH14 located to target the machinery and blacksmith shops (M1 – M3). Elevated concentrations of TPH fraction C_{10}-C_{36} (typical of diesel fuel) were recorded for several of the sub-surface soil samples collected in this area including a concentration of 10,550mg/kg which exceeds the adopted assessment criterion of 1,000mg/kg. It is presumed that the source of the contamination is likely to be related to the temporary storage of fuel which had been undertaken at this location (as indicated in Section 2.1, Connell and Wagner (2001) had identified that this area was initially used for the storage of coal and later the above ground storage of oil);
- The sample of kiln sand collected from with one of kiln buildings (K1 – K3) recorded an elevated concentration of lead (770mg/kg) which exceeded the adopted assessment criterion (300mg/kg). The sample was taken from the near surface, adjacent to a kiln wall which was coated with a glaze as a result of repeated firings. The source of the lead was unclear but was suggested to be either from the glaze or the kiln sands;

- No other contaminant concentrations exceeding the adopted respective assessment criteria were recorded for the soil samples collected and analysed during the assessment program. On this basis significant contamination from the targeted on-site sources was thought to be unlikely;
- The quantity of asbestos roof sheeting or other material in the dump was unknown; and
- Evidence of the septic tank (ST) and the coal and oil storage area (NE5) could not be indentified in the field, and a review of aerial photographs indicates that the coal and oil storage area (NE5) may have been removed from the site between 1972 and 1978 during the redevelopment of the Lane Poole residences.

Robson provided the following recommendations based of the analytical results and field observation:

- Remediate and validate the hydrocarbon impacted soils identified in the area of the machinery and blacksmith shops (M1 – M3);
- Undertake further sampling and assessment of the kiln sand for heavy metal contamination;
- Undertake further investigation to confirm the location of the septic tank (ST) and the time of removal of the coal and oil storage facility (NE5);
- Remediate the asbestos dump (AD) and remove asbestos building products from structures across the site;
- Ascertain the proposed future use for the site to allow the design of the appropriate environmental site assessment program to enable the sites suitability for the change of land use; and
- Ensure a suitable level of 'Duty of Care' is applied to all demolition and waste removal activities as required under the *ACT Occupational Health and Safety ACT 1989.*

2.3 Robson (2006) – Asbestos Dump Remediation Action Plan

In 2006, Robson prepared an environmental assessment report titled Robson (2006) *Remediation Action Plan (Draft), Asbestos Dump, Yarralumla Brickworks, Block 1 Section 102 Yarralumla, Canberra Central ACT* (Robson report reference 3144_CL_RAP_20061109, dated November 2006). The Remediation Action Plan (RAP) was prepared so as to facilitate the safe and effective removal of all waste from the asbestos dump area so that the waste no longer poses a risk to human health or the natural environment.

Three broad phases of work were proposed for the remediation of the asbestos dump including:

- Vegetation removal, including prior organisation of work permits and preparation of a Sediment and Erosion Control Plan and a Project Health and Safety Plan;
- Removal of hazardous materials and recyclable wastes, including waste classification and validation of the remediated area; and
- Site reinstatement, including importing validated fill material and revegetation.

Limited remedial works of the asbestos dump area were subsequently undertaken by Robson in June and July 2007, with approximately 50m^3 of asbestos waste being removed from the site. Remedial works were ceased when a 'Prohibition Notice' was served by a delegate of the ACT Planning and Land Authority (ACTPLA) on the grounds that the excavation work was being undertaken without development approval. At the time that work ceased it was assessed that potentially 500m^3 of asbestos waste remained in the dump area.

3 FUTURE ENVIRONMENTAL WORKS AND INDICATIVE COSTINGS

3.1 Introduction

As indicated in Section 2.2, the EPU have noted that the Yarralumla Brick Works is recorded on their CSMD and GIS as a potentially contaminated site due to the past activities undertaken on the site. The EPU has also noted that for redevelopment of the site, further assessment, remediation and validation would be required at the site, and that any further assessment would require an independent audit by an accredited third party environmental auditor.

The recommendations for the proposed future environmental works provided are based upon guidance provided in the following ACT EPA endorsed legislation and guidelines:

- ACT *Environment Protection Act* 1997;
- ACT *Environment Protection Regulation* 2005;
- ACT EPA (2009) *Contaminated Sites – Environment Protection Policy*;
- Environment ACT (2000) *ACT's Environmental Standards Assessment & Classification of Liquid & Non-Liquid Wastes*;
- National Environment Protection Council (1999) *National Environment Protection (Assessment of Site Contamination) Measure 1999*;
- NSW EPA (1994) *Guidelines for Assessing Service Station Sites*;
- NSW EPA (1998) *Guidelines for the NSW Site Auditor Scheme*;
- NSW EPA (1995) *Sampling Design Guidelines*; and
- NSW EPA (1997) *Guidelines for Consultants Reporting on Contaminated Sites*.

Due to the current limited understanding regarding the presence and distribution of contamination present on the site, numerous simplifications and assumptions have had to be adopted to facilitate the preparation of indicative costings for the proposed future works. These are identified in the discussions provided below.

3.2 Process, Timeframe and Indicative Costs for the Assessment and Remediation of the Site

In general, the objective of the proposed environmental assessment and remediation works is to demonstrate that the site is suitable (from a contamination point of view) for the proposed land use. Upon satisfactory demonstration it would be expected that an Environmental Auditor would be in a position to prepare and issue a Site Audit Statement (SAS) certifying that the site is suitable for the proposed land use.

The three general steps for the assessment and management of contaminated land comprise:

- Site assessment;
- Site remediation; and
- Audit of assessment and remediation.

These broad steps can further be elaborated into the following chronological steps:

- Undertake Preliminary (Phase 1) ESA and Reporting (1);
- Undertake a Hazardous Materials (HAZMAT) survey for the buildings and structures on the site (1);
- Review of Preliminary (Phase 1) ESA and HAZMAT survey (2);
- Preparation of Sampling and Analysis Quality Plan (SAQP) for the Detailed (Phase 2) ESA (1);
- Review of SAQP (2);
- Undertake Detailed (Phase 2) ESA and Reporting (1);
- Review of Detailed (Phase 2) ESA Works and Recommendations (2);
- Preparation of Remediation Action Plan (RAP) (1);
- Review of RAP (2);
- Undertake Remediation, Validation and Reporting (1);
- Review of Remediation and Validation Works (2);
- Preparation of Contaminant Management Plan (CMP) (if necessary) (1);
- Review of CMP (2);
- Preparation of Summary Site Audit Report (SSAR) and Site Audit Statement (SAS) (2);
- Review of SSAR and Site Audit Statement SAS (3); and
- Finalisation of SSAR and SAS (2).

Notes: (1) – Environmental assessor, (2) – Environmental Auditor, (3) – ACT EPA

3.2.1 Environmental Auditor Role

The Environmental Auditor's role is to provide an independent review of the assessment and remediation works undertaken by the Environmental Consultant and, if suitable, to provide a determination (via the SAS) that the site is suitable for the proposed land use. It would be recommended that the Environmental Auditor be engaged as early in the assessment/remediation process as possible to facilitate the achievement of the environmental objects as effectively as possible.

The individual components of the Environmental Auditors involvement would be expected to comprise at least the following:

- Review of Preliminary (Phase 1) ESA and HAZMAT survey;
- Review of SAQP;
- Review of Detailed (Phase 2) ESA Works and Recommendations;
- Review of RAP;
- Review of Remediation and Validation Works;
- Review of CMP;
- Preparation of Summary Site Audit Report (SSAR) and Site Audit Statement (SAS); and
- Finalisation of SSAR and SAS

It is noted that the level of involvement of the Environmental Auditor in each of these individual steps can vary significantly as the assessment/remediation process is often an iterative process affected by the environmental conditions encountered at the site, the assessment/remediation process proposed and implemented, the competency of the environmental consultant, and the risk tolerance of the Environmental Auditor.

An indicative costing for the services of the Environmental Auditor would be in the range of [redacted] The Environmental Auditor is typically involved for the complete duration of the assessment and remediation process. As a guide, allow at least 2 weeks for Environmental Auditor review for each version of submitted documents.

3.2.2 Preliminary (Phase 1) ESA and HAZMAT Survey

Though a Preliminary (Phase 1) ESA has previously been prepared by Connell Wagner in 2001, it is considered that a new Preliminary (Phase 1) ESA would need to be prepared to satisfy the Environmental Auditor for the following reasons:

- To update the ESA and its' present understanding of site contamination considering the changes in site activities and potential environmental conditions since 2001; and
- To meet the specific requirements of NSW EPA (1997) *Guidelines for Consultants Reporting on Contaminated Sites.*

It is also understood that a HAZMAT survey may also have been undertaken in the past, but similarly this should be updated to reflect the current condition of the site at the commencement of the Audit process.

An indicative costing for an Environmental Consultant to prepare a new Preliminary (Phase 1) ESA would be in the order of approximately [redacted] and in the order of approximately [redacted] for the HAZMAT survey. Typically, the results of the Preliminary (Phase 1) ESA and HAZMAT survey would be available within approximately 6 weeks of engagement.

3.2.3 Preparation of a SAQP

A Sampling and Analysis Quality Plan (SAQP) should be prepared by the environmental consultant prior to undertaking the detailed (Phase 2) assessment works. In short, it is based upon the findings of the Preliminary (Phase 1) ESA and has the purpose of documenting (to allow review by the Environmental Auditor) the proposed elements of the field sampling and laboratory analysis, the investigation levels to be adopted, and data quality objectives to be achieved.

An indicative costing for an Environmental Consultant to prepare a SAQP would be in the order of approximately [redacted] A SAQP would typically be prepared within a timeframe of approximately 2 to 3 weeks.

3.2.4 Undertake Detailed (Phase 2) ESA and Reporting

A detailed (Phase 2) ESA will be required to confirm the site is suitable for the more sensitive land use, particularly as AECs requiring investigation have already been identified. The objective of the detailed assessment is to:

- Provide comprehensive information on the contaminants present within the site, including location, concentration, extent and leachability (if required);
- Identify potential impacts on the environment and/or human health, including any off-site impacts; and

- Provide sufficient information for the preparation of a Remedial Action Plan, (if required), which, upon successful implementation, would render the site suitable for the proposed end use.

The works undertaken for the detailed assessment should be in accordance with those proposed in the Environmental Auditor endorsed SAQP.

An indicative costing for an Environmental Consultant to undertake a detailed assessment of the site would be in the order of approximately [redacted] A breakdown of a typical costing is provided in Appendix A.

Assumptions incorporated into calculation of the indicative costing include:

- 160 sample locations comprising 110 grid locations plus 50 target/delineation locations Note that some of the target sample locations may coincide with grid locations, and in such situations efficiencies reducing the total number of sampling locations required would be expected. The grid locations would likely be on a systematic sampling pattern designed to provide a statistically unbiased screening of the site, whereas the target locations are designed to focus on the screening of areas where potentially contaminating activities are known to have been undertaken. The areas for detailed targeted sampling would include (but not necessarily be limited to) the AECs identified in the previous assessments such as the coal and oil storage bunker (NE5), the forklift shed (A6), the machinery and blacksmith shop areas (M1 – M3), the explosive store (ES), the asbestos dump (AD), the kilns (K1 – K3) and the septic tank (ST);
- 80 sample locations tested using excavator, 80 sample locations tested using drilled boreholes;
- 128 hrs for soil sampling (10 locations per 8hr day);
- Installation of 4 groundwater monitoring wells, each to a depth of approximately 12m. 2 wells installed per day;
- 1 round of groundwater monitoring per well with 2 wells sampled per day;
- Analysis of 2 fill and 1 natural sample per location – total of approximately 480 primary soil samples;
- All primary fill and natural samples analysed for Total Petroleum Hydrocarbons (TPH), Benzene, Toluene, Ethylbenzene and Xylenes (BTEX), Polycyclic Aromatic Hydrocarbons (PAH) and metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc);
- Approximately 50 primary near surface soil samples also analysed for Organochlorine Pesticides (OCPs), Polychlorinated Biphenyls (PCBs), Volatile Organic Compounds (VOCs), phenols and asbestos.
- Analysis of approximately 48 duplicate soil samples for TPH, BTEX, PAH and metals, for quality assurance (QA) purposes;
- Analysis of approximately 6 QA duplicate soil samples for OCP, PCBs, phenols and asbestos;
- Analysis of approximately 4 primary groundwater samples and 1 QA duplicate groundwater sample for TPH, BTEX, PAH and metals;
- Analysis of approximately 17 QA rinse blanks for TPH, BTEX, PAH and metals;
- Analysis of approximately 17 QA trip blanks for BTEX; and
- Analysis of samples on standard turn around of 7 to 10 working days.

Timeframes for undertaking a detailed assessment is dependent upon the availability of sub-contractors including analytical laboratories, excavators and drillers. A typical timeframe for a detailed assessment of an industrial facility similar to this site would be in the order of be of approximately 6 to 10 weeks.

3.2.5 Preparation of a RAP

A Remediation Action Plan (RAP) should be prepared by the environmental consultant prior to undertaking any remedial works. The purpose of the RAP is to document the remediation goals and extent of remediation required, discuss the remedial options and justify the rationale for the selected remedial option, propose a sampling plan to validate the remediated area(s), and to document the site management procedures to be implemented.

An indicative costing for an Environmental Consultant to prepare a RAP would be in the order of approximately [redacted] and could take up to several months to prepare, depending upon the type of contamination, complexity of the distribution of the contamination, and the methods available for remediation.

3.2.6 Undertake Remediation, Validation and Reporting

Remediation of a site is required where an assessment indicates that there is a significant risk of harm to human health or significant risk of material or serious environmental harm.

Based upon the assessment works undertaken to date on the site, it is known that remediation of at least the asbestos dump (AD) and the hydrocarbon impacted soils identified in the area of the machinery and blacksmith shops (M1 – M3) will be required. In addition, it is noted that considerable volumes of fill containing brick fragment, slag and coal is present on the site, and that the Environmental Auditor may potentially require some (or all) of the material to be removed on the basis of it presenting an 'aesthetic issue' for the proposed land use. Further, given the historical usage of the site it is considered that additional 'hotspots' of contamination requiring remediation may also be identified by the detailed (Phase 2) assessment works.

An indicative costing for an Environmental Consultant to undertake remediation of the asbestos dump and hydrocarbon impacted area would be in the order of approximately a **$350,000** to **$500,000**. A breakdown of a typical costing is provided in Appendix A.

Assumptions incorporated into calculation of the indicative costing include:

- Fieldwork for remediation of the asbestos dump would take 2 weeks;
- Fieldwork for the remediation of the hydrocarbon impacted area would take approximately 3 days;
- The asbestos dump contains approximately $500m^3$ of waste with a density of $1.8t/m^3$ (ie 900t);
- The hydrocarbon impacted area contains approximately $100m^3$ of waste with a density of $1.8t/m^3$ (ie 180t);
- The hydrocarbon impacted soil is disposed of off-site as a waste rather than landfarmed on-site;
- Disposal cost of wastes is approximately $300/t (includes trucking and landfill disposal costs);
- Waste classification sampling at a rate of 1 per $100m^3$ for asbestos dump and 1 per $25m^3$ for hydrocarbon impacted area. Waste classification for asbestos dump material based on total concentrations of TPH, BTEX, PAH, metals, OCPs, PCBs, phenols and asbestos, and toxicity characteristic leaching procedure (TCLP) for metals and PAH.

Waste classification for hydrocarbon impacted area based on total concentrations of TPH, BTEX, PAH and metals, and TCLP concentrations of BTEX, PAH and metals;

- Analysis of samples on standard turn around of 7 to 10 working days;
- Fill material is not required to be imported onto the site to reinstate remedial works; and
- No groundwater contamination is present.

Timeframes for undertaking a detailed assessment is dependent upon the availability of sub-contractors including analytical laboratories, excavators and drillers. A typically timeframe for the remediation of the asbestos dump and hydrocarbon impacted area would be in the order of be of approximately 6 to 10 weeks.

Note that additional hotspots requiring remediation may also be identified during the Detailed (Phase 2) ESA. The costs associated with such additional remedial works would be dependent upon what is found, but could be in the order of up to [redacted] Similarly the timeframe to undertake such work is dependent upon what is found but, in general, could take up to 6 to 12 months.

3.2.7 Preparation of a CMP

As part of a condition to the issue of a SAS, the Environmental Auditor may require a Contamination Management Plan (CMP) to be prepared, with the aim that the CMP is to be implemented during site redevelopment works (and potentially on-going). The objective of a CMP is generally to provide a framework for identifying and managing 'unexpected finds' of contamination during redevelopment of the site post Auditor 'sign off'.

An indicative costing for an Environmental Consultant to prepare a CMP would be in the order of approximately [redacted] and would typically take 2 to 3 weeks to prepare.

Costs for implementing the CMP are not quantifiable as it is not possible to predict the nature and extent of 'unexpected finds'. In general, the costs to implement the CMP (if required) would be worn by the respective developer on saleable land portions of the site, and government departments (e.g. TAMS) for non-saleable portions of the site (e.g. parks and garden, road verges, roads etc).

4 REFERENCES

ACT *Environment Protection Act* 1997

ACT *Environment Protection Regulation* 2005

ACT EPA (2009) *Contaminated Sites – Environment Protection Policy*

Connell Wagner (2001) *The Old Canberra Brickworks and Environs Development Control Plan, Appendix F – Brickworks Contamination Report.* Connell Wagner reference C015 Final DCP Appendix F, dated 8 February 2001.

Environment ACT (2000) *ACT's Environmental Standards Assessment & Classification of Liquid & Non-Liquid Wastes*;

National Environment Protection Council (1999) *National Environment Protection (Assessment of Site Contamination) Measure 1999;*

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

NSW EPA (1995) *Contaminated Sites Sampling Design Guidelines*

NSW EPA (1997) *Guidelines for Consultants Reporting on Contaminated Sites*

Robson (2006) *Environmental Investigation – Audit Report, Yarralumla Brickworks, Sandford Street Complex, Block 1 Section 102 Yarralumla, Canberra Central ACT.* Robson report reference 3144_CL_EI Final_20061026, dated October 2006.

Robson (2006) *Remediation Action Plan (Draft), Asbestos Dump, Yarralumla Brickworks, Block 1 Section 102 Yarralumla, Canberra Central ACT.* Robson report reference 3144_CL_RAP_20061109, dated November 2006.

5 STATEMENT OF LIMITATIONS

This report was prepared in order to provide indicative recommendations and costings for further environmental assessment and remedial works which may be required to make the site (Yarralumla Brickworks, Block 1 Section 102, Yarralumla) suitable (from an environmental perspective) for redevelopment for medium to high density residential purposes.

THIS REPORT MUST NOT BE REPRODUCED EXCEPT IN FULL AND MUST BE READ IN CONJUNCTION WITH THE REPORT TERMS AND CONDITIONS INCLUDED AFTER THE ABBREVIATIONS SECTION THIS REPORT.

6 ABBREVIATIONS

ACT	Australian Capital Territory
ACTPLA	ACT Planning and Land Authority
AEC	Area of environmental concern
BH	Borehole
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
CMP	Contaminant Management Plan
CSMD	Contaminated Sites Management Database
EPA	Environmental Protection Authority
EPU	Environment Protection Unit
ESA	Environmental Site Assessment
HAZMAT	Hazardous materials
GIS	Geographic Information System
m	Metres
m^2	Square Metres
m^3	Cubic Metres
mg/kg	Milligrams per kilogram
NEPC	National Environmental Protection Council
NEPM	National Environmental Protection Measure
NSW EPA	New South Wales Environmental Protection Authority
OCP	Organochlorine Pesticide
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyls
QA	Quality Assurance
QC	Quality Control
RAP	Remediation Action Plan
SAQP	Sampling and Analysis Quality Plan
SAS	Site Audit Statement
SMF	Synthetic Mineral Fibre
SSAR	Summary Site Audit Report
TCLP	Toxicity characteristic leaching procedure
TPH	Total Petroleum Hydrocarbon
VOC	Volatile organic compounds

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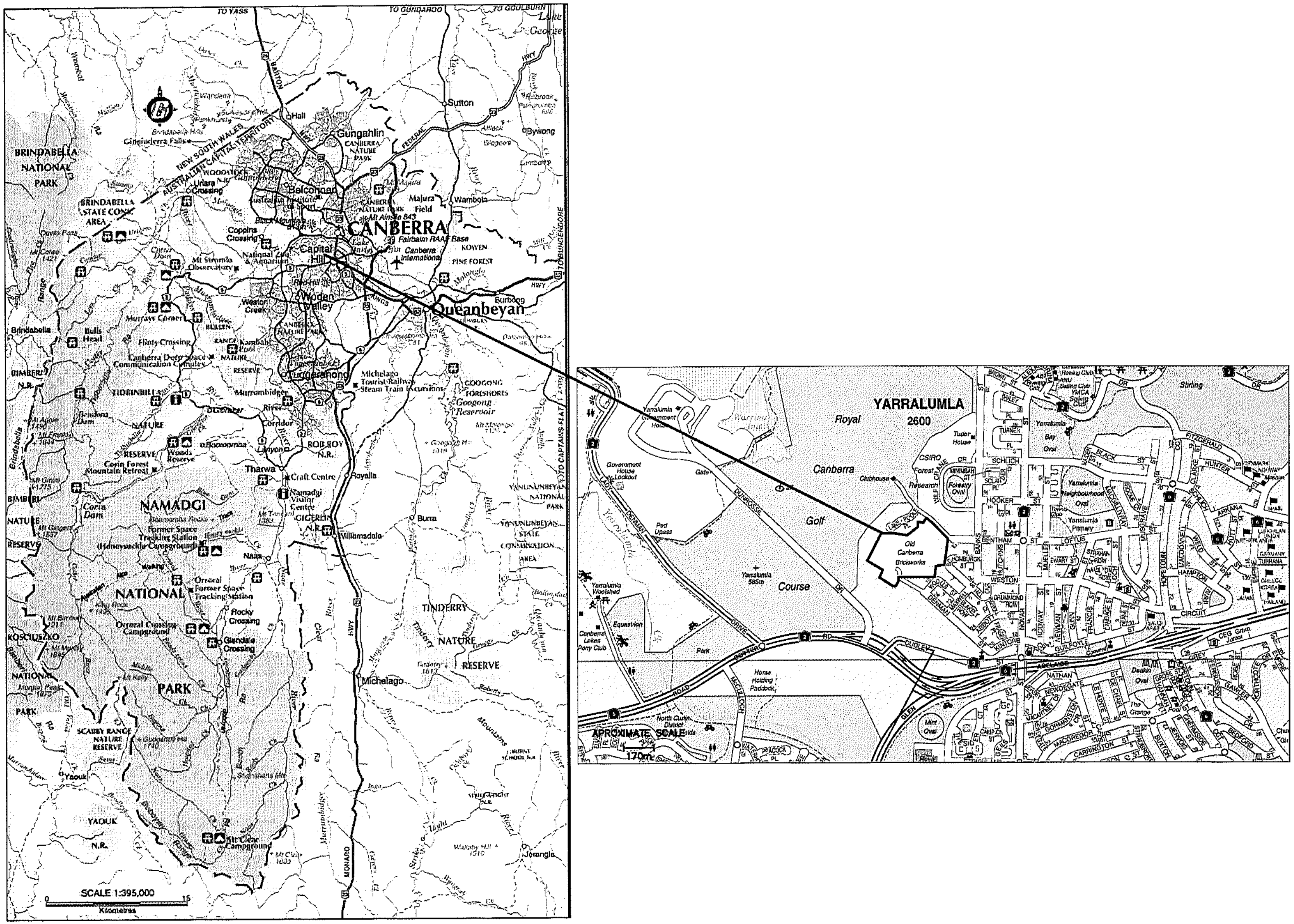
Figures

Figure 1 and 2

A3



LEGEND

APPROXIMATE SITE LOCATION

DIFFERENT SCALES

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Client: LPS – ACT GOVERNMENT

Project: COSTING FOR ASSESSMENT AND REMEDIATION

Location: YARRALUMLA BRICKWORKS YARRALUMLA ACT

Drawing Title: SITE LOCALITY MAP

Drawn CG	Signed	Date 12/5/10
Checked SM	Signed	Date 12/5/10

Rev	Date	Revision Details	Drn
A	12/5/10		CG

Project - Drawing No.	Figure No.	Rev.
314403	1	A

DIFFERENT SCALES

THIS IS ONE INTERPRETATION ONLY
OTHER INTERPRETATIONS ARE POSSIBLE

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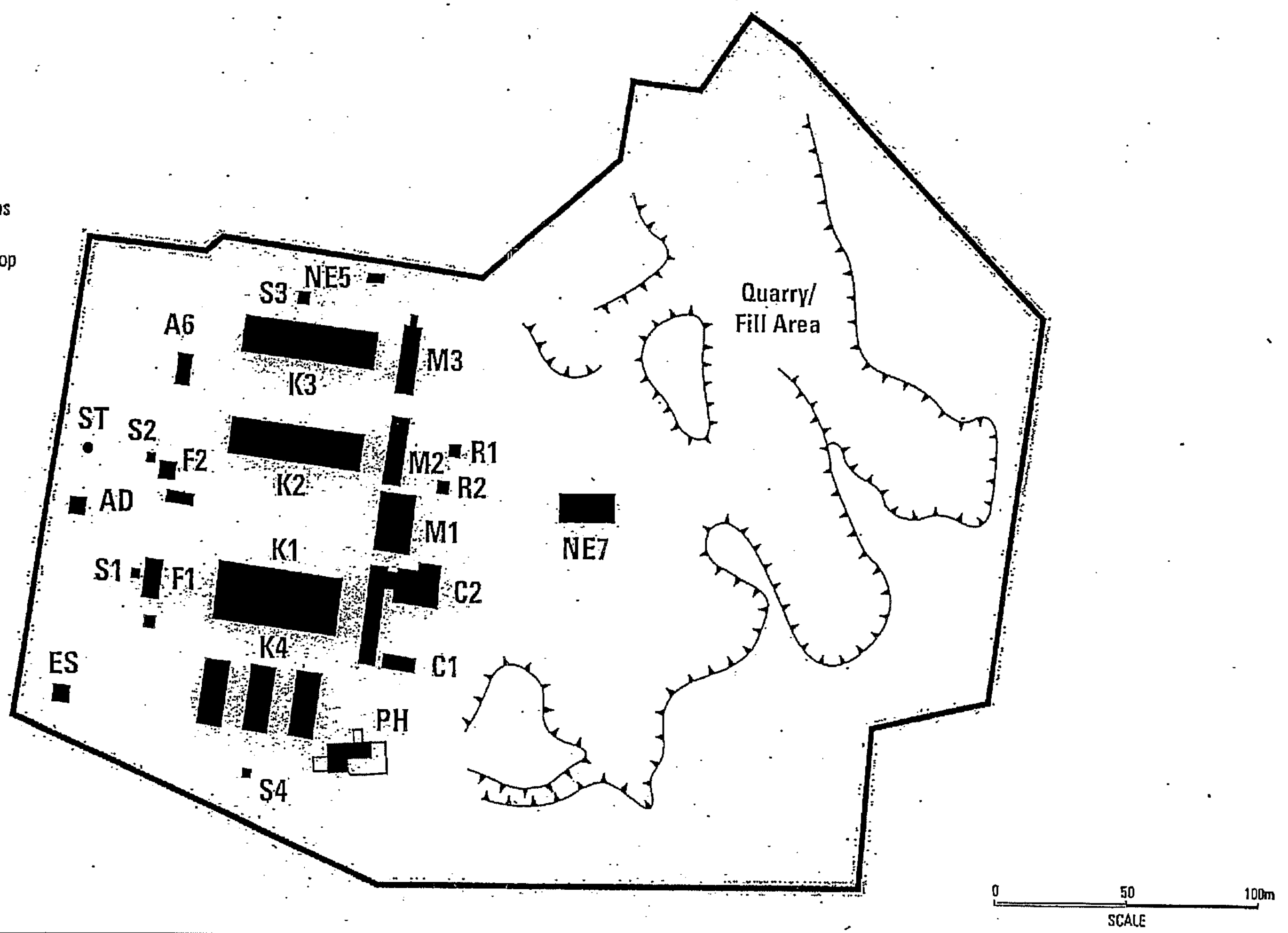

LEGEND

A6	- Forklift Shed
NE5	- Coal and Oil Storage
K1-K4	- Kilns
S1-S4	- Stacks
Fl-F2	- Fan House
C1-C2	- Crusher
R1-R2	- Model Railway Workshops
ST	- Septic Tank
M1-M3	- Machine/Blacksmiths Shop
PH	- Powerhouse and office
ES	- Explosives Store
AD	- Asbestos Dump

MAP SOURCE: CONNELL WAGNER CONTAMINATION REPORT (2001)

DIFFERENT SCALES

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Client: LPS – ACT GOVERNMENT

Project: COSTING FOR ASSESSMENT AND REMEDIATION

Location: YARRALUMLA BRICKWORKS YARRALUMLA ACT

Drawing Title: DETAILED SITE PLAN

Drawn	Signed	Date
CG		12/5/10
Checked	Signed	Date
SM		12/5/10

Rev	Date	Revision Details	Drn
A	12/5/10		CG

Project - Drawing No.	Figure No.	Rev.
314403	2	A

A3

THIS IS ONE INTERPRETATION ONLY
OTHER INTERPRETATIONS ARE POSSIBLE

DIFFERENT SCALES

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Appendix A

Indicative Costings

Table 1: Indicative Activities, Costings and Timeframes for the Assessment and Remediation of the Yarralumla Brickworks

Item	Estimated Cost (Ex GST)	Estimated Timeframe
Preliminary (Phase 1) Assessment	[redacted]	6 weeks
HAZMAT Survey		6 weeks
Sampling and Analysis Quality Plan (SAQP)		2 to 3 weeks
Detailed (Phase 2) Assessment		6 to 10 weeks
Remediation Action Plan (RAP)		Up to 3 months
Remediation, Validation and Reporting		6 to 12 months
Contaminant Management Plan (CMP)		2 to 3 weeks
Environmental Auditing		Duration of project

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Robson

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By email: peter.ozols@act.gov.au

Wednesday 12 May 2010

Dear Peter,

Re: 314403 – Yarralumla Brickworks – Review of Past Site Works and Indicative Costings for Further Assessment and Remediation

Please find enclosed a copy of the report titled *Yarralumla Brickworks, Yarralumla ACT 2600 (Block 1 Section 102, Yarralumla) – Review of Past Site Works and Indicative Costings for Further Assessment and Remediation* (Robson report reference 314403_EAR_ESA_20100512, dated May 2010).

Please do not hesitate to contact the undersigned on the above listed numbers should you have any queries regarding this report.

For and on behalf of Robson Environmental Pty Ltd

Yours sincerely,

S. McElroy

Stuart McElroy
Senior Environmental Engineer – EA & R Section

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Wednesday 21 June 2006

Dear Peter,

Re: Scope for Phase 2 Environmental Assessment – Yarralumla Brickwork, Yarralumla ACT 260.

At the request of Peter Ozols of the ACT Department of Urban Services, Facilities Management, Robson Laboratories Pty Ltd is pleased to submit an outline of the likely scope for the contaminated land assessment and remediation (Phase 2 and 3) for the Yarralumla Brickworks i.e. if the land use is to be altered from what was industrial to a more sensitive land use (residential).

In the case where the future land use is unknown but a better understanding of the extent of potential contamination is required for planning purposes a limited Environmental Audit may be more appropriate at this stage.

These two (2) approaches are outlined on the following pages.

Potential Contaminants at the Brickworks

Based on past sites use as a brickworks and quarry the following types of contaminants are likely to be present on site in specific use locations:

- Asbestos (building materials);
- Hydrocarbons (fuel storage);
- Heavy Metals (brick firing processes);
- Sewage, solvents and chemicals (septic tank); and
- Explosives (associated contaminants).

Option A. The Assessment Process for a change in land use

An environmental assessment is generally undertaken in investigative stages which are defined as Phases i.e. Phase 1, Phase 2 etc (Refer Attachment 1: Contaminated Land Assessment Process Flow Chart).

In simple terms the Phase 1 investigation will define the areas of the site that may require a physical investigation i.e. to define the level and extent of contamination (Phase 2).

The Environmental Investigation(s) for the Yarralumla Brickworks must be undertaken in accordance with the requirements under The ACT Environment Protection Act 1997 and will be based on the following:

- The Australian Capital Territory's Contaminated Sites - Environment Protection Policy (EPP) (2000) which is in accordance with the Environment Protection Act 1997; and

- The ACT Environment Protection Regulations 1997.

The Contaminated Sites - Environment Protection Policy endorses the application of the following principal National assessment guidelines when assessing contaminated sites in the ACT:

- The National Environment Protection (Assessment of Site Contamination) Measure 1999; and

- The ANZECC 1992 Guidelines for the Assessment and Management of Contaminated Sites.

These guidelines make reference to Australian Standards and NSW EPA Guidelines which are specific to certain aspects of contaminated site assessment(s) e.g. waste and fuel tank assessment, and may be applicable during the course of the proposed investigation.

In brief Robson Laboratories Pty Ltd proposed scope for Site validation (change in land use) would include the following:

The Site

1. Review the Connell Wagner Contamination Report (2001) and all other available information;
2. Design a sampling plan for the site with Data Quality Objectives (i.e. to meet residential land use criteria – the most sensitive landuse);
3. Implement the sampling plan; and
4. Based on the results of the sample analysis undertake further investigation/ remediation as required (Phase 3).

In tandem with the above process remediate the known Asbestos Dump.

1. Develop a safe work method statement to enable the removal of the asbestos;
2. Supervise the removal of the asbestos; and
3. Validate the affected area.

EPA Accredited Land Auditor

It is likely that an Auditor will be required by Environment ACT (Environment Protection Unit) to audit the assessment process.

A list of accredited Auditors may be sourced from Environment ACT or Robson Laboratories is able to recommend a preferred selection.

If an Auditor is required Robson Laboratories recommends that the Auditor be engaged to review the Phase 2 – Sampling Plan prior to it's implementation. This process does take time (4 – 6 weeks) which includes obtaining quotes from perspective Auditors.

Option B. Environmental Audit

In brief Robson Laboratories Pty Ltd proposed scope for the Audit would include the following:

A. The Site

1. Review the Connell Wagner Contamination Report (2001) and all other available information;
2. Design a limited sampling plan (not to EPA requirements) for the site with Data Quality Objectives (i.e. to meet residential land use criteria – the most sensitive landuse);
3. Implement the sampling plan; and
4. Based on the results of the sample analysis make recommendations with respect to the likely extent of contamination across the site.

B. In tandem with the above process remediate the known Asbestos Dump.

1. Develop a safe work method statement to enable the removal of the asbestos;
2. Supervise the removal of the asbestos; and
3. Validate the affected area.

Indicative Cost

Option A – Site Validation for a change in land use

[redacted]

EPA Accredited Auditor

Phase 2 (only) - Investigation and Assessment
(includes target and site screen sampling)

Asbestos dump removal and validation
(Based on a volume of 100 tonnes)

Note if additional contamination is identified during the Phase 2 investigation further environmental investigation and remediation costs may be incurred.

Option B – Environmental Audit

Aim to quantify the Environmental Liability of the site

[redacted]

Site Survey

Asbestos dump removal and validation
(Based on a volume of 100 tonnes)

If you would like to discuss these options, I would be pleased to meet with you at a time of your convenience or I may be contacted on the numbers given above.

If you decide to proceed with either of these options a lump sum quote will be provided for all applicable items.

Yours sincerely,

Ben Kendon – BSc; Grad. Dip. Geology
Environmental Scientist

Attachment 1. Contaminated Land Assessment Process Flow Chart.

Contaminated Land Assessment with an Independent Audit

Undertaken By

Environmental Consultant

Reviewed By

***EPA Accredited Contaminated Land Auditor**

Phase 1 – Environmental Investigation

eg. A site history review combined w/ a site visit to identify areas of environmental concern and minimal target sampling.

*For Review

Phase 2 – Environmental Investigation

eg. Physical Investigation - soil sampling to identify and delineate the extent of the contamination etc. (if required)

*For Review

Phase 3 - Site Remediation

1. Development of a Remediation Action Plan (RAP) (if required).
2. Implement the RAP ie. Remove contamination, undertake site validation and or conduct ongoing environmental monitoring.

*For Review

Final Stage - The EPA Accredited Contaminated Land Auditor

Submits Audit Report and Statement to the Environmental Management Authority for final approval.

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ROBSON LABORATORIES Pty Ltd

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Ref: 3144 RAP Proposal.doc

Remediation Action Plan

Proposal for

Asbestos and Brick Waste Dump
Yarralumla Brickworks
Section 102 Block 1
Yarralumla ACT

September 2006

Client: Mr Peter Ozols
Project Manager
Territory and Municipal Services Property Group Facilities Management
PO Box 777
Fyshwick ACT 2609

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Introduction

Robson Laboratories is pleased to submit a proposal to Territory & Municipal Services Property Group Facilities Management (TAMS FM) for a Remediation Action Plan for the removal of the Asbestos and Brick waste dump located on the west boundary of the Yarralumla Brickworks site.

Background

The Robson Laboratories Environmental Investigation confirmed the identification of a large dump site of asbestos cement sheet, brick waste and other general waste located on the west boundary of the site.

Robson Laboratories understands this waste is to be removed from site to an ACT licensed landfill. Due to the presence of asbestos and the general unknown nature of the waste the affected area will require validation upon removal of the waste. The validation must be undertaken by a qualified Environmental Consultant to meet both Sensitive and Ecological Landuse criteria as defined in the Environmental Investigation report.

Aim

A major part of the redevelopment process is to ensure that the previous site use as a landfill has not had an adverse impact on the land and that the affected land remains suitable for Sensitive Landuse.

As the extent of the contamination has been broadly defined in the Environmental Investigation a Remediation Action Plan should be developed to affect an efficient and safe approach to the remediation process.

The Remediation Action Plan for the dump must be designed in accordance with the requirements under the ACT Environment Protection Act 1997.

The Act enables the implementation and application of the following principal National assessment guidelines when assessing contaminated sites in the Australian Capital Territory.

- The National Environment Protection (Assessment of Site Contamination) Measure 1999.

This NEPM makes reference to Australian Standards and NSW EPA Guidelines which are specific to certain aspects of contaminated site assessment including Remediation Action Plan design.

- NSW EPA - Guidelines for Consultants Reporting on Contaminated Sites 1997.

Remediation Action Plan

The development of a Remediation Action Plan (RAP) will enable the facilitation of the safe and timely removal of the waste.

Based on the Environmental Investigation and the NEPM Robson Laboratories recommends the Remediation Action Plan include the following:

- Remediation Goal
- Extent of the remediation required
- Remediation options and how the risk can be reduced
- Rational for the selection of the remedial option
- Proposed Testing to validate the remediated areas (Sample Plan)
- Contingency Plan if remediation option fails
- Interim Site Management Plan (fencing and or warning signs)
- Site Management Plan (operational phase)
- Remediation Schedule
- Hours of operation
- Contingency plans to respond to site incidents, to obviate potential effects on the surrounding environment
- Identification of regulatory compliance requirements
- Contact details of all contractors and other appropriate personnel
- Community relation plans where applicable
- Stage progress reporting where applicable
- Long term site management

Our Fee

Our fee and timing for the Remediation Action Plan has been divided into the following Stages for your convenience:

Table 1. Timing and Fees

Item	Time of Completion	Fee ($)
Stage 1 – RAP Start up i.e. lay out	Week 1	[redacted]
Stage 2 – Map(s) and preliminary Sampling Plan development and design	Week 1	
Stage 3 - Work Method Statements eg -Blackberry Removal -Asbestos Removal -General waste classification and removal	Week 1	
Stage 3 (SMP) – Environmental Control Plan Development and Design i.e. sediment and pollution control	Week 1	
Stage 4 (SMP) – Health and Safety Plan development and design i.e. ensure workers health and safety	Week 1	
Stage 5 – Liaison to include regulators	On-going	
Stage 6 – Identify potential waste removal contractors (develop tender documentation as required)	Weeks 1 & 2	
Stage 7 – Finalisation of RAP (Client Liaison) and submit Draft RAP to TAMs	Week 2	

Notes.
SMP – Site Management Plan

Remediation Action Plan (GST Exclusive)

Conditions:

Further work required out side the scope of this project will only be undertaken with written approval from TAMS.

Timing (Refer Table 1)

Robson Laboratories is able to proceed with the Remediation Action Plan within three (3) days upon receipt of your written approval to proceed.

The RAP would be available within two (2) weeks of our engagement (provided there are minimal delays associated with organising remediation contractors etc).

Upon your approval of the Remediation Action Plan the remediation of the site may commence.

910

ROBSON LABORATORIES Pty Ltd

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Health Safety
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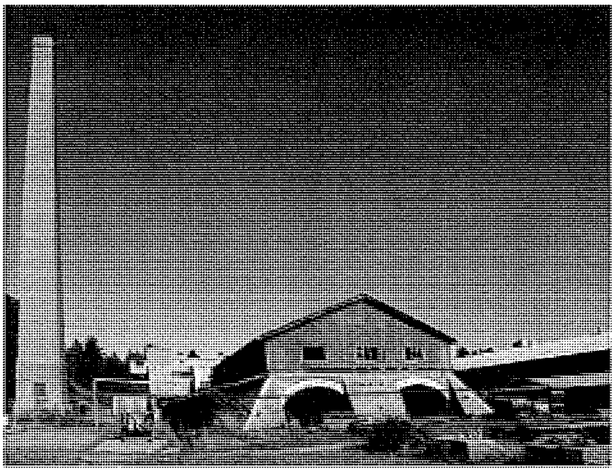
Specification for the Removal of Asbestos Materials from:

Yarralumla Brickworks
Yarralumla ACT

October 2006

In accordance with the requirements of this document and AS2124 - 1992 General Conditions of Contract



Client: TAMS Property Group
255 Canberra Avenue
Fyshwick
ACT 2609

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REMOVAL AND DISPOSAL OF ASBESTOS AND ASBESTOS CONTAMINATED MATERIALS

PREAMBLE

1.0 INTRODUCTION

This document forms the specification for the safe removal of ACM (Asbestos Containing Materials) from the Yarralumla Brickworks. An asbestos removalist with an ACT asbestos removal licence shall be employed to remove all asbestos and asbestos contaminated materials. The asbestos removal contractor must hold a current and applicable ACT friable asbestos removalist license, which would enable the removal of friable asbestos.

The extent of work is as specified below and as indicated on the attached drawings and supplied photographs. Note: this removal specification does not include the asbestos tip located on the western side of the site at Yarralumla Brickworks ACT.

Kiln 1:

Electrical switchboards and fragments of bonded sheeting were identified on the top level. The whole top level and lower level areas will required a thorough inspection to remove the asbestos cement sheet fragments.

Note: Loose fibreglass insulation is present on the ground in various compartments of Kiln 1 and outside Kiln 2. Given the uncertainty of the origin of the SMF Robson Laboratories Pty Ltd recommends it be disposed of as asbestos waste as this material may contain asbestos dust and debris from the removal of the corrugated roof sheets.

Inside top level of Kiln 2:

Millboard sheeting and debris and thick insulation to beams (**Friable**) and Gaskets to plant equipment. The top layer of soil (50 mm) will require removal to ensure that all debris is removed. Removal of SMF insulation is also required.

Kiln 3:

External wall sheeting to upper external office. Electrical switchboards and fragments of bonded sheeting were identified on the top level. The whole top level and lower level areas will required a thorough inspection to remove the asbestos cement sheet fragments.

Former Canteen:

Ground floor ceiling sheets.

Fan House 1:

Switchboard backing sheet and panel behind.

Fan House 2:

Rope lagging (**Friable**); and
Switchboard backing sheet.

Building SS4:

Ceiling sheets;
Internal wall sheets.

Building SS3:

Ceiling sheets.

Building SS2:

Eave sheets.

Building SS1:

Eave sheets.

Building BH:

Ceiling sheets
Eave sheets.

Building A3:

Gable sheets;
Corrugated roof sheets;
Ceiling sheets;
Eave sheets;
Switchboard backing sheet; and
Sheeting debris on floor.

Building A4:

Ceiling sheets; and
Eave sheets.

Small building behind building A4:

Ceiling sheets;
Soffit sheets; and
Eave sheets.

Miscellaneous items on site:

Switchboard backing sheets (on burnt poles);
Sheeting debris (**Friable**), &
Random locations of asbestos sheeting across the site.

To ensure proper management of the project and to reduce the risk of exposure to airborne asbestos fibres, an occupational hygienist should be contracted to manage, monitor and supervise the asbestos removal project.

Responsibilities of the asbestos removalist:

- The friable asbestos is Chrysotile asbestos. Due to the hazardous nature of this material strict adherence to Occupational Health and Safety Policy will be mandatory throughout the contract period;

- All asbestos removal work in the ACT must be undertaken by contractors holding a current ACT friable asbestos removal licence;

- An asbestos removal control plan specific to the Yarralumla Brickworks project must be developed by the asbestos removalist;

- Ensure that the project is supervised by a suitably qualified person on site at all times during asbestos removal;

- Ensure that all personnel working on the project are suitably trained so that the work may be carried out safely and are fully aware of the health risks associated with exposure to asbestos; and

- Establish a health surveillance programme. (Refer Clause 7.3.6 [NOHSC:2002(2005)]

All asbestos removal work is to be carried out in accordance with:

- *Code of Practice for the Safe Removal of Asbestos 2nd Edition* [NOHSC: 2002(2005)];

- Australian Standard AS 2601 - 2001: The demolition of structures;

- ACT WorkCover requirements; and

- To contract requirements and to the satisfaction of project management.

Approval to proceed with the works must be obtained from the Project Manager prior to commencement.

Demolition or any other works within areas where asbestos has been located is not to take place until the asbestos removalist has completed the schedule of work specified in this document and the Project Manager has given a clearance for the next stage of work to proceed.

The following information is to be provided with the tender submission to demonstrate previous experience in asbestos removal;

- Details of previous friable asbestos removal programmes undertaken in occupied buildings;
- Details of proposed key asbestos removal personnel including their names, relevant experience and qualifications; and
- Proposed asbestos removal methods if different from specified procedures.

Additionally, the contractor shall be primarily responsible for coordination with all sub-contractors to isolate all services where required to ensure compliance to the requirements of [NOHSC: 2002(2005)] and to ensure that the highest degree of Occupational Health and Safety is achieved at all times.

2.0 DRAWING

A diagrammatic drawing of the buildings are presented on page 14.

3.0 ASBESTOS REMOVAL

To ensure proper management of the project and to reduce the risk of exposure to airborne asbestos fibres, an occupational hygienist should be contracted to manage, monitor and supervise the asbestos removal project.

The extent of asbestos removal is as per pages 2, 3 & 4 and the drawing on page 14 or as otherwise indicated by the Project Manager. Asbestos removal work is to be carried out in accordance with actpla's (ACT Planning & Land Authority) Asbestos Removal and Disposal document, [NOHSC: 2002(2005)], Australian Standards and as directed by the Project Manager.

Disposal of all asbestos materials will be in accordance with actpla's requirements. The appropriate packaging of removed asbestos materials is to be performed by the asbestos removalist.

4.0 AIRBORNE FIBRE LEVELS

It is the Asbestos Removalist's responsibility to ensure that the maximum fibre levels throughout the asbestos removal work does not equal or exceed 0.01 f/mL. The consequences of airborne fibre levels observed at or exceeding those specified below will result in the Occupational Hygienist instructing the contractor in taking the appropriate 'Control /Action' as listed below;

Control Level (airborne asbestos fibres/mL)	Control / Action
< 0.01	Continue with control measures
≥ 0.01	Review control measures
≥ 0.02	Stop removal work and find the cause

SECTION A - PRELIMINARIES

1.0 SITE INSPECTION

A site inspection is to be arranged through TAMS Property Group. A plan and photographs are included in this specification to assist in the understanding of the scope of works.

2.0 TENDER ENQUIRIES

All tender enquiries should be directed to the Project Manager – Peter Ozols.

Phone: 0438 652 192

Fax: 02 – 6213 0735

Email: Peter.ozols@act.gov.au

3.0 SITE INDUCTION

All asbestos removal personnel, nominated sub-contractors and the occupational hygienist shall attend a **Site Induction** prior to the commencement of works on site.

4.0 INSURANCES

Any insurances shall not carry any exclusion covering asbestos or other dust exclusions. Insurances are to include public liability and workers compensation.

5.0 SITE AND SAFETY MEETINGS

The Contractor will be required to attend Site and Safety meetings during the course of the project as required by the Project Manager.

6.0 TOOL BOX MEETINGS

Prior to the commencement of each days work the Contractor and site personnel involved in the asbestos removal will be required to attend a Tool Box meeting organized by the Project Manager.

7.0 ASBESTOS & MATERIALS STORE & HANDLING

All materials are to be stored only in those areas designated. Contractors are only to use entrances and areas designated by the Project Manager.

8.0 OCCUPATIONAL HYGIENE

To ensure proper management of the project and to reduce the risk of exposure to airborne asbestos fibres, Robson Laboratories Pty Ltd will monitor all aspects of the asbestos removal and provide visual and airborne fibre monitoring during the asbestos removal programme and provide written clearance certification on completion of the project.

9.0 DEFINITIONS

Background samples Air monitoring undertaken in a building known to contain asbestos based materials, prior to an asbestos removal programme to establish ambient airborne fibre levels.

Work area That area restricted from the general public adjacent to the Removal area but in which protective clothing and respirators are not generally required.

Removal area That area which is subject to asbestos removal and in which protective clothing and respirators are required at all times.

Occupied area That area in the vicinity of a Work or Removal area to which the general public have unrestricted access.

10.0 ISOLATION OF SERVICES

The asbestos removalist is required to coordinate with all other trades during the contract period. To ensure a safe working environment the removal contractor is required to provide and maintain appropriate respirators and protective clothing for the use of other trades. The removal contractor is required to instruct the other trades in the safe use of Personal Protective Equipment (PPE) to the Project Managers satisfaction when they are required to work in an asbestos contaminated area.

11.0 LIGHTING AND POWER WITHIN REMOVAL AND WORK AREAS

The asbestos removalist is to ensure that all lighting and power is safe and switched off at the power board at the completion of each shift. All lights shall be of a type and design which will ensure that contact with plastic sheeting does not cause ignition. At the completion of each shift a designated person shall be responsible for ensuring all lights and power are turned off at the power board. The name of this person shall be given in writing to the Project Manager prior to the commencement of each shift. A Log Book must be kept detailing all system tests and the name of the person undertaking the test or system shut-down.

12.0 WATER

Where no electrical hazard exists sufficient water is to be used when removing asbestos materials to minimize the generation of airborne dust.

13.0 HEPA FILTER

Only HEPA (High Efficiency Particulate Air) filter vacuum cleaners (which comply with AS 3544-1988 and AS 4260-1997) are to be on site. Negative air exhaust units are to be fitted with HEPA filters and properly maintained throughout the works. The negative air exhaust units will be tested via air monitoring of the outlet during the introduction of fine particulate matter to the inlet side of each unit.

14.0 SECURITY

The asbestos removal contractor is to ensure that the work and removal areas are secured to prevent accidental or deliberate entry by unauthorised persons. At the completion of each day's work, the work and removal areas are to be locked. One copy of each key used to secure these areas must be issued to the Project Manager.

15.0 WASTE CONTAINER DECONTAMINATION & DUMPING

All asbestos waste shall be placed into labelled plastic bags and/or containers as per [NOHSC: 2002(2005)].

All asbestos and contaminated waste is to be adequately contained prior to leaving the site. A letter of receipt to show the appropriate dumping of the contaminated materials must be provided from the waste disposal facility.

16.0 FIRE PRECAUTIONS

A fire extinguisher suitable for all types of fires likely to be encountered shall be kept within the removal area. All personnel shall be informed in the correct use of the fire extinguisher. The names of all persons trained in the use of the fire control equipment must be noted in the Log Book.

17.0 WARNING SIGNS

Signage as described by *Code of Practice for the Safe Removal of Asbestos 2nd Edition* [NOHSC: 2002(2005)] shall be posted at all possible points of entry to the asbestos removal site.

SECTION B - SCOPE OF WORKS AND REMOVAL PROCEDURES

1. Removal of asbestos and asbestos contaminated materials. Locations and details of asbestos materials are as specified on pages 2, 3 & 4 and as shown on the accompanying plan.

i. Obtain instruction to commence work from the Project Manager.

ii. Place appropriate signage at perimeter of removal area.

iii. Plastic line internal walls and floor/ground areas.

iv. Kiln No.2 only – seal openings where appropriate to satisfy v. (next item)

v. Kiln No.2 only – Attach dry decontamination unit and negative air units to the upper level removal area to ensure satisfactory dust control for all operations associated with the asbestos removal.

vi. Visual inspection and will be carried out to ensure compliance with items iii, iv and v.

vii. Following approval to proceed remove asbestos and asbestos contaminated materials using sufficient water to reduce airborne dust. Ensure effective negative air pressure (where required – Kiln No.2) is maintained during asbestos removal.

viii. All asbestos and asbestos contaminated materials must be bagged or containerised and transported and disposed of to actpla requirements.

ix. Vacuum all surfaces to remove all dust and debris after removal has been completed.

x. Obtain visual inspection to all removal areas and airborne fibre clearance from the Occupational Hygienist.

PROPOSED FEE

Total Cost $ (lump sum) ....

Number of days on site ....

(nominate if weekends are included)

....

....

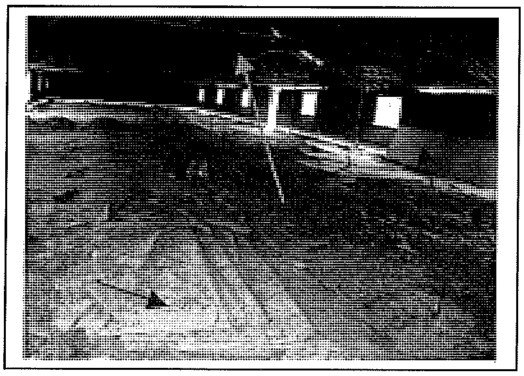
NOTE: NO allowance is required for Occupational Hygiene Services including Air Monitoring, Inspections and Clearance Certification.

....

Removal Contractor

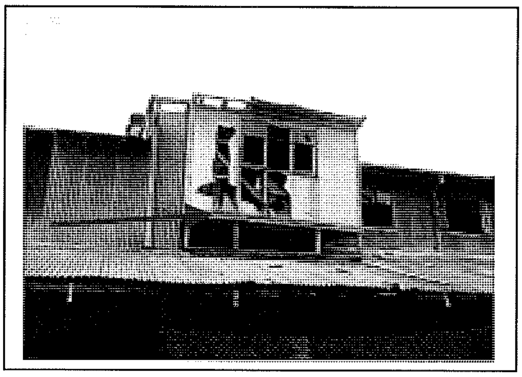
Signature

Tenders must be received by fax or email by (6pm) Tuesday 24 October 2006

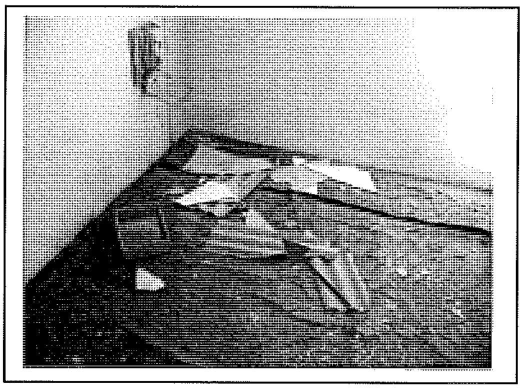


Photograph 1. Millboard, Insulation and debris top floor Kiln 2.

Photograph 2. Insulation top floor Kiln 2.



Photograph 3. Broken external wall sheets atop Kiln 3.



Photograph 4. Damaged sheeting in Building A3.

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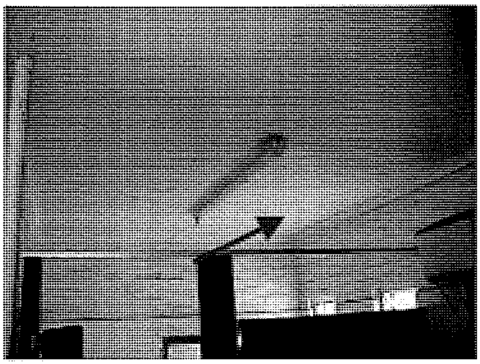
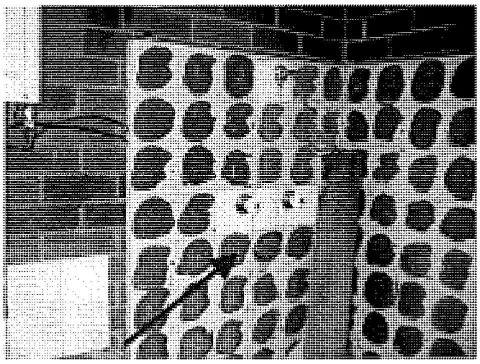
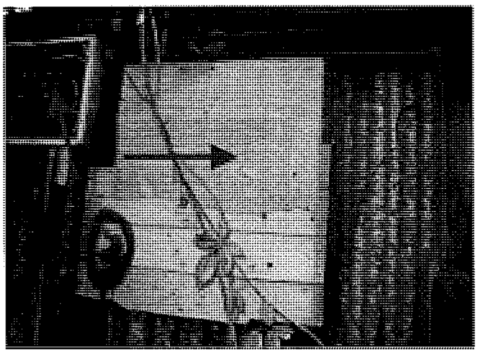


Photograph 5. Former canteen toilet ceiling sheet.



Photograph 6. Shower wall sheet Building SS4.



Photograph 7. Switch board backing sheet and sheeting in Building Fan House 1.

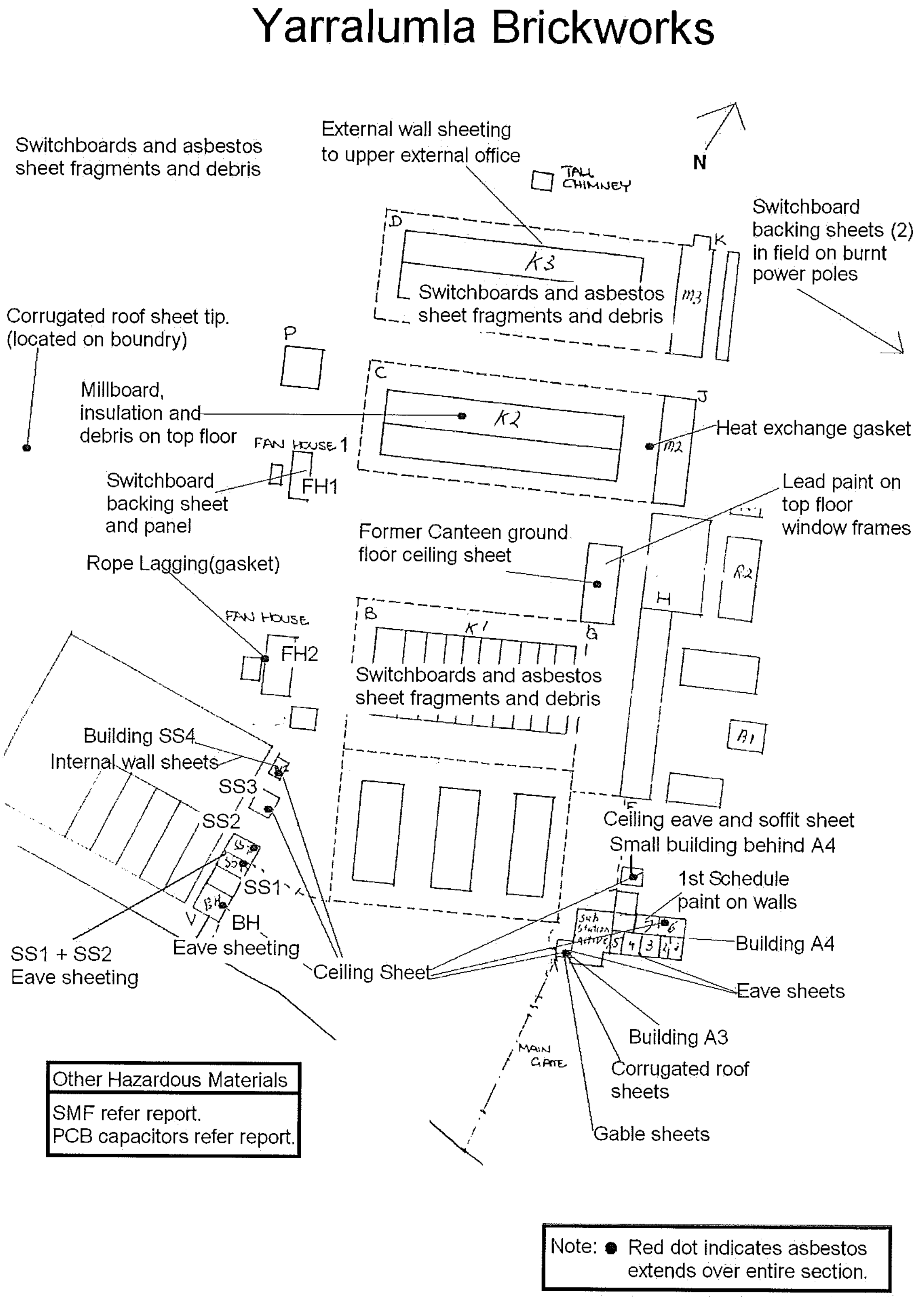


Figure 1:
2810-40 Hazardous Material Location Plan
Note: Reference should be made to the report for a full understanding of this plan.

ROBSON LABORATORIES Pty Ltd

925

ROBSON LABORATORIES Pty Ltd

Occupational Hygiene
Environmental Monitoring

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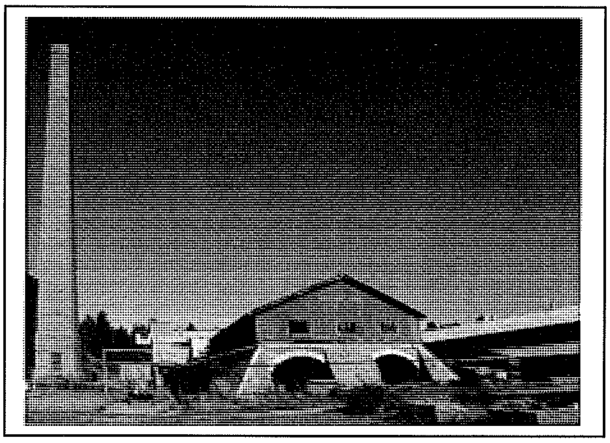
Fax: 02 6239 5669
Mobile:0421 087 298
ABN: 55 008 660 900

Ref: 2810-40 Haz Mat Sur.doc

Survey to Determine the Extent and Condition of Hazardous Building Materials at:

Yarralumla Brickworks
Yarralumla ACT

March 2006



Client: DUS PFM
255 Canberra Avenue
Fyshwick ACT 2609

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1 EXECUTIVE SUMMARY

Robson Laboratories Pty Ltd was contracted by Tony Hardy of the Department of Urban Services Property Facilities Management (DUS PFM) to conduct a Hazardous Materials Survey of the Yarralumla Brickworks, Yarralumla ACT.

The survey was conducted on 24 and 31 January 2006.

Friable asbestos was located in the top level of Kiln 2 in the form of millboard sheeting, thick insulation material to the central beam and debris on the ground. Kiln 1 and Kiln 3 were inaccessible and therefore it has been assumed that the same type and condition of material would be present.

Bonded asbestos was located in the form of sheeting to the perimeter external wall sheeting, eaves, switchboard backing sheets, ceiling sheet, corrugated roof sheet and internal wall sheet. Bonded asbestos was also located in the forms of gaskets to the heat exchange unit in Kiln 2 and rope lagging to the Fan House 2 (duct flange joint).

Lead-paint was identified on site. This paint is white, in poor condition with flaking and chipping in places and found on the internal window frames on the 1st floor of the former canteen. The First Schedule Paint is in poor condition, however as the building is not in use the paint may remain in-situ but should be removed prior to refurbishment. Refer to Appendix D for information on the correct removal procedures. The remaining paint sampled was analysed as lead free paint.

Synthetic Mineral Fibre was identified on site in the form of fibreglass insulation to the water pipes and loose bags of insulation in a few compartments of Kiln 1 and outside Kiln 2.

PCB capacitors to fluorescent light fittings were located in a number of the buildings, refer to page 20.

Air conditioning units were not located at the Yarralumla Brickworks, therefore refrigerants are not of concern.

Refer to Appendix A of this report for the site plan and Appendix D for further information and the correct removal procedures.

Recommendations:

Based on the site survey and analytical results Robson Laboratories Pty Ltd recommends the following:

- The friable millboard sheeting, debris and insulation in the top level of Kiln 2 is in poor condition and should be removed by an ACT licensed asbestos removalist as soon as practicable. It should be assumed that similar materials and condition of material would also be present in the top of Kiln 1 and Kiln 3.

- The external wall sheets around the perimeter of the building atop Kiln 3 are in poor condition and, although not in use, should be removed by an ACT licensed asbestos removalist as soon as practicable. The corrugated roof sheet, ceiling sheet, eaves and gable sheets on building A3 are in poor condition and should be removed by an ACT licensed asbestos removalist as soon as practicable. The remaining ACM is in a fair to good condition and may remain in-situ provided they are well maintained.

- The western end of the site contains a large quantity of corrugated roof sheet which has been dumped and would need to be removed prior to any further site development.

- Lead paint identified on the windows frames of the top floor of the former canteen building is in poor condition and should be removed or encapsulated to prevent further deterioration. First schedule paint identified is in poor condition, and although not in a high volume work area, should be removed as soon as practicable. Refer to Appendix D for the correct removal procedures.

- SMF on water pipes and plant equipment is in fair to poor condition. The loose bags of fibreglass insulation in the Kiln compartments are in a fair to poor condition and should be removed as soon as practicable as asbestos waste. Refer to Appendix D for the correct removal procedures.

- If the capacitors are to be removed appropriate PPE should be worn and they should be disposed of as PCB waste in accordance with local requirements (ACT NoWaste). Refer to Appendix D for the correct removal procedures.

1.1 EXCLUSIONS

This was a non–destructive survey and sampling was therefore limited to accessible materials. **No determination can be made regarding the possibility of concealed asbestos in the following areas without gaining access to allow for inspections:**

- **Asbestos pipe lagging set into masonry walls**
- **Wall Cavities – original asbestos sheeting, debris & insulation**
- **Areas which contain inaccessible building rubble**
- **Plant equipment – asbestos gaskets**
- **Subterranean areas & asbestos sheet fragment packers**
- **Hot water heaters – asbestos beneath Synthetic Mineral Fibre Insulation**

Care should be taken when demolishing or excavating in these areas to determine the existence or otherwise of asbestos. If asbestos is located all demolition or excavation work must cease and an ACT licensed asbestos removalist contacted immediately to remove this material prior to completion of the demolition.

2 SCOPE

Robson Laboratories Pty Ltd was contracted by Tony Hardy of the DUS PFM to conduct a Hazardous Materials Survey of the Yarralumla Brickworks Yarralumla ACT.

The aim was to assess the extent and location of:

- Asbestos building/construction materials;
- Synthetic Mineral Fibre (SMF);
- PCBs;
- Lead-base paint; and
- Refrigerants.

Materials in similar locations and visually consistent with that which is positively identified as consisting of or containing asbestos, SMF, lead-base paint or PCBs were to be considered as being identical.

The extent and likelihood of hazardous materials as described above are to be documented with reference to Commonwealth and State regulations and guidelines, including recommendations for the remediation or control of hazardous substances.

2.1 CODE COMPLIANCE DETERMINATION

All recommendations and Code Compliance are determined with reference to:

- *Code of Practice for the Management and Control of Asbestos in Workplaces* [NOHSC: 2018 (2005)].
- ACT WorkCover.
- ACT BEPCON Requirements & Regulations.
- Worksafe Australia, Sydney 1990, *Synthetic Mineral Fibres: National Standard and National Code of Practice.*
- Standards Australia, AS 4361.2 - 1998 *Guide to lead paint management, Part 2: Residential and Commercial Buildings,* Homebush, ACT.
- ANZECC 1997, *Identification of PCB-Containing Capacitors; An information Booklet for Electricians and Electrical Contractors.*
- Standards Australia, HB 40.1 – 2001 *The Australian Refrigeration and Air-conditioning Code of Good Practice.*
- Dangerous Substances Act 2004 A2004-7.

3 METHOD

The specified premises were visually inspected on 24 and 31 January 2006. Determination of hazardous materials internal and external consisted of the following methodology:

Asbestos: The nature of building materials found was assessed visually and through sampling. Samples suspected of containing asbestos were verified by NATA (National Association of Testing Authorities) accredited laboratory analysis.

PCBs: Capacitors to fluorescent lights were compared to a list of capacitors known to contain PCBs. It has been assumed that capacitors known to contain PCBs in one location *may* reoccur in similar fluorescent lights.

SMF: The extent and location of Synthetic Mineral Fibre (SMF) in wall cavities and ceiling spaces, if present, was documented.

Lead (Pb)-base paints: Paint samples were taken as scrapings from different surfaces to assess the majority of paint types. The percentage lead composition of these samples was established by NATA accredited analysis.

Refrigerants: The air conditioning units, if any, were examined for the use and type of refrigerant gases.

Note: The purpose of this report is to compile a Register of Hazardous Building Materials. It may be used as a general guide for asbestos removal planning, for stakeholder management of hazardous materials, or as reference for maintenance and sub-contractors. *This report must not be used as a specification for asbestos removal.* Prior to removal works, a destructive survey must be carried out to determine to extent of concealed asbestos.

Although all reasonable care and attention was taken in compiling this report no guarantee as to its accuracy or completeness can be given. This can be a result of:

- Difficulty in gaining access to all areas, particularly given the non-destructive nature of the survey;
- The normal construction practice of 'building in' some of the works; and
- The random application of asbestos and other hazardous materials.

Prior to demolition the contractor(s) carrying out the work must fully acquaint themselves with the extent of the hazardous materials, particularly in those areas which may require full or partial demolition in order to determine the exact extent and location of such material.

4 ASBESTOS MATERIALS

4.1 RESULTS

Table 1: Mineralogical analysis of samples for asbestos using polarising light microscopy

Sample No.	Material Type & Location	Composition
2810 – 40 – A1	Kiln 2 top floor millboard	**Chrysotile asbestos**
2810 – 40 – A2	Thick insulation to central beam Kiln 2 top floor	**Chrysotile asbestos**
2810 – 40 – A3	Heat exchange gasket Kiln 2 top floor	**Chrysotile asbestos**
2810 – 40 – A4	Fan House 2 duct flange joint	**Chrysotile asbestos**
2810 – 40 – A5	Former canteen toilet ceiling sheet	**Chrysotile asbestos**
2810 – 40 – A6	1st level walkway floor covering	No asbestos detected
2810 – 40 – A7	Building SS3 ceiling sheet	**Chrysotile asbestos**
2810 – 40 – A8	Building SS4 shower wall sheet	**Chrysotile asbestos**
2810 – 40 – A9	Perimeter eave and soffit sheet (Building A4)	**Chrysotile asbestos**

Sample No.	Visually Assessed Location Table	Composition
2810 – 40 – A10	Switch board backing sheets** (In various locations)	
2810 – 40 – A11	Corrugated roof sheet and debris** (Building A3 & Tip area western side)	
2810 – 40 – A12	Ceiling sheet** (Building A4 & BH)	**Consistent with asbestos materials****
2810 – 40 – A13	External wall sheeting** (Atop kiln 3)	
2810 – 40 – A14	Scattered sheeting debris** (In various locations)	

Table notes:

**Visually assessed in the field.

- It should be noted that the above samples were a representative selection of materials suspected of containing asbestos.
- Materials were not sampled from all areas due to the consistency of the materials used throughout the buildings.
- On-site inspections and an examination of the accompanying plan within this report should be undertaken prior to the commencement of any asbestos removal programme.

Chrysotile	=	**white asbestos**
Amosite	=	**grey or brown asbestos**
Crocidolite	=	**blue asbestos**

4.2 ASBESTOS SUMMARY

Materials containing asbestos have been found in the following locations

Table 2: Summary of asbestos materials

Asbestos Material	Material Location (Refer plan)	Condition	Maintenance	Removal – est. costs
Friable asbestos sheeting	Kiln 2 top floor millboard, insulation and debris (3 kilns)	**2**	**B**	[redacted]
Asbestos sheeting	Corrugated roof sheet, ceiling sheet, eave sheet, gable sheet, switch board backing sheet and debris on ground** (Building A3)	**2**	**B**	[redacted]
	External wall sheeting** (Atop kiln 3)	**2**	**B**	[redacted]
	Corrugated roof sheets** (tip area western side)	3	C	[redacted]
	Scattered sheeting debris** (In various locations)	3	C	[redacted]
	Former canteen toilet ceiling sheet	4	D	[redacted]
	Ceiling sheet (Building SS3)	4	D	[redacted]
	Shower wall sheet (Building SS4)	4	D	[redacted]
	Perimeter eave and soffit sheet (Building A4)	4	D	[redacted]

Asbestos sheeting	Switch board backing sheets** (In various locations)	4	D	Not assessed
	Ceiling sheet** (Building A4)	4	D	Not assessed
	Ceiling sheet** (Building BH)	4	D	Not assessed
Asbestos rope lagging	Duct flange joint Fan House 2	4	D	Not assessed
Asbestos gaskets	Heat exchange gasket (Kiln 2 top floor)	4	D	Not assessed
The inspection of all accessible areas identified the above asbestos materials.				

Table Notes:

**Visually assessed in the field.

Note: Estimated Asbestos Removal costs are only supplied where Condition Ratings are 1 or 2, or Maintenance Ratings are A or B.

Condition Rating

5	Excellent
4	Good
3	Normal
2	Poor
1	Run Down

Maintenance Rating

A	Critical
B	Essential
C	Important
D	Discretionary

4.3 RECOMMENDATIONS

Asbestos Positive Findings:

Refer to Tables 1, 2 and Appendix A for site plans of specific locations.

ELEMENT: Friable asbestos

- **Millboard, top floor Kiln 2 – soft asbestos sheeting**
- **Insulation pads, top floor Kiln 2 – soft asbestos sheeting**
- **Debris on ground, top floor Kiln 2 – asbestos sheeting debris**

Implications:

- The ACM on the top floor of Kiln 2 is soft and friable. This material is in poor condition and may release elevated fibre levels if disturbed by personnel.
- Kiln 1 and Kiln 3 were inaccessible and therefore it has been assumed that the same type and condition of material would be present.

Recommendations:

- The friable ACM on the top floor of Kiln 2 must be removed by an ACT licensed asbestos removalist as soon as practicable. Prior to the removal works the area should be sealed off to prevent further disturbance to the ACM. Appropriate signage must be placed at the start of the walkway to warn people of the asbestos hazard.
- Maintenance and other personnel should be instructed not to remove or damage identified asbestos materials. An ACT licensed asbestos removalist must undertake removal of damaged asbestos containing materials.
- Prior to any planned demolition, refurbishment or maintenance, its effect upon any in-situ asbestos must be established by reference to this document, including amendments.
- If immediate removal of all asbestos is not planned, an Asbestos Management Plan is required (Refer *Asbestos Code of Practice* - Appendix B).

Asbestos Positive Findings:

Refer to Tables 1, 2 and Appendix A for site plans of specific locations.

ELEMENT: Bonded asbestos

- **Building A3 corrugated roof sheet – Asbestos sheeting**
- **Building A3 ceiling sheet – Asbestos sheeting**
- **Building A3 eave sheet – Asbestos sheeting**
- **Building A3 gable sheets – Asbestos sheeting**
- **Building A3 debris – Asbestos sheeting**
- **Atop Kiln 3 external wall sheets –Asbestos sheeting**
- **Scattered sheeting debris – Asbestos sheeting**
- **Former canteen toilet ceiling sheet – Asbestos sheeting**
- **Building SS3 ceiling sheet – Asbestos sheeting**
- **Building SS4 wall sheet – Asbestos sheeting**
- **Building A4 eaves and soffit sheet – Asbestos sheeting**
- **Switch board backing sheets – Asbestos sheeting**
- **Building A4 ceiling sheet – Asbestos sheeting**
- **Heat exchange gasket – Asbestos gaskets**
- **Fan unit duct flange joint – Asbestos rope lagging**

Implications:

- The ACM in and around building A3 are in poor condition and may release asbestos fibre if disturbed.

- The external wall sheeting atop Kiln 3 is in poor condition and is highly likely to deteriorate further during normal building usage.

Recommendations:

- The ACM mentioned above and the scattered asbestos sheeting debris (minor) located across the site must be removed by an ACT licensed asbestos removalist as soon as practicable.

- The remaining ACM is in good condition and may remain in-situ provided it is maintained in good condition until removed during refurbishment by an ACT licensed asbestos removalist. The asbestos is bound into a stable matrix and would not be anticipated to release significant fibre under normal building usage.

- Maintenance and other personnel should be instructed not to remove or damage identified asbestos materials. An ACT licensed asbestos removalist must undertake removal of damaged asbestos containing materials.

- Prior to any planned demolition, refurbishment or maintenance, its effect upon any in-situ asbestos must be established by reference to this document, including amendments.

- If immediate removal of all asbestos is not planned, an Asbestos Management Plan is required (Refer *Asbestos Code of Practice* - Appendix B).

Asbestos Positive Findings:

Refer to Tables 1, 2 and Appendix A for site plans of specific locations.

ELEMENT: Western side of site (Tip Area)

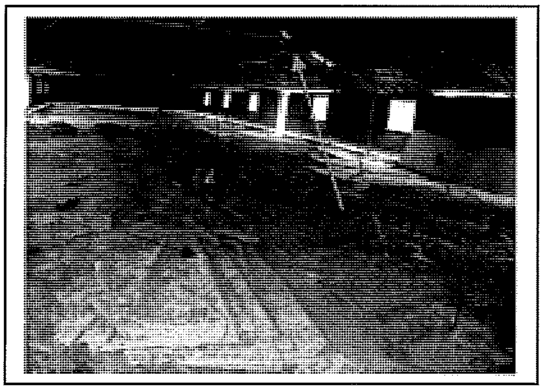
- **Corrugated roof sheets and debris – Asbestos sheeting**

Implications:

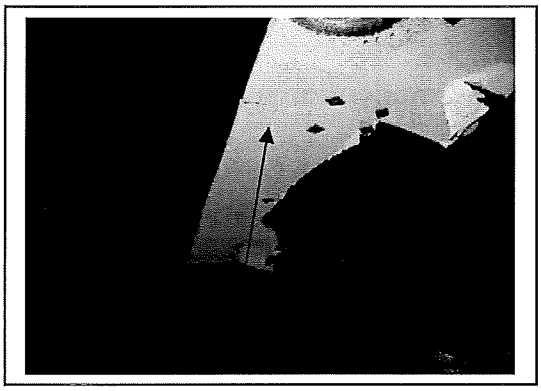
- The corrugated roof sheets and debris in the tip area on the western side of the site are in a fair condition but must be removed. An ACT licensed asbestos removalist must be contracted for the remediation of the tip area and soil validation must be carried out prior to any further site development.

Recommendations:

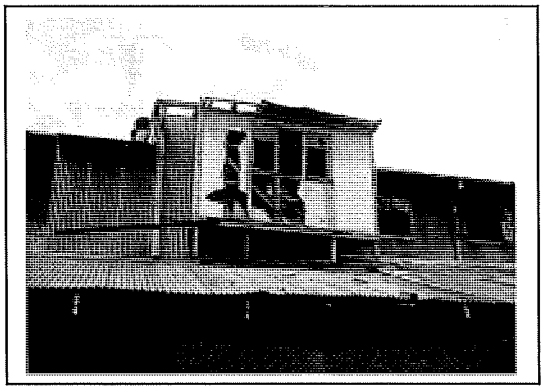
- Appropriate signage must be placed at the edges of the tip area to warn people of the asbestos hazard.
- An ACT licensed asbestos removalist must be contracted to remove the corrugated asbestos sheeting material from the western side of the site (Tip Area).
- Maintenance and other personnel should be instructed not to remove or damage identified asbestos materials.
- If immediate removal of all asbestos is not planned, an Asbestos Management Plan is required (Refer *Asbestos Code of Practice* - Appendix B).



Photograph 1. Millboard, Insulation and debris top floor Kiln 2.

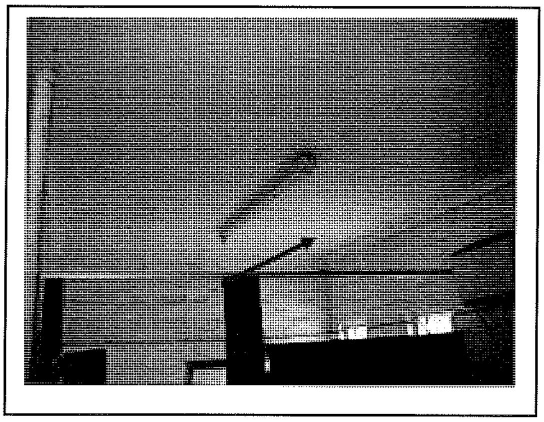


Photograph 2. Insulation top floor Kiln 2.

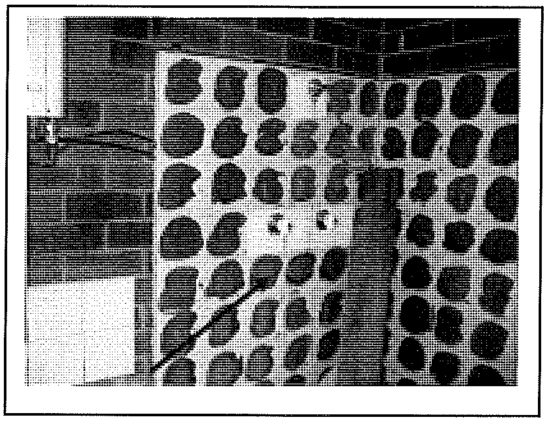


Photograph 3. Broken external wall sheets atop Kiln 3.

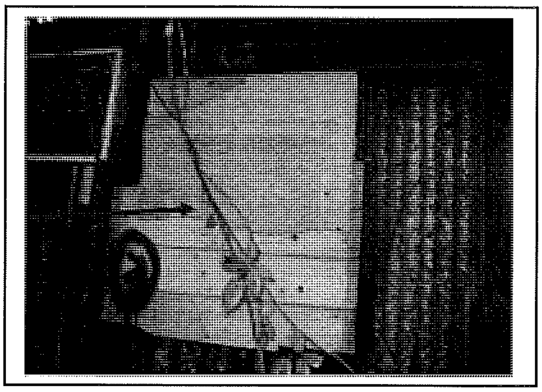
Photograph 4. Damaged sheeting in Building A3.



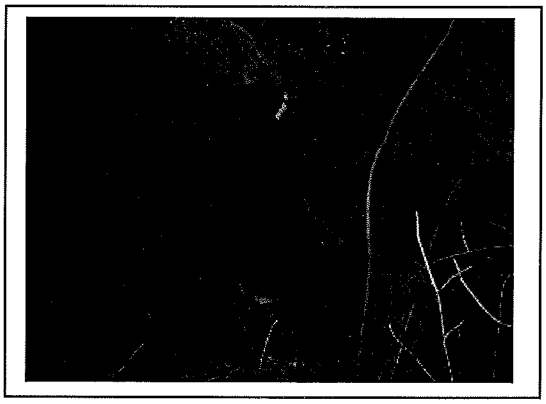
Photograph 5. Former canteen toilet ceiling sheet.



Photograph 6. Shower wall sheet Building SS4.



Photograph 7. Switch board backing sheet and sheeting in Building Fan House 1.



Photograph 8. Corrugated roof sheets in tip area.

5 ANALYSIS OF PAINT SAMPLES FOR LEAD CONTENT

5.1 INTRODUCTION

Lead paint is defined by the Australian Standard (AS 4361.2 – 1998 *Guide to lead paint management Part 2: Residential and Commercial buildings*) as a paint or component coat of a paint system containing lead or lead compounds, in which the lead content (calculated as lead metal) is in excess of 1.0% by weight of the dry film as determined by laboratory testing.

Further, the Standard for the Uniform Scheduling of Drugs and Poisons (National Drugs and Poisons Schedule Committee July 2000) classifies paints having more than 0.25% lead as First Schedule Paint and prohibits their manufacture, supply or use.

It has been shown that the dust generated from dry sanding or abrasive blast cleaning of paints with a lead concentration of 0.25% can have sufficient content to produce exposure levels that exceed those that define a 'lead task' in NOHSC 1012.

Therefore paints with a lead concentration greater than 0.25% (if they are to be removed) must be treated as a lead paint (i.e. subject to the regulations in NOHSC 1012).

Table 3: Lead Composition in Paint by Inductively-Coupled Plasma Spectroscopy

Sample No.	Location and Colour of Paint Sample	Lead in Paint %
2810 – 40 – P1	Doorframe to building R1 (white)	0.0066
2810 – 40 – P2	**Former canteen 1st floor west window (white)**	**19**
2810 – 40 – P3	Former canteen toilet wall (white)	0.093
2810 – 40 – P4	Ceiling in room adjacent canteen (white)	0.072
2810 – 40 – P5	Doorframe to building SS1 (white)	0.0005
2810 – 40 – P6	*Internal wall building A4 (white)*	*0.26*
2810 – 40 – P7	Internal ceiling building A4 (white)	0.024

Notes:

Lead Paint	**(> 1.0% Pb)**
First Schedule Paint	*(> 0.25% Pb)*
Lead-free Paint	(≤ 0.25% Pb)

5.2 DISCUSSION

The analytical results of paint sampling throughout the Yarralumla Brickworks Yarralumla ACT revealed that lead paint was present on the 1st floor window frames of the former canteen.

First Schedule Paint was identified on the walls in building A4.

The remainder of the paint sampled was identified as lead-free.

The lead paint is in poor condition and must be removed to prevent further deterioration. Refer to Appendix D for information on the correct removal procedures.

The First Schedule Paint is in poor condition, however as the building is not in use the paint may remain in-situ but should be removed prior to refurbishment. Refer to Appendix D for information on the correct removal procedures.

It should be assumed that all paints in similar locations throughout the buildings would contain similar concentrations of lead.

5.3 CONCLUSION

The lead paint identified on the 1st floor window frames of the former canteen (white) at the Yarralumla Brickworks, Yarralumla ACT is in poor condition and must be removed or encapsulated to prevent further deterioration. Refer to Appendix D for information on the correct removal procedures.

The First Schedule Paint is in poor condition, however as the building is not in use the paint may remain in-situ but should be removed prior to refurbishment. Refer to Appendix D for information on the correct removal procedures.

The majority of paint types used throughout the buildings are classified as lead free paints.

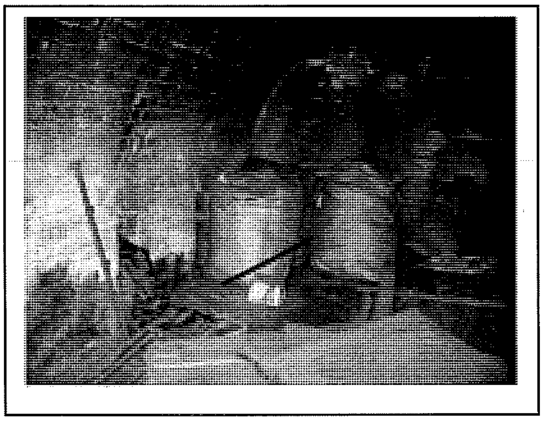
All paints identified were found to be in a poor to fair condition.

Due to the low levels of lead present in most of the paints, they would not be expected to pose a significant risk to human health or the environment.

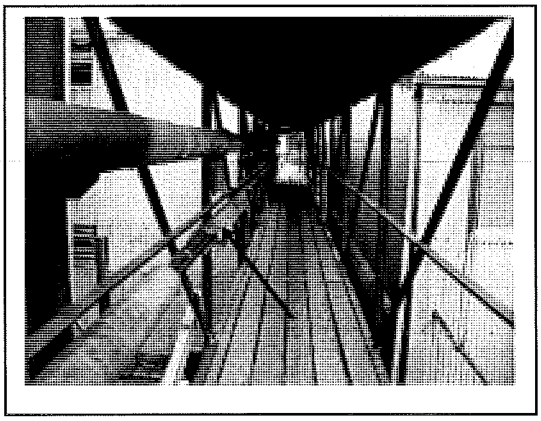
6 SYNTHETIC MINERAL FIBRE (SMF) SURVEY

- SMF was identified in the form of fibreglass insulation on hot water pipes and plant equipment throughout the site. Loose fibreglass insulation is also present on the ground in various locations throughout Kiln 1 and outside Kiln 2.

The loose fibreglass insulation in a number of compartments in Kiln 1 and outside Kiln 2 are in fair condition. Given the uncertainty of the origin of the SMF Robson Laboratories Pty Ltd recommends it be disposed of as asbestos waste as this material may contain asbestos dust and debris from the original removal of the corrugated roof sheets. Refer to Appendix D for information on the correct removal procedures.



Photograph 9. Bags of loose fibreglass insulation stored in Kiln 1.



Photograph 10. Fibreglass insulation on water pipes.

7 PCB SURVEY

The fluorescent light fittings across the site were inspected for the use of PCB capacitors.

7.1 RESULTS

PCB capacitors were identified in the fluorescent light fittings in various buildings at the Yarralumla Brickworks, Yarralumla ACT.

The types of fluorescent light capacitors identified are presented in Table 4 below.

Table 4: Capacitor Type and Location Summary Table

Location	Capacitor Type	Result
North end of site	Plessey plastic 10 µF Type 427/1/07503/006	Negative
Building R2	AEE MP 12 µF Type PMN 5417	Negative
Former canteen ground floor	**AEE MP 6 µF Type PMN 5417**	**Positive**
Building SS1	**Nichicon 1966 6 µF Type SFSGLP**	**Positive**
Building A4 1 Tube	**Dawco metal 3.25 µF BS 4017-1966**	**Positive**
Building A4 2 Tubes	**Ducon metal 6.5 µF APF 265CR**	**Positive**
Building R1	**Ducon metal 6 µF APF 260CR**	**Positive**

7.2 CONCLUSIONS AND RECOMMENDATIONS

Based on the survey results PCB capacitors were identified in the fluorescent light fittings in all buildings at the Yarralumla Brickworks. Refer to Appendix D for information on the correct removal procedures.

8 REFRIGERANTS SURVEY

Results

Air conditioning units were not located at the Yarralumla Brickworks Yarralumla ACT, therefore refrigerants are not of concern.

9 APPENDIX A: HAZARDOUS MATERIAL LOCATION PLAN

10 APPENDIX B: ASBESTOS - INCLUSIONS

Taken from the *Code of Practice for the Management and Control of Asbestos in Workplaces* [NOHSC: 2018 (2005)].

Part 7. RESPONSIBILITIES

Persons with control of premises have a duty of care to:

- Develop and implement and maintain an asbestos management plan;
- Investigate the premises for the presence or possible presence of ACM (asbestos containing materials);
- Develop and maintain a register of the identified or presumed ACM, including details on their locations, accessibility, condition, risk assessments and control measures;
- Assess the condition of any ACM that are found and the associated asbestos risks;
- Develop measures to remove the ACM or otherwise to minimise the risks and prevent exposure to asbestos; and
- Ensure the control measures are implemented as soon as possible and are maintained as long as the ACM remain in the workplace.

Part 8. DEVELOPMENT OF AN ASBESTOS MANAGEMENT PLAN (AMP)

The purpose of an AMP is to help persons with control of premises to comply with the asbestos prohibition and prevent exposure to airborne asbestos fibres while ACM remain in the workplace.

8.1 General principles

The following general principles must be applied in developing an AMP:

- The ultimate goal is for all workplaces to be free of ACM. Accordingly, consideration should be given to the removal of ACM during renovation, refurbishment and/or maintenance, where practicable, in preference to other control measures such as enclosure, encapsulation or sealing.

- Reasonable steps must be taken to label all identified ACM. Where ACM are identified or presumed, the locations must be recorded in a register of ACM.

- A risk assessment must be conducted for all identified or presumed ACM.

- Control measures must be established to prevent exposure to airborne asbestos fibres and should take into account the results of risk assessments conducted for the identified or presumed ACM.

- If ACM are identified or presumed, there must be full consultation, involvement and information sharing during each step of the development of the AMP – i.e. during the identification, risk assessment and establishment of control measures.

- The identification of ACM and associated risk assessments should only be undertaken by competent persons.

All workers and contractors on premises where ACM are present or presumed to be present, and all other persons who may be exposed to ACM as a result of being on the premises, must be provided with full information on the occupational health and safety consequences of exposure to asbestos and appropriate control measures. The provision of this information should be recorded.

11 APPENDIX C: LABORATORY REPORTS

12 APPENDIX D: ADDITIONAL INFORMATION

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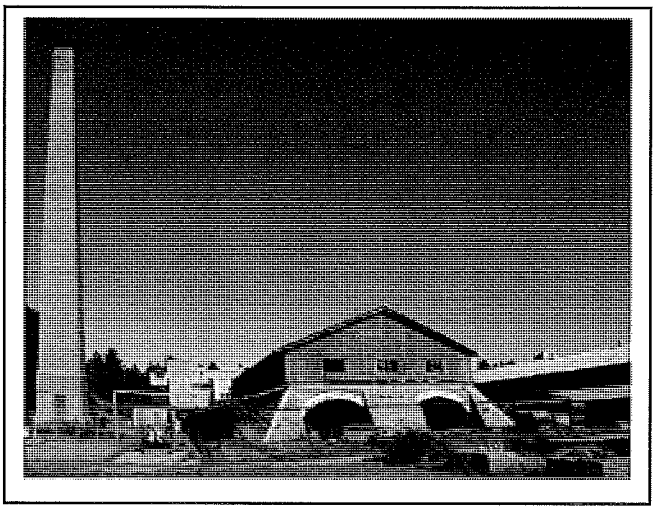
Specification for the Removal of Asbestos Materials from:

Yarralumla Brickworks
Yarralumla ACT

October 2006

In accordance with the requirements of this document and AS2124 - 1992 General Conditions of Contract



Client: TAMS Property Group
255 Canberra Avenue
Fyshwick
ACT 2609

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REMOVAL AND DISPOSAL OF ASBESTOS AND ASBESTOS CONTAMINATED MATERIALS

PREAMBLE

1.0 INTRODUCTION

This document forms the specification for the safe removal of ACM (Asbestos Containing Materials) from the Yarralumla Brickworks. An asbestos removalist with an ACT asbestos removal licence shall be employed to remove all asbestos and asbestos contaminated materials. The asbestos removal contractor must hold a current and applicable ACT friable asbestos removalist license, which would enable the removal of friable asbestos.

The extent of work is as specified below and as indicated on the attached drawings and supplied photographs. Note: this removal specification does not include the asbestos tip located on the western side of the site at Yarralumla Brickworks ACT.

Kiln 1:

Electrical switchboards and fragments of bonded sheeting were identified on the top level. The whole top level and lower level areas will required a thorough inspection to remove the asbestos cement sheet fragments.

Note: Loose fibreglass insulation is present on the ground in various compartments of Kiln 1 and outside Kiln 2. Given the uncertainty of the origin of the SMF Robson Laboratories Pty Ltd recommends it be disposed of as asbestos waste as this material may contain asbestos dust and debris from the removal of the corrugated roof sheets.

Inside top level of Kiln 2:

Millboard sheeting and debris and thick insulation to beams (**Friable**) and Gaskets to plant equipment. The top layer of soil (50 mm) will require removal to ensure that all debris is removed. Removal of SMF insulation is also required.

Kiln 3:

External wall sheeting to upper external office. Electrical switchboards and fragments of bonded sheeting were identified on the top level. The whole top level and lower level areas will required a thorough inspection to remove the asbestos cement sheet fragments.

Former Canteen:

Ground floor ceiling sheets.

Fan House 1:

Switchboard backing sheet and panel behind.

Fan House 2:

Rope lagging (**Friable**); and
Switchboard backing sheet.

Building SS4:

Ceiling sheets;
Internal wall sheets.

Building SS3:

Ceiling sheets.

Building SS2:

Eave sheets.

Building SS1:

Eave sheets.

Building BH:

Ceiling sheets
Eave sheets.

Building A3:

Gable sheets;
Corrugated roof sheets;
Ceiling sheets;
Eave sheets;
Switchboard backing sheet; and
Sheeting debris on floor.

Building A4:

Ceiling sheets; and
Eave sheets.

Small building behind building A4:

Ceiling sheets;
Soffit sheets; and
Eave sheets.

Miscellaneous items on site:

Switchboard backing sheets (on burnt poles);
Sheeting debris (**Friable**), &
Random locations of asbestos sheeting across the site.

To ensure proper management of the project and to reduce the risk of exposure to airborne asbestos fibres, an occupational hygienist should be contracted to manage, monitor and supervise the asbestos removal project.

Responsibilities of the asbestos removalist:

- The friable asbestos is Chrysotile asbestos. Due to the hazardous nature of this material strict adherence to Occupational Health and Safety Policy will be mandatory throughout the contract period;
- All asbestos removal work in the ACT must be undertaken by contractors holding a current ACT friable asbestos removal licence;
- An asbestos removal control plan specific to the Yarralumla Brickworks project must be developed by the asbestos removalist;
- Ensure that the project is supervised by a suitably qualified person on site at all times during asbestos removal;
- Ensure that all personnel working on the project are suitably trained so that the work may be carried out safely and are fully aware of the health risks associated with exposure to asbestos; and
- Establish a health surveillance programme. (Refer Clause 7.3.6 [NOHSC:2002(2005)]

All asbestos removal work is to be carried out in accordance with:

- *Code of Practice for the Safe Removal of Asbestos 2nd Edition* [NOHSC: 2002(2005)];
- Australian Standard AS 2601 - 2001: The demolition of structures;
- ACT WorkCover requirements; and
- To contract requirements and to the satisfaction of project management.

Approval to proceed with the works must be obtained from the Project Manager prior to commencement.

Demolition or any other works within areas where asbestos has been located is not to take place until the asbestos removalist has completed the schedule of work specified in this document and the Project Manager has given a clearance for the next stage of work to proceed.

The following information is to be provided with the tender submission to demonstrate previous experience in asbestos removal;

- Details of previous friable asbestos removal programmes undertaken in occupied buildings;
- Details of proposed key asbestos removal personnel including their names, relevant experience and qualifications; and
- Proposed asbestos removal methods if different from specified procedures.

Additionally, the contractor shall be primarily responsible for coordination with all sub-contractors to isolate all services where required to ensure compliance to the requirements of [NOHSC: 2002(2005)] and to ensure that the highest degree of Occupational Health and Safety is achieved at all times.

2.0 DRAWING

A diagrammatic drawing of the buildings are presented on page 14.

3.0 ASBESTOS REMOVAL

To ensure proper management of the project and to reduce the risk of exposure to airborne asbestos fibres, an occupational hygienist should be contracted to manage, monitor and supervise the asbestos removal project.

The extent of asbestos removal is as per pages 2, 3 & 4 and the drawing on page 14 or as otherwise indicated by the Project Manager. Asbestos removal work is to be carried out in accordance with actpla's (ACT Planning & Land Authority) Asbestos Removal and Disposal document, [NOHSC: 2002(2005)], Australian Standards and as directed by the Project Manager.

Disposal of all asbestos materials will be in accordance with actpla's requirements. The appropriate packaging of removed asbestos materials is to be performed by the asbestos removalist.

4.0 AIRBORNE FIBRE LEVELS

It is the Asbestos Removalist's responsibility to ensure that the maximum fibre levels throughout the asbestos removal work does not equal or exceed 0.01 f/mL. The consequences of airborne fibre levels observed at or exceeding those specified below will result in the Occupational Hygienist instructing the contractor in taking the appropriate 'Control /Action' as listed below;

Control Level (airborne asbestos fibres/mL)	Control / Action
< 0.01	Continue with control measures
≥ 0.01	Review control measures
≥ 0.02	Stop removal work and find the cause

SECTION A - PRELIMINARIES

1.0 SITE INSPECTION

A site inspection is to be arranged through TAMS Property Group. A plan and photographs are included in this specification to assist in the understanding of the scope of works.

2.0 TENDER ENQUIRIES

All tender enquiries should be directed to the Project Manager – Peter Ozols.

Phone: 0438 652 192

Fax: 02 – 6213 0735

Email: Peter.ozols@act.gov.au

3.0 SITE INDUCTION

All asbestos removal personnel, nominated sub-contractors and the occupational hygienist shall attend a **Site Induction** prior to the commencement of works on site.

4.0 INSURANCES

Any insurances shall not carry any exclusion covering asbestos or other dust exclusions. Insurances are to include public liability and workers compensation.

5.0 SITE AND SAFETY MEETINGS

The Contractor will be required to attend Site and Safety meetings during the course of the project as required by the Project Manager.

6.0 TOOL BOX MEETINGS

Prior to the commencement of each days work the Contractor and site personnel involved in the asbestos removal will be required to attend a Tool Box meeting organized by the Project Manager.

7.0 ASBESTOS & MATERIALS STORE & HANDLING

All materials are to be stored only in those areas designated. Contractors are only to use entrances and areas designated by the Project Manager.

8.0 OCCUPATIONAL HYGIENE

To ensure proper management of the project and to reduce the risk of exposure to airborne asbestos fibres, Robson Laboratories Pty Ltd will monitor all aspects of the asbestos removal and provide visual and airborne fibre monitoring during the asbestos removal programme and provide written clearance certification on completion of the project.

9.0 DEFINITIONS

Background samples — Air monitoring undertaken in a building known to contain asbestos based materials, prior to an asbestos removal programme to establish ambient airborne fibre levels.

Work area — That area restricted from the general public adjacent to the Removal area but in which protective clothing and respirators are not generally required.

Removal area — That area which is subject to asbestos removal and in which protective clothing and respirators are required at all times.

Occupied area — That area in the vicinity of a Work or Removal area to which the general public have unrestricted access.

10.0 ISOLATION OF SERVICES

The asbestos removalist is required to coordinate with all other trades during the contract period. To ensure a safe working environment the removal contractor is required to provide and maintain appropriate respirators and protective clothing for the use of other trades. The removal contractor is required to instruct the other trades in the safe use of Personal Protective Equipment (PPE) to the Project Managers satisfaction when they are required to work in an asbestos contaminated area.

11.0 LIGHTING AND POWER WITHIN REMOVAL AND WORK AREAS

The asbestos removalist is to ensure that all lighting and power is safe and switched off at the power board at the completion of each shift. All lights shall be of a type and design which will ensure that contact with plastic sheeting does not cause ignition. At the completion of each shift a designated person shall be responsible for ensuring all lights and power are turned off at the power board. The name of this person shall be given in writing to the Project Manager prior to the commencement of each shift. A Log Book must be kept detailing all system tests and the name of the person undertaking the test or system shut-down.

12.0 WATER

Where no electrical hazard exists sufficient water is to be used when removing asbestos materials to minimize the generation of airborne dust.

13.0 HEPA FILTER

Only HEPA (High Efficiency Particulate Air) filter vacuum cleaners (which comply with AS 3544-1988 and AS 4260-1997) are to be on site. Negative air exhaust units are to be fitted with HEPA filters and properly maintained throughout the works. The negative air exhaust units will be tested via air monitoring of the outlet during the introduction of fine particulate matter to the inlet side of each unit.

14.0 SECURITY

The asbestos removal contractor is to ensure that the work and removal areas are secured to prevent accidental or deliberate entry by unauthorised persons. At the completion of each day's work, the work and removal areas are to be locked. One copy of each key used to secure these areas must be issued to the Project Manager.

15.0 WASTE CONTAINER DECONTAMINATION & DUMPING

All asbestos waste shall be placed into labelled plastic bags and/or containers as per [NOHSC: 2002(2005)].

All asbestos and contaminated waste is to be adequately contained prior to leaving the site. A letter of receipt to show the appropriate dumping of the contaminated materials must be provided from the waste disposal facility.

16.0 FIRE PRECAUTIONS

A fire extinguisher suitable for all types of fires likely to be encountered shall be kept within the removal area. All personnel shall be informed in the correct use of the fire extinguisher. The names of all persons trained in the use of the fire control equipment must be noted in the Log Book.

17.0 WARNING SIGNS

Signage as described by *Code of Practice for the Safe Removal of Asbestos 2nd Edition* [NOHSC: 2002(2005)] shall be posted at all possible points of entry to the asbestos removal site.

SECTION B - SCOPE OF WORKS AND REMOVAL PROCEDURES

1. Removal of asbestos and asbestos contaminated materials. Locations and details of asbestos materials are as specified on pages 2, 3 & 4 and as shown on the accompanying plan.

i. Obtain instruction to commence work from the Project Manager.

ii. Place appropriate signage at perimeter of removal area.

iii. Plastic line internal walls and floor/ground areas.

iv. Kiln No.2 only – seal openings where appropriate to satisfy v. (next item)

v. Kiln No.2 only – Attach dry decontamination unit and negative air units to the upper level removal area to ensure satisfactory dust control for all operations associated with the asbestos removal.

vi. Visual inspection and will be carried out to ensure compliance with items iii, iv and v.

vii. Following approval to proceed remove asbestos and asbestos contaminated materials using sufficient water to reduce airborne dust. Ensure effective negative air pressure (where required – Kiln No.2) is maintained during asbestos removal.

viii. All asbestos and asbestos contaminated materials must be bagged or containerised and transported and disposed of to actpla requirements.

ix. Vacuum all surfaces to remove all dust and debris after removal has been completed.

x. Obtain visual inspection to all removal areas and airborne fibre clearance from the Occupational Hygienist.

PROPOSED FEE

Total Cost $ (lump sum) ....

Number of days on site ....

(nominate if weekends are included)

....

....

NOTE: NO allowance is required for Occupational Hygiene Services including Air Monitoring, Inspections and Clearance Certification.

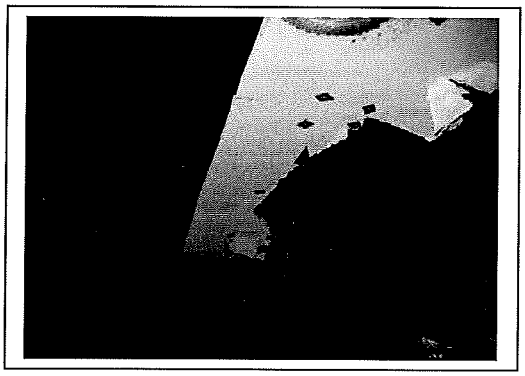
....

Removal Contractor

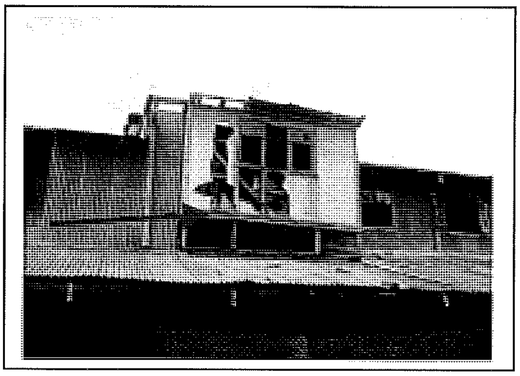
Signature

Tenders must be received by fax or email by (6pm) Tuesday 24 October 2006

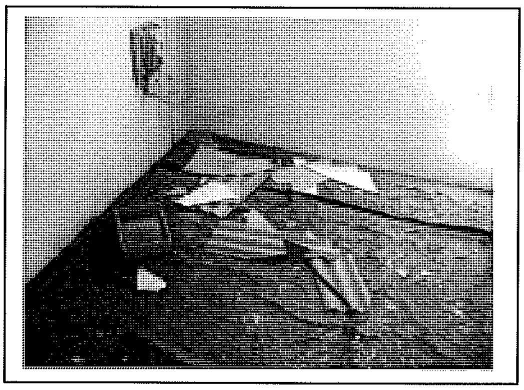
Photograph 1. Millboard, Insulation and debris top floor Kiln 2.



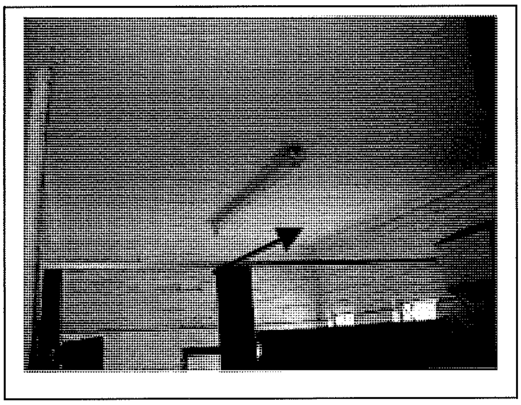
Photograph 2. Insulation top floor Kiln 2.



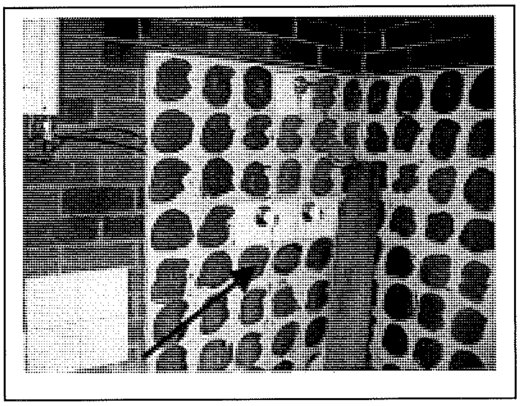
Photograph 3. Broken external wall sheets atop Kiln 3.



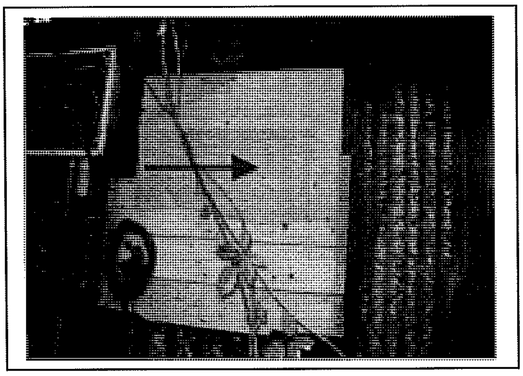
Photograph 4. Damaged sheeting in Building A3.



Photograph 5. Former canteen toilet ceiling sheet.

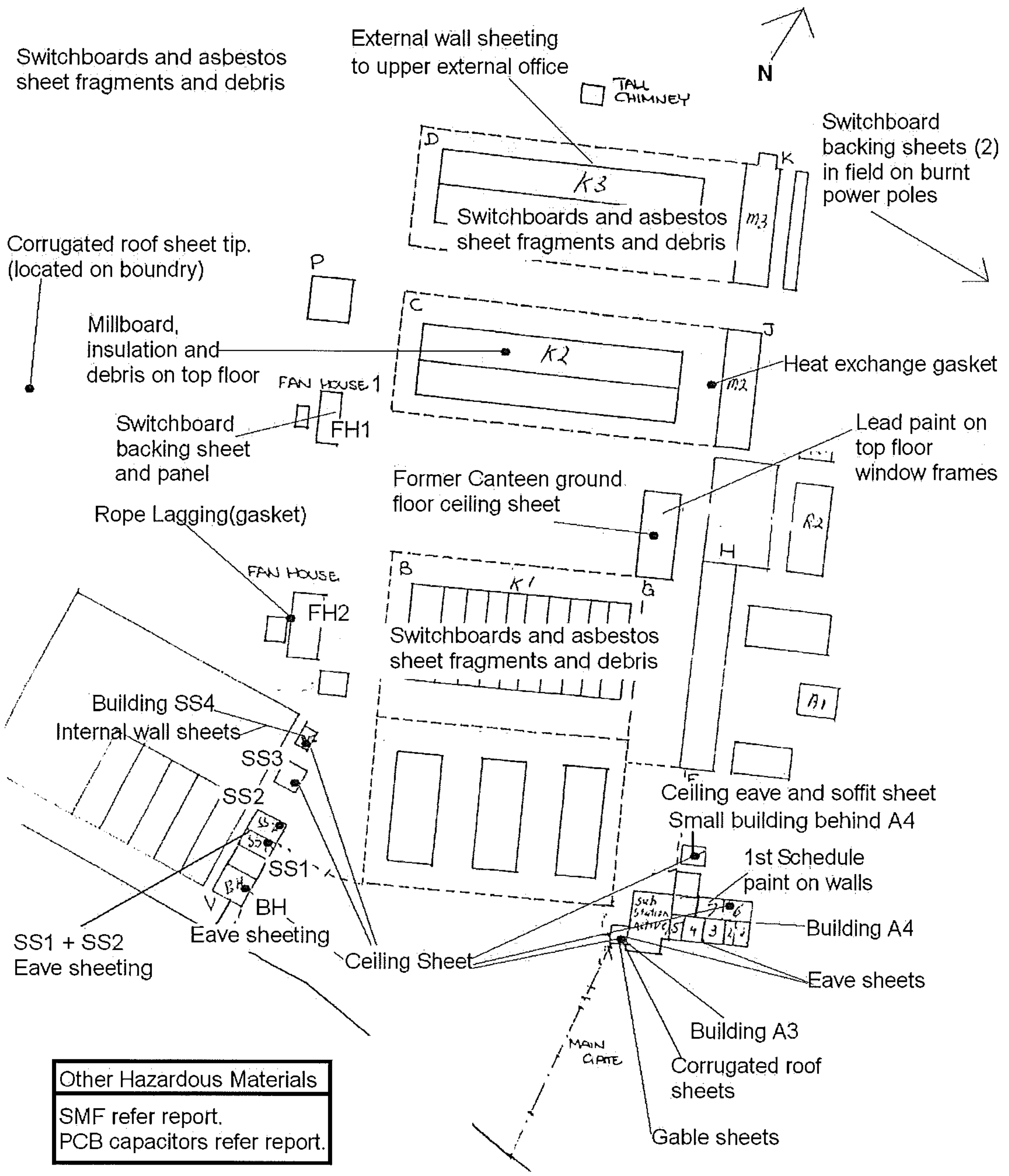


Photograph 6. Shower wall sheet Building SS4.



Photograph 7. Switch board backing sheet and sheeting in Building Fan House 1.

Yarralumla Brickworks



Note: ● Red dot indicates asbestos extends over entire section.

Figure 1:
2810-40 Hazardous Material Location Plan
Note: Reference should be made to the report for a full understanding of this plan.

ROBSON LABORATORIES Pty Ltd

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SGS

6 February 2006 **TEST REPORT**

Robson Laboratories
PO Box 3477
MANUKA
ACT 2603

Your Reference: 2810-40, Yarralumla Brickworks
Report Number: 42729

Attention: Owen Parsons

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

Samples: Qty.	5 Paints
Date of Receipt of Samples:	31/01/06
Date of Receipt of Instructions:	31/01/06
Date Preliminary Report Faxed:	Not Issued

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

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

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

Yours faithfully
SGS ENVIRONMENTAL SERVICES

Edward Ibrahim

Edward Ibrahim
Approved Signatory

SGS Australia Pty Ltd
ABN 44 000 964 278

Environmental Services Botany Industrial Park Gate 3, Denison Street, Matraville 2036 NSW Australia
t +61 (0)2 9666 1426 f +61 (0)2 9666 1364 url www.sgs.com

Lead in Paint Our Reference: Your Reference Sample Type	UNITS ------------- ------------	42729-1 2810-40-P1 paint	42729-2 2810-40-P2 paint	42729-3 2810-40-P3 paint	42729-4 2810-40-P4 paint	42729-5 2810-40-P5 paint
Lead in paint	%	0.0066	19	0.093	0.072	0.0005

Method ID	Methodology Summary
SEP-033	Digestion of paint chips using aqua regia.

PROJECT: 2810-40, Yarralumla Brickworks **REPORT NO: 42729**

QUALITY CONTROL Lead in Paint	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate Base + Duplicate + %RPD	Spike Sm#	Matrix Spike % Recovery Duplicate + %RPD
Lead in paint	%	0.0001	SEP-033	<0.000 1	[NT]	[NT]	Sand	99 || [N/T]

Result Codes

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

Result Comments

Date Organics extraction commenced: N/A
NATA Corporate Accreditation No. 2562, Site No 4354
Note: Test results are not corrected for recovery (excluding Dioxins/Furans* and PAH in XAD and PUF).
Terms and conditions are available from www.au.sgs.com

Quality Control Protocol

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

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ROBSON LABORATORIES Pty Ltd

Occupational Hygiene
Health Safety
Environmental Consulting

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9 Lyell Street Fyshwick ACT 2609
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ABN: 55 008 660 900

Report Ref: 3144_ CL_EI Final_20061018

Environmental Investigation – Audit Report

Yarralumla Brickworks
Sandford Street Complex
Block 1 Section 102 Yarralumla
Canberra Central ACT

October 2006

Client: Territory and Municipal Services Property Group Facilities Management
PO Box 777
Fyshwick ACT 2609

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Appendices

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Appendix 6. Contaminated Land Search Report

Appendix 7. Previous Environmental Report

1 Executive Summary

Robson Laboratories Pty Ltd was commissioned by Territory and Municipal Services Property Group Facilities Management in August 2006 to undertake an Environmental Investigation of specific facilities located within the Yarralumla Brickworks Complex Yarralumla ACT. The purpose of the investigation was to assess the potential environmental impact from the past site use of these facilities to establish budget requirements for effective environmental remediation and hazard abatement (if required).

The facilities targeted include previously identified sources of potential on site contamination:

- Explosive Store (ES);
- Adjacent the asbestos dump (AD);
- Forklift Shed (A6);
- Coal and Oil Storage Area (NE5);
- Kiln Sand;
- General Areas.

Quarry Area (West)

- Machine and Blacksmith Shop Area (M1-M3;
- Quarry Tailing Dump Areas; and
- General Areas.

The representative samples (soil) taken from the site investigations have been classified in accordance with the NEPM (Assessment of Site Contamination).

This assessment is in accordance with the ACT Environment Protection ACT 1997.

The Environmental Investigation identified a range of contaminants which are discussed below.

Fill

Extensive fill was identified adjacent the asbestos dump which comprised mainly of brick waste however ash and slag materials were also identified. The depth of fill horizon ranged between 2 and 3 metres below ground level.

Fill was also located in the levelled grassed section of the Quarry area and is visually apparent as waste mounds in the elevated sections around the lake.

Laboratory analysis to date does not indicate that this fill is contaminated.

Lead

Lead was found to be elevated in the Kiln sands of Kiln 2 (770mg/kg) which exceeds the Sensitive Landuse Criteria of 300mg/Kg. The sample was taken from the northwest corner of Kiln 2.

This result indicates that further testing of the Kiln sands will be required to delineate the extent of the elevated lead levels.

Hydrocarbons

Hydrocarbon contamination was detected at Borehole 14 (0.5-0.7m) in the vicinity of the Machine and Blacksmith Shop Area (Quarry Area directly east of Kiln 2 and 3 – refer Appendix 1).

The concentration of Total Petroleum Hydrocarbons was 10,550 mg/kg which exceeds the Sensitive Landuse Criteria of 1,000mg/kg.

Hydrocarbon odours were observed to be present at this location to a depth of 3m.

This result indicates that further drilling or excavation in this location will be required to delineate the extent of the spill and or remove the hydrocarbon contaminated soil.

Apart from the asbestos dump no other contaminants were identified on site that exceed the Sensitive Landuse criteria at this stage.

Recommendations

Based on the analytical results and field observations Robson Laboratories Pty Ltd recommends the following:

1. In the area adjacent the machine shed where hydrocarbon contamination was identified, excavate and validate the affected area and resultant stockpile for Sensitive Landuse and waste classification purposes.

2. Undertake further sampling and assessment of the Kiln Sands for heavy metal contamination.

3. Undertake further investigation to enable the confirmation of the location of the Septic Tank and the time of the removal of the Coal and Oil Storage Facility.

4. Implement the remediation of the Asbestos Dump and the removal of Asbestos building materials from structures across the site.

5. Ascertain the future use for the site to allow for the design of the appropriate environmental assessment to enable the sites suitability for a change in land use.

6. Ensure a suitable level of Duty of Care is applied to all demolition and waste removal activities as required under the ACT Occupational Health and Safety Act 1989.

2 Introduction

Robson Laboratories Pty Ltd was commissioned by Territory and Municipal Services Property Group Facilities Management in August 2006 to undertake an Environmental Investigation of specific facilities located within the Yarralumla Brickworks Complex Yarralumla ACT. The purpose of the investigation was to assess the potential environmental impact from the past site use of these facilities to establish budget requirements for effective environmental remediation and hazard abatement (if required).

The facilities targeted include previously identified sources of potential on site contamination:

- Explosive Store (ES);
- Adjacent the asbestos dump (AD);
- Forklift Shed (A6);
- Coal and Oil Storage Area (NE5);
- Kiln Sand;
- General Areas.

Quarry Area (West)

- Machine and Blacksmith Shop Area (M1-M3;
- Quarry Tailing Dump Areas; and
- General Areas.

The Environmental Investigation was undertaken on 6 and 7 July 2006.

The representative samples (soil) taken from the site investigations have been classified in accordance with the National Environment Protection Measure (Assessment of Site Contamination).

This assessment is in accordance with the ACT Environment Protection Act 1997.

3 Scope of Work

Robson Laboratories undertook the following scope of works:

Environmental Investigation:

1. Review the Connell Wagner Contamination Report (2001) and all other available information;

2. Design a limited sampling plan (not to EPA requirements) for the site with Data Quality Objectives (i.e. to meet residential land use criteria – the most sensitive landuse);

3. Implement the sampling plan which included:

- Undertake a drilling program targeting seven (7) specific locations across the site.
- Identify depth of fill (if any) in these locations.
- Take representative soil samples from the each of the boreholes, one (1) from the fill soil and one at depth (i.e. natural soil).
- As the source of contamination is specific in some locations and non-specific in general areas the following contaminants were selected for analysis:

  -Benzene, Toluene, Ethyl benzene & Xylene (BTEX);
  -Total Petroleum Hydrocarbons (TPH);
  -Polycyclic Aromatic Hydrocarbons (PAHs);
  -Heavy Metals (As, Cd, Cr, Cu, Hg, Ni, Pb and Zn);
  -Organochlorine Pesticides;
  -Polychlorinated Biphenyls; and
  -Explosives and Nitroglycerin.

4. Based on the results of the sample analysis make recommendations with respect to the likely extent of contamination across the site to TAMS FM.

4 Site Information

4.1 Site Identification

Name and Site Location: **Yarralumla Brickworks**

Yarralumla ACT
(Block 1 Section 102)

Name of the Lessee: **ACT Government**
Managed by: **Territory and Municipal Services Property Group Facilities Management (TAMS FM)**

Client: **TAMS FM**
PO Box 777
Fyshwick ACT 2609

Site Assessor: **Robson Laboratories Pty Ltd**
9 Lyell Street Fyshwick
PO Box 112 Fyshwick
ACT 2609

4.2 Site Description

The site is located on a large block of 9.6 hectares approximately 4.8 km southwest of Canberra City. The site slopes to the west and is surrounded by a golf course and residential land. Apart from the built up areas on the west side of the site large pine trees line the perimeter of the site and are also dominant on the walls of the Quarry.

The site is bounded by the Royal Canberra Golf course to the west, Lane Poole Place and Bentham Street to the North, Schomburgk and Woollis Streets to the East and South. The site may be accessed by Denman Street at the south end and is secured by a chain wire fence.

The site has two distinct areas the west side which is defined by the kiln buildings and workshops and the East side which is defined by the Quarry. The quarry floor is dominated by a man made lake which was mostly dry at the time of the investigation.

Large areas of the site have been filled with either quarry tailings or brick waste generated from the manufacturing processes.

The facilities targeted include previously identified sources of potential on-site contamination:

- Explosive Store (ES);
- Adjacent the asbestos dump (AD);
- Forklift Shed (A6);
- Coal and Oil Storage Area (NE5);
- Kiln Sand;
- General Areas.

Quarry Area (West)

- Machine and Blacksmith Shop Area (M1-M3;
- Quarry Tailing Dump Areas; and
- General Areas.

4.3 Geology and Other Physiographic Information

Refer Connell Wagner Report 2001 (Appendix 6).

4.4 Site History

Refer Connell Wagner Report 2001 (Appendix 6).

4.4.1 Historical Aerial Photograph Review

Historical aerial photograph review of the site was undertaken through the actpla office located in Dickson ACT. The aerial photographs were reviewed at approximately 10 year intervals from the earliest record to the present.

November 1950: The Brickworks was established and the site was bounded by trees/ orchard to the north, housing development to the east, open paddocks to the south with a number of sheds and established trees to the west.

1955: A third kiln has been established on the site.

1961: A large shed has been built on the east side of the site (NE7) and a drainage line is apparent on the south side of Fan House 2 that flows to the west. There are large stockpiles of material on the quarry side of the site. There is land disturbance on the south boundary of the site which is probably for cultivation.

February 1972: All kilns have been built and a car park has been established on the southeast corner of the site. Red stockpiles (brick) on the boundaries of the quarry (SE and NW end of the lake). Coal and oil storage (NE5) appears to be located outside of the north boundary. CSIRO School of Forestry was established (NE of the site).

1978: Established drainage line between the two fan houses is present and NE5 has been removed. Stockpiles of material are present across the eastern half of the site in two locations and a dump site is present in the NE corner of the property outside the current boundary.

February 1980: A large volume of material is present on the west side of the site 'asbestos dump'. The railway line is established and all kiln roofs appear to be tin. Note: the only kiln roof that may have been asbestos is Kiln 3.

1981: As per 1980 but the 'asbestos dump' was obscured by vegetation.

March 1983: Coal storage area removed.

March 1985: 'Asbestos' dump was clearly present below the drainage line on the west side of the site. The tourist railway line and the artificial lake have been established. Revegetation of the quarry area is apparent. Houses were established on the east and north boundaries of the site.

1991: The dump was covered in vegetation.

1997: As per 1991 but there are logs stored on the east side of the site. Houses are established to the east and north.

2004: As per 1997.

4.5 Contaminated Land Review

The contaminated land search undertaken through Environment ACT Environment Protection Unit did not identify a record of the site on the Register of contaminated sites under section 21(A) of the Environment Protection Act 1997.

However, the site is recorded on the EPU Database as potentially contaminated due the past activities at the site.

Further, the search identified the site as an abandoned commercial brickworks on Blocks 1, 7 and 20 Section 102 Yarralumla and the EPU has received a Phase 1 environmental assessment prepared by Connell Wagner dated February 2001 which is reviewed in this report.

The EPU supported the Consultants recommendations that further investigation, validation and remediation would be required and any further assessment would require an independent audit by an accredited third party environmental auditor.

The EPU has previously indicated to the ACT planning authorities that it would oppose any change in land use from a brickworks until the site is assessed and independently audited by a contaminated land auditor.

4.6 Review of the Connell Wagner Contamination Report 2001

The study was a preliminary (Phase 1) assessment of potential site contamination and was based on interviews with persons who worked on the brickworks and a desktop study which undertook the review of available historic information.

The study identified a number of locations on site which are likely to be sources of on-site contamination but did not identify any off site contamination sources.

These include:

- Coal and Oil Storage Bunkers (NE5);
- Forklift Shed (A6);
- Model Railway Workshops (M1-M3);
- Septic Tank (ST);
- Blacksmiths Shop (M1-M3);
- Explosive Storage Area (ES); and
- General fill on the site.

The report also makes comment on the likely presence of above ground hazardous material in buildings and that the site has been filled in places with materials that have been sourced from the site.

The report concludes that it is probably suitable for its intended site use (a commercial and recreational facility) provided the potential sources of contamination are investigated in accordance with Environment ACT requirements.

4.7 Summary

The review of the available site history information confirmed that the source of land contamination is from on site activities.

The Connell Wagner report identified the presence of the Septic Tank (ST) and the Coal and Oil Storage Area (NE5). These facilities could not be specifically identified in this survey and based on aerial photograph information it appears that the coal and oil storage bunker (NE5) may have been removed from site at another time (between 1972 and 1978) i.e. the development of the Lane Poole residences.

Further prior to the approval of a change of landuse an appropriate environmental investigation must be undertaken and independently audited by a contaminated land auditor.

5 Method and Sampling Plan

The Environmental Investigation was undertaken on 6 and 7 July 2006.

The sampling was undertaken by a Robson Laboratories Environmental Scientist in accordance with Section 7 and 8 of AS 4482.1-2005 *Guide to the sampling and investigation of potentially contaminated soil – Part 1: Non-volatile and semi-volatile compounds.*

This included a Field QA/QC program.

To ensure that the field QA/QC program was upheld the following QA/QC samples were taken.

- Duplicate sample (blind and split duplicate); and
- Rinsate (water).

A duplicate sample is a sample collected at the same place and time as the routine sample and is intended to represent the same entity as closely as possible. A duplicate sample is taken at a rate of 1 per 10 samples and analysed for the same analytes as the routine samples.

A blind duplicate is analysed by the primary lab and a split duplicate is analysed by a secondary lab.

A rinsate sample is a sample of the water used to clean the sampling equipment between sampling events to assess the effectiveness of the decontamination procedure of sampling equipment. A rinsate sample is taken at a rate of 1 per sampling session and analysed for the same analytes as the routine samples.

The analytical laboratory (SGS) completed their own internal QA procedures as required by the National Association of Testing Authorities (NATA) during the analysis of samples. In general terms, this involved duplicates of particular soil samples being analysed for the same parameters. The repeatability of the analytical procedures was assessed in this way by the laboratory. In addition, laboratory blanks and standard solutions were analysed by the laboratory for the same parameters as the soil samples to check instrument accuracy. The QA results are presented with laboratory reports in Appendix 4.

All representative soil samples were sampled with a clean stainless steel auger. The soil samples were placed into sterile glass jars and sealed with teflon coated lids and secured in a cooled container with chain of custody forms for transport to a NATA Registered Laboratory for Analysis.

All sampling equipment was decontaminated between each sampling event with tap water and Decon 90 a phosphate free detergent.

5.1.1 Assessment Criteria

The assessment criteria are defined as threshold levels of the concentration of contaminants in the soil allowable for a designated site use as defined in following Environment ACT approved Guideline:

- National Environmental Protection Council (NEPC) 1999 National Environment Protection Measures. *Assessment of Site Contamination;* and,

The Yarralumla Brickworks is zoned for industrial landuse under the Territory Plan. However, to allow for flexibility for future landuse the assessment criteria have been set to the most sensitive Health Investigation Level i.e. Residential 'A' (NEPM) which is defined as follows:

> **Residential A:** standard residential with garden/accessible soil (home grown produce contributing less than 10% of vegetable and fruit intake; no poultry): this category includes children day-care centres, kindergartens, preschools and primary schools.

A summary of the soil assessment criteria is presented in Table 2 on the next page.

Table 2: Assessment Criteria

Contaminant	Primary Assessment Criteria – Sensitive Land-use (mg/Kg dry wt)	Waste Classification (Environment ACT Tables A3 & A4) (mg/Kg dry wt)	
		Inert	Solid
Petroleum Hydrocarbons (NSW EPA Guidelines for Assessing Service Station Sites; Table 3)			
C_6-C_9	65	650	650
C_{10}-C_{40}	1000	5000	10000
Benzene	1	1	10
Toluene	1.4	28.8	288
Ethyl benzene	3.1	60	600
Total Xylene	14	100	1000
PAHs	20	200	200
Benzo(a)pyrene	1	0.08	0.8
Phenols	8500	28.8	288
Organic Contaminants[1], Heavy Metals and Asbestos			
OC	10	-	-
PCBs	10	2	<50
Arsenic	100	10	100
Cadmium	20	2	20
Chromium (III)	12%	10	100
Chromium (VI)	100		
Copper	1000	Environmental Background 1 - 30	
Lead	300	10	100
Mercury (inorganic)	15	0.4	4
Nickel	600	4	40
Zinc	7000	Environmental Background 2 - 180	
Asbestos	Not Present	Industrial Level Waste	

Table Notes:
[1] National Environment Protection (*Assessment of Site Contamination)* Measures – *Health Based Investigation Levels* (Table 5-A).

All sampling was undertaken in accordance with the sampling plan provided in Table 3 on the next page.

Table 3. Sampling Plan

Area to be validated	***No. of Samples Allowed***	***Analytes***
Kiln Area (West Side)		
Explosive Store (ES)	Borehole samples from **2** locations **Total No. of Samples 3**	Heavy Metals (As, Cd, Cr, Cu, Hg, Pb, Ni and Zn), pH & Explosive Screen (includes nitro-glycerine)
Asbestos Dump (AD)	Borehole samples from **3** locations ***Total No. of Samples 4***	Heavy Metals (As, Cd, Cr, Cu, Hg, Pb, Ni and Zn), PAH and Asbestos
Forklift Shed **(A6)**	Borehole samples from **2** locations **Total No. of Samples *2***	TPH, PAH and Heavy Metals (As, Cd, Cr, Cu, Hg, Pb, Ni and Zn)
Coal and Oil Storage Area (NE5)	Borehole sample from **1** location **Total No. of Samples *1***	TPH, PAH and Heavy Metals (As, Cd, Cr, Cu, Hg, Pb, Ni and Zn)
Kiln Sand	Sample of sand from **1** location ***Total No. of Samples 1***	PAH and Heavy Metals (As,Cd,Cr, Cu, Hg, Pb, Ni & Zn)
Quarry (East Side)		
Machine and Blacksmith Shop (M1-M3)	Borehole samples from **2** locations **Total No. of Samples *3***	TPH, BTEX & Lead
Quarry tailing dump areas	Borehole samples from **4** locations **Total No. of Samples *4***	TPH, PAH, Heavy Metals (As, Cd, Cr, Cu, Hg, Pb, Ni and Zn), Organochlorine Pesticides (OC) and Polychlorinated Biphenyls (PCB).

Area to be validated	No. of Samples Allowed	Analytes
General Areas	Borehole samples from **7** locations **Total No. of Samples 7**	TPH, PAH, Heavy Metals (As, Cd, Cr, Cu, Hg, Pb, Ni and Zn), Organochlorine Pesticides (OC) and Polychlorinated Biphenyls (PCB).
Quality Assurance and Quality Control Samples	Duplicate Samples1 per 10 **Total No. of Duplicate Samples 3**	TPH, BTEX, PAH, Heavy Metals (As, Cd, Cr, Cu, Hg, Pb, Ni and Zn).
	1 Rinsate per sampling event **Total No. of Samples 1**	

6 Analytical Results and Field Observations

The analytical results for Soil contaminants are presented below in Table 4. The site soil sampling location plans and the Laboratory Test Reports are included in Appendix 1 and 4 respectively.

6.1 Field Observations

Fill was encountered in all almost all locations across the site. The fill generally consisted of brick fragments, minor slag and coal and gravels.

Hydrocarbon contamination was identified at Borehole 14 to a depth of 3m. Apart from the fill and the asbestos dump on the west side of the site no other obvious signs of contamination were identified.

Table 4. Summary of Analytical Results (mg/kg) – Environmental Site Investigation

Sample No	BTEX	TPH $C_6 - C_9$	TPH $C_{10} - C_{40}$	Total PAHs	OCP	PCB	Nitro-glycerin	Expl.	Asbestos	As	Cd	Cr	Cu	Hg	Pb	Ni	Zn
3144 – BH1 (0.0-0.3m)	<3.0	<0.50	<0.50	NT	NT	NT	NT	<0.05	NT	3	0.1	27	16	<.05	44	11	20
3144 – BH1 (0.7-1.0m)	NT	<0.50	<0.50	NT	NT	NT	0.0	<0.05	NT	13	0.2	21	15	<.05	27	11	160
3144 – BH2 (0.13-0.43m)	NT	<0.50	<0.50	NT	NT	NT	NT	<0.05	NT	6	0.2	24	14	<.05	52	14	66
3144 – BH3 (0.11-0.41m)	NT	<20	<120	<2	<0.1	<0.9	NT	NT	NT	8	0.2	25	17	0.05	280	16	59
3144 – BH4 (0.0-0.03m)	NT	<0.50	<0.50	<2	NT	NT	NT	NT	NAD	<3	<0.1	5.7	7.4	<0.05	5	7.2	7.4
3144 – BH4 (0.7-1.0m)	NT	<0.50	<0.50	<2	NT	NT	NT	NT	NAD	10	0.2	13	19	<0.05	19	27	60
3144 – BH5 (1.8-2.0m)	NT	<20	<120	<2	<0.1	<0.9	NT	NT	NAD	9	1.3	12	13	0.07	38	12	120
3144 – BH6 (0.0-0.3m)	NT	<20	<120	<2	<0.1	<0.9	0.0	<0.05	NT	5	0.2	16	17	<0.05	93	13	75
3144 – BH8 (0.0-0.3m)	NT	<20	<120	<2	NT	NT	0.0	<0.05	NT	10	0.1	8.9	31	<0.05	10	42	35
3144 – BH9 (0.0-0.3m)	NT	<20	<120	<2	NT	NT	NT	NT	NT	4	0.1	20	11	<0.05	28	18	37
3144 – BH10 (0.15-0.45m)	NT	<20	<120	<2.08	NT	NT	NT	NT	NT	10	0.3	20	16	<0.05	22	18	97
Assessment Criteria																	
Residential Landuse 'A'	19.5	65	1000	20	NA	10	NA	NA	Not Present	100	20	100	1000	15	300	600	7000

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Sample No	BTEX	TPH $C_6 – C_9$	TPH $C_{10} – C_{40}$	Total PAHs	OCP	PCB	Nitro - glyc erine	Expl.	Asbe stos	As	Cd	Cr	Cu	Hg	Pb	Ni	Zn
3144 – BH11 (0.0-0.3m)	NT	<20	<120	<2	<0.1	<0.9	NT	NT	NT	8	0.2	10	16	<0.05	36	13	48
3144 – BH12 (0.0-0.3m)	NT	<20	<120	<2	<0.1	<0.9	NT	NT	NT	20	0.2	20	21	<0.05	33	21	100
3144 – BH13 (0.0-0.3m)	NT	<20	232	<3.56	NT	NT	NT	NT	NT	8	0.1	10	15	<0.05	14	22	22
3144 – BH14 (0.5-0.7m)	<3.0	<20	10,550	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	19	NT	NT
3144 – BH14 (2.3-2.5m)	<3.0	<20	213	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	26	NT	NT
3144 – BH15 (0.7-1.0m)	NT	<20	176	<1.92	<0.1	<0.9	NT	NT	NT	11	0.2	11	47	<0.05	20	32	200
3144 – BH17 (0.0-0.3m)	NT	<20	<120	<2	<0.1	<0.9	NT	NT	NT	7	0.2	17	22	<0.05	16	11	38
3144 – BH18 (0.0-0.3m)	NT	<20	<120	NT	NT	NT	NT	NT	NT	4	0.1	11	11	<0.05	9.2	10	27
3144 – BH19 (0.7-1.0m)	NT	<20	<120	<2	<0.1	<0.9	NT	NT	NT	5	0.2	18	22	<0.05	18	20	60
3144 – BH20 (0.0-0.3m)	NT	<0.50	<0.50	NT	NT	NT	NT	NT	NT	11	0.3	16	42	<0.05	28	29	75
3144 – BH21 (0.0-0.3m)	NT	<0.50	<0.50	<2	NT	NT	NT	NT	NT	5	1.1	10	16	<0.05	190	11	140
3144 – SS1	NT	NT	NT	<2	NT	NT	NT	NT	NT	16	0.6	5.1	38	<0.05	770	8.5	540
Assessment Criteria																	
Residential Landuse 'A'	19.5	65	1000	20	NA	10	NA	NA	Not Present	100	20	100	1000	15	300	600	7000

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Sample No	BTEX	TPH $C_6 - C_9$	TPH $C_{10} - C_{40}$	Total PAHs	OCP	PCB	Nitro-glycerine	Expl.	Asbestos	As	Cd	Cr	Cu	Hg	Pb	Ni	Zn
3144-DUP-1	<3.0	<20	**6,700**	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	21	NT	NT
3144-DUP-2	NT	<20	<120	<2	NT	NT	NT	NT	NT	4	0.1	11	8.9	<0.05	11	8.4	26
3144-DUP-3	NT	NT	NT	<0.5	NT	NT	NT	NT	NT	7	2	13	18	<0.1	209	NT	249
3144-R1 (water)	NT	<0.040	<0.5	NT	NT	NT	NT	NT	NT	<.05	<0.002	<0.005	0.02	<0.0005	<0.02	<0.009	0.071
Assessment Criteria																	
Residential Landuse 'A'	19.5	65	1000	20	NA	10	NA	NA	Not Present	100	20	100	1000	15	300	600	7000

Table Notes:
NA: Not Available; NT: Not Tested; NAD: No Asbestos Detected
[1] *NEPM (Assessment of Contaminated Sites) 1999* – Table 5A -*Schedule (B1) Guideline on the Investigation Levels for Soil and Groundwater.*
Bold: Exceeds the Assessment Criteria

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6.1.1 QA/QC RESULTS

The field QA/QC program included the collection and analysis of the following sample type:

- Blind and Split Duplicate; and
- Rinsate

Duplicate Samples

The duplicate samples were collected at rate of 1 per 10 samples resulting in three (3) duplicate samples (Dup–1 to 3). Duplicate samples 1 and 3 were analysed for a selection of the same analytes using the same methods as the routine samples (refer Table 5). Note: Duplicate 2 is not included in the analysis as the primary sample was not submitted for testing.

To validate the data Relative Percentage Difference (RPD) analysis was undertaken (Refer to formula below). The result of this analysis is presented in Table 5.

$$\text{Relative Percentage Difference (RPD)} = \frac{\text{Result No.1} - \text{Result No. 2}}{\text{Mean result}} * 100$$

The RPD calculation was used to normalise each pair of results, allowing improved QA/QC data interpretation. For those RPD values that exceed a generally accepted 50% limit, the correspondence of data is considered to be unsatisfactory, however, consideration needs to be given to homogeneity of the sampled material. Additionally variation can be expected to be higher for organics than for inorganics and for low concentration of analytes. Duplicate samples with an RPD of less than 50% are considered to have acceptable correlation.

Table 5. RPD Analysis

Sample No.	BTEX	TPH C_6-C_9	TPH C_{10}-C_{36}	PAH	As	Cd	Cr	Cu	Hg	Pb	Ni	Zn
3144 - BH14 (0.5-0.7m)	<3.0	<20	10,550	NT	NT	NT	NT	NT	NT	19	NT	NT
3144 – DUP1	<3.0	<20	6,700	NT	NT	NT	NT	NT	NT	21	NT	NT
RPD %	**NA**	**NA**	**44**	**NA**	**NA**	**NA**	**NA**	**NA**	**NA**	**10**	**NA**	**NA**
3144 – BH21 (0.0-0.3m)	NT	NT	NT	<2	5	1.1	10	16	<0.05	190	11	140
3144 – DUP3	NT	NT	NT	<2	7	2	13	18	<0.1	209	NT	249
RPD %	**NA**	**NA**	**NA**	**NA**	**33**	**29**	**26**	**12**	**NA**	**10**	**NA**	**56**

NA: Not Applicable. **NT:** Not Tested
BOLD: RPD level exceeds the generally accepted 50% limit.

All of the calculated RPD results are below the acceptable limit of 50% apart from the result for the Split Duplicate (Dup 3) for Zinc (56%).

This result may be attributable to the low concentrations of the analyte or sampling error. It is unlikely to be laboratory error as the other results for Dup 3 were below the acceptable limit and therefore this result is not of concern.

Based on the results of the RPD Analysis and consideration given to the results the laboratory data is of acceptable quality.

Rinsate Sample

The rinsate sample (R1) was analysed for Total Petroleum Hydrocarbons (TPH) and Heavy Metals as per the routine samples. The analytical results for the sample were either below the assessment criteria or below the laboratory detection limit indicating that the decontamination procedure between samples was satisfactory.

Laboratory QA/QC Results

The results of the laboratory internal Quality Control program are included along with the analytical results in Appendix 4.

In summary the results indicate:

- The laboratory control samples, which were run with each batch of samples analysed, were within acceptable QC limits set by the laboratory; and
- The concentrations of the Laboratory blanks, which were run with each batch of samples analysed, were below the Practical Quantitation Limit (PQL).

Based on the above information, the laboratory control data indicates that the analytical procedures are considered to be of acceptable quality.

7 Discussion

Total Petroleum Hydrocarbons

Total Petroleum Hydrocarbons (TPH) were only identified in one location BH14 between M3 and M2.

The TPH (C_{10}-C_{36}) were identified in the soils at depth between 0.5m and 3m below the surface and the near surface sample exhibited concentrations in excess of the assessment criteria (TPH C_{10}-C_{36} - 1000mg/kg). The two (2) soil samples taken for analysis at this location returned results of 10,550mg/kg (0.5-0.7m) and 273mg/kg (2.3-2.5m). The source of the contamination is probably temporary fuel storage in this location. The hydrocarbon fractions identified are typical of distillate (diesel fuel).

The extent of the spill is unknown but Borehole 15 located approximately 15m east of Borehole 14 did not identify any fuel contamination. The topsoil in the general area was discoloured i.e. dark and perhaps is the result of long term use of diesel fuel in this location.

Lead

Lead was identified in excess of the assessment criteria (300mg/kg) in the Kiln Sands of Kiln 2 (SS-1 – 770mg/kg). The sample was taken adjacent the kiln wall which was coated with a glaze as result of repeated firings.

The source of the lead may be from the glaze and not be specifically from the kiln sands (sand on the floor of the kilns).

Further investigation would be required to clarify the source of lead and also if this high concentration of lead is representative.

Asbestos

Asbestos building materials are known to exist in large quantities especially in the internal sections of the kiln roofs and in the dump on the west side of the site. However, the quantity of asbestos roof sheeting or other material in the dump is relatively unknown and cannot be quantified until the vegetation and other waste is removed. Based on recent inspections and the knowledge that the original roofs of the larger buildings (kilns) on site have tin roofs the quantity may be less than generally thought.

Other site contaminants

No other contaminants were identified in the fill or in the natural soils in the sampled locations in excess of the assessment criteria.

These contaminants include:

BTEX, PAH, Organochlorine Pesticides (OC), Polychlorinated Biphenyls (PCB), Explosives, Heavy Metals (As, Cd, Cr, Cu, Hg, Ni and Zn) and Asbestos.

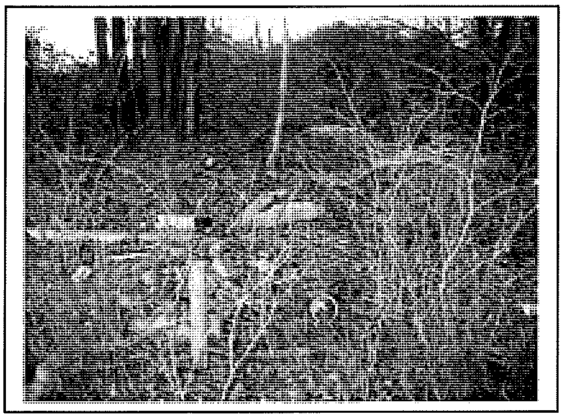
Therefore significant contamination from the targeted on-site sources is thought to be unlikely.

Fill

The fill identified across the site comprises of bricks and brick fragments, clay and slag. The presence of this large volume of material is more likely to pose a geotechnical challenge for any major redevelopment of the site and may have to be removed or at least relocated.

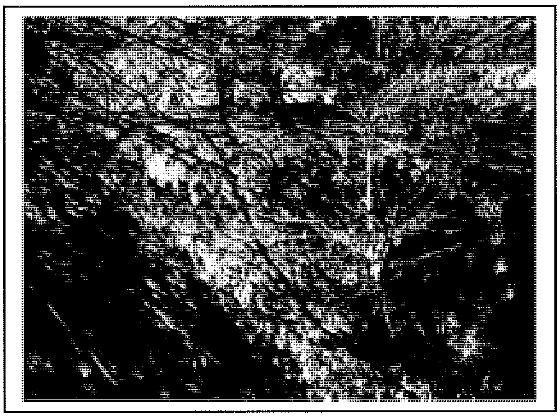
General photographs of the site are presented on the following page.

Photograph 1: West view of crusher area.

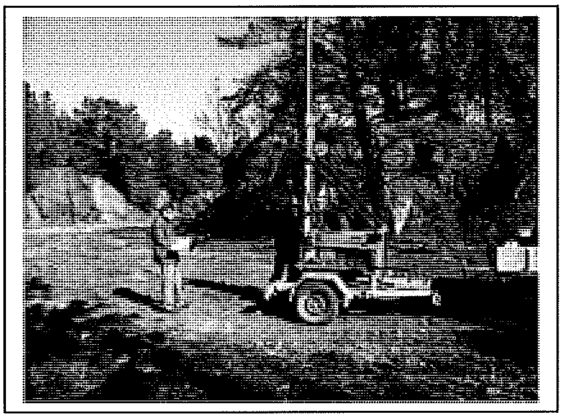


Photograph 3: Evidence of asbestos sheeting in the dump on the west side of the property.

Photograph 2: Typical vegetation on the knolls that dominate the quarry.



Photograph 4: View of the brickwork buildings from a typical knoll on the east side of the site.



Photograph 5: Drilling BH 19 into brick fill.

8 Recommendations

Based on the analytical results and field observations Robson Laboratories Pty Ltd recommends the following:

1. In the area adjacent the machine shed (M3) where hydrocarbon contamination was identified, excavate and validate the affected area and resultant stockpile for Sensitive Landuse and waste classification purposes.

2. Undertake further sampling and assessment of the Kiln Sands for heavy metal contamination.

3. Undertake further investigation to enable the confirmation of the location of the Septic Tank and the time of the removal of the Coal and Oil Storage Facility.

4. Implement the remediation of the Asbestos Dump and the removal of Asbestos building materials from structures across the site.

5. Ascertain the future use for the site to allow for the design of the appropriate environmental assessment to enable the sites suitability for a change in land use.

6. Ensure a suitable level of Duty of Care is applied to all demolition and waste removal activities as required under the ACT Occupational Health and Safety Act 1989.

9 References

ACT's Environmental Standards: *Assessment and Classification of Liquid and Non-Liquid Wastes* June 2000.

Australian Standard AS 4482.1-1997 *Guide to the sampling and investigation of potentially contaminated soil – Part 1: Non-volatile and semi-volatile compounds.*

National Environmental Protection Council (NEPC). National Environment Protection (*Assessment of Site Contamination)* Measure 1999.

Connell and Wagner 2001 - Appendix F- Brickworks Contamination Report

NOHSC: 2018 (2005) - Code of Practice for the Management and Control of Asbestos in Workplaces;

NOHSC 2002 (2005) - *Code of Practice for the Safe Removal of Asbestos – 2nd Edition*

NSW EPA (1994) - *Guidelines for Assessing Service Station Sites.*

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APPENDICES

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APPENDIX 1

Site Location Map and Sampling Location Plans (Figures 1-3)

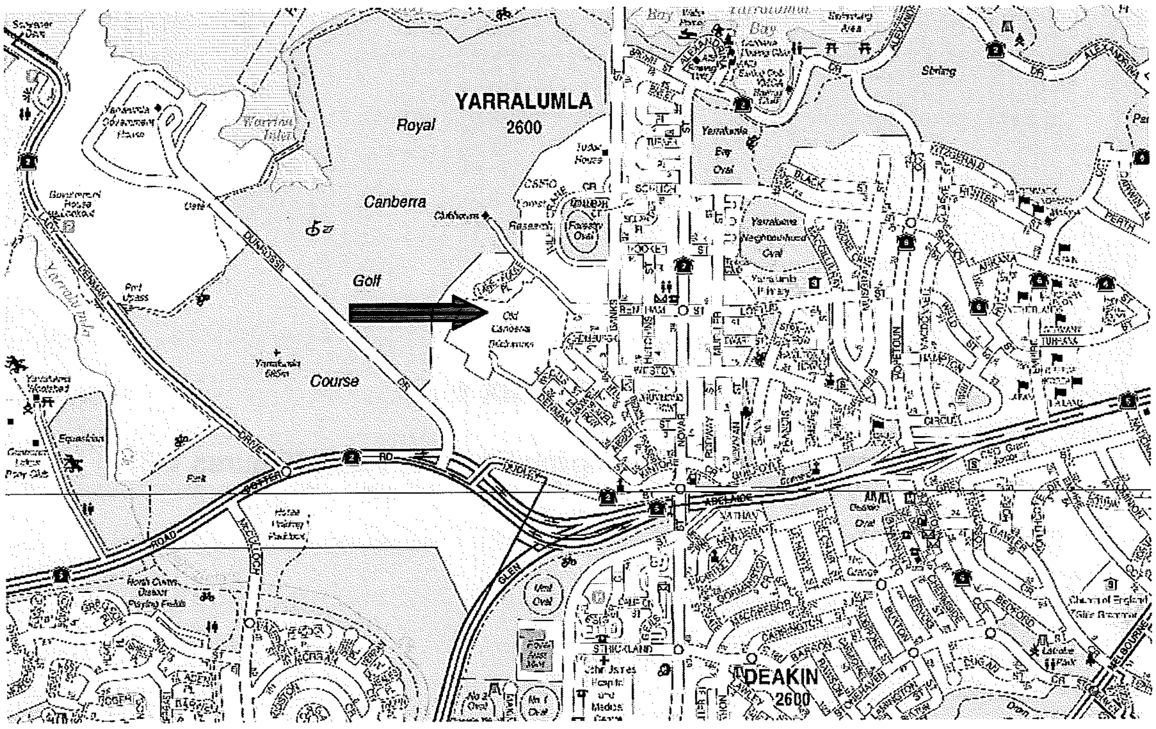

Figure 1.
Site Location Map
Yarralumla Brickworks

Source: Six Cities 2001
UBD on Disk

APPENDIX 2

Aerial Photographs – 1955 and 2004

APPENDIX 3

Borehole Logs (1-21)

APPENDIX 4

Laboratory Test Report and Chain of Custody Forms

APPENDIX 5

Estimated Remediation Costs

Table 6. Estimated Remediation Costs

Item	Action	Estimated Cost ($) (ex GST)
Asbestos Dump	Remediate	[redacted]
Machine Shop Fuel Spill	Further investigation/ remediation – Cost depends on extent of contamination	[redacted]
Kiln sands	Assess extent of heavy metal (lead contamination)	[redacted]
Fill removal across the site	Remove as required i.e. if not suitable as building foundations - Depend on future site use.	[redacted]
Final approval for a change of land use from Environment ACT (includes independent audit)	Further site assessment, remediation and validation.	[redacted]

Estimated Cost: Based on previous quotes or researched cost estimates.

APPENDIX 6

ACT Contaminated Land Search Report

APPENDIX 7

Appendix F- Brickworks Contamination Report
Connell and Wagner 2001

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ROBSON LABORATORIES Pty Ltd

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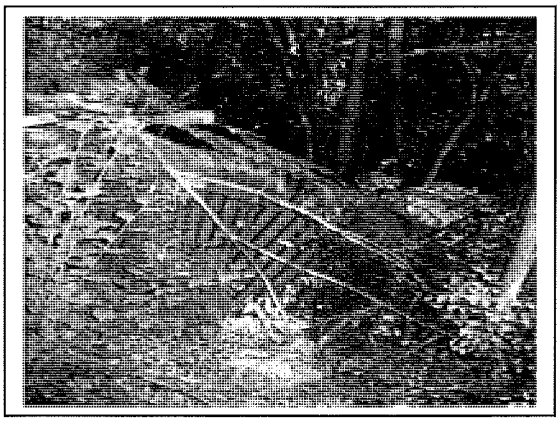
Report Ref: 3144_ CL_RAP_20070612

Remediation Action Plan

Asbestos Dump
Yarralumla Brickworks
Block 1 Section 102 Yarralumla
Canberra Central ACT

June 2007



Client: Territory and Municipal Services Property Group Facilities Management
PO Box 777
Fyshwick ACT 2609

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Appendices

Appendix A. Aerial Photograph (2004) and Site and Site Remediation Plan (Fig.1 & 2)
Appendix B. Work Method Statements (For: Blackberry and Asbestos Removal).
Appendix C. Project Health and Safety Plan

DOCUMENT DISTRIBUTION:

Organisation	Person	Copy Numbers
Robson Laboratories Pty Ltd	Project File – Ben Kendon	1
TAMS FM	Client: Mr Peter Ozols	2
On Site Shed	Irwin and Hartshorn	3

1 Executive Summary

Robson Laboratories Pty Ltd was commissioned by Territory and Municipal Services Property Group Facilities Management (TAMS FM) in September 2006 to develop the Remediation Action Plan (RAP) for the remediation of the Asbestos Dump located on the western boundary of the Yarralumla Brickworks, Yarralumla ACT.

The RAP for the Dump is required to facilitate the safe and effective removal of all waste from the impacted area so that the waste no longer poses a risk to human health or the natural environment.

The RAP is based on the results of the Environmental Investigation undertaken in August 2006.

The area affected by the dump is to be remediated (cleaned up) and the site made suitable for Sensitive Landuse.

This RAP has been developed in accordance with the National Environment Protection Measure (Assessment of Site Contamination) Measure (1999) (NEPM) which satisfies the requirements under the ACT Environment Protection Act.

This NEPM makes reference to Australian Standards and NSW EPA Guidelines which are specific to certain aspects of contaminated site assessment e.g. waste and fuel tank assessment, and may be applicable during the course of the remediation.

This RAP is in accordance with the assessment structure set out in the NSW EPA: 'Guidelines for Consultants Reporting on Contaminated Sites'.

The RAP provides a description of the dump site and the brickworks and identifies the method (s) and likely sampling plan(s) required for the effective remediation of the site.

Area of Environmental Concern

Based on the site history, site inspection and minimal sampling, the dump area is classified as an Area of Environmental Concern and will require further investigation to confirm that contamination of the surrounding soils has not occurred.

The Asbestos Dump must be remediated by an appropriately licensed waste removal contractors.

Table 1. Areas of Environmental Concern

Source of Potential Land Contamination	Contaminants	Location of source
Asbestos Dump	Asbestos, Heavy Metals and Hydrocarbons	Western Boundary of the Brickworks

The Remediation Action Plan will facilitate the remediation of the Dump in the following Stages:

Stage 1 – Vegetation Removal

1. All work permits, Sediment and Erosion Control Plan and the Project Health and Safety Plan to be in place prior to the commencement of any site work.

2. To allow access to the dump all vegetation which includes blackberry vines and trees must be removed by a demolition contractor and stockpiled on site in a designated area (TBA).

Stage 2 – Hazardous Material and Recyclable Waste Removal

3. All recyclable waste (metal, concrete, wood and brick) to be separated from the asbestos sheet material and other hazardous materials as identified.

4. All accessible loose asbestos sheet fragments located in dump (moderate volumes) to be removed in accordance with the NOHSC Asbestos Code of Practice by an ACT Licensed (Friable) Asbestos Removal Contractor (to be announced (TBA)).

5. All excavated soil material must be stockpile on site for waste classification prior to disposal.

6. The removal of the waste is to be supervised by Mr Ben Kendon (Senior Environmental Scientist) and in his absence by Mr John Robson (Director) of Robson Laboratories to enable the identification of potential contaminants.

7. On completion of the waste removal the affected area will be validated by a qualified staff member from Robson Laboratories Pty Ltd to meet the Sensitive Landuse criteria as defined in this plan.

Stage 3 – Site Reinstatement

8. Reinstate the excavated area with imported validated fill and revegetate as required. There is likely to be an old stormwater drain in this location and this may also require reinstatement.

2 Introduction

Robson Laboratories Pty Ltd was commissioned by Territory and Municipal Services Property Group Facilities Management (TAMS FM) in September 2006 to develop the Remediation Action Plan (RAP) for the remediation of the Asbestos Dump located on the western boundary of the Yarralumla Brickworks, Yarralumla ACT.

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This NEPM makes reference to Australian Standards and NSW EPA Guidelines which are specific to certain aspects of contaminated site assessment e.g. waste and fuel tank assessment, and may be applicable during the course of the remediation.

This RAP is in accordance with the assessment structure set out in the NSW EPA: 'Guidelines for Consultants Reporting on Contaminated Sites'.

The RAP provides a summary of the dump site and identifies the method and the likely sampling plan(s) required for the effective remediation of the site.

3 Scope

The Scope of Work is as follows:

Based on the Environmental Investigation and the NEPM Robson Laboratories Pty Ltd will develop a Remediation Action Plan that includes the following:

- Site Characterisation
- Remediation Goal
- Extent of the remediation required
- Remediation options and how the risk can be reduced
- Rational for the selection of the remedial option
- Proposed Testing to validate the remediated areas (Sample Plan)
- Contingency Plan if remediation option fails
- Interim Site Management Plan (fencing and or warning signs)
- Site Management Plan (operational phase)
- Remediation Schedule
- Hours of operation
- Contingency plans to respond to site incidents, to obviate potential effects on the surrounding environment
- Identification of regulatory compliance requirements
- Contact details of all contractors and other appropriate personnel
- Community relation plans where applicable
- Stage progress reporting where applicable
- Long term site management

4 Methodology

The methodology is based on a review of information sources as outlined in the NSW EPA (1997): 'Guidelines for Consultants Reporting on Contaminated Sites'.

5 Site Characterisation

The following site history is a summary of the Robson Laboratories Pty Ltd - Environmental Investigation Audit Report undertaken in October 2006.

5.1 SITE IDENTIFICATION

- **Site location:** Yarralumla Brickworks
- **Block and Section:** 1 and 102
- **Site Zoning:** Entertainment, Accommodation and Leisure (Landuse) under the Territory Plan.
- **Name of Lessee:** ACT Government
- **Managed by:** Territory and Municipal Services Property Group Facilities Management (TAMS FM)
- **Client:** TAMS FM
PO Box 777
Fyshwick ACT 2609

- **Site Assessor:** Robson Laboratories Pty Ltd
9 Lyell Street
Fyshwick ACT 2609

5.2 LAND TITLE

A land title search has yet to be undertaken but Robson Laboratories understands the Title is held by the ACT Government.

The site is zoned as *Entertainment, Accommodation and Leisure Landuse* under the Territory Plan.

Based on information sourced from the internet the following site uses and site use intentions were identified.

- The Federal Government announces the site as a Brickworks in 1910.
- The site closes as a Brickworks in 1976.
- AR Marr takes over the site in 1976 to develop the site as a tourist complex.
- The Commonwealth accepts the surrender of the lease from AR Marr in 1984.

5.3 PREVIOUS REPORT REVIEW

The Connell and Wagner 2001 - Appendix F- Brickworks Contamination Report identified the location of the Asbestos Dump.

5.4 HISTORIC DEVELOPMENT APPLICATIONS

In general following the economic collapse of the brickworks in 1976 various proposals have put forward for a tourist park and a mixed site use area. Apart from site improvements undertaken by AR Marr all proposals to date have yet to be approved.

5.5 CONTAMINATED LAND REVIEW

The contaminated land search undertaken through Environment ACT Environment Protection Unit did not identify a record of the site on the Register of contaminated sites under section 21(A) of the Environment Protection Act 1997.

However, the site is recorded on the EPU Database as potentially contaminated due the past activities at the site.

Further, the search identified the site as an abandoned commercial brickworks on Blocks 1, 7 and 20 Section 102 Yarralumla and the EPU has received a Phase 1 environmental assessment prepared by Connell Wagner dated February 2001 which is reviewed in this report.

The EPU supported the Consultants recommendations that further investigation, validation and remediation would be required and any further assessment would require an independent audit by an accredited third party environmental auditor.

The EPU has previously indicated to the ACT planning authorities that it would oppose any change in land use from a brickworks until the site is assessed and independently audited by a contaminated land auditor.

5.6 AERIAL PHOTOGRAPHS

Historical aerial photograph review of the site was undertaken through the actpla office located in Dickson ACT. The aerial photographs were reviewed at approximately 10 year intervals from the earliest record to present.

The review identified the site use as a Brickworks and Quarry (Refer Robson Laboratories Pty Ltd *Environmental Investigation Audit Report October 2006*).

The Asbestos dump was noted as present as early as 1980.

6 Site Condition and Environment

The Asbestos Dump

The dump covers an area of ~ 0.5 Hectares within the Yarraluma Brickworks. The dump is obscured by Blackberry vines and is bisected by a stormwater channel. The dump is best accessed from the south end. The dump is characterised by medium to large size deciduous trees and obvious mounds and pits of buried waste before the dump levels out along the western boundary of the site. The boundary abuts onto a thin strip of public land which separates it from Royal Canberra Golf Course and private property.

The visible waste in the dump includes Asbestos sheeting, metal, rubber, plastic and brick waste.

The Brickworks

The Yarralumla Brickworks site is located on a large block of 9.6 hectares approximately 4.8 km southwest of Canberra City. The site slopes to the west and is surrounded by a golf course and residential land. Apart from the built up areas on the west side of the site large pine trees line the perimeter of the site and are also dominant on the walls of the Quarry.

The site is bounded by the Royal Canberra Golf course to the west, Lane Poole Place and Bentham Street to the North, Schomburgk and Woollis Street to the East and South. The site may be accessed by Denman Street at the south end and is secured by a chain wire fence.

The site has two distinct areas the west side which is defined by the Kiln Buildings and workshops and the East side which comprises the Quarry. The quarry floor is dominated by a man made lake which was mostly dry at the time of the investigation.

Large areas of the site have been filled with either quarry tailings or brick waste generated from manufacturing processes.

6.1 TOPOGRAPHY

The Asbestos Dump is generally flat but slopes to the west toward the Royal Canberra Golf Course and is located above an old stormwater drain. The nearest surface water body is Warrina Inlet of Lake Burley Griffin which is approximately 600m northwest of the site.

6.2 HYDROLOGY

Canberra has an average monthly rainfall of ~ 52mm with most of the rain falling between the months of March and May and September to November.

The dump site is unsealed and well vegetated and slopes to the west. Runoff from the sites is expected to be minimal except in very wet conditions when the soil becomes saturated. Drainage is expected to follow the old stormwater drain therefore contamination (if any) would be expected to follow the drain.

6.3 GEOLOGY AND HYDROGEOLOGY

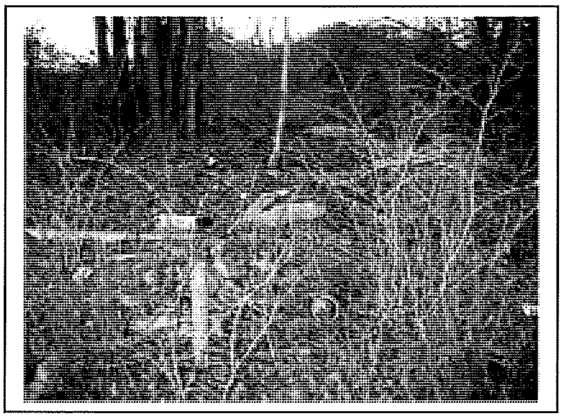
The asbestos dump is expected to be underlain by the Yarralumla Formation (tuffaceous siltstone, sandstone and limestone) which comprises of a suite of sedimentary deposits Silurian in age (425 m.y).

7 Visual and Physical Investigation

The Environmental Investigation identified Asbestos sheet and other types of building waste which is mostly obscured by vegetation.

The analytical results of samples taken from the fill materials (brick and slag) adjacent the asbestos dump as reported in the *Robson Laboratories Environmental Investigation Audit Report October 20006* did not identify any other significant contamination.

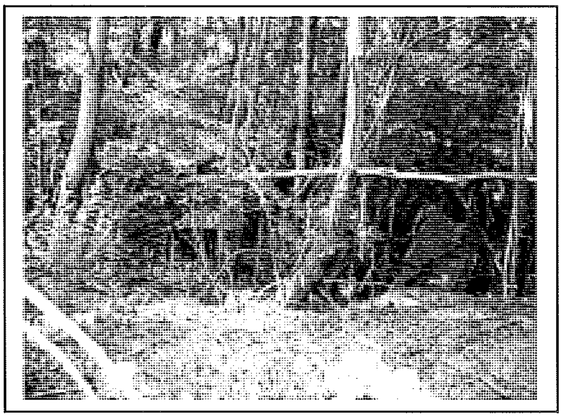
Refer photographs that characterise the waste on the next page.



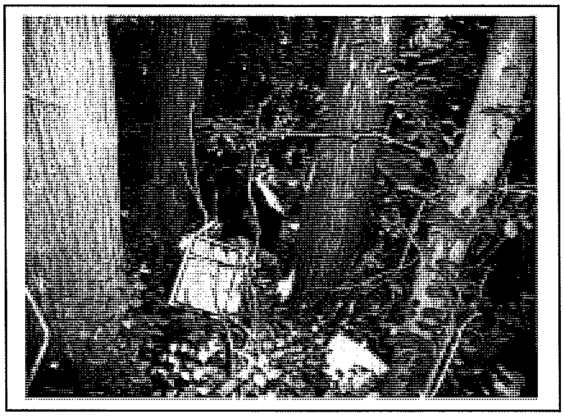
Photograph 1: Asbestos sheet debris in dump.

Photograph 2: Sheet and metal debris in dump.

Photograph 3: General view of dump.



Photograph 4: Metal waste in main drainage line.



Photograph 5: Metal waste in dump pit.

Photograph 6: Area adjacent the dump.

8 Remediation Action Plan

8.1 REMEDIATION GOAL

The goal of the remediation project is to successfully remove all waste from the dump site to ensure the affected area is suitable for Sensitive Landuse.

8.2 REMEDIATION EXTENT

All waste materials are to be removed from the dump site to enable vegetative regrowth within the affected area.

8.2.1 Asbestos Dump

The visible waste identified at the dump include Asbestos sheet material, metal, plastic, glass, brick and ceramic.

There is an unknown volume of buried waste which is expected to consist of brick, slag and clay materials.

Table 2. Remediation Activity

Stage	Remediation Activity
1	*Set up Remediation Area* Set up Site Access and define designated areas Set up Sediment and Erosion Control Measures (as required)
2	Removal and stockpiling of vegetation
3	Separation and removal of all asbestos and recyclable waste
4	Excavation and stockpiling of buried waste prior to assessment for disposal
5	Validation sampling of resultant excavation
6	Site reinstatement as required.

8.3 REMEDIATION OPTIONS

To achieve the remediation goal the following remediation options have been considered:

Options

1. Design a suitable on-site burial site for the asbestos and other waste stream.

2. Remove all hazardous, recyclable and non-recylable waste from the site and dispose of in accordance with all ACT regulatory requirements. This method will allow for the removal of all types of waste for recycling and disposal at licensed waste management facilities.

Robson Laboratories Pty Ltd recommends Option 2 as it will not only remove the risk to human health and the environment but permit the most cost effective way to manage the dump for the following reason:

A) There would be no requirement for the design, construction and on-going management of the on-site municipal waste tip.

8.4 VALIDATION SAMPLING OF THE REMEDIATED DUMP

Based on the Environmental Investigation the following validation program is proposed.

Asbestos Dump

As set out in Table 2 the remediation of the dump will be undertaken in the following order:

1. Removal of vegetation and stockpile on site.
2. Removal and separation of all recyclable waste and hazardous materials.
3. Excavation and removal of all remaining waste streams.

Upon completion of all waste removal undertake validation sampling of the affected area.

The sampling plan must be based on the size and depth of the affected areas and volumes of affected waste materials which may only be determined following the removal of the waste.

All sampling plans will be designed in accordance with AS 4482.1-2005 *Guide to the sampling and investigation of potentially contaminated soil – Part 1: Non-volatile and semi-volatile compounds.*

Groundwater sampling (if required) will be undertaken in accordance with the *Groundwater Sampling Guidelines EPA Victoria April 2000.*

8.4.1 Quality Assurance and Quality Control Program

Soil/Water

All samples must be placed in laboratory prepared glass jars and sealed with Teflon lined plastic lids. The glass jars must be secured in an ice-cooled chest with chain of custody forms for transport to a NATA Registered Laboratory (SGS Environmental Services Pty Ltd) for Analysis. This must include a Field QA/QC program.

To ensure that the field QA/QC program is upheld the following Quality Control samples must be taken:

Duplicate sample (blind and inter – lab duplicate);

Trip Blank (volatiles only); and

Rinsate (water).

A duplicate sample (blind) is a sample collected at the same place and time as the routine sample and is intended to represent the same entity as closely as possible. A duplicate sample is analysed for the same analytes as the routine samples. A duplicate sample is taken at a rate of 1 per 10 samples taken.

An inter-lab duplicate (split) is defined as above but the analysis is undertaken by a secondary lab (Australian Laboratory Services Pty Ltd). Every third (3rd) duplicate sample taken will be sent to the secondary lab for analysis and will be analysed for the same analytes as the routine samples.

Trip Blank is a clean sample that is transported with the field samples to illustrate that cross contamination has not occurred during sample transport. A trip blank with only be taken in the case where volatiles have been sampled. The Trip Blank will be taken at a rate of 1 per sampling session and analysed for the volatile contaminants only.

A rinsate sample is a sample of the water used to clean the sampling equipment between sampling events to assess the decontamination procedure of sampling equipment. A rinsate sample is taken at a rate of 1 per sampling session and analysed for the same analytes as the routine samples.

The analytical laboratories (SGS and ALS) complete their own internal QA procedures as required by the National Association of Testing Authorities (NATA) during the analysis of samples. In general terms, this involves duplicates of particular soil samples being analysed for the same parameters.

The repeatability of the analytical procedures will be assessed in this way by the laboratory. In addition, laboratory blanks and standard solutions are analysed by the laboratory for the same parameters as the soil samples to check instrument accuracy.

All representative soil samples will be sampled with clean stainless steel equipment. All sampling equipment will be decontaminated between each sampling event with tap water and phosphate free detergent.

8.4.2 Assessment Criteria

Assessment criteria are defined as threshold levels of the concentration of contaminants in the soil allowable for a designated site use and/or waste disposal as defined in the following Environment ACT approved National Guideline:

1. National Environmental Protection Council (NEPC) 1999 National Environment Protection Measures. *Assessment of Site Contamination;* and

2. NSW EPA 1994. *Guidelines for Assessing Service Station Sites;*

3. ACT 1999. *Environmental Guidelines: Assessment, Classification and Management of Liquid and Non-Liquid Wastes.*

The land is zoned as Industrial Landuse under the Territory Plan. Although the areas affected by the dump is not specifically designated for residential land use the following Assessment Criteria has been set to the most sensitive investigation level to allow for the future flexibility in land use.

Health based Investigation Levels (HILs)

Health Investigation Level - Residential 'A' to allow for future flexibility in land use. The Health Investigation Level Residential 'A' is defined below.

> **Residential A:** standard residential with garden/accessible soil (home grown produce contributing less than 10% of vegetable and fruit intake; no poultry): this category includes child day-care centres, kindergartens, preschools and primary schools.

Ecologically-based Investigation Levels (EIL).

This assessment criteria is defined as the Ecologically-based Investigation Level (EIL). These criteria should be developed at a regional level and be related to land use. However as specific regional data was not sourced and is likely to be unavailable generic urban based suburban EILs have been adopted in this instance.

Groundwater Investigation Levels

The assessment criteria have been set to stock irrigation water standards as the bore water is unlikely to be used by the site occupants. In the case where the contaminant concentration has not been set for stock irrigation the aquatic ecosystem (fresh and marine) criteria have been adopted.

Aesthetic Guidelines

Numeric data is not available for the aesthetic guidelines however the general aesthetic condition of site must also be considered i.e. upon completion of site investigation/remediation the soils should not remain discolored, malodorous or of abnormal consistency.

A summary of the Soil and Water Assessment Criteria is presented in Table 3 and 4 on pages 20 and 21.

Waste Classification

If contaminated soils are to be removed from the site they must be classified i.e. inert, solid, industrial & hazardous so that the soils may be disposed of in accordance with Environment ACT's requirements.

Table 3. Landuse Assessment Criteria

Contaminant	**HIL (Type A)**[1] (mg/Kg dry wt)	**EIL (Urban)**[1]	**Drinking Water/Fresh Waters (Aquatic Ecosystems)**[1] (mg/L)	**Remediation Criteria**[3]	
	Soil	**Soil**	**Water**	**Soil** (mg/kg)	**Water** (mg/L)
Hydrocarbons:					
TPH C_6-C_9	65[2]	NA	NA	65[2]	NA
TPH C_{10}-C_{40}	1000[2]	NA	Not Visible	1000[2]	Not Visible
Benzene	1[2]	NA	0.001	1[2]	0.001
Toluene	1.4[2]	NA	0.8	1.4[2]	0.8
Ethylbenzene	3.1[2]	NA	0.3	3.1[2]	0.3
Total Xylene	14[2]	NA	0.6	14[2]	0.6
Phenols	8,500	NA	Chlorinated (0.04-1.5)	8,500	Chlorinated (0.04-1.5)
Total PAH	20	NA	3ug/L[4]	20	NA
Benzo(a) Pyrene	1	NA	0.00001	1	0.00001
Other Organic Compounds:					
Organochlorine Pesticides (OCP)					
Aldrin + Dieldrin	10	NA	0.0003	10	NT
Chlordane	50	NA	0.001	50	NT
DDT+DDD+DDE	200	NA	0.02 (DDT)	200	NT
Heptachlor	10	NA	0.0003	10	NT
Organophosphate Pesticides (OPP)	NA	NA	NA	NA	NA
Total PCBs	10	NA	0.001ug/L[4]	10	0.001ug/L
Metals:					
Arsenic (total)	100	20	0.007	20	0.007
Beryllium	20	NA	4[4]	20	4[4]
Cadmium	20	3	0.002	3	0.002
Chromium (III)	12%	400	NA	12%	NA
Chromium (Total)	Back-ground 5 -1000	Back-ground 5 -1000	10ug/L[4]	Background 5-1000	0.01[4]
Chromium (VI)	100	1	0.05	100	0.05
Copper	1000	100	2	100	2
Lead	300	600	0.01	300	0.01
Mercury (inorganic)	15	1	0.001 (Total)	1	0.001 (Total)
Nickel	600	60	0.02	60	0.02
Zinc	7000	200	3	200	3

Notes:

NA: Not Available

1. NEPC (1999) – *Schedule (B1) Guideline on the Investigation Levels for Soil and Groundwater*
2. NSW EPA (1994) *Guidelines for Assessing Service Station Sites* - Soil Investigation Levels
3. The Site Remediation Criteria is equal to the lower value of the HILs and EILs.
4. In the absence of a criterion for an analyte for drinking water the default criteria is suitable for the protection of aquatic ecosystems (Fresh Waters): NEPC (1999) – *Schedule (B1) Guideline on the Investigation Levels for Soil and Groundwater.* Table 5-B Groundwater Investigation Levels (Fresh Waters).

Table 4: Soil Waste Assessment Criteria

Contaminant	**Waste Classification (Environment ACT Tables A3 & A4)[1] (mg/Kg dry wt)**		
	Inert	**Solid**	**Industrial**
C_6-C_9	650	650	2600
C_{10}-C_{40}	5000	10,000	40,000
Benzene	1	10	40
Toluene	28.8	288	1152
Ethyl benzene	60	600	2400
Total Xylene	100	1000	4000
Phenol	28.8	288	1152
Total PAH	200	200	800
Benzo (a) Pyrene	0.08	0.8	3.2
Organic Contaminants			
Aldrin + Dieldrin	NA	NA	NA
Chlordane	NA	NA	NA
DDT + DDD+ DDE	NA	NA	NA
Heptachlor	NA	NA	NA
OPP	NA	NA	NA
PCBs	2	<50	<50
Metals:			
Arsenic (total)	10	100	400
Beryllium	2	20	80
Cadmium	2	20	80
Chromium (III)	NA	NA	NA
Chromium (Total)	NA	NA	NA
Chromium (VI)	10	100	400
Copper	NA	NA	NA
Lead	10	100	400
Mercury	0.4	4	16
Nickel	4	40	160
Zinc	NA	NA	NA

Notes:
NA: Not Available. – If detected above the laboratory detection limit the levels will be discussed with EPA to develop appropriate assessment criteria.
[1]CT: Contaminant Threshold values for waste classification without doing the leachate test.

8.5 CONTINGENCY PLAN

In the case where contamination is identified that cannot be remediated by the proposed method a Risk Assessment shall be undertaken and a Management Plan developed specific to the contamination type.

8.6 SITE PREPARATION

8.6.1 Services and Utilities

Below ground services are not known to exist in the vicinity of the Asbestos Dump apart from the old stormwater drain which will be exposed upon the removal of the vegetation. Further, any below ground services that exist on the site would be accurately located and their positions clearly marked prior to any excavation or necessary construction works.

8.6.2 Fences and Warning Signs

Upon completion of the removal of the vegetation appropriate signage must be put in place prior to the removal of the asbestos waste. This is in accordance with NOHSC 2002 (2005) - Code of Practice for the Safe Removal of Asbestos – 2nd Edition.

Site fencing is likely to be required around the excavation.

8.6.3 Stormwater Control Measures

Stormwater control measures are proposed during the site preparation phase to prevent the transport of sediment and potentially contaminated soil away from the site for the duration of the project.

8.6.4 Occupational Health & Safety Plan

A Project Health and Safety Plan (PHSP) has been prepared for all personnel and contractors performing on-site works associated with this RAP. A copy of the PHSP is provided in Appendix C.

Contractors would be required to read and understand the PHSP, however, contractors would be responsible for formulating and monitoring their own Health and Safety.

All work associated with the remediation of the site would conform at a minimum, to the requirements of the ACT Occupational Health and Safety Act 1989.

8.6.5 Community Consultation

Due to the low risk of the project and significant separation from residential housing community consultation is not considered to be applicable. However representatives of active the Yarralumla residential group are to be informed.

8.6.6 Licenses and Approvals

Robson Laboratories Pty Ltd has contacted the actpla and has been informed that licences or approvals are not required for this project apart from the contractors who must be licensed to operate in the ACT.

Robson Laboratories Pty Ltd will ensure that all sub-contractors hold current and relevant licences and insurances.

8.7 SITE MANAGEMENT PLAN (OPERATIONAL PHASE)

Work method statements have been developed for the removal of the vegetation and the asbestos and are presented in Appendix B.

8.7.1 Noise

Minor increased noise levels may result from the use of machines on site during the course of the project.

To mitigate any noise which may arise as a result of site works, all works would be carried out in accordance with all applicable local noise regulations.

8.7.2 Odour

It is not expected that any significant odours would arise from site works. However, Robson Laboratories will have on hand an odour suppressant ('biosolve') during the remedial works. Other odour mitigation measures which may be employed include:

- Covering odorous material with plastic sheeting, if they have to be left for a considerable time; and
- Consideration of weather conditions prior to events and excavation of soils.

8.7.3 Dust

Airborne dust may be generated by wind action on stockpiles and on any loose soil on the ground. Due to the sites isolation from residential properties dust is unlikely to cause a nuisance for the surrounding area. However, due to the asbestos hazard dust must be controlled. Therefore, the following dust control measures are proposed:

- Dust levels would be monitored visually during site work; and
- Water sprays must be used to keep the ground surface and uncovered stockpiles and dust moist at all times.
- In the case where stockpile are to be left on site for a long period of time appropriate stabilisation methods will be employed.

8.7.4 Stormwater Runoff

It is expected that contaminated soil (if identified) may be stored on site for limited periods. Therefore, bunding would be constructed to prevent run-off caused by recent rain. Additionally, hay bales (straw only) and sediment fences will be used at appropriate locations to prevent site run-on and potential run-off of sediments into the old stormwater system.

8.7.5 Restricted Access

Contractors only will be allowed on-site whilst excavation and removal of soil to trucks is in progress. No members of the public will be allowed on site during this time.

8.7.6 Contact Details of Personnel

Ben Kendon of Robson Laboratories Pty Ltd is the Project Manager of the Project and will supervise all site remediation with assistance from the sub-contractor Supervisors i.e. the removal of recyclable materials.

Ben Kendon's contact details are provided below:

Ben Kendon – Robson Laboratories Pty Ltd
Phone (W): (02) 6239 5656
Phone (M): 0414 491 961
Fax (W): 6239 5669
Work Address: 9 Lyell Street Fyshwick ACT 2609

Contact details for other major contractors will be provided as they become available (Refer Table 5 on the next page).

Table 5. Sub - contractors

Organisation	Contact	Emergency (Phone/Fax)	Activities Involved
Irwin and Hartshorn	Tony Irwin – (02) 6260 1588	Ben Kendon (Project Manager) 0414 491 961 (02) 6239 5656	Set up site area i.e. site access, sediment control measures and restricted areas
Irwin and Hartshorn	Tony Irwin – (02) 6260 1588	Ben Kendon (Project Manager) 0414 491 961 (02) 6239 5656	Removal of vegetation cover
Irwin and Hartshorn and Bellchambers Asbestos Removals	Tony Irwin – (02) 6260 1588; George Bellchambers (02) 6299 7332	Ben Kendon (Project Manager) 0414 491 961 (02) 6239 5656	Separation of asbestos waste from general building and brick waste (recyclables)
Irwin and Hartshorn	Tony Irwin – (02) 6260 1588;	Ben Kendon (Project Manager) 0414 491 961 (02) 6239 5656	Soil excavation and stockpiling
Irwin and Hartshorn	Tony Irwin – (02) 6260 1588;	Ben Kendon (Project Manager) 0414 491 961	Site Reinstatement (if required)

(02) 6239 5656

8.8 REMEDIATION SCHEDULE, WORKING HOURS AND REPORTING

8.8.1 Schedule

The following is Robson Laboratories proposed remediation schedule (subject to the endorsement of all relevant Stakeholders).

Table 6. Remediation Schedule

Task	Proposed Start Date	Expected Duration	Proposed Completion Date	Comments
Stage 1 and 2				
Site set up, Removal of vegetation and stockpile on site	5/6/07	2-3 Days	15/6/07	Vegetation removal to commence on 12 June 2007
Stage 3 and 4				
Removal of Asbestos, all recyclable materials and stockpiling of fill soil.	18/6/07	10 Days	29/6/07	Will depend on what is found following vegetation removal
Stage 5				
Validation sampling of the excavated areas and stockpiles.	TBA	1 – 2 Days	TBA	
Groundwater Bore Installation (if required)	TBA	1 Day	TBA	Dependent on waste identified (may not be required).
Stage 6				
Site reinstatement provided validation of the area has been successful.	TBA	1 Week	TBA	
Laboratory Analysis, Data Interpretation and Draft Validation Report		5 Weeks		
Total	Unknown	8 Weeks	Unknown	Requires further information

Note: The dates set in this schedule are to be used as a Guide.

8.8.2 Working Hours

Remediation work may only be conducted within the hours from 7 AM to 6 PM Monday to Saturday, in accordance with the ACT Government. Furthermore, no work will be undertaken on Sunday or Public Holidays.

8.8.3 Reporting

Progress report will be issued on a weekly basis.

Upon receipt of laboratory results from the validation sampling an interim letter report will be issued by fax. This will be followed by a detailed report providing full details of the scope of the environmental site investigation and interpretation of the results against the site remediation criteria within five (5) weeks.

9 Conclusions

This RAP was prepared by Robson Laboratories Pty Ltd and is based on the results of the previous environmental investigation, our understanding of the desired landuse, available remediation technologies and their respective costs.

Robson Laboratories considers that the remediation program proposed in this report, if implemented in full, would result in the identification and remediation of all contaminated material and adequately address adverse odours such that the site will be suitable for the intended land-use and not pose a significant risk of harm to human health and/or the environment.

10 References

1. Australian and New Zealand Environment and Conservation Council (ANZECC) and National Health and Medical Research Council (NHMRC) (1992) *Australian and New Zealand Guidelines for the Assessment and Management of Contaminated Sites.*

2. Australian Standard AS 4482.1: 2005 Guide to the sampling and investigation of potentially contaminated soil – Part 1: Non-volatile and semi-volatile compounds.

3. Connell and Wagner 2001 - Appendix F- Brickworks Contamination Report

4. Environment ACT June 2000. ACT's *Environmental Standards: Assessment & Classification of Liquid and Non-Liquid Wastes.*

5. NOHSC 2002 (2005) - Code of Practice for the Safe Removal of Asbestos – 2nd Edition

6. NOHSC 2018 (2005) - Code of Practice for the Management and Control of Asbestos in Workplaces.

7. NSW EPA: *Guidelines for Consultants Reporting on Contaminated Sites 1997.*

8. NSW EPA: *Guideline for Assessing Service Station Sites 1994.*

9. National Environmental Protection Council (NEPC) 1999. National Environment Protection Measures. *Assessment of Site Contamination – Health Based Investigation Levels.*

APPENDICES

A, B and C

APPENDIX A

Aerial Photograph and
Site Location Plans (Figures 1 and 2)

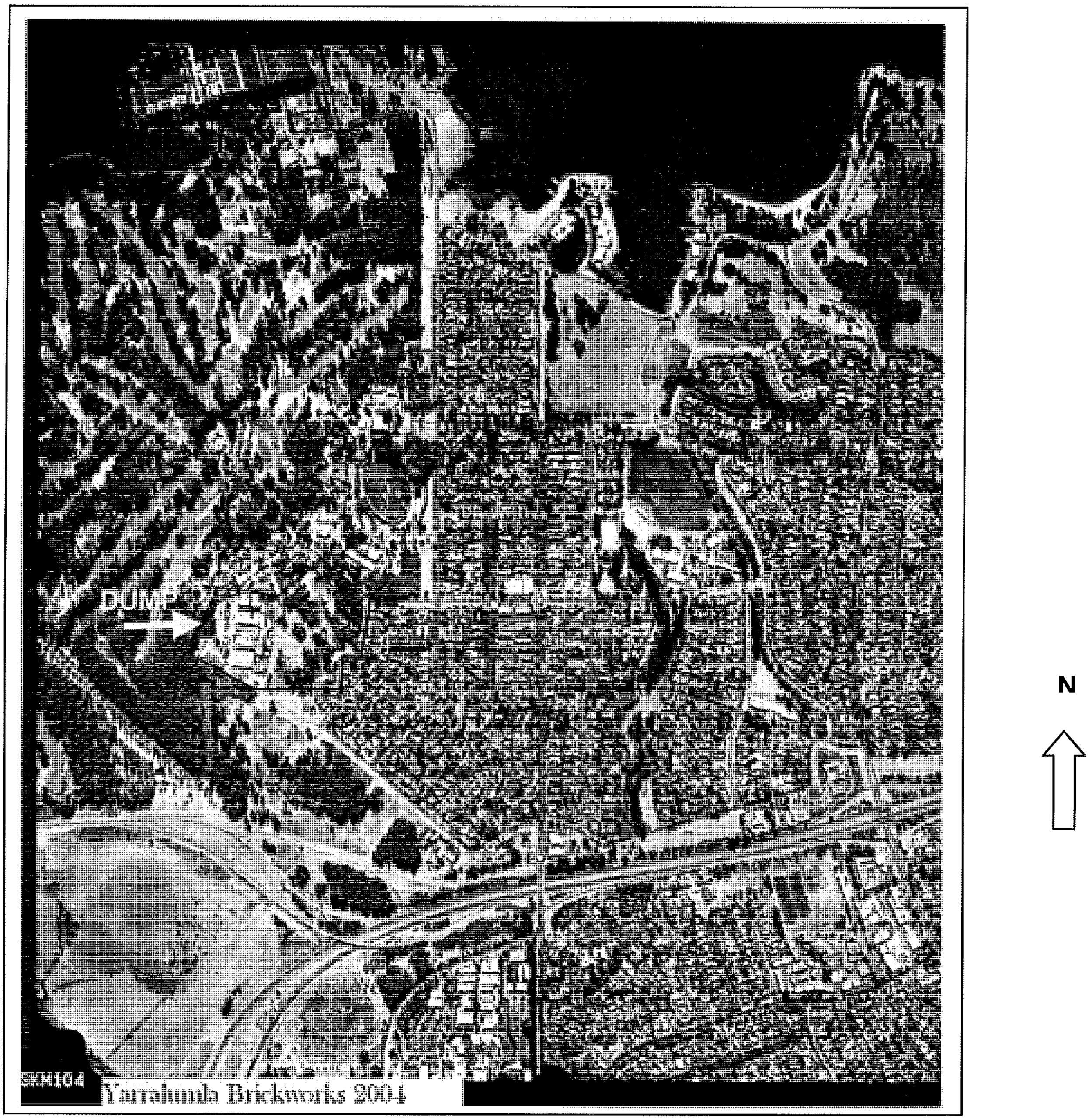


Figure 1. Aerial Photograph of the Site.

Appendix B

Work Method Statements

Work Method Statement for the removal of Blackberry vines and other vegetation that obscure the extent of the Asbestos Dump.

In accordance with blackberry removal practices as undertaken by Parks, Conservation and Land the demolition/ earthmoving contractor shall implement the following:

Site Set Up

1. Define appropriate storage area.

2. Due to the potential asbestos hazard ensure all machine operators and other personnel have been provided with the P2 respirators and coveralls, are comfortable with wearing them and understand the risks of working in the proximity to asbestos.

3. Ensure an ACT licensed asbestos removalist is available on site at all times to facilitate the removal of the asbestos hazard as required. This may include the removal of asbestos waste or simply assuring that the area is kept moist with a fine water mist.

Removal Works

1. Removal of blackberry and other vegetation to facilitate access to the waste. The vegetation will be removed with an appropriate machine and stockpiled in the designated removal area where it is to be managed by Parks, Conservation and Land.

2. In the case where an asbestos hazard must be removed the work will cease until the asbestos has been removed.

3. The larger trees will be preserved where possible.

Work Method Statement for the removal of Bonded Asbestos Sheet Materials from the Asbestos Dump.

Following the removal of the vegetation cover and as the Asbestos materials become accessible removal may commence.

All asbestos materials must removed and transported by an ACT licensed asbestos removalist in accordance with the following Guidelines:

- *Safe Removal of Asbestos Code of Practice 2nd Edition <NOHSC: 2002 (2005); and*
- *ACT Environment Protection Authority: Practice Note No.4 Contaminated Sites – Requirements for the transport & Disposal of Asbestos Contaminated Wastes.*

The movement of the asbestos waste must be conducted under the following conditions:

Storage area set up adjacent removal area

1. Cordon off designated area and fix appropriate signage.

   e.g. ASBESTOS HAZARD
   Contact your Site Supervisor before entering this site.

2. Based on the volume of material identified the sheeting may either be hand picked and placed in plastic asbestos bags for disposal or larger volumes may need to be placed directly into a doubled lined (200 micron thick plastic) metal container.

3. In the case that asbestos contaminated soil is identified this soil may either be loaded directly into metal drums or into a shipping container or similar. If the material has to be stored on site the base of the stockpile areas will need to be lined with 2 layers of 200 micron thick plastic and the stockpiles covered with plastic if they are to be left overnight.

4. Ensure the storage area has been inspected by the Occupational Hygienist for approval prior to the area being used.

Removal Works

1. PPE must be worn; P2 respirators, disposable overalls, gloves, hearing protection (as necessary).

2. A fine water mist is to be sprayed over the area during the removal of the asbestos waste.

3. The transport vehicle and storage containers must be leak proof, lined with 200 micron plastic sheet and equipped with a secured dust cover.

4. Air monitoring will only be required if large volumes of asbestos waste are identified. In the case that air monitoring is undertaken the results will be forwarded to the Asbestos Removalist prior to the commencement of work on the next day.

5. In the event that high fibre concentrations exceed the action level of 0.01 fibres/ml all work must stop and the removal method reviewed.

On Completion

1. All machinery and trucks must be decontaminated (wet wiped) immediately following completion of all work.

2. All waste plastic and disposable coveralls must be disposed of as asbestos waste.

3. All areas affected by the asbestos dump and storage areas, must be visually cleared by an Occupational Hygienist and a Clearance Certificate issued.

4. Depending on the volume and condition of the asbestos waste identified, soil sampling may be required.

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ROBSON LABORATORIES Pty Ltd

Occupational Hygiene
Health Safety
Environmental Consulting

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9 Lyell St Fyshwick ACT 2609
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Mobile: 0414 491 961
ABN: 55 008 660 900

Ref: 3144 RAP Appendix C.doc

Project Health and Safety Plan

for

Site Remediation & Validation of:

Asbestos Dump
Yarralumla Brickworks
Block 1 Section 102
Yarralumla ACT

Client: Territory and Municipal Services Property Group Facilities Management
PO Box 777
Fyshwick ACT 2609

1. Application

This Project Health and Safety Plan (PHSP) is designed to provide a framework to effectively manage all significant health and safety risks/issues associated with the site remediation and validation of the asbestos dump located on the west boundary of the Yarralumla Brickworks. The PHSP has been specifically prepared by Robson Laboratories (its agents and/or subcontractors) and covers operations associated with the works.

JOB NO: 3144

JOB TITLE: Site Remediation and Validation of the Asbestos Dump, Yarralumla Brickworks Yarralumla ACT.

<u>**Key Personnel**</u>

ENVIRONMENTAL WORKS PROJECT MANAGER (ROBSON LABORATORIES):

Mr Ben Kendon

Canberra Office

Address: 9 Lyell Street Fyshwick ACT 2609

Phone: (02) 6239 5656
Phone (M): 0414 491 961 **Fax (W):** (02) 6239 5669

OTHER CONTRACTORS: TO BE ANNOUNCED (REFER TABLE IN SECTION 2)

2. Work Details

WORK SITE ADDRESS: Yarralumla Brickworks, Yarralumla ACT

SITE ACCESS

The site is accessible from Denman Street and a site access area may need to be constructed to permit work in the area. The asbestos dump site work area will be taped off at all times and access to the site will be limited to personnel working on the site, project management, and approved visitors who have undergone site safety induction.

SCOPE OF WORK:

The site remediation and validation of the asbestos dump will involve the removal and disposal of all contaminated or aesthetically adverse material identified during the Environmental Investigation (October 2006) and subsequent remediation.

2.1 Remediation Methodology and Rationale

2.1.1 Hazardous Materials

These materials are to be removed by ACT licensed removal contractors.

2.1.1 Waste Soils

These soils will be removed by excavation and disposal to a suitable landfill following waste soil classification. If contaminant levels meet the assessment criteria the soils will be reused on-site.

If high levels of hydrocarbon contamination are identified in the excavation phase these soils may require on-site bioremediation prior to transport to landfill.

These options will be evaluated by Robson Laboratories once the extent of the contamination is known.

Once all waste soils have been removed the affected areas will be validated in accordance with the Remediation Action Plan.

<u>Disposal of Contaminated Water</u>

In the case where contaminated water is identified the water will be removed by a licensed liquid waste contractor.

<u>Soil Disposal</u>

The soils from the excavations will be transported by a licensed contractor (TBA) in covered trucks to the Mugga Lane Landfill for disposal as either 'inert' or 'solid' classified waste. Soil which is to be disposed off-site must be assessed in accordance with the Environment ACT June 2000. ACT's *Environmental Standards: Assessment & Classification of Liquid and Non-Liquid Wastes.* and its potential to:

a) release harmful greenhouse gases (eg. methane and carbon dioxide); and

b) release nutrient rich or chemical contaminated liquid (leachate).

No contaminated soil is to be removed from site without prior approval from Environment ACT.

The principle analytical test for assessment of the leachability of soil is the Toxicity Characteristics Leaching Procedure (TCLP). It is possible to rely solely on total concentrations of the contaminants (i.e. initial testing) however, the guideline criteria are considerably more stringent. If TCLP analysis is undertaken in conjunction with total concentration analysis the guideline criteria are more flexible.

Based on the laboratory results, the individual contaminants analysed are provisionally classified into one of four classes of waste according to its potential impact to the environment. The four groups ranging from least to most harmful to the environment are:

- Inert
- Solid
- Industrial
- Hazardous

The final classification of the soil is equal to the highest provisional classification of the individual contaminants. Currently, the Mugga Lane Landfill in the ACT accepts inert and solid waste. Industrial and Hazardous level waste must be disposed to landfill in Sydney NSW.

PROJECT SCHEDULE:
Contract Commencement Date: 29 May 2007
Estimated Completion Date: 29 September 2007

Activity	Start Date	Estimated End Date
Site Establishment (Stage 1)	5 June 2007	8 June 2007
Removal of vegetation and stockpile on site (Stage 2)	12 June 2007	15 June 2007
Removal of Asbestos, all recyclable materials and stockpiling of fill soil (Stage 3 and 4)	18 June 2007	29 June 2007
Validation sampling of the excavated areas and stockpiles (Stage 5)		
Groundwater Bore Installation (if required) (Stage 5)		
Site reinstatement provided validation of the area has been successful (Stage 6)		
Laboratory Analysis, Data Interpretation and Draft Validation Report		

Note: The dates set in this schedule are to be used as a Guide.

SUB CONTRACTORS: TBA

Organisation	Contact	Emergency (Phone/Fax)	Activities Involved
Irwin and Hartshorn	Tony Irwin – (02) 6260 1588;	Ben Kendon (Project Manager) 0414 491 961 (02) 6239 5656	Set up site area i.e. site access, sediment control measures and restricted areas (Stage 1)
Irwin and Hartshorn	Tony Irwin – (02) 6260 1588;	Ben Kendon (Project Manager) 0414 491 961 (02) 6239 5656	Removal of Vegetation Cover (Stage 2)
Irwin and Hartshorn; and Bellchambers Asbestos Removal	Tony Irwin – (02) 6260 1588; George Bellchambers – (02) 6299 7332	Ben Kendon (Project Manager) 0414 491 961 (02) 6239 5656	Separation of asbestos waste from general building and brick waste (recyclables) (Stage 3)
			Soil excavation and stockpiling (Stage 4)
			Site Reinstatement (Stage 6)

3. Hazard Identification, Risk Assessment and Control Measures

3.1 Chemical Hazards

Based on the Environmental Investigation (October 2006) undertaken by Robson Laboratories Pty Ltd - the potential chemical hazards include soil/fill or perched water, containing:

- Asbestos;
- Heavy metals;
- Total Petroleum Hydrocarbons (TPH);
- Aromatic and aliphatic hydrocarbons; and
- Polychlorinated Biphenyls.

Material Safety Data Sheets for the above Contaminants are presented in Attachment 2 and these include:

Asbestos;

<u>Petroleum Products;</u>

- Unleaded Petrol; and
- Diesel;

Polychlorinated Biphenyls (PCBs).

3.2 Chemical Hazards Exposure Routes

Project personnel may be exposed to any or all of the above chemicals while working on the site particularly when disturbing soil/water during excavation. These chemicals could enter the unprotected body via the following exposure pathways:

- Dermal contact - This may include direct contact with contaminated fill, dust or fluids.
- Ingestion - Contaminated fill, dust or fluids.
- Inhalation - Airborne dust, fumes/vapours.
- Injection - Contaminated fill, dust or fluids entering a puncture wound.

Personal protective equipment (PPE) plays a major role in ensuring that project personnel are protected against exposure to chemical hazards. Details regarding the type of PPE to be used during this project are addressed in Section 4.

3.3 Physical Hazards

Movement of Vehicles and Equipment
Remediation works will involve the movement of excavators, trucks and other vehicles. All personnel on foot should be aware of designated traffic routes and plant/equipment operating around them. Robson Laboratories and other contractor personnel will provide supervision of equipment movements as required.

Excavation
Excavation can cause rapid exposure and release of contaminants in soils. Soil samples and photographs will be taken as soon as sampling pits are opened. Following excavations, pits will be filled in as soon as possible. Excavations will never be left open and unsupervised in a state in which they present a hazard to site personnel. If left open, all excavations will be appropriately fenced (temporary fencing, soil mounding) and clearly marked with warning signs and tape. Any excavation that is greater than 1.2m will not be entered and shoring or battering back of excavation walls to a natural angle will be conducted for any excavation greater than 1.2m that is to be entered. Also, excavations where seepage is occurring will not be entered

Confined or Enclosed Spaces
Entry into confined spaces will only be conducted by appropriately trained personnel and with appropriate safety equipment (air-supply regulator, personal gas monitor etc). No entry into confined space is proposed for this project.

Underground Services or Utilities
Major hazards associated with excavations are underground services, utilities and structures such as electricity cables, gas pipelines, water or sewerage pipelines, communications cables, UST's, basement voids, and mine shafts.

Robson Laboratories will undertake to identify where practicable the location of potential hazards prior to excavation works.

Based on the location of the dump these hazards are not expected to be present.

Note: *However, where the location of these services, utilities and structures is unknown, hand augers, ground penetrating radar or soil probing will be employed prior to any excavation work.*

If any suspect structure is exposed or damage to a service occurs, the appropriate service provider will be advised immediately. If a gas pipe is damaged all activity which might act as a source or ignition will be immediately restricted.

Noise
Noise represents a health risk to workers and those in the vicinity of the site. Following assessment and where possible noise levels will be minimised. Personnel regularly exposed to loud machinery noise, must wear appropriate and clean hearing protection.

Operation of Equipment and Machinery
Only persons trained and licensed will operate site machinery.

Flammable or Explosive Materials
If expected or found on site, flammable or explosive materials will be monitored to keep flammable gas below 10% or the Lower Explosive Limit (LEL).

Fire
To ensure the prevention of fire, smoking or the use of a lighter or matches anywhere on-site is strictly prohibited. Heavy machinery is required to carry a fire extinguisher at all times and a minimum of two dry powder fire extinguishers be present near the active work areas.

If vegetation (blackberry vine) is to be burnt on site this is to be undertaken by the local bush fire brigade under controlled conditions.

Asbestos Exposure
To ensure that site personnel are not exposed to asbestos dust, asbestos airborne fibre monitoring will be undertaken as required.

Asbestos airborne fibre monitoring will be undertaken with the following sampling equipment.

- Battery Powered Pump;
- Clean connecting hose;
- Membrane Filters (mixed ester of cellulose) with a 0.8 micrometre pore size;
- Open face plastic filter holders.

Analysis

All works and representative air samples will be analysed in accordance with the National Occupational Health and Safety Commissions "Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Dust" for both exposure and control sampling and test certificates will be NATA endorsed.

Exposure Standards

NSW WorkCover Exposure Standards – National Occupational Health and Safety Commission (1995) has specified that the average fibre concentration of the air breathed by the worker throughout a working shift would not exceed the occupational exposure standard of 0.1 fibres/mL.

However, based on the premise that exposure to asbestos fibres during removal works should be minimised for both workers and the public Robson Laboratories has adopted the 'control levels' as set out in the following document.

- NOHSC 2002 (2005) - Code of Practice for the Safe Removal of Asbestos – 2nd Edition.

Control Levels (airborne asbestos fibres/ml)	Control/ Action
< 0.01 f/ml	Continue with control measures
≥ 0.01 f/ml	Stop work and review control measures
≥ 0.02 f/ml	Stop work and find cause i.e. lack of water, wind strength.

Hydrocarbon Gas Exposure and Odours (unexpected)
To ensure that site personnel are not exposed to high levels of hydrocarbon gas on-site monitoring for hydrocarbon gas levels will be undertaken as required.

Hydrocarbon gas levels will be monitored with both a Photoionisation Detector and a Combustible Gas Indicator. Based on the Worksafe Australian Exposure Standards for operator exposure levels for Benzene (5ppm Time Weighted Average) the following response action levels have been developed for the specific work areas in the site.

Hydrocarbon Air Monitoring Response Actions

Monitoring Location and Frequency	PID Level	Response Action
Where: 4 corners of the site. When: 4 times per day at regular intervals.	>5ppm (benzene equivalent).	Cease work immediately. and investigate source.
	>50ppm (benzene equivalent).	Cease work immediately, evacuate site and investigate source.

Notes:
ppm: parts per million.
PID: Photoionisation Detector

Hydrocarbon Odours

Odour levels can only be assessed qualitatively and not quantitatively. Qualitative olfactory assessment will be undertaken by the Environmental Scientist and will be based on his industry experience.

To ensure the safety and comfort of the site personnel during all excavation works the following response levels will be implemented which are presented in the Table below.

Odour Response Actions

Monitoring Location	Odour Levels	Response Action
Site Area	Low to Medium High	Investigate with PID and CGI
Site Area	Medium to High	Cease work, evacuate area and Investigate with PID and CGI

Notes:
Odour level assessment will be based on qualitative olfactory assessment to be undertaken by an Environmental Scientist.

UV Exposure and Heat Stress
Over exposure to sunlight can result in sunburn to exposed skin and in extreme conditions, heat stroke. The use of a sun screen (30+SPF) on all exposed skin is recommended. Hats (including hard hats in specified areas) will also provide additional protection. Sunglasses should be worn (where appropriate) to protect eyes from effects of UV exposure.

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4. Summary of Risk Elimination/Reduction Actions

This summary provides a checklist of the actions required to eliminate or reduce the risks to an acceptable level.

Design/Physical Actions

- Risk Assessment: the identification of potential contaminants, pathway or exposure route the contaminant might take and the receptor (human or ecological) will be identified.
- Asbestos airborne fibre monitoring will be undertaken as required e.g. when asbestos is being disturbed.
- A Photoionisation Detector (PID) will be used to monitor atmospheric concentrations of gases during the excavation operations of Asbestos Dump.
- No smoking within the work area.
- Appropriate PPE be used (see below).
- Excavation workers should be experienced and work in pairs.
- Personnel should wash hands before smoking, eating, drinking or using the toilet.

Personal Protective Equipment

Site Supervisor and workers involved in the intrusive activities *on-site* such as excavation work will be required to wear the following PPE:

- Work uniform (long sleeve shirt and trousers - preferably cotton).
- Hard hat (when in a 20m radius of an operating drilling rig).
- Steel capped boots at all times.
- Safety glasses or goggles (when in a 20m radius of an operating drilling rig).
- Hearing protection (ear muffs or plugs - as directed).
- Chemical resistant gloves (solvgard/nitrile type) are to be worn whenever there is the possibility of contact with contaminated soil, water or equipment.
- Class P2 or P3 half face mask with replaceable filters conforming to AS 1716 when operating or near an excavator or any other equipment which may exposed contaminated materials (as directed).
- Gloves.

5. Emergency Procedures

PROJECT SAFETY OFFICER

A Project Safety Officer is to be on site at all times when work is being performed. The Project Safety Officer must be trained in First Aid and hold a current First Aid Certificate from legitimate organisation eg. St Johns Ambulance.

The Project Safety Officer for the project is:

Mr Ben Kendon - Project Manager
Robson Laboratories Pty Ltd

Contact No: (02) 6239 5656 M: 0414 491 961

All Contractor(s) are to provide a list of nominated personnel who will be the Project Safety Officer for their company while operating on site.

Contractor: Irwin and Hartshorne

Project Safety Officer: ____________________________________

Contact No: ____

Contractor: Bellchambers Asbestos Removal

Project Safety Officer: ____________________________________

Contact No: ____

Contractor: ____

Project Safety Officer: ____________________________________

Contact No: ____

ROLE OF THE PROJECT SAFETY OFFICER

The role of the project safety officer is the following:

- To ensure a fully stocked a First Aid Kit is on site at all times during the project;
- In the event of injury the Project Safety Officer is to be informed immediately;
- Work is not to proceed on site until agreed to by the Project Safety Officer;
- To ensure all site works are undertaken in accordance with the Project Health and Safety Plan; and
- To maintain health and safety records and activity reports which will include:
  - ➢ Signed copies of the Compliance Agreement;
  - ➢ Personnel injury or exposure incident reports;
  - ➢ Records of Safety violations and corrective actions taken; and
  - ➢ Records of workers with current first aid certificates.

EMERGENCY CONTACT NUMBERS (REFER BELOW)

Emergency - **000**

The Canberra Hospital -Yamba Drive Garran ACT

General Enquiries (02) 6244 2222

Emergency Department (02) 6244 2611

Upon dialling the above number(s) The Canberra Hospital (TCH) will advise what course of action to take. This will be one of the following –

- Minor injuries can be dealt with here initially, followed up by a visit to a doctor.
- For more urgent situations the local State Emergency Services will attend to treat and assess. They will organise a medical transport if required. The Ambulance is the usual, but not only, mode of evacuation.

The nearest Hospital or Local Medical Practitioner is located at the Canberra Hospital, Yamba Drive Garran ACT (Refer to Location Map in Attachment 1).

Robson Laboratories Canberra Office: 02 6239 5656

Environmental Project Manager (Ben Kendon) 0414 491 961 (Mobile)

Note: Ben Kendon is trained at the Senior First Aid level and on site stocked first aid kits will be available on site.

EMERGENCY PROCEDURES:

An Emergency condition is considered to exist if:

- Any personnel are involved in an accident or experience any adverse effects or symptoms of exposure while on the site.
- A condition is discovered that suggests the existence of a situation more hazardous than anticipated.
- Fire, bomb threat, failure of a structure and/or an explosion.

In the event of an emergency or accident causing injury at the site, the procedure below will be followed:

1. Stop work.
2. All personnel shall leave the work zone they are present in.
3. Report to the central emergency assembly area (Main Gate entry to the Brickworks). If this location is not considered safe or not as yet specified then an alternate location will be provided that is specific to the site. (Refer Attachment 1 – Emergency Assembly Area Location Plan).
4. Await further instructions from the on duty Project Safety Officer.

No project personnel or visitors are to leave the assembly area unless advised to do so by the Project Safety Officer.

FIRST AID PROCEDURES

In the event of a Medical Emergency basic First Aid Procedures are presented in Attachment 4. These include St Johns Ambulance 'Emergency First Aid – A Quick Guide' and specific basic treatment procedures for Unconsciousness, Bleeding, Burns and Scalds. Also Refer to the First Aid section of the Material Safety Data Sheets for the Hydrocarbon based Fuels and Polychlorinated Biphenyls in Attachment 2.

6. Induction

All personnel who are to do work on the site will be given a general workplace health and safety induction, covering relevant topics from the list below.

Upon completion of the induction procedures all personnel must sign the Health and Safety Plan Compliance Agreement presented in Attachment 4.

WORKPLACE INDUCTION:

Name/Organisation	Signature	Date

CLIENT INDUCTION (IF REQUIRED):

Does the Client (or others in control of the workplace) require induction into their procedures?

Yes **No**

Name/Organisation	Signature	Date

- prevention of accidents, including keeping a lookout for hazards and reporting hazards ☐
- unfamiliar workplaces or work ☐
- procedures for dealing with emergencies and accidents ☐
- manual lifting procedures and handling of materials ☐
- fatigue and heat stress ☐
- use of alcohol and drugs ☐
- fire, fire fighting and flammable substances ☐
- hazardous substances ☐
- electrical safety ☐
- safety barriers and safety signs ☐
- eye, head, hearing and respiratory protection ☐
- protective clothing, helmets and footwear ☐
- hazards from equipment or areas left unattended ☐
- hazards from vehicles ☐
- use of workplace amenities, cleanliness and housekeeping ☐
- sunburn ☐
- wearing jewellery ☐
- workplace health and safety plans ☐
- workplace health and safety meetings ☐
- an outline of the persons obligations under the Act ☐

Name/Organisation	Signature	Date

Attachment 1

Location Map of Nearest Medical Facility
and
Site Emergency Assembly Area

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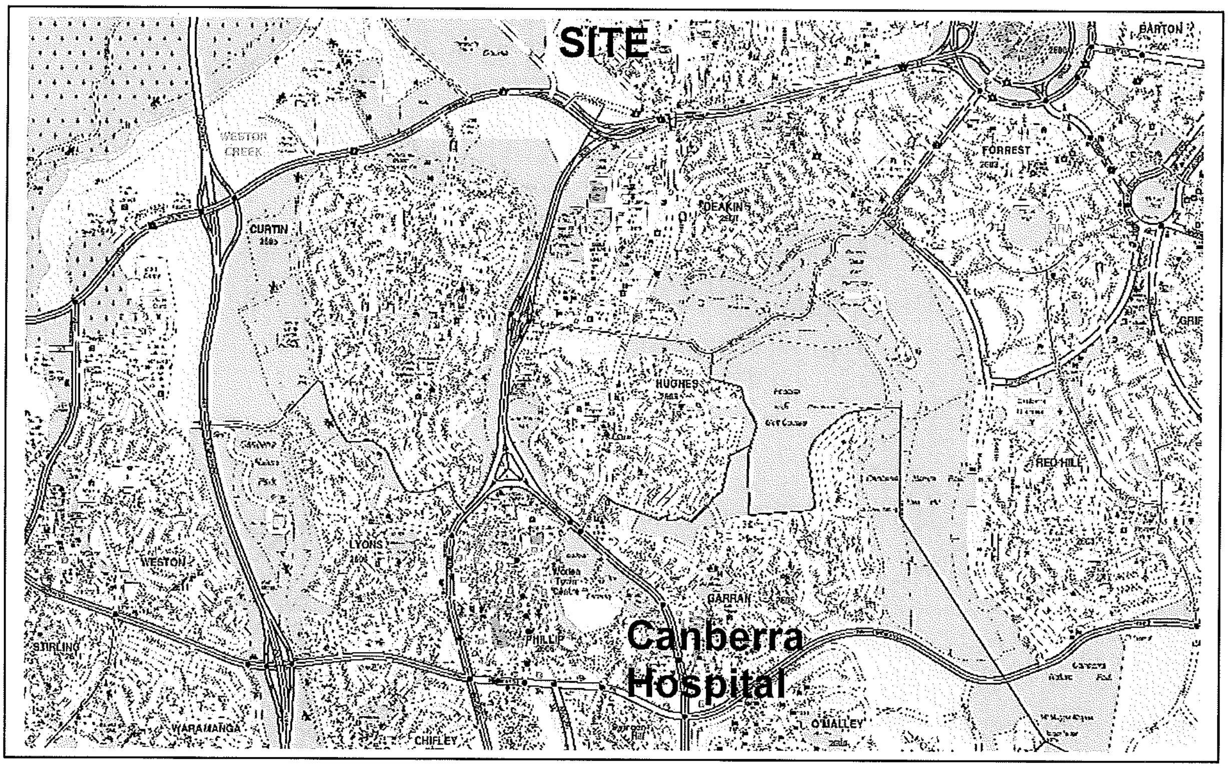
Location Map of Nearest Medical Facility



Yarralumla Brickworks

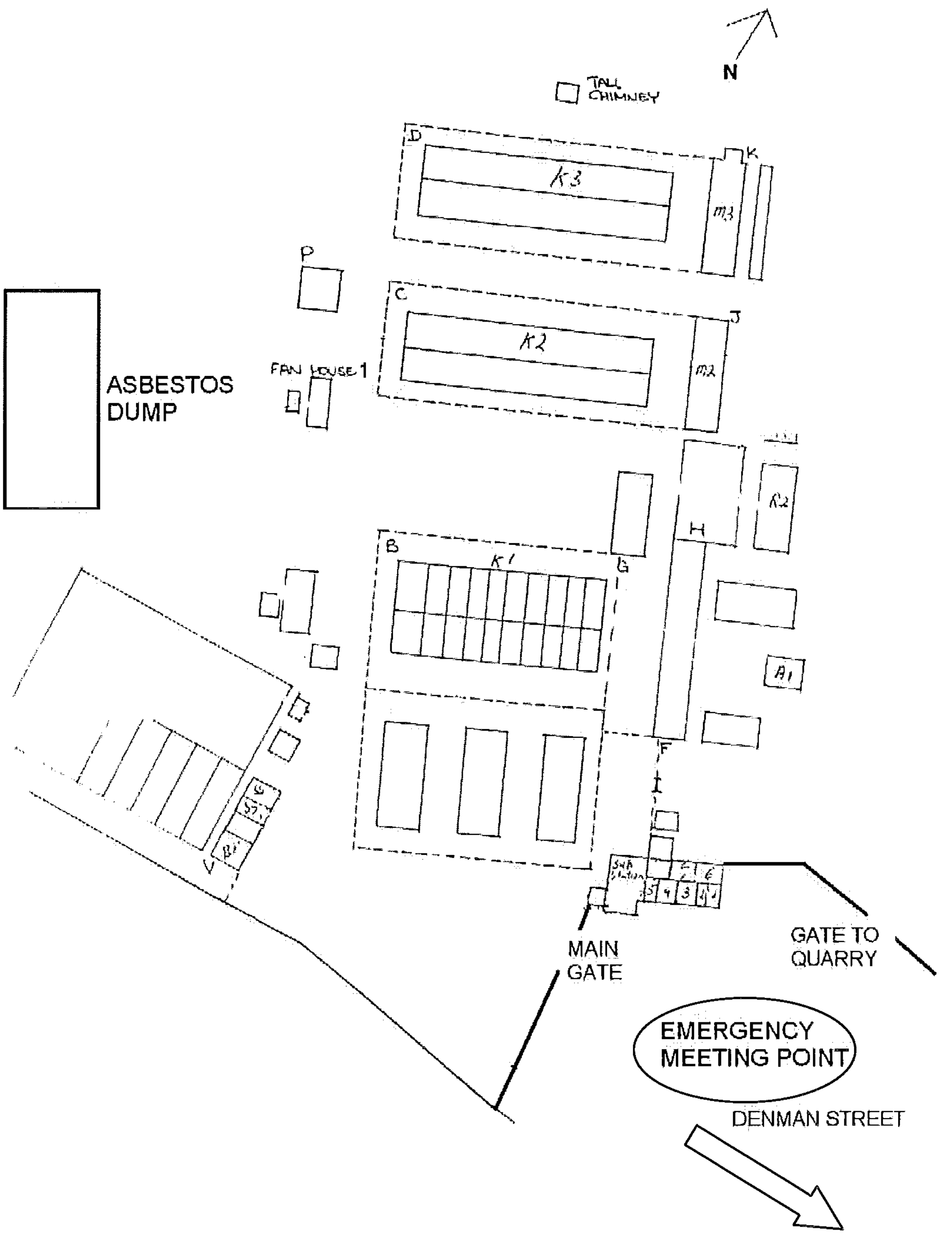


Figure 4. Emergency Meeting Point - Yarralumla Brickworks.
Job No. 3144_CL_ADRAP_20061108
Note: Reference should be made to the report for a full understanding of this plan.

ROBSON LABORATORIES Pty Ltd

Attachment 2

Material Safety Data Sheets

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Attachment 3

Basic First Aid Procedures

Attachment 4

Health and Safety Compliance Agreement

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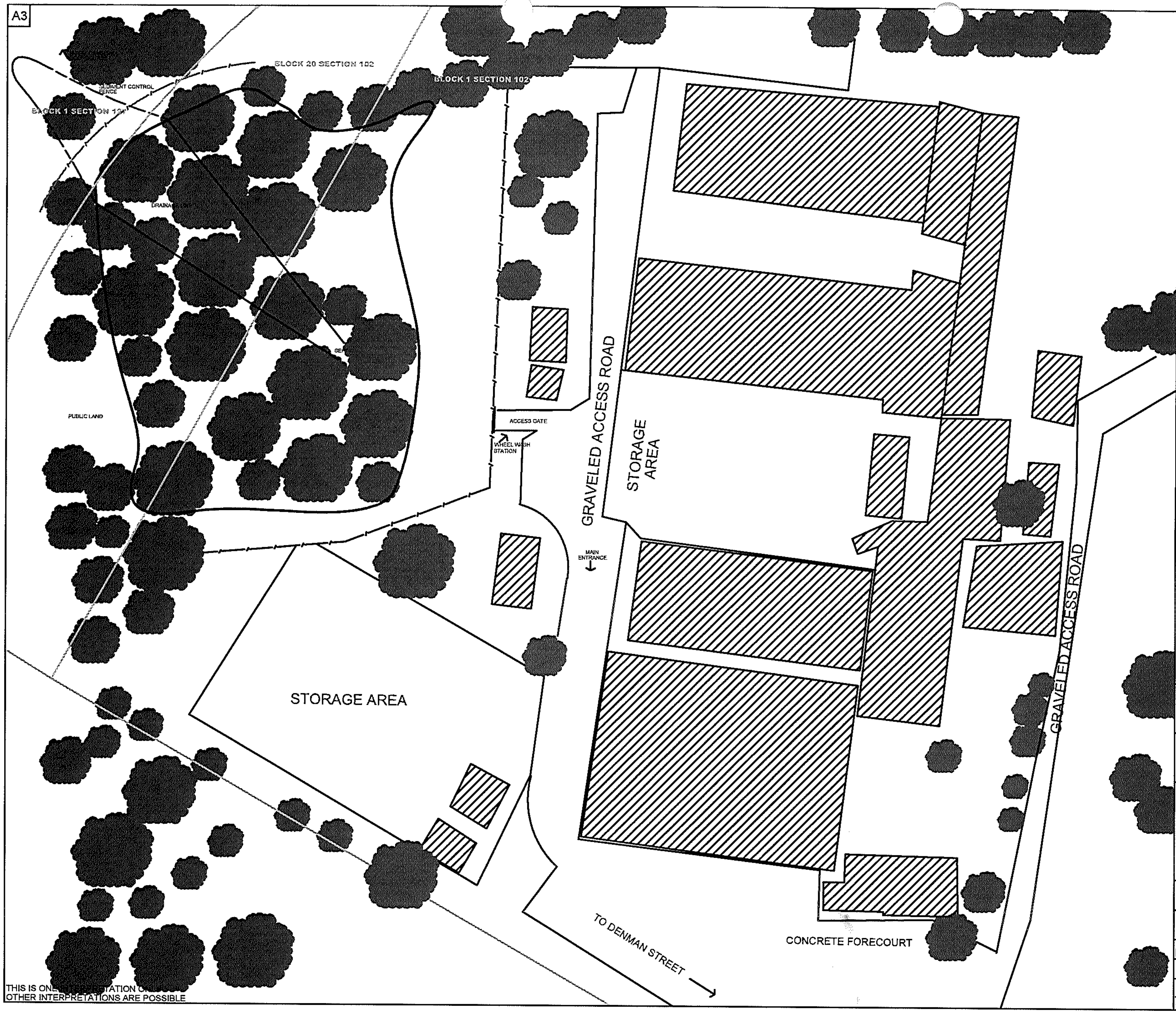
Health and Safety Compliance Agreement

I..(print name)
of
..(company)
name have received a copy of the Project Health and Safety Plan for the remediation of the Asbestos Dump at the Yarralumla Brickworks site Block 1 Section 102 (Robson Laboratories Pty Ltd - RAP 3144).

I have read the plan, understand it, and agree to comply with all its provisions. I understand I could be prohibited from working on the project for violating any of the safety requirements specified in the Project Health and Safety Plan.

A3



THIS IS ONE INTERPRETATION ONLY
OTHER INTERPRETATIONS ARE POSSIBLE

LEGEND

- BLOCK BOUNDARY
- BUILDING CANOPY
- APPROXIMATE EXTENT OF ASBESTOS DUMP
- FENCELINE
- TREE / SHRUB / VEGETATION
- AREA IMPACTED BY SURFACE WATER DISPERSION OF ASBESTOS DUMP
- SEDIMENT CONTROL FENCE

0 5 10 15 20 25
SCALE METERS

NOTE: ALL LOCATIONS AND BOUNDARIES ARE APPROXIMATE ONLY

Robson ENVIRONMENTAL
Environmental Excellence through Experience, Endeavor and Evaluation

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ABN: 55 008 660 900

Client:
ACT PROPERTY GROUP

Project:
ASBESTOS DUMP
REMEDIAL ACTION PLAN

Location: YARRALUMLA BRICKWORKS
(BLOCKS 1 & 20 SECTION 102 AND BLOCK 1 SECTION 127)
YARRALUMLA ACT 2600

Drawing Title:
DETAILED SITE PLAN

Drawn K.C.	Signed	Date 5.04.2013
Checked B.K.	Signed	Date 5.04.2013

Rev	Date	Revision Details	Dm
A	5.04.2013		K.C

Project - Drawing No.	Figure No.	Rev.
7504-23	2	A

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Old Canberra Brick Works Yarralumla

Fire Safety Report

On behalf of the ACT Property Group

Prepared by Ross Turton

of the

ACT Fire Brigade
Fire Safety Section

14th May 2009

1. Introduction

The Fire Brigade was requested by the ACT Property Group to conduct a general Fire Safety inspection of the Old Canberra Brickworks site. A similar inspection was conducted by this Section in May 1999 at the invitation of the ACT Heritage Commission. Recommendations from the 1999 inspection have been implemented over the intervening years.

Fire Safety Officers carried out the inspection for this report on Wednesday 13 May and on Friday 15th May, 2009.

It should be noted that the on-site inspection was not a Building Code of Australia (BCA) compliance audit. This level of inspection was thought to be inappropriate as the building was constructed long before the introduction of the BCA. Consideration was given to aspects of fire safety provisions that are referenced in the BCA.

The original buildings on-site were constructed in 1916, with further construction occurring through to mid 1960. There have been significant changes to regulations, even since the last constructed buildings were completed. Therefore, there is a wide variation in Fire Safety standards in the existing buildings compared to current standards. Where differences are significant and may affect the safety of current occupants, the Brigade has made directions and recommendations within the report.

2. Summary of Report

The site currently houses two principal occupants "Thor's Hammer" and "PJ's Joinery". Additionally a builder(s) is storing tools and equipment and small amounts of building materials in building K1 and in building R2. Neither presents a high fire load, or a risk of fire occurring.
An artist's studio is located upstairs in building 'T1' above a disused toilet block. This is a small studio run by a solo artist and again is of minimal concern regarding the risk of fire starting or high fire load. Occupation of this area is frequent if at all.

"Thor's Hammer" (a timber recycling business) has a large quantity of stored timber, spread over the site. The workshop for the business is located in building M1 and on the day of the inspection was clean and tidy with no obvious build up of sawdust or other combustible materials. The storage of recycled timber throughout the site allowed good access and egress and general housekeeping was good.

"PJ's Joinery" a minor tenancy houses a cabinet maker/joiner and an artist/sculptor. The premises were well kempt on the day of inspection and the activities performed within pose minimal risk of fire

3. Fire Appliances

3.1 Fire Hydrants

There are three operating external hydrants on the site. Two pillar type hydrants on the western side of the site are functional and vehicular access to the hydrants is adequate. Due to vandalism the hydrant hand wheels have been removed and placed in a "fire safety locker' located within "Thor's" Building M1. A system to secure the hand wheels permanently to the hydrants should be implemented to allow quick Brigade access in the event of fire. A third in-ground ball valve hydrant is located in the front car park area.

3.2 Fire Hose reels (FHR) & Fire Extinguishers

Two fire Hose reels have been installed in 'Thor's" building M1. It was also noted that this area was well served by three portable extinguishers. (9 litre water, 4.5kg dry powder & 4.5kg carbon dioxide type). Additional extinguishers are required in "PJ's Joinery" building W. (9litre water and a 4.5kg dry powder type at the western EXIT. It is further recommended that a Fire Hose reel be installed within this tenancy. Currently arrangements are in place for "PJ's Joinery" to access a fire hose reel within the "Thor's Hammer" tenancy.

3.3 Emergency Lighting and Exit Signage

There is no emergency lighting or exit signage in the complex

3.4 Thermal Smoke Detection System

No facilities for automatic notification of the Brigade are installed in the complex
In the event of fire there is no automatic notification back to the Brigade. It is therefore probable that a fire occurring at the site could take hold prior to the arrival of the Brigade and prove difficult to control and extinguish. Regular security patrols after hours would reduce the likelihood of that occurrence.

3.5 Fire Compartmentation

Resistance to fire spread within buildings does not exist. There is resistance to the spread of fire achieved by physical separation of some buildings

3.6 Means of Escape

In the current occupied areas means of escape appears adequate. Occupant numbers are small, they are familiar with their own tenancies and travel distances to available exits in these areas are not excessive. Exit signage and emergency lighting is not provided.

4. Current tenanted areas

4.1 Building M1

This is the workshop area for **"Thor's Hammer"**. The building is of steel frame construction clad with iron. The building contains some wood working machinery and small quantities of timber used for processing. The area is clean and tidy with good access and egress. The build up of sawdust, timber off cuts or other combustibles was not evident at the time of inspection. The area has a relatively low fire load. Possible ignition causes include heating appliances, electrical malfunction and carelessly discarded smokers material.

The area contained three portable extinguishers that were mounted on columns for easy access. Two Fire Hose reels were also installed to cover building M1. Hose reels and Extinguishers were due for their regular service inspection at the time of inspection.

The tenant has installed a dedicated store of fire fighting equipment (protective clothing etc) and has a practiced evacuation plan in place.

4.2 Building T1- known as "The Old Canteen"

The building is of double brick construction with a disused toilet block on the ground floor and a vacant artist's studio on the level above. There is minimal fire load on the ground level due to its tiled brick construction and this area is not occupied. Potential for fire to occur is minimal. The artist's studio formally known as **"Maries Studio"** on the first floor is approximately 10 metres by 5 metres in dimension. There is a single exit via timber stairs and the area is now used for minor storage .by "PJ's Joinery".

4.3 Buildings M2 & M3

These buildings are of non-combustible construction of steel sheeted with iron. The buildings contain a high fire load consisting of timber bundled to a height of 2 metres. This timber belongs to "Thor's Hammer". Care needs to be taken with it's placement to ensure clear access and egress paths are maintained

4.4 Buildings K1, K2 &K3

These buildings are of non–combustible construction consisting of solid brick kilns but with a verandah attached to both sides constructed of timber frame sheeted with iron.
K1 has a small number of areas being used by a builder to store steel formwork and other builder's items. These are of minimal fire load and would not be expected to threaten the building in the event of fire.

K2 has a number of small sections being used as storage space by a theatrical group? Fire load is minimal and the building structure would not be threatened in the event of fire. "Thor's Hammer" is using sections of the verandah for timber storage.
The kiln area of K3 is vacant and contains no fire load; however parts of the verandah are being used by "Thor's Hammer" for storage of timber to a height of approximately 2 metres.

4.5 Building K4

The area known as K4, was the last completed construction in the complex, and is mainly steel framed with iron cladding. It contains disused oil fired kilns with large steel access doors that are secured to prevent access.
"Thor's Hammer" is storing large quantities of bundled timber to a maximum height of approximately five metres.

4.6 Boiler House and Substation

Both buildings are of double brick construction. The boiler house is vacant and the sub-station is locked and maintained by ACTEW to provide power to the site.

4.7 Old Site Office

The building is approximately 18 metres by 10 metres of solid brick construction. The area is vacant.

4.8 Workshop-Building W

The building is of steel–framed construction with iron cladding with approximate dimensions of 20X 13 metres. It is presently jointly occupied by a cabinet maker/joiner and an artist that are identified on the door as **"PJ's Joinery"**.
There is a timber framed partition within the space creating a room of approximately 25 metres square. The building is separated from "Thors" building M1 by approximately 3 metres.

At the time of inspection this tenancy was found well kempt. The build up of sawdust, timber off cuts or other combustibles was not evident at the time of inspection. The area has a relatively low fire load. Possible ignition causes include heating appliances, electrical malfunction and carelessly discarded smoker's material.

Two unserviceable extinguishers were available at the time of inspection. Additional extinguishers are required. (9 litre water and a 4.5kg dry powder type at the western EXIT). The existing dry powder extinguisher is suitable if serviced and wall mounted. It is further **recommended** that a Fire Hose reel be installed within this tenancy. Currently arrangements are in place for "PJ's" to access a fire hose reel within "Thor's" tenancy.

5. Requirements

5.1. Existing hydrants need to be clearly marked and vegetation from around them removed to increase their visibility and ease of access. It is suggested the pillar type hydrants are repainted and reflective banding tape applied. Hand wheels to these hydrants are to be reinstated and permanently secured to prevent vandalism or theft.

5.2. Portable Fire Extinguishers are to be installed within the "PJ's Joinery" tenancy (9 litre water type and 4.5kg ABE dry powder). The requirement for a 9 litre water type would be waivered if the recommendation to fit a fire hose reel is adopted.

5.3. Current Fire Hose reels and extinguishers in building M1 "Thor's Hammer" to be serviced in accordance with Australian Standard AS1851.

5.4. The site, as inspected, presents itself as a safety risk to the general public if they were allowed access to it. The site is currently secured with a two metre high barbed wire topped fence. This fence must be checked on a regular basis.

6. Recommendations

6.1. Install a Fire Hose reel in "PJ's Joinery".

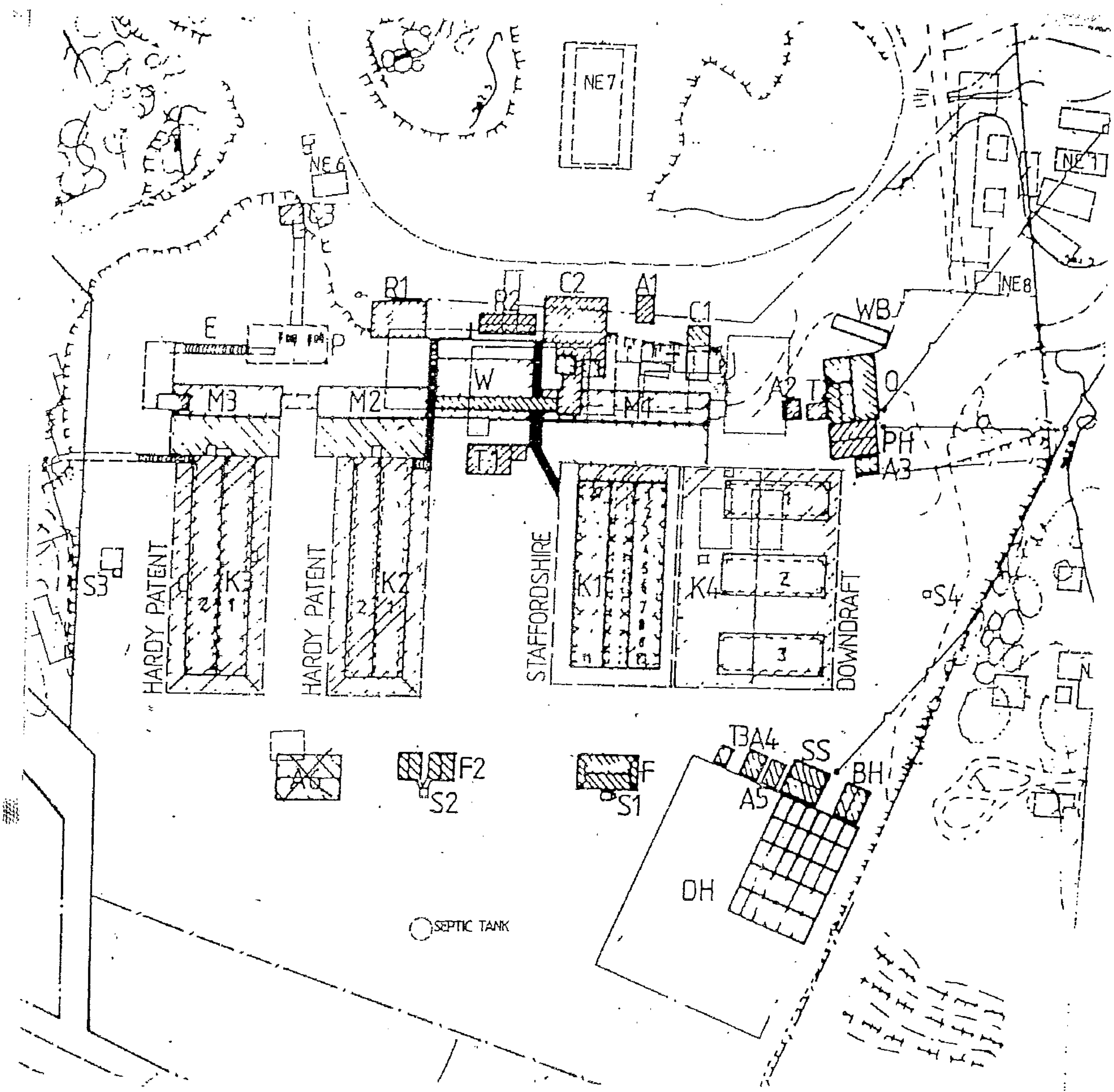
6.2. The random storage of timber over the site presents itself as a hazard. The fuel load within or adjacent to some buildings is high, particularly in building K4 where the building would be threatened in the event of fire. Consideration should be given to limit the fuel load to approximately the quantity at the time of inspection.

6.3. Advice from a structural engineer should be sought regarding cracked and spalling brickwork in kilns and their structural adequacy.

6.4. A licensed electrician should perform inspections on all electrical equipment and facilities on site to ensure the safety of all persons.

7. Conclusion

The site is currently used by a limited number of tenants. Provided the requirements of this report are implemented, the site's current limited public access does not present a high level of risk.
If the current usage of the site were to change, a comprehensive review to upgrade fire safety systems would be required.



DETAIL OF KILN AREA

KEY

- K1 Kiln . Staffordshire c 1915
- K2 Kiln . Hardy Patent c 1927
- K3 Kiln . Hardy Patent c 1953
- K4 Kiln . Downdraft c 1963
- F1 Fan House for Staffordshire c 1915
- F2 Fan House for Patent c 1927
- S1 Chimney Stack for Staffordshire c 1915
- S2 Chimney Stack for Patent c 1927
- S3 Chimney Stack for Patent c 1953
- S4 Chimney Stack for Downdraft c 1961
- M1 Machine Bay for Staffordshire and Downdraft c 1955 (also Brick Press Building 1)
- M2 Machine Bay Patent c 1955
- M3 Machine Bay Patent c 1955
- W Workshop c 1955
- C1 Small Crusher House (Hazemag)
- C2 Large Crusher House (or Pan Building) c 1955
- C3 Primary Crusher House c 1955
- P Pan Building Site c 1955
- E Elevator Conveyor c 1955
- O Offices c 1916
- PH Power House c 1915
- WB Weighbridge c 1960's
- T1 Toilet Block (lockers, lunch & first aid) c 1947/50
- T2 Minor toilet block
- T3 Minor toilet block
- BH Boiler House c 1971
- SS Sub Station and Control Room c 1971
- DH Drying House and Slab c 1971
- R1 Railway (model) Workshop c 1979
- R2 Railway (model) Storage Shed c 1979
- Q Quarry Brickpit
- A Geological Monument
- B Geological Monument
- C Geological Monument
- D Geological Monument
- A1 Ancillary Building Storage Shed c 1958
- A2 Ancillary Building Studio/Shed
- A3 Ancillary Building Studio/Shed Former Burners Hut
- A4 Ancillary Building Studio/Shed
- A5 Ancillary Building Studio/Shed
- A6 Forklift Shed c 1965
- NE1 Site of 1913 Temporary Open Kilns and Workshop
- NE2 Site of Brickworks Camp (Accommodation village)
- NE3 Site of Explosives Store
- NE4 Site of Weatherboard Cottage
- NE5 Site of oil tank/coal store
- NE6 Site of Cottage and associated buildings
- NE7 Site of Clay Storage Area (shed)
- NE8 Site of Carpenters Shed

Old Canberra Brickworks

ELEMENT LOCATION PLAN

Lester Firth Associates Pty Ltd

0 10 20 30 50 100 m

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COMMUNITY AND INFRASTRUCTURE SERVICES

ACT Property Group

Fire management works undertaken at Yarralumla Brickworks
Attachment to *Fire Services Condition Assessment Report, 2007*

Since the *Fire Services Condition Assessment Report*, November 2007 for the Yarralumla Brickworks ACT Property Group, ACT Department of Territory and Municipal Services has undertaken the following upgrades to address concerns in the report:

- The hydrant system for the site was checked and repairs made.
- Additional fire protection equipment was installed on site such as extinguishers.
- The main water supply isolation valve was replaced and installed including an in-ground access cylinder and cover.
- A new in-ground fire hydrant and pipe were installed at the front car park area.
- Signage regarding fire services was improved.
- Fire Services on the site are inspected regularly by qualified contractors and fire services are maintained to the Australian Standards

Tania Shaw
a/Manager, Property Asset Management
ACT Property Group

20 January 2009