

---

## Appendix E – SEM Inspection Report



Effective Environmental Solutions

140 Gladstone St, Fyshwick ACT 2609  
PO Box 112, Fyshwick ACT 2609  
P: 02 6239 5656 F: 02 6239 5669  
E: [fraind@robsonenviro.com.au](mailto:fraind@robsonenviro.com.au)  
W: [www.robsonenviro.com.au](http://www.robsonenviro.com.au)

Franco Frino  
Senior Manager - Project Management  
Asset Management Branch  
Community Services Directorate,  
ACT Government  
Level 3 Nature and Conservation House  
Belconnen ACT 2617

24 August 2013

Re: Preliminary inspection and SEM sampling report for 25 Bradfield Street,  
Downer, ACT, 2602.

Dear Franco,

John Robson of Robson Environmental visited the above location on Friday 23 August 2013 and undertook the following sampling and inspection;

- Surface dust sampling (2 samples) of the cleaned brick walls for asbestos containing material,
- Surface dust sampling (1 sample) of the cleaned timber stud walls for asbestos containing material,
- A visual inspection of the base of the perimeter wall cavities below floor level during the removal of the timber floor boards by Empire Contracting to determine what level of contamination is present.

The surface dust samples were collected using an air sampling pump connected to a scanning electronic microscope (SEM) filter holder for each location. The loose dust collected in each of the three (3) surface dust samples was transferred into three (3) petri dishes and uniquely labelled. The petri dish samples were returned to the laboratory for asbestos analysis using polarised light microscopy (PLM). The three (3) filter samples will be delivered to the Electron Microscopy Unit at the Research School of Biological Sciences at the ANU to be analysed for their asbestos content by SEM.

The results of SEM and PLM analysis are presented in Tables 1 & 2 respectively with the laboratory certificates of analysis presented in Appendix 2.

In addition photographs of the sampled and assessed materials are presented in Appendix 1.



**Material Assessment**

The assessor also provided information regarding Material Assessment i.e. risk assessment. The assessment was conducted based on the condition of the materials at the time of inspection. 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 into account the information in the Asbestos Management Register, including:

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

**Table 1: Sample Analysis Results - SEM**

Sample Number	Description/Location	* Action rating	ACM type	Fibrous Content	Recommended Action
J0709 - SEM	Surface dust to rough mortar to eastern gable end brick wall	1A	Loose insulation	Amosite Asbestos	Spray heavily with sealant and demolish with effective dust control procedures
J0710 - SEM	Surface dust to wall bracing, stud and rafter timbers to north-eastern area	1A	Loose insulation	Amosite Asbestos	
J0711- SEM	Surface dust to smooth bricks to southern wall adjacent electrical switchboard recess	1A	Loose insulation	Amosite Asbestos	

\*The action rating(s) in the table above is the combined ACM condition rating and ACM risk rating (see page 3). Refer to Certificate of analysis

**Table 2: Sample Analysis Results - PLM**

Sample Number	Description/Location	* Action rating	ACM type	Fibrous Content	Recommended Action
J0709 - PLM	Surface dust to rough mortar to eastern gable end brick wall	1A	Loose insulation	Amosite Asbestos	Spray heavily with sealant and demolish with effective dust control procedures
J0710 - PLM	Surface dust to wall bracing, stud and rafter timbers to north-eastern area	1A	Loose insulation	Amosite Asbestos	
J0711- PLM	Surface dust to smooth bricks to southern wall adjacent electrical switchboard recess	1A	Loose insulation	Amosite Asbestos	

\*The action rating(s) in the table above is the combined ACM condition rating and ACM risk rating (see page 3).

**Material Assessment Restrictions and Caveats**

The samples taken from suspected asbestos containing materials are representative of the materials sampled, individually identified, transported, analysed and reported in accordance with the National Occupational Health and Safety Commission (NOHSC) Guidelines, relevant Statutory Regulations, Codes of Practice and Robson Environmental survey/inspection procedures.

The presence of asbestos in a bulk sample is determined by Polarised Light Microscopy (PLM) with dispersion staining techniques.

Robson Environmental has taken care to ensure that this report includes the most accurate information available. This report does not constitute a full register of asbestos containing materials at the above establishment as required by State Legislation and the National Code of Practice. The material assessments, recommendations and/or conclusions contained in this report must not be used to excuse a person of their responsibility to work in accordance with relevant Statutory Requirements, Codes of Practice, Guidelines, Material Safety Data Sheets, Work Instructions or reasonable work practices.

**ACM CONDITION RATING**

1	Severe	Material in extremely poor condition, area requires isolation.
2	Poor	<b>Friable:</b> Unstable material <b>Bonded:</b> Deteriorated surface and considerable damage & debris
3	Fair	<b>Friable:</b> Stable material <b>Bonded:</b> Fair condition, minor cracks and damage
4	Good	Well sealed stable surfaces

**ACM RISK RATING**

A	Very High	Exposure to airborne asbestos as a consequence of very minor disturbance
B	High	Exposure to airborne asbestos likely during normal building use
C	Medium	Exposure to airborne asbestos unlikely during normal building use
D	Low	No exposure to airborne asbestos during normal building use

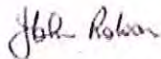
**Discussion:**

The analysis of the three (3) SEM and three (3) PLM samples all revealed substantial concentrations of Amosite Asbestos. The asbestos was detected to the mortar between the bricks, to the smooth surfaces of the bricks and to the roof timber joints to the interior of the residence.

An inspection of the base of the perimeter wall cavities below floor level revealed clumps of insulation consistent with amosite asbestos. The migration, spread and settling of the loose asbestos insulation in the house is extensive and has migrated from the ceiling space to the bottom of the perimeter timber stud walls and into the sub-floor space, including adjacent wet area floor waste locations.

All surfaces to all building materials of the residence must be heavily sprayed with a binding sealant prior to demolition. Effective dust control procedures must be implemented during all phases of the demolition and during the removal of 300mm of topsoil to the residential Block, 25 Bradfield Street, Downer.

Refer to the attached photographs showing the sample locations and loose asbestos insulation contamination.



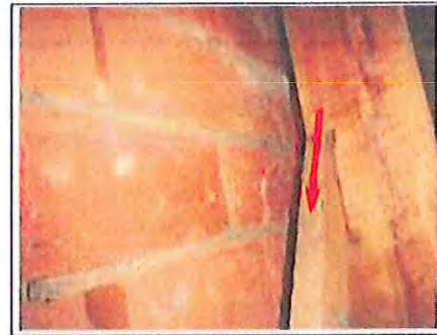
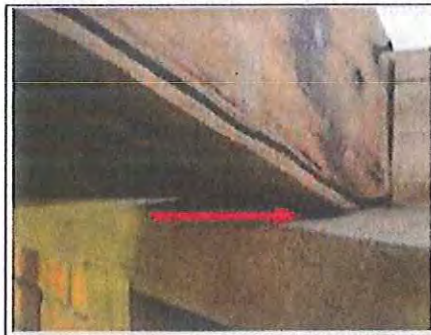
John Robson B.Sc., Grad. Dip. Occ. Hyg.  
Class A Asbestos Assessor ACTPLA  
License No: 2006640  
Occupational Hygienist  
Managing Director  
Robson Environmental Pty Ltd



**Appendix 1**  
**Photographs of SEM/PLM sample locations**



**Photographs 1 and 2:** Eastern gable end brick wall, surface dust to rough mortar. Surface dust sample location – sample J0709



**Photographs 3 and 4:** North-eastern area wall, surface dust to wall bracing, stud and rafter timbers. Surface dust sample location – sample J0710



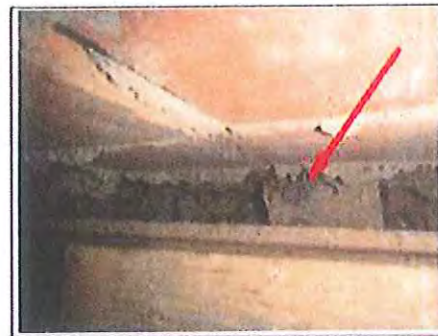
**Photographs 5 and 6:** Southern side brick wall, surface dust to smooth bricks adjacent electrical switchboard recess. Surface dust sample location – sample J0711



**Photographs 7 and 8:** Wall cavity and clump of asbestos insulation collected from cavity resting on stud wall timber base plate.



**Photographs 9 and 10:** Clumps of loose asbestos resting on the floor of the sub-floor space and in the perimeter wall cavity.



**Photographs 11 and 12:** Clumps of loose asbestos resting on the floor of the sub-floor space adjacent sewer and in the perimeter wall cavity.

**A p p e n d i x 2**  
**C e r t i f i c a t e s o f A n a l y s i s**



Effective Environmental Solutions

Fibre Identification Certificate of Analysis					
Report Number: 7692	Date of Report: 27.08.2013	Samples Taken by: Robson Environmental	Page 1 of 1		
Client Details			Laboratory Details		
Client: Community Services Directorate			Address: 140 Gladstone Street Fyshwick, Canberra 2609		
Attention: Franco Ferra			Manager: Ged Keane		
Received: 23.08.2013			Telephone: 02 6239 5656		
Client Reference: 25 Bradfield Street, Downer			Fax: 02 6239 5669		
Email:			Email: <a href="mailto:fferrid@robsonenviro.com">fferrid@robsonenviro.com</a>		
Test Specifications Employed: A54064 (2004) & In House Procedure No 2					
Methodology Summary					
<p>Samples of material are examined to determine the presence of asbestos fibres using A54064 (2004) &amp; 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). Unambiguous 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 asbestos or not. Careful application of the test procedure provides sufficient diagnostic clues to allow unambiguous identification of asbestos type, 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.</p>					
<p>Robson Environmental is not responsible for the accuracy or competence of sampling carried by third parties. Sample location(s) and/or sample point(s) of third party services 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. In sampling, Robson Environmental takes responsibility of information reported only when a staff member takes the samples.</p>					
<p><b>Asbestos Detected:</b> Asbestos detected by Polarised Light Microscopy (PLM), including Dispersion Staining (DS).  <b>No Asbestos Detected:</b> No Asbestos detected by Polarised Light Microscopy (PLM), including Dispersion Staining (DS).  <b>UMF Detected:</b> Fibrous form of uranyl formate detected by Polarised Light Microscopy (PLM), including Dispersion Staining (DS). Confirmation to another competent analytical technique may be necessary.  <b>Hand picked:</b> refers to small discrete amounts of asbestos removed from a large body of non-asbestos material.</p>					
<p><b>Limit of Detection &amp; Reporting Limit</b>                  Keynote limitations of the test procedure using Polarised Light Microscopy (PLM) are:</p> <ul style="list-style-type: none"> <li>PLM is a qualitative technique only.</li> <li>It does not allow identification of asbestos or other fibre asbestos.</li> <li>The test encompasses asbestos mineral forms: chrysotile, amosite and crocidolite and does not extend to other forms of asbestos such as actinolite, anthophyllite and tremolite which are not included in the test procedure. Thus, the method is used to determine whether the fibre major asbestos minerals: amosite (brown), chrysotile (white) and crocidolite (black).</li> <li>Visual identification requires that the sample material contains a sufficient quantity of the unknown fibre in excess of the practical detection limit used in the test. PLM and Dispersion Staining, which has a calculated practical detection limit of 0.010 1% equivalent to 0.1 1g/kg (AS4398 2004 App. A4).</li> </ul> <p>Results relate only to the samples submitted for testing.                  Test result may not be representative of full.                  Test report Accredited for compliance with ISO/IEC 17025</p>					
Sample No.	Client Ref.	Location	Physical Structure	Sample Description	Analysis of Fibrous Content
J0709		Surface to rough mortar to eastern gable and brick wall	Dust/debris	51gram	Amosite Asbestos Detected
J0710		Surface dust to wall bracing, stud & rafter timbers to north east	Dust/debris	51gram	Amosite Asbestos Detected
J0711		Surface dust to smooth bricks to southern wall adjacent electrical switch board recess	Dust/debris	51gram	Amosite Asbestos Detected

Simon Saville  
Approved Identifier



Simon Saville  
Approved Identifier

Document issued in accordance with NATA's accreditation requirements and without alterations or omissions and must not be duplicated unless in full

**Centre for Advanced Microscopy**

R N Robertson Building (Bldg 46), Sullivan's Creek Rd  
The Australian National University  
Canberra ACT 0200



**Client:** Robson Environmental  
**Job No:** 7692  
**Order No:** 7692-SEM01  
**Dates of Examination:** 2nd September 2013  
**SEM Operator:** Frank Brink

SEM samples were analysed using the 'Nuclepore SEM method described by: Altree-Williams S, & J.S. Preston, (1985). Asbestos and other fibre levels in buildings. Ann. occup. Hyg. 29 (3): 357:363

Collection area of each sample filter: 408 mm<sup>2</sup>  
Field area on screen (at x1200 magnification): 0.0075 mm<sup>2</sup>  
Number of fields examined on each sample: 100

1) Table indicating total number of fibres (asbestos, mineral, and organic) found on each sample:-

Sample Number	Air Volume (liters)	Asbestos Fibres Found	Mineral Fibres Found	Organic Fibres Found
J0709 -1SEM	-	77*	1	1
J0710 -1SEM	-	19	0	1
J0711 -1SEM	-	43	1	0

\* Only 50 fields examined (instead of 100)

Fibres incl calculation not requested

21 Other information

- (a) Fibres were found on all filters examined. Some typical images and spectra are shown in the attached figures below. Most fibres analysed contained significant Si and Fe with lesser amounts of Mn and Mg. In the case of filter J0711-ISEM many fibres also showed additional Na and Cl, thought to be due to some form of contamination from the environment. Semi quantitative analysis performed on a range of fibres indicate a (Fe+Mg+Mn) to Si ratio of around 7.5 : 7.5 when based on a total of 15 cations. This appears to be largely consistent with the asbestos form of Grunerite  $(\text{Fe}, \text{Mg}, \text{Mn})_3(\text{Si}_2\text{O}_7)_2(\text{OH})_2$  a variety of Amosite asbestos.

Dr. F J Brink  
Centre for Advanced Microscopy, ANU

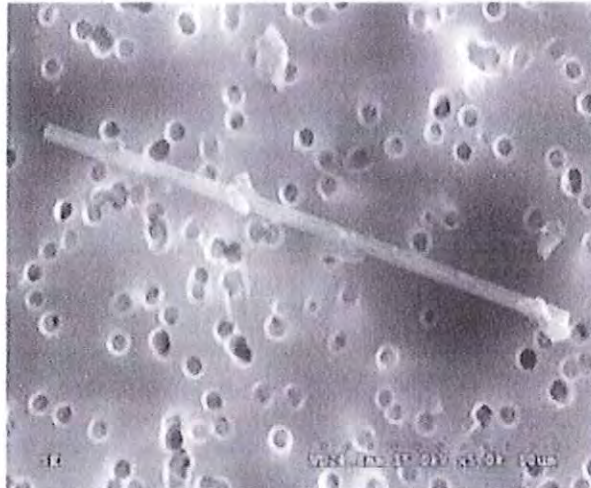


Fig 1: SEM micrograph of an Amosite fibre using the secondary electron signal (SE)

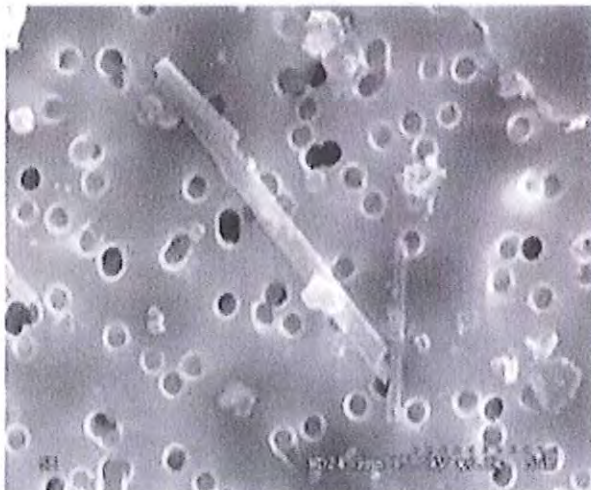


Fig 2: SEM micrograph of an Amosite fibre using the secondary electron signal (SE)



Fig 3: SEM micrograph of a typical Amosite fibre, using the backscattered electron signal (BSE)



Fig 4: SEM micrograph of an Amosite fibre using the secondary electron signal (SE)

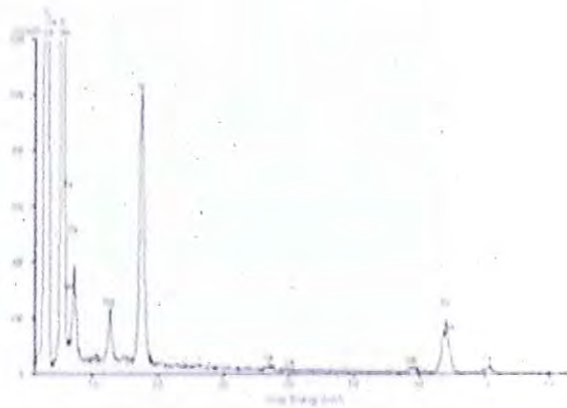


Fig 5 X-ray spectrum from a typical 'clean' Amosite fibre found in samples J0709 and J0710

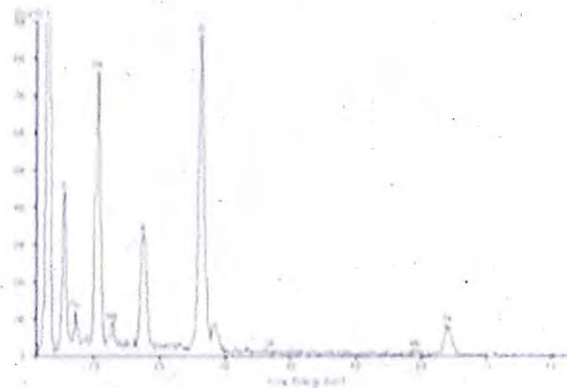


Fig 5 X-ray spectrum from a fibre in sample J0711 showing significant Na and Cl contamination. Mg, Si, Fe and Mn peak ratios remain the same as in samples J0709 and J0710, suggesting these fibres are also Amosite asbestos