ASBESTOS CONTAINING MATERIALS
SURVEY REPORT

Bundaberg campus grounds / forensic crash lab investigation
scenario compound
Bundaberg

PREPARED BY:
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ABN 29 001 584 612

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DOCUMENT CONTROL

<table>
<thead>
<tr>
<th>Reference</th>
<th>Date</th>
<th>Prepared</th>
<th>Checked</th>
<th>Authorised</th>
</tr>
</thead>
<tbody>
<tr>
<td>622.10968.00010-R01-v1</td>
<td>06 October 2017</td>
<td>Jason Hutchins</td>
<td>David Egert</td>
<td>Narelle Cames</td>
</tr>
</tbody>
</table>
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EXECUTIVE SUMMARY

SLR Consulting Australia Pty Ltd (SLR) was engaged by Grant Farrell of CQ University to undertake an assessment of the asbestos debris in soil at the Bundaberg Campus. The inspection and assessment was conducted by Jason Hutchins & Narelle Carnes from SLR on 05 October 2017.

Asbestos containing materials (ACM) in the form of fibre cement sheeting is assumed to exist within the ground subsoil of the Bundaberg Campus, debris on the ground surface was sampled by Octief on the 16th June 2017, and as a result of the positive results the visible debris was removed by BR Building Group on the 28th June 2017.

Known hotspots on the campus for the debris - western half of the campus, with focus around the Forensic Crash Lab Investigation Scenario compound.

The ACM assumed to be within the soil of the Bundaberg grounds is cement sheeting and the fibres are bound within the cement matrix, therefore this minimises the risk of exposure to asbestos of all personnel on the premises including all staff and students, maintenance personnel, contractors and other visitors.

The recommendations arising out of this report are:

- Asbestos cement fragments are known to exist within the ground sub surface in the following locations: western half of the campus, with focus around the Forensic Crash Lab Investigation Scenario compound, although the whole campus should be treated as potentially contaminated.
- The possible presence of any asbestos fragments in the subsoil should be investigated further by a competent consultant prior to any subsoil disturbance within the inspected area (or other surrounding areas that may be similarly affected) and appropriate action taken. This should include but not limited to:
  - Prior to any excavation test holes dug and spoil sieved and inspected for the presence of ACM. If ACM is discovered the contaminated spoil must not be relocated to other areas of the site and must be treated as contaminated waste.
  - The grounds area is inspected yearly or after weather events to ensure no ACM fragments have risen to the ground surface.

As required by Work Health and Safety Regulations 2011(QLD), a person with management or control of a workplace is obliged to comply with the requirements outlined in the Regulation as follows:

a. All asbestos of ACM at the workplace is identified and maintained in a register of asbestos containing materials;

b. All in situ ACM is clearly indicated and labelled;

c. Implementation of an Asbestos Management Plan; and


The list above is a summary/overview only and should not be relied on to accurately identify ACM. The locations and details of all items of known ACM at the property are documented in the Asbestos Register in Part 4 of this report.

In order to comply with the Work Health and Safety Regulations 2011(QLD), any action taken to control asbestos and ACM in the place of work, or in plant at the place of work, is to be recorded in the Asbestos Control Log attached in Appendix A.
Copies of NATA Laboratory Certificates for asbestos identification analysis are provided in Appendix B. Refer to Appendix C for Limitations of this survey. Relevant photographs taken during the inspection are provided in Appendix D.
1 BACKGROUND AND SCOPE

SLR Consulting Australia Pty Ltd (SLR) was requested by Grant Farrell of CQ University to undertake an assessment of the assumed asbestos debris in the sub soil at the Bundaberg Campus. The assessment was conducted by Jason Hutchins & Narelle Carnes from SLR to ascertain the location, type, condition, and management of Asbestos Containing Materials (ACM) known to potentially exist within the ground area of the Bundaberg Campus. The inspection of the area was conducted on 25 August 2017 by Jason Hutchins from SLR.

The ground at Bundaberg Campus is an historical dump site and particularly the western half which has previously had numerous broken pieces of ACM eroding out of the ground. The majority of the ACM has been identified in the forensic crash lab investigation scenario compound refer to site location map Figure 1.

ACM in the form of fibre cement sheeting was identified on the ground surface in June 2017, Octief was engaged to undertake sampling on the 16th June 2017 (refer CER1706201503 in Appendices) all six samples were identified as containing Chrysotile asbestos. BR Building Group was then engaged on the 28th June 2017 to carry out and emu pick of the ground area.

1.1 Site Description

The site is located on the south side of University Drive. A Locality Map is presented in Figure 1 for the purpose of this report; University Drive is taken to run in an east - west direction, directly adjacent to the site.

The following information is known about the area:

- ACM was found and removed from both the red & yellow areas with particular concentrations found within the yellow zone highlighted in green & orange.
- The majority of the yellow zone is the forensic crash lab investigation scenario compound.

![Figure 1 Site Location](image)

Relevant photographs taken during the inspection are provided in Appendix D.
1.2 Survey Strategy

Asbestos material surveys are undertaken considering a risk management approach, in accordance with best practice. The survey was conducted in a manner which conforms with the Work Health and Safety Regulations 2011(QLD) and WHS Code of Practice How to Safely Remove Asbestos 2011.

The purpose of this survey/investigation review is to locate, as far as reasonably practicable, the presence, type and extent of any suspect ACM in the ground, to assess the condition, provide a suitable risk assessment/rating and recommended control actions based on the condition of the materials at the time of the survey. As this is not an intrusive, style survey, findings must not be deemed absolute. A subsoil investigation should be completed by a competent consultant prior to any subsoil disturbance within the grounds area (or other surrounding areas that may be similarly affected) and appropriate action taken.

1.3 Methodology

Asbestos material surveys are undertaken considering a risk management approach, in accordance with best practice, State Legislation and Safe Work Australia NOHSC Guidance. The survey was conducted in a manner which conforms with Work Health and Safety Regulations 2011(QLD) and WHS Code of Practice How to Safely Remove Asbestos 2011.

Asbestos containing materials presumed or identified through visual and/or analytical characterisation were performed and reported in this report and documented in the Asbestos Containing Materials Register (ACMR) for the Site (provided in Appendix A).

The assessment was conducted on the basis of the condition, type and location of the materials at the time of inspection. The scope of this investigation did not allow intrusive sampling techniques to be undertaken, and consequently the register may have limitations as a reference document for the purposes of renovation or demolition.

Sample collection was performed in a non-destructive and non-invasive manner by competent persons. Presumptions, based on knowledge and experience, that inaccessible areas may contain asbestos materials may also be made and stated within the register.

The survey consisted of a visual inspection with limited sampling/analysis of materials undertaken by a trained and experienced surveyor. Materials are assumed to contain asbestos where:

- Laboratory analysis has confirmed the presence of asbestos in a visually similar material; or
- Materials visually appear to be asbestos containing but no sample was collected, for example due to access restraints.

Samples are typically collected using a hand tool or core borer. Hand drills and other tools are used where required. Power tools were not used during the survey.

Small representative samples were collected from materials presumed to contain asbestos (where not previously identified). Samples collected are representative of the material sampled, individually identified, transported, analysed and reported in accordance with Guidelines, relevant Statutory Regulations, Codes of Practice and SLR in-house Work Instructions and procedures. Samples were submitted to a NATA certified laboratory for confirmation analysis by stereo microscope and polarised light microscopy (PLM) with dispersion staining techniques. Notably, with some asbestos containing bulk material it can be very difficult, or impossible, to detect the presence of asbestos using the polarised light microscopy analytical method, even after ashing or disintegration of samples. This is due to the low grade or small length or diameter of asbestos fibres present in the material, or attributed to the fact that, very fine fibres have been distributed individually throughout the materials. Some materials, such as vinyl tiles, may require further analysis via X-ray diffraction or Scanning Electron Microscopy.
The ACMR consists of relevant information gathered on site, assessment of risk and recommendations for ongoing management of in situ asbestos materials. Reference to photographs, where available, is made in the register along with sample identification and analysis results, where applicable. Sample analysis results from preceding assessments may be referenced in the ACMR (refer to previous survey reports for analytical test results where reference is made to previous sample data).

1.4 Exclusions

Certain areas were inaccessible at the time of the inspection. Table 1 lists those areas/materials that were inaccessible.

Table 1 Inaccessible Areas and/or Materials

<table>
<thead>
<tr>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>General exterior ground surfaces and sub surface areas e.g. asbestos in fill/soil.</td>
</tr>
</tbody>
</table>

2 SURVEY RESULTS

The results of the asbestos survey are presented in a tabular format. Section 3.1 details all of the ACM identified. Section 3.2 shows all of the non-asbestos containing materials as determined during laboratory analysis.

To assist with the interpretation of the results the following legend provides detailed meaning of abbreviations and terms that may appear in the tables.

Legend

| Internal/ External | Refers to the location of the material in relation to the structure. Eg Eaves would be External of the building; Kitchen would be internal of the building. |
| Floor | Refers to the floor level on which the material is located. |
| Specific location | Refers to the precise location of the material within a room eg Room 1 - infill panel below window on southern wall. |
| Material | Refers to the type of material identified e.g. vinyl tile, fibre cement sheeting, fibrous insulation, etc. Material does not refer to the use or application of the material. This is covered in 'Application'. |
| Application | Refers to the use or application of the material e.g. floor covering, soffit lining, pipe lagging, etc. |
| Photograph | Refers to the photograph reference number located in the appendices. |
| Approximate Extent | Usually refers to the surface area or length of the material expressed as either square metres (m²) or linear metres (Lin m). The dimension is an estimate only and should not be relied upon as an exact measure. |
| Results of Analysis | Refers to the type of asbestos identified during laboratory analysis. There are three main commercial asbestos types: chrysotile (CH-white), amosite (A-brown or grey), and crocidolite (C-blue). The term NAD which appears only in the non-asbestos register; means no asbestos was detected during laboratory analysis. Materials shown as ‘Similar to……….’ have not been sampled but appear the same as other materials previously sampled. ‘Suspect’ refers to those materials not sampled (perhaps for safety reasons) and which are not similar to previously sampled materials. ‘Assumed’ refers to those materials not sampled (perhaps for safety/access reasons) and which exhibit similar properties to other materials identified/sampled. |
Risk of Disturbance

Refers to frequency of disturbance

**High:** The material is located in frequently accessible areas with potential for disturbance

**Medium:** The material is prone to mechanical disturbance due to routine building activity and/or maintenance

**Low:** Routine accessibility is unlikely to cause significant deterioration, the material is located in areas with minimal or no disturbance potential or the material is adequately sealed

**NA:** Not Applicable where Analysis indicates No Asbestos Detected

Overall Condition / Deterioration

Refers to the physical state or condition of the material.

**Good** - material shows no, or very minor, sign of damage and/or deterioration

**Fair** - material shows signs of minor damage and/or deterioration

**Poor** - material shows sign of significant damaged and/or deterioration or the material is partly or wholly unserviceable for its intended use.

**Very Poor** - High damage/visible debris.

Friability of Asbestos

Friable or Non Friable

Sealed / Surface Treatments

Refers to whether or not the material is encapsulated with a sealant such as paint, wallpaper, etc. concealing its exposed surfaces.

**Sealed** - Non-friable composite asbestos/encapsulated cement

**Sealed** - Enclosed sprays/lagging/board

**Partially Sealed** - Bare AIB or encapsulated lagging/spray.

**Unsealed** - Unsealed lagging/spray/loose asbestos.

Outcome of Risk or exposure risk assessment

The Material Assessment score is calculated by adding the parameters above. The potential for releasing fibres is detailed below.

<table>
<thead>
<tr>
<th>Material Assessment Score</th>
<th>Fibre Release Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 or higher</td>
<td>High</td>
</tr>
<tr>
<td>7 – 9</td>
<td>Medium</td>
</tr>
<tr>
<td>5 – 6</td>
<td>Low</td>
</tr>
<tr>
<td>4 or lower</td>
<td>Very Low</td>
</tr>
</tbody>
</table>

The material assessment looks at the type and condition of the ACM and the ease with which it will release fibres if disturbed. It does not take into account occupancy or activities within the area, including periodic maintenance works.

**Removal Recommended:** Engage appropriately qualified persons (i.e. licensed asbestos removal contractor) to remove and dispose of the ACM under controlled conditions in accordance with relevant state specific Removal Code of Practice.

**Repair / encapsulation Recommended:** Repair or encapsulate (e.g. paint) or enclose the ACM to minimise deterioration until such time that the ACM is removed

**Suitable for Continual Use:** ACM may remain in situ provided appropriate management controls are adopted, the material is appropriately labelled and re-assessed every 5 years or earlier, where a risk assessment indicates the need for reassessment or the ACM has been disturbed or removed.

**NA:** Not Applicable where Analysis indicates No Asbestos Detected

Recommended control Actions

Refers to the recommended controls / actions required to ensure the identified asbestos materials are managed as per the legislative requirements.

Labels Affixed

Yes/No or NA - Not Applicable where Analysis indicates No Asbestos Detected

Additional Comments

Refers to any other relevant comments that may assist with the future management of the material.

Next Inspection Date

Determined by the Risk Assessment or NA - Not Applicable where Analysis indicates No Asbestos Detected.
### 3 ASBESTOS CONTAINING MATERIALS REGISTER

#### 3.1 Asbestos Register

The following table is a register of all identified ACM on site, confirmed through analysis or assumed materials deemed to be homogenous or consistent in appearance and manufacture to similar samples collected/analysed. This Summary of ACM should be read in conjunction with all sections of this report.

<table>
<thead>
<tr>
<th>Sample No./Visual observation</th>
<th>Location</th>
<th>Analysis</th>
<th>Risk assessment</th>
<th>Additional information</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Risk of Disturbance</td>
<td>Overall Condition / deterioration</td>
</tr>
<tr>
<td>Previously Sampled S01-S06</td>
<td>Ground Floor Campus grounds</td>
<td>Debris in ground, Fibrous Cement</td>
<td>unknown</td>
<td>Chrysotile</td>
</tr>
</tbody>
</table>

**Notes:**
- The Asbestos Containing Materials Register should be read in conjunction with all sections of this report.
- Certificate of analysis/test results are detailed in Appendix B of this report.
### 3.2 Non Asbestos Containing Materials

The following table is a register of all identified non-asbestos containing materials on site, confirmed through analysis.

<table>
<thead>
<tr>
<th>Sample No./ Visual Observation</th>
<th>Photo</th>
<th>Location</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Int / Ext Floor Specific Location</td>
<td>Material Application</td>
<td>Extent</td>
<td>Result</td>
</tr>
</tbody>
</table>

No Non Asbestos Containing Materials Found

**Notes:**
- The Asbestos Containing Materials Register should be read in conjunction with all sections of this report.
- Certificate of analysis/test results are detailed in Appendix B of this report.
4 DISCUSSION AND RECOMMENDATIONS

As previously detailed in the Scope Section 2, SLR was appointed to complete a survey and assessment of the asbestos debris in soil at the Bundaberg Campus with regards to the identification of ACM. The extent of the inspection and samples collected for subsequent analysis was completed in order to confirm, as far as reasonably practicable, the location, condition and risk presented by ACM remaining in-situ (and was based on the level of access available).

Further to the completion of the on-site investigation and collection/analysis of samples, there are detailed site/work-specific requirements and precautions that must be taken in the management, control and removal of ACM. In addition to those listed on the Asbestos Containing Materials Register, the following are some general recommendations and precautions that should be considered. Detailed documents, which may include, Scope of Works, Safe Work Method Statements and Risk Assessments, should be prepared to appropriately address health and safety issues associated with specific work and site conditions.

It is also a requirement as per Regulation 429 an Asbestos Management Plan must be prepared if Asbestos or ACM has been identified or assumed present, or likely to be present from time to time in a workplace.

4.1 Site Specific Recommendations

- Asbestos cement fragments are known to exist within the ground sub surface in the following locations: western half of the campus, with focus around the Forensic Crash Lab Investigation Scenario compound, although the whole campus should be treated as potentially contaminated.

- The possible presence of any asbestos fragments in the subsoil should be investigated further by a competent consultant prior to any subsoil disturbance within the inspected area (or other surrounding areas that may be similarly affected) and appropriate action taken. This should include but not limited to:
  - Prior to any excavation test holes dug and spoil sieved for the presence ACM. If ACM is discovered the contaminated spoil must not be relocated to other areas of the site and must be treated as contaminated waste.
  - The grounds area is inspected yearly or after weather events to ensure no ACM fragments have risen to the ground surface.

4.2 General Recommendations

- This document should be held as an Asbestos Register of the areas inspected and updated every 5 years or earlier where ACM have been disturbed or a risk assessment indicates the need for re-assessment. All occupiers of the workplace are to be provided with a copy of this register and all updates to it.

- If any material that may contain asbestos is found on site that is not included within the register, the material should be sent for identification and expert advice sought. The material should be assumed to contain asbestos in the interim.

- As a precautionary measure, all materials, which may contain asbestos, should be assumed to contain asbestos and treated appropriately until sampling and analysis confirms otherwise.

- In order to comply with the Work Health and Safety Regulations 2011(QLD), any action taken to control asbestos and ACM in the place of work, or in plant at the place of work, is to be recorded in the Asbestos Control Log attached in Appendix A.

- Any areas of the workplace that contain ACM including plant, equipment and components should be signposted with appropriate warning signs to ensure that asbestos is not unknowingly disturbed without the correct precautions being taken. These signs should be placed at all the main entrances to the work areas where asbestos is present and should

- If asbestos materials become significantly damaged, weathered and/or produce visible dust or significant debris, then health and safety management works are likely to be required. A suitably qualified and experienced consultant, such as SLR, can advise and assist in carrying out such works.
5 LEGISLATION, GUIDELINES AND REGULATIONS

- Work Health and Safety Act 2011
- Work Health and Safety Regulations 2011
- Code of Practice: How to Safely Remove Asbestos [QLD Workplace Health and Safety (2011)]
- Code of Practice: How to Manage and Control Asbestos in the Workplace [QLD Workplace Health and Safety (2011)]
- Code of Practice: Demolition Work [QLD Workplace Health and Safety (2011)]
- AS/NZS 1716-2012 - Respiratory Protective Devices
- AS/NZS 1715-2009 - Selection, Use and Maintenance of Respiratory Protective Devices
- AS 2601-2001 - The Demolition of Structures
- AS 1319-1994 Safety Signs for the Occupational Environment
Appendix A
Asbestos Control Log
To comply with the WHS Code of Practice How to Safely Remove Asbestos 2011, all actions taken to control asbestos and ACM are to be recorded in the table below. It is recommended that similar details also be recorded for any other asbestos materials identified.

<table>
<thead>
<tr>
<th>NAME</th>
<th>COMPANY</th>
<th>DATE</th>
<th>ASBESTOS MATERIAL RELATED WORK UNDERTAKEN</th>
<th>REFERENCE NUMBER</th>
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</thead>
<tbody>
<tr>
<td>Jason Hutchins</td>
<td>SLR Consulting Australia Pty Ltd</td>
<td>5/10/2017</td>
<td>Asbestos Building Materials Survey</td>
<td>Report No 622.10968.00010-R01-v1ASR</td>
</tr>
</tbody>
</table>
Appendix B
Certificate of Analysis
Asbestos Bulk Sample Analysis Report
Certificate No CER1706201503

Client: CQ University Rockhampton
Client Contact: Grant Farrell
Telephone: (07) 4930 9241
Email: facmg@cqu.edu.au; g.farrell@cqu.edu.au
Project: Bundaberg CQU Crash Lab
Site Location: 1 University Drive, Bundaberg

Sample ID | Sample Location | Sample Description | Approximate Size or Weight | Asbestos Detected (Yes/No) | Fibre Types Detected |
--- | --- | --- | --- | --- | --- |
S01 | External grounds | Fibre cement sheeting | 50x50x5mm | Yes | CHR |
S02 | External grounds | Fibre cement sheeting | 50x40x5mm | Yes | CHR |
S03 | External grounds | Fibre cement sheeting | 70x50x5mm | Yes | CHR |
S04 | External grounds | Fibre cement sheeting | 60x60x7mm | Yes | CHR |
S05 | External grounds | Fibre cement sheeting | 40x40x5mm | Yes | CHR |
S06 | External grounds | Fibre cement sheeting | 40x40x5mm | Yes | CHR |

Detection limit (AS 4964) – 0.1 g/kg

Approved Identifier: Shipra Saha Singh
Report Approved By: Shipra Saha Singh

Notes: Hand-picked refers to small discrete amounts of asbestos distributed unevenly in a large body of non-asbestos material. Due to their nature, confirmation using another independent analytical technique is recommended if no asbestos is detected in samples of vinyl tiles, bituminous materials, mastics, adhesives, paints, sealants, resins or ore.
The results contained within this report relate only to the sample(s) submitted for analysis and OCTIEF accepts no responsibility for the collection, packaging and transportation of sample submitted by external parties. Sample descriptions, sizes and weights are approximate only.

Accredited for compliance with ISO/IEC 17025 – Testing
The results of the tests, calculations and/or measurements included in this document are traceable to Australian/National standards.
NATA accreditation number: 15172
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Appendix C
Limitations
Surveys are conducted in a conscientious and professional manner. The nature of the task and the likely disproportion between any damage or loss which might arise from the work or reports prepared, and the cost of our services, is such that SLR cannot guarantee that all asbestos building materials have been identified and/or addressed.

Due to the possibility of renovations and additions to the building(s) over time, ACMs may have been concealed (for example behind new walls, flooring, ceilings, within boxing, etc.); such areas were inaccessible during the inspection. It is recommended that prior to any refurbishment/demolition works at the site that a full destructive asbestos building materials refurbishment/demolition survey is undertaken by a suitably qualified and experienced consultancy, such as SLR. An intrusive survey is required under AS 2601 (2001) The Demolition of Structures. If any materials reasonably suspected of containing asbestos are found on site, which are not identified within this report, the client’s independent consultant, SLR, should be contacted to complete additional confirmatory sampling and analysis as required.

A change in building use/nature of activities could affect the control actions recommended within this report and a re-survey may be required.

Thus, while we carry out the work to the best of our ability, we totally exclude any loss or damages which may arise from services we have provided to CQ University and/or associated parties.

Where potentially ACM are identified these are normally reported on to the best of the consultant’s ability. Analysis is not normally included and there is no guarantee that all such materials have been identified and/or addressed.

All work conducted and reports produced by SLR are prepared for a particular Client’s objective and are based on a specific scope, conditions and limitations, as agreed upon between SLR and the Client. Information and/or report(s) prepared by SLR may therefore not be suitable for any use other than the intended objective. No parties other than the Client should use any information and/or report(s) without first conferring with SLR.

Before passing on to a third party any information and/or report(s) prepared by SLR, the Client is to inform fully the third party of the objective and scope, and all limitations and conditions, including any other relevant information which applies to the information and/or report(s) prepared by SLR.

It is the responsibility of third parties to investigate fully to their satisfaction if any information and/or report(s) prepared by SLR are suitable for a specific objective.

The report(s) and/or information produced by SLR should not be reproduced and/or presented/reviewed except in full.

Materials other than asbestos are generally outside the scope as identification can require specialised analysis/inspection techniques.

Settled dust is generally not sampled or commented on. Settled dust may contain asbestos, particularly if it is in the vicinity of ACM or areas where ACM have been removed.
Appendix D
Photographs
**Location:** Ground Floor Campus grounds

**Material Application:** Debris on ground, Fibrous Cement

**Extent:** unknown

**Sample Number:** Previously Sampled S01 - S06

**Product Type:** Asbestos reinforced composites etc. (1)

**Condition:** Poor (2)

**Surface Treatment:** Unsealed FCS, AC (1)

**Asbestos Type:** Chrysotile (1)

**Recommendation:** Manage

Various other Ground area photos
Appendix E
Site Plan
Wheelchair access is available to all buildings and amenities via the front door.

CONTACT US

ADDRESS
University Drive (off Isis Highway), Bundaberg QLD 4670

PHONE
Student Enquiries 13 27 86
Overseas Enquiries +61 7 4930 9000

TEACHING FACILITIES
1 Academic and Teaching
3 Library, Bookshop, Teaching and Nursing labs
5 Academic and Teaching
8 Academic and Research
9 Chemistry and Biology labs
12 Crash lab

ADMINISTRATION AND STAFF
4 DFM sheds
7 Office of Indigenous Engagement and Academic
11 DFM sheds

SPORTS AND RECREATIONAL
6 Refectory
10 Tennis courts
ASBESTOS

Asbestos: Description, Properties and Uses

Asbestos is the generic term given to a group of naturally occurring fibrous minerals, based on hydrated silicates, which are found in various rock formations. Differing ratios of oxygen, hydrogen, sodium, iron, magnesium and calcium elements account for several different types of asbestos minerals, the most common varieties being Amosite (brown asbestos), Chrysotile (white asbestos), Crocidolite (blue asbestos). Other types include Anthophyllite, Actinolite and Tremolite.

The immense popularity of asbestos as a building material is attributed to its near unique properties of fire resistance, high abrasion resistance and superb acoustical characteristics coupled with its relatively low cost. Prior to 1973, asbestos was the material of choice for fire proofing, thermal insulation, sound insulation and abrasion resistance. It was used as a spray-on insulation of ceilings and steel girders; as a thermal insulation of boilers, pipes, ducts, air conditioning units, etc; as an abrasion resistant filler in floor tiles, vinyl sheet floor coverings, roofing and siding shingles; as a flexible, though resistant joining compound and filler of textured paints and gaskets; as the bulking material with the best wear characteristics for automobile brake shoes and in countless domestic appliances such as toasters, grills, dishwashers, refrigerators, ovens, clothes dryers, electric blankets, hair dryers, etc.

Asbestos: Health Effects

Many asbestos bearing materials or products are of no significant health risk whatsoever when used in the normal course of events. A health risk exists when asbestos fibres are released into the air and when that air is inhaled into the lungs. Even then, it appears that most people exposed to relatively small amounts of asbestos do not develop any related health problems. There is however no “safe” level of asbestos exposure since the risk is dependent on numerous factors including the time since exposure, exposure duration and concentration, asbestos type, the attributes of the particular individual and environmental factors such as exposure to cigarette smoke and other airborne pollutants.

There are three main diseases associated with airborne asbestos fibres:

- **Asbestosis** - A fibrosis (or scarring) of the lung associated with relatively massive exposure to asbestos.
- **Lung Cancer** - Indistinguishable from that caused by smoking and a common cause of death. The risk of lung cancer is much higher when there is exposure to both cigarette smoking and to airborne asbestos.
- **Mesothelioma** - A cancer of the chest and abdominal lining, it is specific to asbestos exposure.

A feature of these diseases is that symptoms take a long time to appear, generally 5 to 40 years. Once symptoms are evident the disease progresses rapidly.

There is some evidence that Chrysotile asbestos is less carcinogenic than Amosite, and that Amosite is less carcinogenic than Crocidolite in causing mesothelioma, but the evidence is less clear for lung cancer.

Measurement of Airborne Asbestos Fibres

The Work Health and Safety Regulations 2011(QLD), and the Safe Work Australia Asbestos Codes of Practice & Guidance Note set the maximum allowable time weighted average for all forms of asbestos at 0.1 fibre/mL of air.

Air monitoring is used to determine airborne fibre levels. SLR is NATA certified for Asbestos Fibre Counting and Volume Measurement to carry out such monitoring.

The Safe Work Australia Code of Practice How to Safely Remove Asbestos 2011 states that air monitoring should be performed whenever Asbestos Containing Materials (ACM) are being removed, to ensure the control measures are effective.

The onus to provide a safe environment rests with persons in control of a business or undertaking, persons with management or control and persons carrying out demolition or refurbishment work. To meet these obligations it is recommended that SLR be engaged by the site controller, or their representative, and not an asbestos removal contractor as there could be a conflict of interest in the latter arrangement.

Asbestos Survey

Asbestos surveys are undertaken to identify any asbestos materials/hazards and assess the risk associated with the material/hazard.

Surveys are conducted through visual inspection by experienced personnel. During the inspection material samples are taken as appropriate for analysis.
Limitations

Due to the nature of the task all asbestos surveys are limited. Since asbestos can occur in so many forms and in so many locations, and as there is no instrument to detect asbestos, it is never possible to guarantee all asbestos has been identified. Access is usually restricted, and there may be asbestos hidden behind walls or other structures. Building plans are of great assistance to consultants undertaking surveys.

Asbestos Register

An asbestos register is a record of the location, type and condition of all asbestos containing products identified in a building. Under the Safe Work Australia Codes of Practice and the legislation, any place of work constructed prior to 31 December 2003 must have an Asbestos Register. A SLR Asbestos Survey Report includes an asbestos register.

Registers must be maintained and changes in the condition or extent of any asbestos present should be recorded. Registers should also detail the next review date, at present annually since the condition of asbestos materials, legislation, guidelines and standards change.

Management Plan

An asbestos management plan is required where asbestos materials have been identified and are to remain on site. The plan would normally be a component in the overall Hazard Management Plan for the site.

Control Options

Asbestos judged to constitute a health risk should be removed, enclosed or encapsulated by an approved asbestos contractor.

Enclosure

This involves the installation of a permanent, solid, non-porous, impervious barrier between the asbestos material and the surrounding environment. Examples include building boxes around steam pipes etc. A suspended ceiling is not permanent and, since occasional access is necessary above a suspended ceiling, enclosure is negated. Furthermore, many suspended ceilings act as return air plenums so enclosure is impossible.

Encapsulation

Encapsulation involves coating the material with a sealant. Good sealants penetrate through the asbestos material to the substrate. The encapsulating substance then hardens and binds all the asbestos fibres into a solid matrix. This is usually a short to medium term management option.

Removal

Removal is not without hazards to the occupants of the building. If not strictly controlled, the removal process can result in increased fibre counts in other areas. Technical competence, experience and integrity are of prime importance in evaluating asbestos removal plans.

We advise clients to work within the usual practised time frames of the experienced asbestos removal companies under strict supervision by a qualified person. Pressing for quicker turnaround times may result in low quality workmanship and unnecessary asbestos risk. Building owners may be in part responsible for risks created by the removal Contractor due to carelessness or negligence.

An independent consultant such as SLR, experienced in the supervision of asbestos removal, should be retained to act on the client’s behalf.

Clearance Inspection

A clearance inspection must be conducted at the completion of asbestos removal works. The clearance inspection may include airborne asbestos monitoring and/or sampling/analysis of materials and should be completed by a suitably qualified and experienced consultant, such as SLR.