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ASBESTOS CONTAINING MATERIALS SURVEY REPORT

Nulloo Yumba
Building 031
Rockhampton North

Report Number 622.10968.00000/0040-R01-ASR-Bld031

28 November 2017

CQ University
Building 37, Bruce Highway
Rockhampton
Queensland, 4702

Version: v1

ASBESTOS CONTAINING MATERIALS SURVEY REPORT

Nulloo Yumba
Building 031
Rockhampton North

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This report has been prepared by SLR Consulting Australia Pty Ltd with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with the Client. Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of CQ University.
No warranties or guarantees are expressed or should be inferred by any third parties.
This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.

DOCUMENT CONTROL

| Reference | Date | Prepared | Checked | Authorised |
|------------------------------------|------------------|---------------|----------------|----------------|
| 622.10968.00000/0040-R01-v1-Bld031 | 28 November 2017 | Jordan Harley | Narelle Carnes | Narelle Carnes |
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EXECUTIVE SUMMARY

SLR Consulting Australia Pty Ltd (SLR) was engaged by Grant Farrell of CQ University to undertake an asbestos building materials survey of Building 031 Nulloo Yumbah at Rockhampton North. The survey was conducted by Jordan Harley and Sam Ahlstrand from SLR on 30 October 2017.

There was no asbestos containing materials (ACM) identified.

The locations and details of all items tested at the property are documented in the Non 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 Laboratory Certificates for asbestos identification analysis are provided in **Appendix B**. Refer to **Appendix C** for Limitations of this survey.

1 BACKGROUND AND SCOPE

SLR Consulting Australia Pty Ltd (SLR) was requested by Grant Farrell of CQ University to undertake an asbestos building materials survey of Rockhampton North to ascertain the location, extent, type and condition of Asbestos Containing Materials (ACM). The survey was conducted on 30 October 2017 by Jordan Harley and Sam Ahlstrand from SLR.

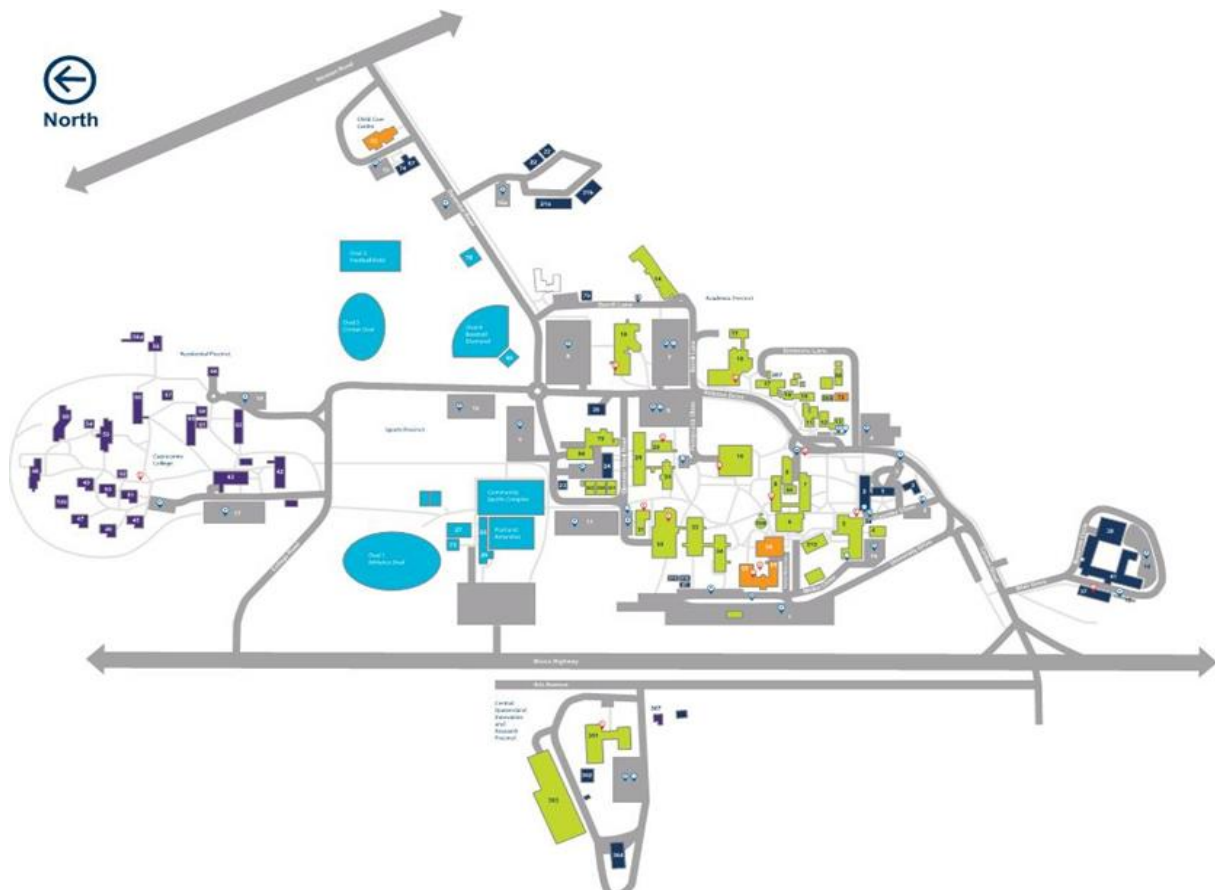
1.1 Site Description

The site is located on the east side of Bruce Highway. A Locality Map is presented in **Figure 1** for the purpose of this report, Bruce Highway is taken to run in a north – south direction, directly adjacent to the site.

The following information is known about the building:

- The building was a two storey constructed circa 1979.
- The building was in use, at the time of the survey.

Figure 1 Site Location



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 is to locate, as far as reasonably practicable, the presence, type and extent of any suspect ACM in the building(s), to assess their 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, demolition or refurbishment style survey, findings must not be deemed absolute. A demolition/refurbishment style survey is to be conducted prior to such works commencing as described in AS2601 (2001) The Demolition of Structures and outlined in state WHS Code of Practice: Demolition Work (2015): Refer to Appendix C for limitations.

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 of the building were inaccessible at the time of the inspection. This includes areas/materials that were inaccessible due to being “live electrical” or “moving parts” equipment. **Table 1** lists those areas/materials that were inaccessible.

Table 1 Inaccessible Areas and/or Materials

| Location | Explanation |
|---------------------------------------|-------------|
| All areas accessed during the survey. | |

Additionally, and unless specifically noted, the survey did not cover:

- Wall/ceiling panelling behind laminations/coverings.
- Concealed floor coverings beneath carpet or superficial floor coverings.
- Fuses within “live” electrical panelling. Fuses of a certain age may contain asbestos containing flashguards.
- Hidden and/or inaccessible locations such as in or under concrete slabs, in or under vinyl/linoleum/carpet, wall cavities, hidden storage areas and the like. If the vinyl or linoleum is tested, this does not necessarily mean that the resin/glue is included in the analysis.
- Lift wells and inaccessible/unidentified shafts, cavities and the like.
- Air conditioning, heating, mechanical, electrical or other equipment.
- General exterior ground surfaces and subsurface areas eg asbestos in fill/soil.
- Materials dumped, hidden, or otherwise placed in locations which one could not reasonably anticipate.
- Materials other than normal building fabric, materials in laboratories or special purpose facilities and building materials that cannot be reasonably and safely assessed without assistance.

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 (m ²) or linear metres (Lin m). The dimension is an estimate only and should not be relied upon as an exact measure. |
| Results of Analysis | <p>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).</p> <p>The term NAD which appears only in the non-asbestos register; means no asbestos was detected during laboratory analysis.</p> <p>Materials shown as 'Similar to.....' have not been sampled but appear the same as other materials previously sampled.</p> <p>'Suspect' refers to those materials not sampled (perhaps for safety reasons) and which are not similar to previously sampled materials.</p> <p>'Assumed' refers to those materials not sampled (perhaps for safety/access reasons) and which exhibit similar properties to other materials identified/sampled.</p> |
| Risk of Disturbance | <p>Refers to frequency of disturbance</p> <p>High: <i>The material is located in frequently accessible areas with potential for disturbance</i></p> <p>Medium: <i>The material is prone to mechanical disturbance due to routine building activity and/or maintenance</i></p> <p>Low: <i>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</i></p> <p>NA: <i>Not Applicable where Analysis indicates No Asbestos Detected</i></p> |
| Overall Condition / Deterioration | <p>Refers to the physical state or condition of the material.</p> <p>Good - material shows no, or very minor, sign of damage and/or deterioration</p> <p>Fair - material shows signs of minor damage and/or deterioration</p> <p>Poor - material shows sign of significant damaged and/or deterioration or the material is partly or wholly unserviceable for its intended use.</p> <p>Very Poor - High damage/visible debris.</p> |
| Friability of Asbestos | Friable or Non Friable |
| Sealed / Surface Treatments | <p>Refers to whether or not the material is encapsulated with a sealant such as paint, wall paper, etc. concealing its exposed surfaces.</p> <p>Sealed - Non-friable composite asbestos/encapsulated cement.</p> <p>Sealed- Enclosed sprays/lagging/board</p> <p>Partially Sealed - Bare AIB or encapsulated lagging/spray.</p> <p>Unsealed - Unsealed lagging/spray/loose asbestos.</p> |

| <p>Outcome of Risk or exposure risk assessment</p> | <p>The Material Assessment score is calculated by adding the parameters above. The potential for releasing fibres is detailed below.</p> <table border="1" data-bbox="454 331 1362 533"> <thead> <tr> <th data-bbox="454 331 928 371">Material Assessment Score</th> <th data-bbox="928 331 1362 371">Fibre Release Potential</th> </tr> </thead> <tbody> <tr> <td data-bbox="454 371 928 412">10 or higher</td> <td data-bbox="928 371 1362 412">High</td> </tr> <tr> <td data-bbox="454 412 928 452">7 – 9</td> <td data-bbox="928 412 1362 452">Medium</td> </tr> <tr> <td data-bbox="454 452 928 492">5 – 6</td> <td data-bbox="928 452 1362 492">Low</td> </tr> <tr> <td data-bbox="454 492 928 533">4 or lower</td> <td data-bbox="928 492 1362 533">Very Low</td> </tr> </tbody> </table> <p>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.</p> <p>Removal Recommended: <i>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.</i></p> <p>Repair / encapsulation Recommended: <i>Repair or encapsulate (e.g. paint) or enclose the ACM to minimise deterioration until such time that the ACM is removed</i></p> <p>Suitable for Continual Use: <i>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.</i></p> <p>NA: <i>Not Applicable where Analysis indicates No Asbestos Detected</i></p> | Material Assessment Score | Fibre Release Potential | 10 or higher | High | 7 – 9 | Medium | 5 – 6 | Low | 4 or lower | Very Low |
|---|---|---------------------------|-------------------------|--------------|------|-------|--------|-------|-----|------------|----------|
| Material Assessment Score | Fibre Release Potential | | | | | | | | | | |
| 10 or higher | High | | | | | | | | | | |
| 7 – 9 | Medium | | | | | | | | | | |
| 5 – 6 | Low | | | | | | | | | | |
| 4 or lower | Very Low | | | | | | | | | | |
| <p>Recommended control Actions</p> | <p>Refers to the recommended controls / actions required to ensure the identified asbestos materials are managed as per the legislative requirements.</p> | | | | | | | | | | |
| <p>Labels Affixed</p> | <p>Yes/No or NA - Not Applicable where Analysis indicates No Asbestos Detected</p> | | | | | | | | | | |
| <p>Additional Comments</p> | <p>Refers to any other relevant comments that may assist with the future management of the material.</p> | | | | | | | | | | |
| <p>Next Inspection Date</p> | <p>Determined by the Risk Assessment or NA - Not Applicable where Analysis indicates No Asbestos Detected.</p> | | | | | | | | | | |

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.


| Sample No./ Visual observation | Photo | Location | | | Analysis | Risk assessment | | | | | | Additional information | | |
|---|-------|--------------------------------------|-------------------------|--------|----------|------------------------|---|------------------------------|----------------------------------|---|--------------------------------|------------------------|------------------------|--------------------------------|
| | | Int / Ext Floor Specific Location | Material Application | Extent | Result | Risk of Disturbance | Overall Condition / deterioration | Friability of Asbestos | Sealed/ Surface Treatments | Outcome of Risk or Exposure Risk Assessment | Recommended Control Actions | Labels Affixed | Additional Comments | Next Inspection due date |
| No Asbestos Containing Materials Found | | | | | | | | | | | | | | |

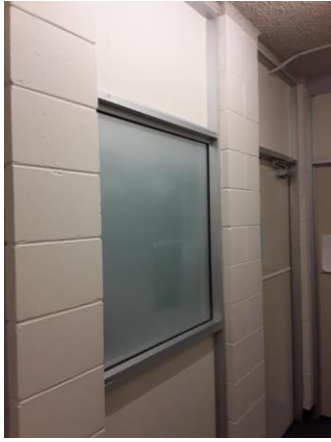
Notes:

- The Asbestos Containing Materials Register should be read in conjunction with all sections 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.

| Sample No./ Visual Observation | Photo | Location | | | Analysis |
|--------------------------------------|--|---|------------------------------|------------------|----------|
| | | Int / Ext Floor Specific Location | Material Application | Extent | Result |
| 1-428 |  | External All External eaves | Eave lining , Fibrous Cement | 80m ² | NAD |

| Sample No./ Visual Observation | Photo | Location | | | Analysis |
|--------------------------------------|---|---|-------------------------------|--------|----------|
| | | Int / Ext Floor Specific Location | Material Application | Extent | Result |
| 1-429 |  | External Doors and windows throughout | Infill panels, Fibrous Cement | | NAD |

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 Rockhampton North 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).

- Within the scope and limitations of this report, no ACM were identified in the building surveyed at the time of inspection.
- This document should be held as an Asbestos Register of the building inspected and updated where 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 the material should be sent for identification and expert advice sought. The material should be assumed to contain asbestos in the interim.

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 this register. These details are to be recorded in the Asbestos Control Log attached in **Appendix A**

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)]
- Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition [National Occupational Health and Safety Commission: 3003 (2005)]
- 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

Appendix B

Certificate of Analysis

ASBESTOS ANALYTICAL REPORT

Report Number 622.10968.00040-R01-v0.1-ANA-CQUNorth-Building 031 Nulloo Yumbah

Client: Central Queensland University - Rockhampton

Client Contact: Grant Farrell

Client Address: Bruce Highway,
Rockhampton,
QLD 4702

Date Sampled: 30 October 2017

Report Date: 07 November 2017

Site Address/ Location: Rockhampton North Campus.

Test Methods: Sample(s) examined under a Polarised Light Microscope including dispersion staining techniques, in accordance with AS 4964 and method AIP.01.03



Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards. NATA is a signatory to the APLAC mutual recognition arrangement for the mutual recognition of the equivalence of testing, calibration and inspection reports.

Results

| Sample No. | Description | Analysis Result |
|------------|--------------|-----------------|
| 1-428 | Fibre Cement | Organic Fibres |
| 1-429 | Fibre Cement | Organic Fibres |

Fibre identification Legend

| | | | |
|-----|-------------------------------|-----|-------------------------|
| AMO | Amosite (brown/grey asbestos) | ORF | Organic Fibre |
| BIT | Bitumen | NAD | No Asbestos Detected |
| CHR | Chrysotile (white asbestos) | NFD | No Fibres Detected |
| CRO | Crocidolite (blue asbestos) | SMF | Synthetic Mineral Fibre |
| INS | Insulation | UMF | Unknown Mineral Fibres |

Notes:

- Sampling was undertaken by SLR.
- The results contained within this report relate only to sample(s) submitted for testing.
- The report(s) and/or information produced by SLR Consulting Australia Pty Ltd should not be reproduced and/or presented/reviewed except in full.
- Even after disintegration of some bulk samples (eg bituminous materials and vinyl tiles/sheeting) detection of fibres may be difficult when using polarized light microscopy and dispersion staining techniques. This may be due to the matrix of the samples (uneven distribution) or fine fibres that are difficult to detect and positively identify.
- Detection Limit - 0.1 g/kg (AS 4964).
- An Independent Analytical Technique is Recommended for Vinyl Samples (i.e. Vinyl Floor Tiles).



Andrew Lynam
BEnvSc

Limitations

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 Central Queensland University - Rockhampton and/or associated parties.

The analysis was undertaken by SLR Consulting, 2 Lincoln Street, Lane Cove NSW 2066 (NATA Accreditation No. 3130).

All work conducted and reports produced by SLR Consulting are prepared for a particular Client's objective and are based on a specific scope, conditions and limitations, as agreed upon between SLR Consulting and the Client. Information and/or report(s) prepared by SLR Consulting 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 Consulting.

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Appendix C

Limitations

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

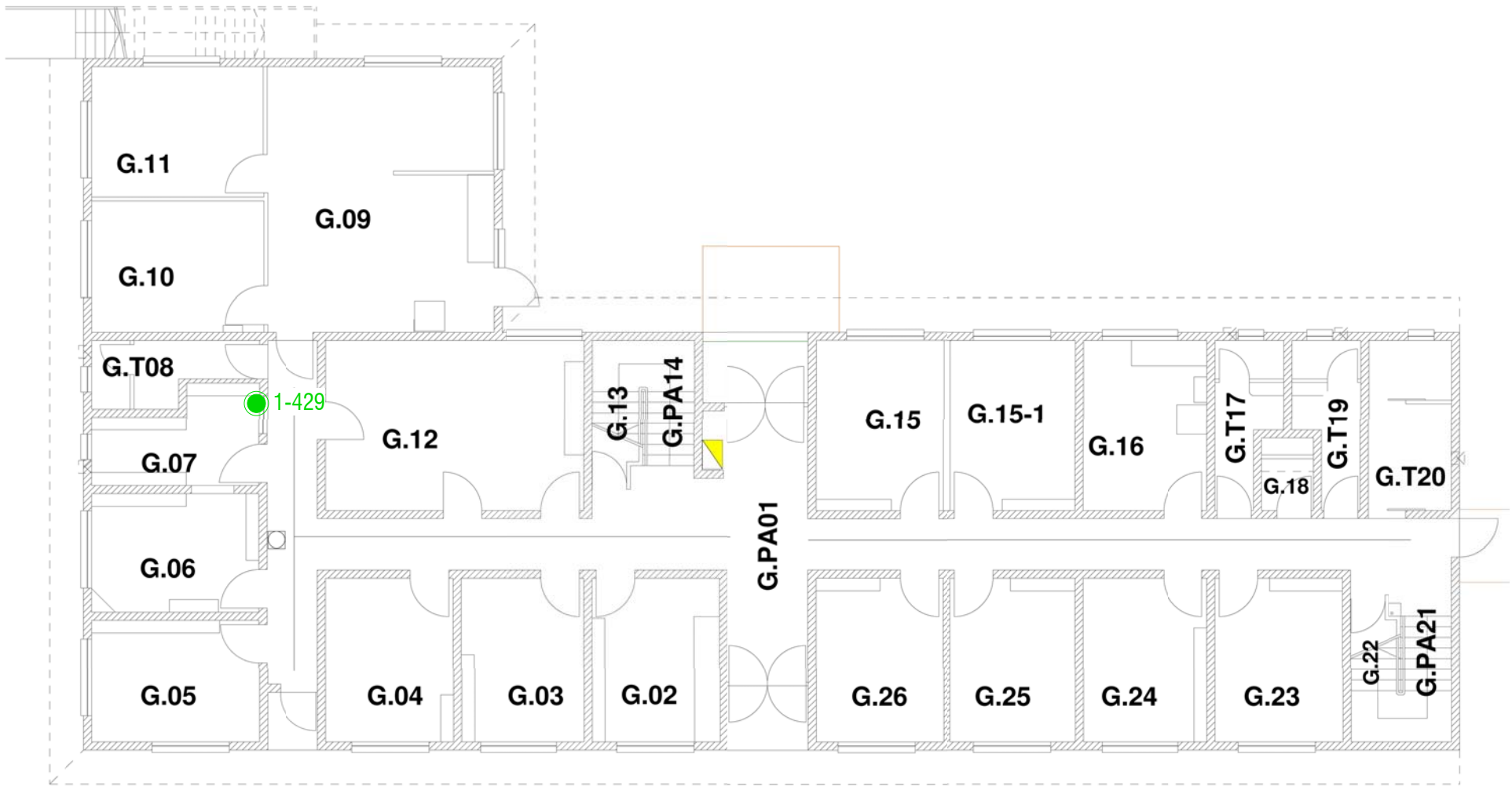
Photographs

No Asbestos Situations Identified


Appendix E

Site Plan

C:\LF\SLR\622.10968\ROCKHAMPTON NORTH\SLR62210968_RN-0031G_01.rvt



LEGEND:

-  Sample location
No Asbestos Detected

NOT TO SCALE - FOR DIAGRAMMATIC PURPOSES ONLY



Sheet Size: A4



| | |
|------------------|------------------------|
| Building No: | 031 |
| Inspection Date: | Sept / Oct 2017 |
| Inspected By: | NC |
| Figure No.: | SLR62210968-RN-031G-01 |
| Drawn By: | LF |
| Drawn Date: | 10/11/17 |

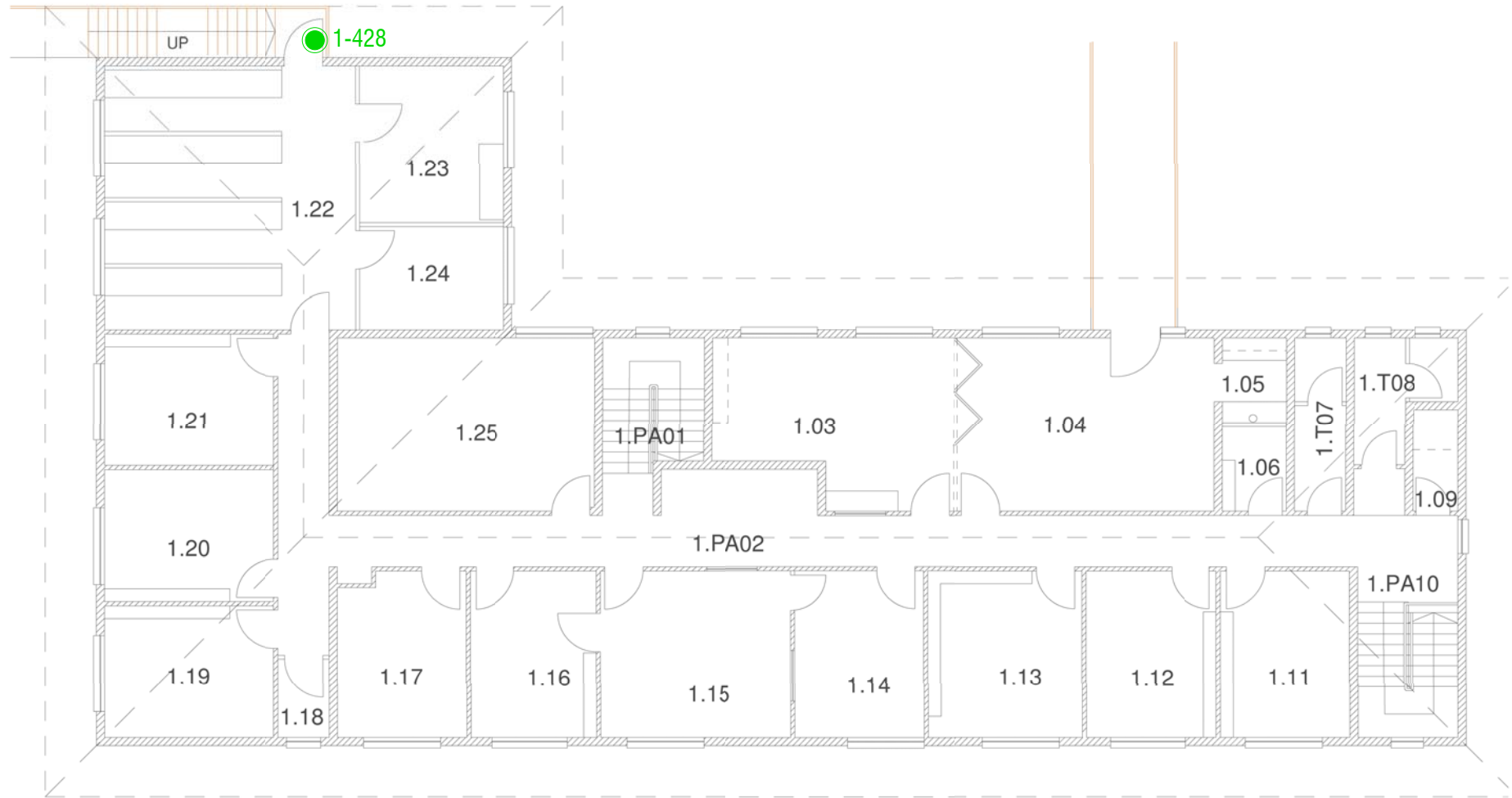


CQ University Asbestos Audits


ROCKHAMPTON NORTH CAMPUS

Nulloo Yumbah - Ground Level
Bruce Highway, Rockhampton North,
QLD 4702

C:\LF\SLR622-10968\ROCKHAMPTON NORTH\SLR62210968_RN-0031L1_01.rvt



LEGEND:

-  Sample location
No Asbestos Detected

NOT TO SCALE - FOR DIAGRAMMATIC PURPOSES ONLY



Sheet Size: A4



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| | |
|------------------|-------------------------|
| Building No: | 031 |
| Inspection Date: | Sept / Oct 2017 |
| Inspected By: | NC |
| Figure No.: | SLR62210968-RN-031L1-01 |
| Drawn By: | LF |
| Drawn Date: | 10/11/17 |



CQ University Asbestos Audits

ROCKHAMPTON NORTH CAMPUS

Nulloo Yumbah - Level 1
Bruce Highway, Rockhampton North,
QLD 4702

Appendix F

General Information

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.