Remediation Action Plan For Asbestos Impacted Soil

December 2018

Cornerstone Development Management Pty Ltd

84-88 Parker Street

Nepean, NSW 2179

Distribution: **1 Geotechnique**
2 Ai Group

Ai AUSTRALIAN INDUSTRY GROUP

Australian Industry Group
A.B.N. 763 699 587 788
51 Walker Street, North Sydney
Tel: 02 9466 5500 Fax: 02 9466 5599

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Rev No.	Author	Reviewer	Approved For Issue		
			Name	Signature	Date
1	John Tiong (Licensed Asbestos Assessor [LAA000114] Certified Occupational Hygienist [COH No:54])	John Tiong	John Tiong		19/12/18

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1.0 INTRODUCTION AND BACKGROUND

General Information

Australian Industry Group (Ai Group) was commissioned by Cornerstone Development Management Pty Ltd to prepare a Remediation Action Plan (RAP) to manage site asbestos contamination issue at 84-88 Parker Street, Nepean, NSW.

The Preliminary Contamination Assessment Report undertaken and prepared by Geotechnique identified bonded asbestos contamination within the site. No contamination was identified beyond the depth of 0.5m from a total of eight samples (*Preliminary Contamination Assessment, Report no: 14219/2-AA* [May 2018]). Bonded asbestos cement fragments (>7mm fraction) was observed at BH103. Preliminary findings with regards to asbestos contamination as follows (refer to Appendix for specific location of nominated borehole (BH):

- BH103 – Further detailed/confirmation sampling within a radius of 5 metres has been carried out. The extend of the contamination is within a radius of 3.5 metre of (Bore Hole) BH103 to a depth of 0.3 m.

Prior to the commencement of works it is recommended that all relevant parties conduct a walk-through inspection of the proposed removal location . This will allow greater transparency between the parties involved and a better understanding of the extent of soil to be removed from site.

2.0 OBJECTIVES AND SCOPE OF WORK

2.1 Objectives

The objectives of the RAP are to:

- Set soil remediation goals to an extent that enables the client to ensure that the remediated site is suitable for its proposed use and will pose no unacceptable risk to human health or the environment with regards to the contaminants of concern;
- Propose a cost effective and practical soil remediation strategy;
- Document in detail all procedures and plans to be implemented to reduce risks to acceptable levels for the proposed site use;
- Establish environmental safeguards required to complete the remediation in an environmentally acceptable matter; and
- Comply with the relevant regulatory guidelines.

2.2 Scope of Works

It should be noted that the scope of works does not cover above ground buildings/structures. The scope of work required to achieve the objectives of the RAP involves the following:

- Review previous investigations undertaken on site;
- For those areas where confirmation sampling is required, additional soil sampling will be required with standard quality assurance and quality control measures applied.
- Outline the methodology and procedures for the remediation strategy;
- Confirm that the proposed remediation should achieve an acceptable outcome;
- Confirm that the proposed strategies for asbestos management of any on-site remediation, protect human health, property and the environment during the remediation activities; and
- Supervise the proposed works and prepare an Asbestos Materials Clearance Report.

2.3 Legislative Requirements

The RAP has been written in accordance with the requirements of:

- WHS Regulations 2011.
- WHS Act 2011.
- *Managing asbestos in or on soil*, SafeWork NSW, March 2014
- *Guidelines for the NSW Site Auditor Scheme*, NSW Dec 2006
- *Assessment of site Contamination,* National Environmental Protection Measure (NEPM Amendment), 2013
- *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia,* Western Australia (WA) department of Health (DOH), May, 2009.
- NSW EPA *Waste Classification Guidelines Part 1: Classifying Waste*.

2.4 Whole Report

No one section or part of a section, of this plan should be taken as giving an overall idea of this plan. Each section must be read in conjunction with the whole of this plan, including its appendixes and attachments.

3.0 SITE INFORMATION AND IDENTIFICATION

3.1 Site Location

Refer to Section 3.0 of the *Preliminary Contamination Assessment, Report no: 14219/2-AA* [May 2018]) as prepared by Geotechnique. For more updated site location and features, refer to Drawing No: *14219/2-AA1* and*14219/2-AA2* [May 2018].

3.2 Site Information and History

Refer to Section 4.0 and 5.0 (respectively) of the *Preliminary Contamination Assessment, Report no: 14219/2-AA* [May 2018] as prepared by Geotechnique.

3.3 Site Topography, Geology & Hydrogeology

Refer to Section 6.0 of the *Preliminary Contamination Assessment, Report no: 14219/2-AA* [May 2018] as prepared by Geotechnique.

4.0 RAP RELEVANCY

The RAP is not a static document. It is a working document that requires review and amendment during the life of the remediation project within the site.

A review of the RAP should be undertaken by a suitably qualified or experienced person when either of the following occurs:

- Change in the scope of the project;
- Following a significant asbestos issue or WHS issue;
- When there needs to be improvement in performance regarding the implementation of the RAP; or
- Completion of asbestos audits.

5.0 CONCEPTUAL SITE MODEL

5.1 Potential Contamination Types

The following types of contaminants which have been identified are summarised below:

Table 1. Source and type of contaminant that is present on site.

Source of Contamination	Location (please refer to Appendix for specific locations of nominated test pit (TP)	Potential Contaminants	Migration Path
Top Soil	BH103 (1/4 circle of 3.5 metre radius of [Bore Hole] BH103 to a depth of 0.3m, light blue shaded area refer to Appendix II)	Asbestos containing material (Asbestos Fines and Fragments) within fill materials	Deterioration and/or disturbance of ACM
Asbestos cement fragments	Asbestos cement fragments (3/8 circle of 4.0 metre radius of BH103 on the surface, light red shaded area refer to Appendix II)	Asbestos containing material (Asbestos Fragments) predominantly on the surface	Deterioration and/or disturbance of ACM

5.2 Potential Contamination Receptors

If the restricted areas are accessed the main potential asbestos contamination receptors are considered to include: site visitors, contractors, property owner and adjacent property owners/users, which may come into contact with the above-mentioned asbestos containing material. Apart from existing and neighbouring residences, there are no other sensitive receptors in close proximity to the nominated area.

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6.0 REMEDIATION ACTION PLAN

6.1 Remediation Action Goal

The goals of the remediation process are to:

- Render the site suitable for the intended residential land use, according to commercial / Industrial soil asbestos investigation criteria used from *Assessment of site Contamination,* National Environmental Protection Measure (NEPM Amendment), 2013;
- Eliminate any unacceptable risk to human health associated with contaminated asbestos material; and
- Protect site workers, visitors, and the community throughout the remediation works.

Prior to the commencement of works it is recommended that all relevant parties conduct a walk-through inspection of the proposed removal locations so that the hot spot and stockpile locations are identified. This will allow greater transparency between the parties involved and a better understanding of the extent of soil to be removed from site

6.2 Soil Surface with asbestos cement fragments

3/8 circle of 4 metre radius of [Bore Hole] BH103 on the surface or light red shaded area of Appendix II

- All asbestos remediation work to be undertaken by Class B asbestos removal contractor;
- As the asbestos is limited to the soil surface, removal operations should involve thorough hand picking of all asbestos material throughout the nominated site. Please note this will necessitate the clearing of vegetation for the visual inspection to take place.
- Multi-directional raking of the soil to approximately 10 cm below the soil surface and removal of debris;
- Clearance inspection of the subject area by an experienced occupational hygienist following removal works;
- Rake teeth are required to be < 7 mm spaced apart and >10cm long;
- A minimum of 2 passes of raking is required with a 90° direction change between each grid pattern; and
- Visual inspection of the area should not detect any ACM on the surface.

6.3 Soil with contaminated fill material:

BH103

¼ circle of 3.5 metre radius of [Bore Hole] BH103 to a depth of 0.3m or light blue shaded area of Appendix II

Ai Group recommends the following in relation to the asbestos contaminated fill materials:

- All asbestos remediation work to be undertaken by Class B asbestos removal contractor.
- Scraping the top 300mm of top soil will be required. As the majority of the bonded asbestos materials are limited to the top soil, the depth of the excavation should be determined by the onsite occupational hygienist. From the soil investigation carried out, it is expected a depth of 0.3m or greater will need to be excavated.
- It is expected excavation will involve layered cutting/scrapping and attempts make to keep the cut/scrapped layer as thin as possible.
- Buried services were encountered approximately 3m north of BH103 and 2m south of BH103 running approximately parallel to the white car parking marking along the east/west direction.

- During excavating activity, dust suppression via light wetting shall be carried out. A site specific health and safety management plan to be developed prior to commencement of any excavation work. The site specific health and safety management plant should also include:
    - Notification to SafeWork NSW
    - Site specific security and safety measures
    - Traffic management
- Background air monitoring to occur for the duration of excavation activity.
- In the event the contaminated top soil material is to be stockpiled and kept on site for a prolonged period, industry standard sediment control measures must be set up. This include covering of stockpiled fill material with tarpaulins. Consideration should also be given to erecting of silt fence or use of straw bales to prevent fill material being washed away during rainfall event(s).
- For minor asbestos occurrence, spotters can remove asbestos containing material under instruction from duty hygienist. All removed asbestos cement fragments to be double bagged in asbestos warning heavy plastic bags.

- The excavated fill material should be classified for off-site disposal in accordance with the NSW EPA *Waste Classification Guidelines Part 1: Classifying Waste for off-site disposal*;

- A visual inspection is to be carried out by the onsite hygienist following the removal works

- Clearance inspection of the subject area is to be carried out by an experienced occupational hygienist following removal works. All excavated material will need to undergo validation process. For each soil sample, of approximately 500 – 700mL will be collected and analyse by NATA accredited laboratory for asbestos.

6.4 Waste Assessment Classification

Any soil removed from the site requires a waste classification, this is done so the appropriate disposal practices are followed in accordance with the Protection of the Environment Operation Act 1997 (POEO Act). For the purpose of waste classification the site is assessed against ”NSW Environmental Protection Act (EPA) *Waste Classification Guidelines 2014”*.

In this instance, based on laboratory test results, the asbestos contaminated soil will be classified as “**Special Waste – Asbestos Waste**” in accordance to “*Waste Classification Guidelines Part 1: Classifying Waste*", the NSW Environment Protection Authority (EPA), 2014

6.5 Removal of Contaminated Material to Landfill

This option comprises of the excavation of the identified contaminated soil, classification of the soil to the waste guidelines, and disposal of the soil to an EPA licensed landfill. This will allow the following:

- All of the identified asbestos contaminated soil can be removed from the site eliminating future liability;
- All associated human health or environmental risks are removed; and
- Ongoing management requirements which accompany any residual contamination or encapsulation options are limited.

6.6 Remediation Acceptance Criteria

Table 2 below lists the contaminated of concern, adopted validation criteria and relevant guidelines.

Table 2. Remediation acceptance criteria

Contaminant	Adopted Validation Criteria	Guideline
Bonded ACM	Visual assessment of removal locations and validation sampling No visible asbestos fragments on soil surface and, 0.01% w/w for bonded ACM (residential with accessible soil)	*Guidelines for the Assessment of On-Site Containment of Contaminated Soil*, September 1999, ANZECC (ANZECC 1999); National Environmental Protection Measure (2013 amendment).
Asbestos fines	Visual assessment of removal locations and validation sampling No visible asbestos fragments on soil surface and, 0.001% for friable asbestos in soil	*Guidelines for the Assessment of On-Site Containment of Contaminated Soil*, September 1999, ANZECC (ANZECC 1999); National Environmental Protection Measure (2013 amendment).

6.7 Approximate quantity to be removed offsite (fill material only)

Contaminated soil to be removed offsite is estimated to be: 12 tons

Please note that the figures provided are an approximation of the total amount to be removed from site.

7.0 SITE MANAGEMENT CONTROL STRATEGY

7.1 Unexpected Finds

The Unexpected Finds Protocol is developed to provide guidance on the process to follow if asbestos is encountered unexpectedly during future works (refer to Appendix B)

As a minimum the Unexpected Finds Protocol should be included the followings:

- If suspected asbestos containing material is discovered, the duty occupational hygienist should be notified and the area closed off with the use of barrier tape and warning signs. Warning signs should be in accordance with Australian Standard 1319-1994 – Safety Signs for the Occupational Environment;
- The duty Occupational Hygienist to confirm presence of asbestos and determine remediation works required such as escalating the Work Area to Quarantine Area.
- Any asbestos impacted (or potentially impacted) soil, to be determined by an Occupational Hygienist is to be either disposed of as Special Waste (Asbestos) or stockpiled in a secure location for waste assessment classification and screened as per southern section protocol. All stockpiles are to be lightly wetted and covered prior to removal;
- All asbestos remediation work to be undertaken by Class B asbestos removal contractor;
- Airborne asbestos fibre to be carried out by a qualified occupational hygienist

7.2 Works on Site

The Contractor should ensure that all works are undertaken in accordance with the site Remediation Action Plan and any other relevant documentation which have been prepared for the site.

8.0 HEALTH AND SAFETY MANAGEMENT

8.1 Potential Health and Safety Risks

The site has been identified to contain asbestos and subsequently has health risks associated with the soil contamination at the site. The risks posed by the hazards identified at the site are exposure to asbestos by way of inhalation (asbestos containing dust and free asbestos fibres).

During any excavation works within the site, all personnel must be appropriately trained and wearing the appropriate personal protective equipment (PPE) to undertake works within an asbestos work area. Management procedures for asbestos should be in accordance with the asbestos removal guidelines.

8.2 Personal Protective Equipment

All workers working within restricted areas at the site prior to the remediation works shall wear personal protective equipment as per the asbestos removal guidelines.

8.3 Personal Hygiene

All workers working within the restricted areas at the site shall observe the following personal hygiene rules:

- There shall be no food, beverage, or tobacco product present or consumed in works areas;
- Good hygiene practices and the provision of good hygiene facilities will minimise additional employee exposure to the identified contaminants via ingestion or inhalation, and prevent contamination of workers' vehicles and homes;
- Hand-washing facilities shall be used to wash hands and face prior to eating, drinking
- or smoking; and
- Eating facilities shall be clean and accessible for employees and subcontractors. The work area should not be used as eating areas.

APPENDIX I

(Detailed Soil Sampling Result)

AUSTRALIAN SAFER ENVIRONMENT & TECHNOLOGY PTY LTD

ABN 36 088 095 112

Our ref: ASET70008 / 73188 / 1 - 13
Your ref: Nepean
NATA Accreditation No: 14484

14 December 2018

AI Group
51 Walker Street
North Sydney NSW 2060

Accredited for compliance with ISO/IEC 17025.

Attn: Mr John Tiong

Dear John

Asbestos Identification
This report presents the results of thirteen samples, forwarded by AI Group on 11 December 2018, for analysis for asbestos.

1.Introduction: Thirteen samples forwarded were examined and analysed for the presence of asbestos.

2. Methods: The samples were examined under a Stereo Microscope and selected fibres were analysed by Polarized Light Microscopy in conjunction with Dispersion Staining method**(Australian Standard AS 4964 - 2004 and Safer Environment Method 1 as the supplementary work instruction) (Qualitative Analysis only).7**

3. Results:

Sample No. 1. ASET70008 / 73188 / 1. Nepean-BH103-1W-0.3.
Approx dimensions 12.0 cm x 12.0 cm x 6.5 cm
The sample consisted of a mixture of sandy soil, stones, fragments of cement, glass, sandstone, fibre cement* (Approximate dimensions = 4.0cm x 3.5cm x 0.45cm) and plant matter.
Chrysotile* asbestos, Amosite* asbestos and Crocidolite* asbestos detected.

Sample No. 2. ASET70008 / 73188 / 2. Nepean-BH103-1S-0.4.
Approx dimensions 12.0 cm x 12.0 cm x 6.52 cm
The sample consisted of a mixture of soil, stones, fragments of cement, glass, brick, sandstone and plant matter.
No asbestos detected.

Sample No. 3. ASET70008 / 73188 / 3. Nepean-BH103-1N-0.3.
Approx dimensions 12.0 cm x 12.0 cm x 6.5 cm
The sample consisted of a mixture of sandy soil, stones, fragments of cement, glass, sandstone and plant matter.
No asbestos detected.

Sample No. 4. ASET70008 / 73188 / 4. Nepean-BH103-1E-0.4.
Approx dimensions 12.0 cm x 12.0 cm x 6.52 cm
The sample consisted of a mixture of sandy soil, stones, fragments of cement, glass, brick, sandstone, bitumen and plant matter.
No asbestos detected.

Sample No. 5. ASET70008 / 73188 / 5. Nepean-BH103-2SW-0.3.
Approx dimensions 12.0 cm x 12.0 cm x 6.5 cm
The sample consisted of a mixture of sandy soil, stones, fragments of cement, glass, sandstone and plant matter.
No asbestos detected.

Sample No. 6. ASET70008 / 73188 / 6. Nepean-BH103-2NW-0.3.
Approx dimensions 12.0 cm x 12.0 cm x 6.57 cm
The sample consisted of a mixture of sandy soil, stones, fragments of cement, glass, sandstone and plant matter.
No asbestos detected.

Sample No. 7. ASET70008 / 73188 / 7. Nepean-BH103-2NE-0.3.
Approx dimensions 12.0 cm x 12.0 cm x 6.58 cm
The sample consisted of a mixture of sandy soil, stones, fragments of cement, glass, plastic, sandstone, bitumen and plant matter.
No asbestos detected.

Sample No. 8. ASET70008 / 73188 / 8. Nepean-BH103-2SSE-0.3.
Approx dimensions 12.0 cm x 12.0 cm x 6.57 cm
The sample consisted of a mixture of sandy soil, stones, fragments of cement, glass, brick, sandstone, bitumen and plant matter.
No asbestos detected.

Sample No. 9. ASET70008 / 73188 / 9. Nepean-BH103A-3SW-0.3.
Approx dimensions 12.0 cm x 12.0 cm x 6.5 cm
The sample consisted of a mixture of sandy soil, stones, fragments of cement, glass, plastic, fibre cement* (Approximate dimensions = 0.5cm x 0.2cm x 0.2cm), and plant matter.
Chrysotile* asbestos, Amosit* asbestos and Crocidolite* asbestos detected.

Sample No. 10. ASET70008 / 73188 / 10. Nepean-BH103A-3S-0.3.
Approx dimensions 12.0 cm x 12.0 cm x 6.58 cm
The sample consisted of a mixture of sandy soil, stones, fragments of cement, glass, sandstone, fibre cement* (Approximate dimensions = 0.5cm x 0.5cm x 0.1cm), bitumen and plant matter.
Chrysotile* asbestos, Amosite* asbestos and Crocidolite* asbestos detected.

Sample No. 11. ASET70008 / 73188 / 11. Nepean-BH103-4.5NWW.
Approx dimensions 12.0 cm x 12.0 cm x 6.59 cm
The sample consisted of a mixture of sandy soil, stones, fragments of cement, glass, brick, sandstone, char and plant matter.
No asbestos detected.

Sample No. 12. ASET70008 / 73188 / 12. Nepean-BH103-5S.
Approx dimensions 12.0 cm x 12.0 cm x 6.59 cm
The sample consisted of a mixture of sandy soil, stones, fragments of cement, glass, sandstone, and plant matter.
No asbestos detected.

Sample No. 13. ASET70008 / 73188 / 13. Nepean-PNEUVAY-1.
Approx dimensions 3.5 cm x 3.0 cm x 0.4 cm
The sample consisted of a fragment of a fibro plaster cement material containing organic fibres.
No asbestos detected.

Reported by,

Mahen De Silva. BSc, MSc, Grad Dip (Occ Hyg)
Occupational Hygienist / Approved Identifier.
Approved Signatory

WORLD RECOGNISED ACCREDITATION

Accredited for compliance with ISO/IEC 17025.

The results contained in this report relate only to the sample/s submitted for testing. Australian Safer Environment & Technology accepts no responsibility for whether or not the submitted sample/s is/are representative. Results indicating "No asbestos detected" indicates a reporting limit specified in AS4964 -2004 which is 0.1g/ Kg (0.01%). Any amounts detected at assumed lower level than that would be reported, however those assumed lower levels may be treated as "No asbestos detected" as specified and recommended by AS4964-2004. Trace / respirable level asbestos will be reported only when detected.

Estimation of asbestos weights involves the use of following assumptions;
Volume of each kind of Asbestos present in broken edges have been visually estimated and it has been assumed that volumes remain similar throughout the binding matrix and those volumes are only approximate and not exact. Material densities have been assumed to be similar to commonly found similar materials and may not be exact.

The approx weights given above can be used only as a guide. They do not represent absolute weights of each kind of asbestos, as it is impossible to extract all loose fibres from soil and other asbestos containing building material samples using this method. However above figures may be used as closest approximations to the exact values in each case. Estimation and/ or reporting of asbestos fibre weights in asbestos containing materials and soil is out of the Scope of the NATA Accreditation. NATA Accreditation only covers the qualitative part of the results reported. This weight disclaimer also covers weight / weight percentages given.

^ denotes loose fibres of relevant asbestos types detected in soil/dust.
*** denotes asbestos detected in ACM in bonded form.**
 # denotes friable asbestos as soft fibro plaster and/or highly weathered ACM that will easily crumble.

APPENDIX II

(RAP Site Schematic)

Imagery ©2018 NearMap.com

LEGEND

Borehole

0 5 10 15 20 25m

Scale 1:500

Sample Location	Depth (m)	Contaminant
BH103	0-0.15	Asbestos Containing Material (ACM) fragment (>7mm fraction)

PREPARED BY:

GEOTECHNIQUE® PTY LTD

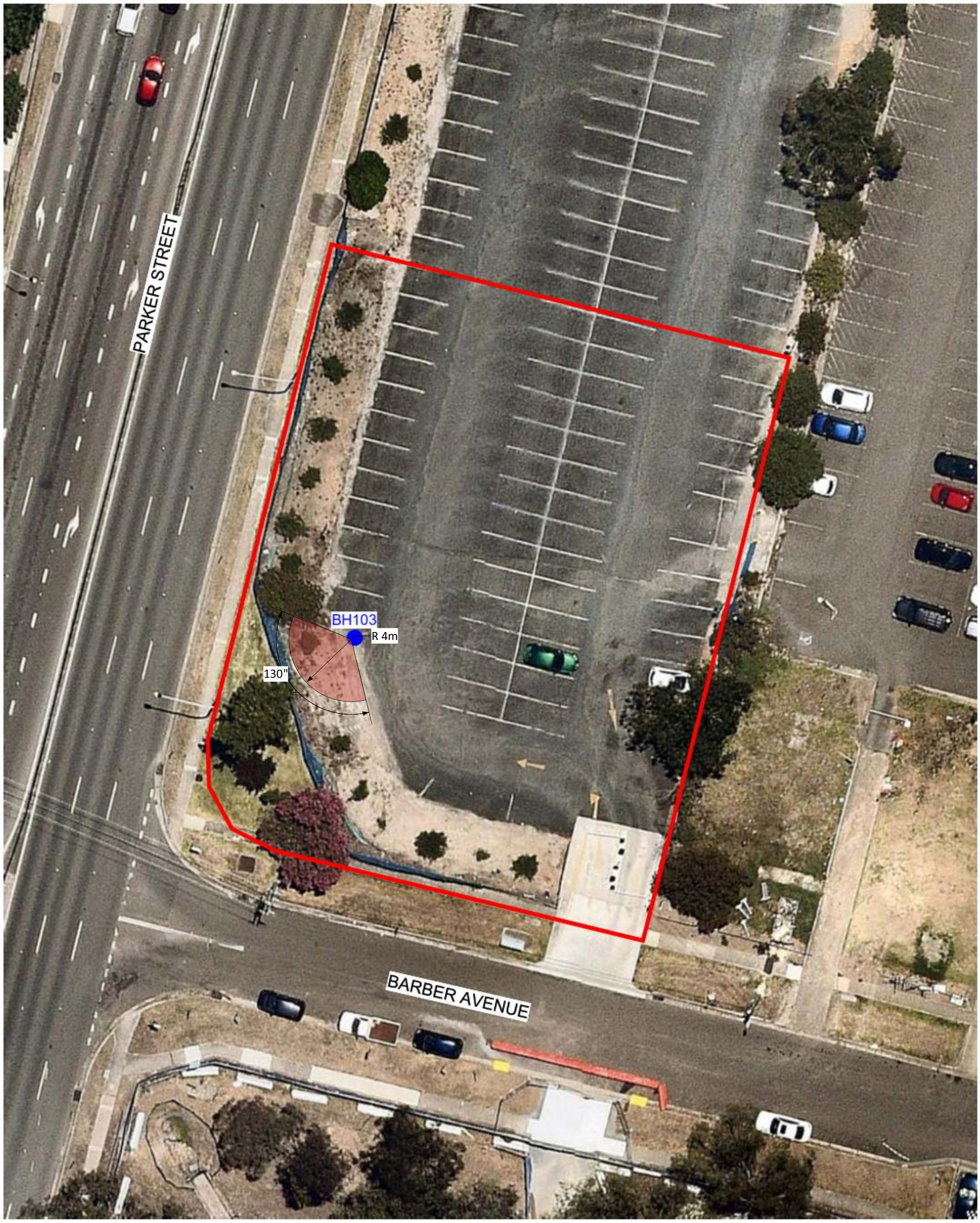
PO Box 880
Penrith NSW 2750
Tel: 02 4722 2700
Fax: 02 4722 2777
e-mail:info@geotech.com.au
www.geotech.com.au

Cornerstone Development Management Pty Ltd
Proposed Development
84-88 Parker Street
Kingswood

Shaded area to be excavated to a depth of 0.3m

Drawing No: 14219/2-AA2
Job No: 14219/2
Drawn By: MH
Date: 31 May 2018
Checked By: DS

File No: 14219-2
Layers: 0, AA2



Imagery ©2018 NearMap.com

0 5 10 15 20 25m

Scale 1:500

LEGEND

● Borehole

Sample Location	Depth (m)	Contaminant
BH103	0-0.15	Asbestos Containing Material (ACM) fragment (>7mm fraction)

PREPARED BY:

GEOTECHNIQUE® PTY LTD

PO Box 880
Penrith NSW 2750
Tel: 02 4722 2700
Fax: 02 4722 2777
e-mail:info@geotech.com.au
www.geotech.com.au

Cornerstone Development Management Pty Ltd
Proposed Development
84-88 Parker Street
Kingswood

Shaded area to be emu-picked

Drawing No: 14219/2-AA2
Job No: 14219/2
Drawn By: MH
Date: 31 May 2018
Checked By: DS

File No: 14219-2
Layers: 0, AA2