

30/09/2016

**BULLI ACCE**  
**JOB NO.1110**

CONSTRUCTION WASTE  
MANAGEMENT PLAN

18 October 2017



RICHARD CROOKES  
  
CONSTRUCTIONS

Delivering  
Certainty

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# Revision

Rev Date	Revision Description	PM's Initials (i.e. acceptance of changes)
18Oct17	Original Issue	

# I Introduction

This Construction Waste Management Plan forms part of the Project Management Plan for The Bulli Aged Care Centre of Excellence Project.

This waste management plan has been prepared in consultation with Wollongong City Council as well as the Wollongong Development Control Plan referencing mainly the following chapters;

- Chapter E7 Waste Management
- Chapter E21 Demolition and Asbestos Management
- Chapter E20 Contaminated Land

## I.1 Purpose of the Plan

Richard Crookes Constructions (RCC) recognises the importance of promoting building design and construction techniques which minimise waste and provides an efficient recycle procedure for all waste material.

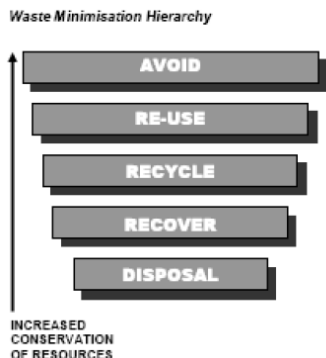
The purpose of this plan is to outline processes for:

- Recycling demolition materials including concrete.
- Identify and manage hazardous materials.
- Minimising waste on site.

# 2 RCC Objectives and Targets

RCC's overall objective is to achieve a minimum of (80%) for recycled waste (by weight) generated by the Project.

The Operational Controls implemented to achieve this include:

Operational Controls		Method of Recording
General	Identify any hazardous and toxic materials (e.g. asbestos) and comply with WorkCover requirements. Develop project Waste Management Plan Try not to over-order on materials (initial waste avoidance). Communicate housekeeping & litter reduction rules with subcontractors during contract letting and site inductions.	Hazardous substance survey Waste Records Inductions
Implement the waste hierarchy – avoid, reuse, recycle and lastly disposal to landfill.		
 <p><b>Waste Minimisation Hierarchy</b></p> <p>↑</p> <p><b>AVOID</b></p> <p><b>RE-USE</b></p> <p><b>RECYCLE</b></p> <p><b>RECOVER</b></p> <p><b>DISPOSAL</b></p> <p>INCREASED CONSERVATION OF RESOURCES</p>		

Operational Controls		Method of Recording
Demolition Plan	<p>Demolition disposal for concrete, bricks, plasterboard, timber, tiles, PVC, metal, paper &amp; cardboard, glass, appliance, carpet, vegetation, soil – to Recycled Facility</p> <p>Asbestos ACM to be removed by a licenced contractor (up to 30 June 2007 &gt;200m<sup>2</sup>, 1 July 2007 &gt; 50m<sup>3</sup>, from 1 Jan 2008 &gt; 10m<sup>2</sup> of bonded asbestos) &amp; managed in accordance with WHS Act &amp; Regulation 2012 and EPA requirements.</p> <p>Lead paints &amp; dusts will be removed using wet sanding and vacuum techniques (cleaners which comply with AS/NZS 3544 Industrial vacuum cleaners for particulates hazardous to health). Waste will be contained within sealed plastic bags for disposal. Clean up with a wet mop.</p>	Monthly Waste Report Disposal dockets
Consider recycling reprocessing	<p>Where practicable:</p> <p>Concrete – used for filling, levelling or road base.</p> <p>Timber for reuse or mulching</p> <p>Aluminium wall frames – reprocess</p> <p>Plasterboard – recycled or use as soil improvers</p> <p>Steel – reprocess</p> <p>Toughened Glass – reprocess</p> <p>Carpet &amp; underlay – reprocess &amp; mulch mats</p>	Monthly Waste Report

## 2.1 Estimated Waste Quantities: Use This to Estimate the Waste Quantities

Source Blacktown Council Waste Not Development Control Plan (internet, [http://www.blacktown.nsw.gov.au/planning-anddevelopment/waste-not-overview/waste-not-overview\\_home.cfm](http://www.blacktown.nsw.gov.au/planning-anddevelopment/waste-not-overview/waste-not-overview_home.cfm), 2007).

Block of Flats (per 1000 m <sup>2</sup> )			
Waste Type	Conversion Factor	Demolition (t)	Construction (t)
Excavated Material	1.8 t/m <sup>3</sup>	na	na
Concrete (incl. Blocks)	2.4 t/m <sup>3</sup>	813	813
Bricks	1.0 t/m <sup>3</sup>	655	655
Timber Gyprock	Timber 0.5 t/m <sup>3</sup> Gyprock: 0.75 t/m <sup>3</sup>	22	22
Steel	2 -4 t/m <sup>3</sup>	9	9
Roof Tiles	0.75 t/m <sup>3</sup>	33	33
Other – vegetation, cardboard, plastic	0.05 t/m <sup>3</sup>	26	26

## 3 Hazardous Materials Management

Since the site has some asbestos containing material, all hazardous materials will be managed as per the attached Remediation Plan in Appendix A and the Asbestos Management Plan attached as per Appendix B

## 4 Reporting

### General waste reporting:

The Building Cadet will be responsible for collecting monthly waste reports and issuing them to the Project Manager and the Principal's Authorised Person.

These reports will measure the weight of waste generated of material by classification, total weight of waste, percentage by weight recycled and percentage by weight to landfill.

## 5 Estimated Quantities

The Waste management plan – Construction chart (Form 18.2b) attached as Appendix C is an estimate of the core waste streams that will be removed from the Bulli ACCE Project. The waste to be removed will be assessed for the Reuse & recycling content and the Disposal to landfill.

## Appendix A – BULLI Remediation Action Plan



# **Douglas Partners**

*Geotechnics | Environment | Groundwater*

Report on  
Remediation Action Plan

Bulli Hospital Proposed Aged Care Facility  
22 Hospital Road, Bulli

Prepared for  
Health Infrastructure

Project 38227.04  
June 2017

Integrated Practical Solutions



## Document History

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The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

	Signature	Date
Author		14 June 2017
Reviewer	 for Paul Gorman	14 June 2017



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## **Report on Remediation Action Plan**

### **Bulli Hospital Proposed Aged Care Facility**

#### **22 Hospital Road, Bulli**

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## **1. Introduction**

This Remediation Action Plan (RAP) outlines the methods and procedures that will be used to remediate contaminated soils within 22 Hospital Road, Bulli (the site) for a proposed aged care facility development. This report has been prepared with reference to Douglas Partners Pty Ltd (DP) proposal dated 30 June 2016 and was commissioned by Health Infrastructure.

The RAP has been developed based on available standards and guidelines prepared by the relevant authorities, and the results of the following investigations conducted by DP:

- DP's *Report on Geotechnical Investigation, Redevelopment of Bulli Hospital, Hospital Road, Bulli*, DP Project 38227.00, dated August 2003 (DP, 2003)
- DP's *Report on Preliminary Site Investigation with Limited Sampling, Proposed Aged Care Facility, Bulli Hospital Car Park, 22 Hospital Road*, DP project reference 38227.01 dated November 2015 (DP, 2015).
- DP's *Geotechnical Comment, Proposed Aged Care Facility, 22 Hospital Road, Bulli*, DP project reference 38227.03 dated April 2016 (DP, 2016a).
- DP's *Report on Detailed Asbestos Investigation, Proposed Aged Care Facility, Bulli Hospital Car Park, 22 Hospital Road*, DP project reference 38227.02 dated June 2016 (DP, 2016b).

DP (2015) and DP (2016b) identified asbestos contamination at the site in both bonded (asbestos containing materials, ACM) and friable (friable asbestos FA, and asbestos fines AF) forms at the locations shown on Drawing 1, Appendix B.

This RAP details the objectives, methods and procedures by which the remediation and site validation will be achieved within the site. It will enable the site to be declared suitable for the proposed aged care facility development.

It is noted that detailed design with geotechnical considerations was not available at the time of preparing this RAP. The remediation strategies detailed herein will be undertaken as part of construction. As such the final remediation strategy will be dependent on the final design including all geotechnical considerations.

## **2. Methods and Objectives of the RAP**

It is proposed that the remediation method will involve the on-site management of soils impacted by and potentially impacted by ACM, FA and AF by capping with a layer of site won non-asbestos contaminated soil to a depth of at least 1 m for landscaped / public open space areas and at least 0.5 m for all other areas such as hardstand (buildings and pavements).

The objective of the RAP is to ensure that the site is remediated in an acceptable manner, with minimal environmental impact, to a condition suitable for the proposed aged care facility development.

The objectives of this RAP are therefore to provide a strategy for site remediation which:

- Minimises impacts from the site on the environment and on public health and safety during site remediation;
- Maximises the protection of workers involved with site remediation;
- Renders the site safe for the proposed landuse and substantially reduces potential exposure pathways to contaminants;
- Minimises impacts on the local environment during and following site remediation.

### **3. Review of Site Information**

#### **3.1 Site Description**

The site is identified as Part Lot 1 Deposited Plan 165903 and part of Lot 1 Deposited Plan 175787 22 Hospital Road, Bulli, refer to Drawing 1, Appendix B. The site has an irregular shaped footprint, with an area of approximately 11,900 m<sup>2</sup>. The site is bound to the north by Whartons Creek and residential properties to the east by an Ambulance Depot associated with the Bulli Hospital followed by residential properties, to the south by Hospital Road then the Bulli Hospital and to the west by residential properties. Surface levels are relatively uniform across two levelled portions of the site, eastern and western portions, with localised steep slopes in the middle portion and southern boundary of the site. The western level portion of the site had surface levels in the range of 34 m Australian height datum (AHD) to 38 m AHD, and the eastern level portion of the site had surface levels in the range of 26 m AHD to 28 m AHD.

#### **3.2 Site Condition**

At the time of the preparation of the RAP the site was primarily used as a hardstand car park associated with the Bulli Hospital. The eastern portion of the site (the portion within Lot 1 Deposited Plan 175787) was currently unused with a vacant building present. It is understood that the vacant building is proposed for demolition as part of the early works programme and that a hazardous building materials survey for the building has been undertaken.

#### **3.3 Proposed Development**

The proposed development of the site is for an aged care facility that will broadly comprise the following:

- Two main buildings; a four storey building in the eastern portion of the site and a two storey building in the western portion of the site with a combined footprint of around 4,000 m<sup>2</sup>;

- Concept plans provided for the buildings show various rooms including around 100 accommodation / care facility rooms, dining areas and medical services;
- Two hardstand car parking areas associated to each main building area with a combined footprint of around 3,200 m<sup>2</sup>; and
- Landscaped areas.

Based on the provided design drawings it is estimated that limited bulk earthworks will be required to achieve a ground floor level at RL 28 for the four-storey (eastern) structure and RL 36.2 for the two-storey (western) structure.

It is also understood that the structural loads for the two-storey (western) structure are similar to conventional residential construction. Furthermore, two-storey (western) structure will be supported on a deep foundation system (probably screw piles) with suspended ground slabs. The four-storey (eastern) structure will incorporate slab-on-ground construction, and will be supported on a piled foundation system (probably cased bored piers or continuous flight auger piles).

### 3.4 Geology and Hydrogeology

Reference to the 1:100 000 Wollongong-Port Hacking Soil Series Sheet indicated that the site is underlain by Gwyneville Residual soils comprising footslopes of the Illawarra Escarpment and isolated rises of the Wollongong Plain.

Reference to the 1:100 000 Wollongong-Port Hacking Geological Series Sheet indicated that the site is underlain by Illawarra Coal Measures of Permian Age which typically comprise interbedded quartz-lithic sandstone, grey siltstone and claystone, carbonaceous claystone, clay, laminate and coal.

Reference to the 1:25,000 Wollongong Acid Sulfate Risk Map indicated that the site is not located in an area mapped as requiring investigation to assess the area for acid sulfate soils.

Whartons Creek is located on the northern boundary of the site.

## 4. Previous Investigations

### 4.1 DP (2003)

DP (2003) comprised the drilling of boreholes, with *in situ* geotechnical testing and sampling of the subsurface strata, following by laboratory testing of selected samples, engineering analysis and reporting. The current site was a part of the DP (2003) site which also included the Bulli Hospital to the south of the current site

DP (2003) included the drilling of 12 boreholes (1 to 12) with eight of these being within the current site (5 to 12). Boreholes 5 to 12 were drilled to depths between 7.74 m below ground level (bgl) and 17 m bgl. Variable filling was encountered in each of the boreholes from the surface to depths of between 0.3 m bgl and 4.0 m bgl. The filling was described as comprising clayey gravel, gravelly clays and silty clays. Coalwashery rejects and general rubble were also noted in the filling.

## 4.2 DP (2015)

DP (2015) comprised a desktop site history investigation, a site walkover, intrusive sampling at a limited density (eight locations, being approximately a third of the density required by the Sampling Design Guidelines (NSW EPA 1995) for site characterisation), laboratory analysis of selected samples and reporting.

Based on the review of site history and the site walkover, it was considered that hazardous building materials may have been used in the construction of the building in the eastern portion of the site. It is noted that the client has indicated that a hazardous building materials assessment has already been undertaken on this building.

Uncontrolled fill was encountered in all DP (2015) investigation locations, including reworked natural, coal washery rejects, fibrous cement, road base, bricks, concrete, ceramic tiles, scrap metal and plastic. Fibrous cement fragments were observed in three of the sampling locations. Representative samples of the fibrous cement sheeting were confirmed to contain asbestos through laboratory identification. It is noted that the limited amount of coal washery rejects encountered meant that further assessment of this material was not recommended by DP (2015).

Based on the results of DP (2015) the common contaminants metals, total recoverable hydrocarbons (TRH), benzene, ethylbenzene, toluene and xylene (BTEX), polycyclic aromatic hydrocarbons (PAH), polychlorinated biphenyls (PCB), organochlorine pesticides (OCP), organophosphorous pesticides (OPP) and total phenols were not identified as contaminants of concern for the site.

Based on the findings of DP (2015), it was considered that the site has the potential for the presence of asbestos that would preclude the proposed development of the site in its current condition. To determine the extent and degree of asbestos contamination impact a detailed site investigation for asbestos was recommended to determine the suitability of the site for the proposed development or to allow for the preparation of a RAP.

Subject to the results of the above it was considered likely that the site could be made suitable for its proposed aged care facility development.

## 4.3 DP (2016a)

DP (2016a) comprised the provision of geotechnical comment on geotechnical aspects that would need to be considered for the proposed development. The following comments were provided:

- *“The results of the 2003 investigation indicated the presence of an uncontrolled filling platform that was considered to have a moderate to high risk of damage to property occurring should development be undertaken on the platform in its present condition. Section 5.4 of the DP August 2003 report included removal of all existing filling and treatment of weak natural subgrade followed by filling under controlled conditions. However, the proposed layout of the western section, which include suspended slab construction founded on a deep footing system and a building footprint located outside the zone of influence of the batter (ie located a distance at least twice the height of the batter), will mitigate the need for such works within the building footprint.*

- *Within pavement areas, the existing filling should be excavated to at least 1 m below proposed subgrade level, test rolled and additional filling (which could include moisture-conditioned excavated fill materials) placed and compacted in layers to achieve a minimum density ratio of 98% relative to Standard compaction in the lower 0.5 m and 100% standard in the upper 0.5 m. These works are aimed at providing a reasonably uniform subgrade for pavement construction.*
- *Where slab-on-ground construction is proposed for the eastern structure, all filling is to be removed and weak natural subgrade treated followed by filling under controlled conditions in accordance with Section 5.4 of the DP August 2003. Alternatively, a reduced earthworks methodology (as indicated above) could be considered in conjunction with suspended slab construction.*
- *Due to the generally "wet-of-optimum" conditions encountered, allowance will need to be made for some over-excavation (beyond the initial 1 m) and replacement with a bridging layer of ripped rock, or equivalent together with the installation of subsurface drainage.*
- *Section 5.6 of the DP August 2003 report provides guidance on batter slopes. In summary, the report suggests maximum temporary sideslopes of 2:1 (horizontal:vertical) in existing uncontrolled filling and 1:1(H:V) in the stiff clays and extremely low to very low strength rock. Permanent batters should be no greater than 2.5:1(H:V) in controlled filling and stiff clay and should be topsoiled and vegetated as soon as possible after construction to minimise soil erosion.*
- *It is understood that comment is required on the geotechnical appropriateness of constructing steeper temporary batters. In this regard, steeper slopes must only be considered at those locations where there is sufficient distance for slumped material (if the batter was to fail) to accumulate without causing damage to downslope structures. Notwithstanding this, an increase risk of slumping (particularly during and following inclement weather) must be acknowledged and accepted. Furthermore, additional vigilance will be required during construction to monitor the slopes to ensure personnel safety.*
- *Steeper batters (no steeper than 1:1 in uncontrolled filling and 0.75:1 in stiff clays and extremely low to very low strength rock) could be feasible but limited to the eastern end of the existing fill platform (where there is a buffer to the neighbouring ambulance station). As a precaution to personnel safety, daily inspections of the batters must be undertaken by the site manager to assess changes in the batter profile and/or propagation of tension cracks that would be indicative of slope movement.*
- *Temporary batters along the Hospital Road frontage must be formed no steeper than 1:1 and supported in the long term by engineer-designed retaining structures.*
- *All excavations must also be regularly inspected by either an experienced geotechnical engineer or engineering geologist who can advise on remedial requirements if adverse or variable conditions are encountered.*
- *Due to the close proximity of residential development, steeper batters than those previously nominated are not considered geotechnically appropriate for the northern and western extents of the fill platform.*
- *Where there is insufficient space for temporary batters, either temporary shoring or the construction of soldier pile or contiguous pile retaining structures will be required. The design of shoring and retaining structures will also need to take account of any lateral loads due to inclined surfaces, nearby structures or accessways.*

- *Whilst detailed review of foundation options can only be undertaken once footing loads become known, based on previous experience with similar developments, it is expected that a deep footing system founding on the underlying weathered bedrock will be required. Comments on deep foundations are given in Section 5.8.2 of the DP 2003 report. The main advantage of a footings-to-rock foundation system would be that settlements (both total and differential) would be minimal."*

DP (2016a) concluded that *"development of the site as proposed is geotechnically feasible, construction will be a challenge due to the variable ground conditions."*

#### **4.4 DP (2016b)**

DP (2016b) comprised a detailed asbestos investigation and included the excavation / drilling of test pits / boreholes, analysing samples from each test location in the field and at a NATA accredited laboratory and reporting.

The field work for the detailed asbestos investigation comprised the drilling of 16 boreholes and excavation of 34 test pits to depths of between 1.0 m bgl and 3.0 m bgl. Anthropogenic items were encountered in the subsurface filling in the majority of test locations comprising carbonaceous materials, ceramic tile / pipe, brick, concrete pieces, scrap metal, glass, bitumen fragments, timber, slag and fibrous cement. Filling was observed to depths of between 0.25 m bgl and 2.8 m bgl.

Seventy (70) bulk samples were sieved in the field to identify and quantify the presence of suspected asbestos containing material (ACM). Suspected ACM was encountered in test pits 204, 206, 210, 211, 218, 222, 226, 233, 238 and 250 and in borehole 220. Representative fragments of the ACM encountered in the abovementioned test locations were dispatched to the laboratory for asbestos identification and were confirmed to contain chrysotile, amosite and crocidolite asbestos. Of these locations the concentration of ACM was found to exceed the adopted site assessment criteria (SAC) in test pits 204, 206, 210, 211, 218, 222, 224, 226, 233 and 250. The test pit and bore locations are shown on Drawing 1, Appendix B.

Furthermore, chrysotile FA/AF was detected in samples 201/0.3-0.5 and 218/1.3-1.5 with the concentration in sample 218/1.3-1.5 exceeding the adopted site assessment criteria (SAC).

Based on the findings of DP (2016b) it was considered that the presence of asbestos contamination at the site would preclude the proposed development in its current condition.

DP (2016b) recommended that a RAP be prepared to identify and outline suitable strategies for remediating the site so that it could be rendered compatible with the proposed development. Such remediation / management strategies for the ACM impacted soils could comprise on site treatment, on site containment or off-site disposal. However, it was further noted that on site treatment would not be a viable option for the FA / AF.

## 5. Conceptual Site Model

A conceptual site model (CSM) is a representation of site-related information regarding contamination sources, receptors and exposure pathways between those sources and receptors (linkages). The CSM provides the framework for identifying how the site became contaminated and how potential receptors may be exposed to contamination either in the present or the future i.e. it enables an assessment of the potential source – pathway – receptor linkages (complete pathways).

### 5.1 Identified Contamination

Based on the findings of DP (2015) and DP (2016) it is considered asbestos contamination exists at the site primarily through the filling of the site through its development as a car park and demolition of previous structures. The approximate lateral extents of the areas of identified or potential asbestos contamination are shown on Drawing 1, Appendix B. It is noted that the lateral extents are based on positive indicators of potential asbestos contamination (i.e. construction and demolition related items such as ceramic tile / pipe, brick, concrete pieces, scrap metal, glass, bitumen fragments, timber, slag and fibrous cement) as observed in subsurface filling during DP (2015) and DP (2016a).

### 5.2 Contamination Sources and Contaminants of Concern

Based on the findings of DP (2015) and DP (2016b) the sources (S) of contamination comprise:

- S1 - Uncontrolled filling of an unknown origin associated to the demolition of previous structures and development of the site.

Common contaminants of concern associated with the above identified sources of contamination are metals, TRH, BTEX, PAH, PCB, OCP, OPP, total phenols, asbestos in construction and demolition waste or waste soils. However, based on the results of DP (2015) the common contaminants metals, TRH, BTEX, PAH, PCB, OCP, OPP and total phenols were not identified as contaminants of concern for the site.

DP (2015) identified asbestos as the primary contaminant of concern for the site. DP (2016b) confirmed that asbestos contamination was present.

### 5.3 Potential Receptors

Receptors (R) that potentially could be influenced by the potential contaminants at this site include:

Human health receptors:

- R1 - Construction workers during the development.
- R2 - End users (residential and staff).
- R3 - Adjacent users (residential).

## 5.4 Potential Pathways

Potential pathways (P) for contaminants on the site, with consideration to the site's proposed end use, current condition, and geological, topographical and hydrogeological characteristics, include:

- P1 - Ingestion and dermal contact.
- P2 - Inhalation of dust and/or vapours.

## 5.5 Summary of Complete Pathways

A 'source–pathway–receptor' approach has been used to assess the potential risks to human and environmental receptors from contamination sources on or in the vicinity of the site, via exposure pathways. The potential pathways between the sources and receptors are provided in Table 3.

**Table 3: Potential Complete Pathways**

Source	Transport Pathway	Receptor	Action Recommended	Acceptance Criteria
S1 – Uncontrolled filling containing asbestos contamination associated to the demolition of previous structures and development of the site.	P1 - Ingestion and dermal contact	R1 - Construction Workers	Remediation of contaminated soils as outlined in this RAP.	Validation required as outlined in this RAP.
	P2 - Inhalation of dust	R2 - End users	Development and implementation of a CMP during construction works.	
	P2 - Inhalation of dust	R3 - Adjacent users	Long term Environmental Management Plan (EMP) to manage any future planned intrusive works.	

## 6. Assessment of Remediation Options

A number of remediation options were reviewed with reference to the principles and criteria defined in relevant documents, including, the following:

- NEPC, "National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013", 11 April 2013 (NEPC, 2013: Ref 1);
- NSW EPA, Contaminated Site, "Guidelines for the NSW Site Auditor Scheme 2nd Edition", April 2006 (Ref 2).

NEPM (2013) states that the preferred hierarchy of options for site clean-up and/or management are as follows:

- On-site treatment of the contamination so that it is destroyed or the associated risk is reduced to an acceptable level; and
- Off-site treatment of excavated soil, so that the contamination is destroyed or the associated risk is reduced to an acceptable level, after which soil is returned to the site; or,

If the above are not practicable,

- Consolidation and isolation of the soil on site by containment with a properly designed barrier; and
- Removal of contaminated material to an approved site or facility, followed, where necessary, by replacement with appropriate material;

or,

- Where the assessment indicates remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy.

Based on the distribution and depth of contaminated soils, subsurface conditions and the type of contamination (i.e. ACM, FA and AF) and concentrations present, a number of remediation options were considered as follows:-

1. Off-site disposal of all asbestos contaminated soils to a licensed landfill;
2. On-site treatment of asbestos contaminated soils, excluding FA / AF contaminated soils; and
3. On-site management (i.e. capping) of the asbestos contaminated soils.

Advantages and disadvantages of each option were assessed, however, Options 1 and 2 were considered to not be feasible for the following reasons:

- Given the relatively large volume of contaminated material present, the costs for Option 1 is likely to be significantly more expensive than the cost of on-site capping and therefore unlikely to be economically feasible for redevelopment of the site;
- Option 2 will not address the FA / AF contamination. Capping or off-site disposal, therefore, would still be required for these materials; and
- Option 2 would incur considerable time delays for remediation.

On-site management (Option 3) of contaminated soils is considered to be a feasible remediation option to protect human health and the environment, and minimise constraints on the future use of the site for the sensitive land use.

The Waste Hierarchy adopted by the NSW EPA is, in order of preference, Avoidance, Resource Recovery and Disposal. A 'Cap and Contain' system would be consistent with a resource recovery initiative

It is envisaged that site remediation and associated site filling can be integrated to ensure that the contaminated soil is placed beneath a suitable capping layer, and requirements for costly off-site disposal of contaminated soils is minimised.

It is noted that the remediation strategy for this RAP is limited to consolidation and capping or capping *in situ* within the proposed development area.

## 7. Remediation Goals and Acceptance Criteria

### 7.1 Remediation Goals

The main objective of the remediation programme will be to place contaminated soils beneath a suitable capping layer to prevent exposure and accessibility. The capping layer will comprise a 1 m thick layer of non-asbestos impacted site won soils for the landscaped areas and a 0.5 m thick layer of non-asbestos impacted site won soils for hardstand areas.

Any excess materials requiring off-site disposal should be classified with reference to NSW EPA waste classification guidelines (Ref 3), and disposed to a facility which is licensed to receive such materials.

To further reduce the potential impact on the environment and human health, the following additional measures are recommended in the construction of the capping layer within the development area:

- Placement of a brightly coloured marker layer on top of the contaminated fill materials to act as a warning layer and to provide separation from overlying materials;
- Preparation of a long term Environmental Management Plan (EMP). The EMP will outline the precautionary management procedures to be adopted if the permanent capping layer is breached in future. The EMP will also promote awareness of the contamination management and the requirement of avoiding disturbance to the capping where possible; and
- Vegetation cover for the southern batter area comprising, for example, a landscaped garden.

This process of remediation will substantially reduce the potential for human contact with materials that are contaminated so that the development site can be made suitable for the proposed aged care facility.

### 7.2 Remediation Acceptance Criteria

Achievement of the objective of capping of the contaminants will be demonstrated by the successful installation of a constructed capping layer. In the case of contained soils the remediation acceptance criteria (RAC) will not, therefore, take the form of a set of concentrations for various contaminants. Rather, the RAC will comprise the verification of the completion of the capping layer (in accordance with this RAP) by the Environmental Consultant (refer Section 8), and will be deemed to have been attained when the capping has been successfully installed.

Where asbestos contaminated soils are excavated for consolidation and capping elsewhere, the lateral extents of the excavation of the asbestos contaminated soils or potentially contaminated soils will be validated by the environmental consultant in accordance with Section 11. The RAC for the validation will be the site assessment criteria discussed in Section 7.3 and visual assessment that no anthropogenic items are present.

In addition to the above, any imported fill used to construct the capping layers, reinstate site excavations, raise site levels (if required) and for use in landscape areas will be classified as Virgin Excavated Natural Material (VENM), Excavated Natural material (ENM) (refer to Ref 4), or any other applicable Resource Recovery Order (RRO) as issued by the NSW EPA, assessed as being suitable for use on site from the contamination perspective by the Environmental Consultant. All imported

material should be accompanied by a certificate / report from the supplier, otherwise detailed assessment (including analysis of representative samples) will be required prior to use on-site. No material will be imported to the site without the prior approval of the Environmental Consultant.

### 7.3 Site Assessment Criteria

The Site Assessment Criteria (SAC) applied in this RAP are informed by the CSM which identified human and ecological receptors to potential contamination on the site (refer to Section 5). Where applicable, field and analytical results will be assessed (as a Tier 1 assessment) against the SAC comprising the screening levels of Schedule B1, NEPC (2013).

Bonded ACM is the most common form of asbestos contamination across Australia, generally arising from:

- Inadequate removal and disposal practices during demolition of buildings containing asbestos products;
- Widespread dumping of asbestos products and asbestos containing fill on vacant land and development sites; and
- Commonly occurring in historical fill containing unsorted demolition materials.

Mining, manufacturing or distribution of asbestos products may result in sites being contaminated by friable asbestos including free fibres. Severe weathering or damage to bonded ACM may also result in the formation of friable asbestos comprising FA and/or AF.

Asbestos only poses a risk to human health when asbestos fibres are made airborne and inhaled. If asbestos is bound in a matrix such as cement or resin, it is not readily made airborne except through substantial physical damage. Bonded ACM in sound condition represents a low human health risk, whilst both FA and AF materials have the potential to generate, or be associated with, free asbestos fibres. Consequently, FA and AF must be carefully managed to prevent the release of asbestos fibres into the air.

Health Screening Levels (HSLs) for asbestos in soil, which are based on likely exposure levels for different scenarios, have been adopted in NEPC (2013) from DoH (2009). The HSLs have been developed for various land use scenarios including Residential A (gardens and accessible soil), Residential B (minimal opportunities for soil access), Recreational C (parks and public open space) and Commercial / Industrial D.

On the basis of the proposed land use and in accordance with Table 7, Schedule B1, NEPC (2013) the following HSLs will be adopted in the assessment of asbestos concentrations within the site (if required):

- 0.01% w/w of bonded ACM (Residential A);
- 0.001% w/w friable asbestos (FA) and asbestos fines (AF), where quantifiable; and
- No visible asbestos on the ground surface

NEPC (2013) defines the various asbestos types referred to above as follows:

- Bonded ACM:** Asbestos containing material which is in sound condition, bound in a matrix of cement or resin, and cannot pass a 7mm x 7mm sieve.
- FA:** Fibrous asbestos material including severely weathered cement sheet, insulation products and woven asbestos material. This material is typically unbonded or was previously bonded and is now significantly degraded and crumbling.
- AF:** Asbestos fines including free fibres, small fibre bundles and also small fragments of bonded ACM that pass through a 7mm x 7mm sieve.

In terms of imported materials, apart from the VENM, ENM or RRO compliance as stated in Section 7.2, all analytical data will be assessed against SAC comprising the HSLs, Health Investigation Levels (HILs), and Management Limits for Residential A (gardens and accessible soil) land use. Where materials are proposed to be used in landscaping areas, the data will also be assessed with reference to the Environmental Investigation and Screenings levels (EILs and ESLs) for the same land use.

## 7.4 Long Term Management

DP recommends that a long term EMP be prepared for the site. The EMP should be prepared at the completion of remediation works. The EMP will promote awareness of the contamination management and the requirements to avoid disturbance (where possible), and provide an outline and maintenance requirements.

While no active long term maintenance is envisaged, the EMP would recommend routine inspections of the capping layer to monitor for erosion, cracking, settlement or movements of the capping slab/pavements and landscape areas. Maintenance would be required if the site inspection indicates that the capping layer is not operating effectively (i.e. if significant cracking is present within concrete slabs or if the pavement/landscape areas are eroding or cracking).

The EMP will also detail the protocols to be followed in the event of future planned intrusive works (e.g. new structures, buried services, tree plantings) such that the potential exposure is limited and managed, excavated soils are properly segregated, and the capping layer is reinstated appropriately.

The EMP would need to be noted on the Section 149 planning certificate to ensure future landholders (if any) or future developments on the site are aware of the management requirements for the development area.

## 8. Roles and Responsibilities

In order to achieve the goals of the remediation/earthworks programme, the following roles and responsibilities have been identified for the contractor and consultants:

**Contractor**

The contractor is responsible for on-site operations including:

- Handling of fill materials (contaminated or otherwise) including excavations, stockpiles, segregation, placement, compaction, disposal of excess fill materials;
- Safety of all personnel on site;
- Measures to minimise environmental effects;
- Preparation of a site specific construction environmental management plan (CEMP) and WHS plan. The CEMP will require review and comment by the Environmental Consultant and the regulator to confirm consistency with the objectives of the RAP prior to commencement of remediation;
- Ensure required licenses and approvals from regulatory authorities are obtained prior to remediation works commencing. It is noted that an appropriately licenced contractor will be required to conduct earthworks within the site due to the possible presence of ACM in filling.

**Occupational Hygienist (OH)**

- Advice on management of asbestos contamination (if required);
- Set-up and maintenance, analysis and reporting of air monitoring for air borne asbestos fibres during construction works resulting in the disturbance of fill materials (i.e. any excavations, stockpiling, placement or transport of fill materials).

**Environmental Consultant (EC)**

- Periodic inspections during remediation and validation works;
- Review of documentation associated with imported materials;
- Sampling and classification of on-site and imported fill materials (where required);
- Approval for the import of any Contractor nominated materials;
- Provision of a validation report;
- Provision of a long term EMP.

**Site Auditor (SA)**

- Review of this RAP;
- Review of any proposed deviations from this RAP, if required;
- Review of validation report;
- Preparation of a Site Audit Statement and Site Audit Report.

**Client**

- Overall project management;
- Engaging suitably qualified remediation contractor, and Environmental Consultant to conduct the remediation works;
- Engaging a surveyor to conduct surveys in relation to the capping layer;

- Ensure necessary approvals and notifications have been obtained prior to remedial works commencing;
- Liaison with the regulator, environmental consultant, remediation contractor during remediation process;
- Submission of validation reports to Council.

Prior to the commencement of remedial works, a site meeting between the client, contractor and environmental consultant is recommended to confirm responsibilities and procedures in accordance with the agreed management plan.

## 9. Regulatory Approvals and Licenses

State Environmental Planning Policy No. 55 - Remediation of Land (Ref 5 SEPP 55) aims to provide a state-wide planning approach to the remediation of contaminated land. Under clause 7(1) of SEPP 55 the approval authority is required to consider whether the land is contaminated, and:

- a) if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out; and
- b) if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.

This RAP presents the proposed management and remediation options to address contamination on site. Implementation of the RAP will render the site suitable for the proposed development.

In accordance with Clause 9 of SEPP 55 the definition of Category 1 remediation works which require development consent are as follows:

- a) designated development, or
- b) carried out or to be carried out on land declared to be a critical habitat, or
- c) likely to have a significant effect on a critical habitat or a threatened species, population or ecological community, or
- d) development for which another State environmental planning policy or a regional environmental plan requires development consent, or
- e) carried out or to be carried out in an area or zone to which any classifications to the following effect apply under an environmental planning instrument:
  - i) coastal protection,
  - ii) conservation or heritage conservation,
  - iii) habitat area, habitat protection area, habitat or wildlife corridor,
  - iv) environment protection,
  - v) escarpment, escarpment protection or escarpment preservation,

- vi) floodway,
  - vii) littoral rainforest,
  - viii) nature reserve,
  - ix) scenic area or scenic protection,
  - x) wetland, or
- f) carried out or to be carried out on any land in a manner that does not comply with a policy made under the contaminated land planning guidelines by the council for any local government area in which the land is situated (or if the land is within the unincorporated area, the Western Lands Commissioner).

Based on the above definition site remediation works are not considered to be Category 1 under SEPP55.

In accordance with SEPP55 Council must be notified 30 days prior to the commencement of Category 2 remediation commencing.

Based on review of Appendix VI of the Guidelines for the NSW Site Auditor Scheme (Ref 2), the following consent, notification or licence requirements are anticipated:

- Any conditions outlined in the DA;

The DA consent for the proposed development should be staged and conditional, such that DA consent for the proposed development, except activities required for the purposes of remediation, is conditional upon the following:

- Submission of a validation report and long term EMP for the site;

The Site Audit Statement to be prepared by the SA will also condition the EMP. The client should confirm that Council acknowledges and accepts this.

Notification is placed on the Section 149 planning certificate detailing the site has been remediated and is subject to a long term EMP. The EMP will need to be made legally enforceable and the landowner will need to confirm in writing that it accepts the EMP and will ensure its execution.

## **10. Remediation Strategy**

### **10.1 Identification of Remediation Components**

The remediation strategy for the site comprises on-site management (Option 3) of contaminated soils. This generally comprises the following:

- Excavation of contaminated soils where required (i.e. to invert depth of proposed capping layer);
- Placement of excavated contaminated materials in designated capping areas (i.e. beneath invert depth for proposed capping layer);
- Capping of contaminated soils with a layer of site won non-asbestos contaminated soil to a depth of at least 1 m for landscaped / public open space areas and at least 0.5 m for all other areas

such as hardstand (buildings and pavements). It is noted that the installation of sub surface utilities will need to take place above the capping layer.

- The capping of contaminated soils can either be done *in situ* or in a designated capping area. Capping *in situ* is generally preferable as it minimises the disturbance of asbestos contaminated soils. The excavation of asbestos contaminated soils and subsequent placement in a designated capping area will likely be required based on the scope of the proposed development.
- If asbestos contaminated soils are buried or covered with less than 3 m of fill that has been demonstrated to be free of contamination, additional management measures as well as memorial or notes to title will be required. Measures will include a geo-textile “marker” layer, an ongoing site management plan and vegetation cover in non-hardstand or building footprint areas.

Key components to the remediation strategy are summarised as follows:

- Designated “Area A” remediation areas (indicative at this stage), as shown on Drawing 2, Appendix B. Area A refers to open space land use areas within the proposed development where asbestos impacted material will be excavated to 1 m below final finish level and capped with a minimum of 1 m of site won non-asbestos contaminated or potentially asbestos contaminated soils (i.e. soils containing construction or demolition items). Excavated asbestos impacted or potentially asbestos contaminated material will be consolidated in a designated area and capped.
- Designated “Area B” remediation areas (indicative at this stage), as shown on Drawing 2, Appendix B. Area B refers to building footprint or hardstand areas within the proposed development where asbestos impacted material will be excavated to 0.5 m below base of slab / pavement and capped with a minimum of 0.5 m of site won non-asbestos contaminated or potentially asbestos contaminated soils (i.e. soils containing construction or demolition items). Excavated asbestos impacted or potentially asbestos contaminated material will be consolidated in a designated area and capped.

## 10.2 Sequence of Remediation

The following general methodology and sequence of activities is suggested:

1. Client/Contractor to obtain all necessary approvals and notifications to allow commencement of the works, including Council approvals, and Work Cover NSW permit for asbestos related works (i.e. excavation, handling, placement and capping of soils containing possible ACM). The contractor should hold the relevant licenses/approvals for asbestos related works;
2. Inception meeting between the client, contractor, OH and environmental consultant to confirm responsibilities and procedures for remediation and construction;
3. Contractor to set up environmental controls and secure the construction area, including the development area (i.e. building and pavements) and the adjacent staging area. Measures should be made to minimise the risk of disturbance and exposure to underlying potentially contaminated soils within the staging area, such as the placement of temporary capping/hardstand within areas to be trafficked during construction;
4. Excavate Area A (as shown on Drawing 2, Appendix B) using appropriate WHS and environmental controls to a depth of 1 m below final surface level or invert level of proposed sub surface utilities, whichever is the greater. It is noted that extents shown on Drawing 2 are indicative only; excavations should continue if signs of asbestos contamination or potential for

asbestos contamination (i.e. construction or demolition items) are observed in the lateral extents of the excavation. Once the likely lateral extent of the asbestos contamination or potential for asbestos contamination (i.e. construction or demolition items) in Area A has been excavated the Environmental Consultant should be notified and an inspection of the resultant excavation should be undertaken. If no visible signs of asbestos contamination are noted then validation samples of the lateral extent of the excavation should be collected in accordance with Section 11. Once the delineation is complete and validated a survey of the lateral extents is to be undertaken.

5. Excavate Area B (as shown on Drawing 2, Appendix B) using appropriate WHS and environmental controls to a depth of 0.5 m below base of slab / pavement or invert level of proposed sub surface utilities, whichever is the greater. Excavations should be undertaken using appropriate WHS and environmental controls. It is noted that lateral extents shown on Drawing 2 are indicative only; excavations should continue if signs of asbestos contamination or potential for asbestos contamination (i.e. construction or demolition items) are observed in the lateral extents of the excavation. Once the likely lateral extent of the asbestos contamination or potential for asbestos contamination (i.e. construction or demolition items) in Area B has been excavated the Environmental Consultant should be notified and an inspection of the resultant excavation should be undertaken. If no visible signs of asbestos contamination or potential contamination are noted then validation samples of the lateral extent of the excavation should be collected in accordance with Section 11. Once the delineation is complete and validated a survey of the lateral extents is to be undertaken.
6. A validation assessment of the fill beyond the extent of the validated remediation excavations in accordance with Section 11 with any additional areas of asbestos contaminated or potentially contaminated soils excavated and validated as per Steps 4 and 5.
7. All excavated asbestos contaminated or potentially contaminated soils should be stockpiled in a designated and demarcated area. The stockpile should be managed using appropriate WHS and environmental controls;
8. Excavate in a designated area within the landscaped / public open space areas or the building footprint, car park and hardstand areas, as highlighted on Drawing 2, Appendix B to accommodate the geotechnical requirements and the placement of excavated asbestos contaminated or potentially contaminated soils to a minimum depth of 1 m below finish level or invert sub surface utility level in landscaped / public open space areas or 0.5 m below base of slab / pavement or invert sub surface utility level in building footprints, car park or hardstand areas. Care will need to be taken during the excavation of the designated area to ensure that additional impacted or potentially impacted soils are not uncovered. If additional impacted soils are uncovered these should be managed in accordance with the unexpected finds protocol (refer Section 14). An indicative potential designated area has been highlight on Drawing 2, Appendix B being beneath building and in an area where excavation is likely to be required from the geotechnical perspective. The indicative potential designated area is also within an area of the site where the filling was not observed to contained construction or demolition items as potential indicators of further asbestos impacted materials. As the detailed design of the proposed development progresses the actual designated area will be established through collaboration between the client, the contractor and the environmental consultant;
9. Survey of the base and lateral extents of the excavation should be undertaken by a registered surveyor prior to placement of asbestos contaminated soils;
10. Placement of asbestos contaminated or potentially contaminated soils in designated areas of the excavation beneath landscaped / public open space areas or building footprints, car park or

hardstand areas. The placement of asbestos contaminated or potentially contaminated soils should be undertaken using appropriate WHS and environmental controls. Regular surveys of the materials placement should be undertaken to keep track of when the placement is at 0.5 m below final finish level;

11. No placement of asbestos contaminated or potentially asbestos contaminated soils should be undertaken within 1 m below finish surface level beneath landscaped / public open space areas or 0.5 m below base of slab in building footprints, car park or hardstand areas. When the placement of asbestos contaminated soils reaches 1 m below finish surface level beneath landscaped / public open space areas or 0.5 m below base of slab in building footprints, car park or hardstand areas the surface should be surveyed by a registered surveyor;
12. Following survey confirmation of site levels, place a brightly coloured geo-textile (Bidim A34 or similar) marker layer over all asbestos contaminated soils, extending 0.5 m beyond the asbestos contaminated soils where practical. Parallel sheets of geo-textile should be fixed together by overlap of 0.2 m;
13. The placement of the brightly coloured geo-textile marker layer should be inspected by the Environmental Consultant and assessed as being appropriate prior to placement of the non-asbestos contaminated soils as the capping layer;
14. Placement of the 1 m capping layer over Area A and 0.5 m capping layer over Area B. The capping layer should comprise site won non-asbestos contaminated or potentially asbestos contaminated soils or material otherwise approved by the Environmental Consultant;
15. Repeat previous systematic survey to ensure that all areas are covered by the appropriate capping layer;
16. Any excess asbestos contaminated or potentially contaminated soils excavated from within the site that cannot be accommodated beneath capping will require the following:
  - o Temporary stockpiling;
  - o Sampling and analysis to confirm waste classification in accordance with EPA guidelines (Ref 3) for off-site disposal to a licenced landfill; and
  - o Appropriate off-site disposal by a licenced contractor (refer to Section 10.2).
17. At the completion of capping, a validation inspection should be conducted by the environmental consultant to confirm that appropriate capping has been achieved in accordance with the RAP. Upon the completion of capping, a suitable environmental consultant should prepare a Validation report that will be finalised following the completion of construction. A long term EMP should also be prepared at the completion of construction for Council review and approval, in order for Council to update the S149 certificate for the site.

It is noted that the above procedure is not prescriptive and the contractor should confirm the construction process that will achieve the objectives of remediation in a practical and economical manner, with due regard to WHS. This procedure should be presented in the CEMP for the work.

### 10.3 Disposal of Contaminated Materials

Any excess asbestos contaminated or potentially contaminated materials which cannot be accommodated beneath capping must be disposed of to an appropriately licensed landfill.

Previous investigations indicated that these materials are likely to be classified as Special Solid Waste (Asbestos) with the soil component being classified as General Solid Waste.

Materials requiring off-site disposal must be classified in accordance with the *NSW EPA Waste Classification Guidelines, Part 1: Classifying Waste (November 2014 – Ref 3)*. In addition, asbestos contaminated soil/fill will require disposal to a licensed landfill as 'special waste' in accordance with Reference 3.

Classification of materials for off-site disposal will include inspection, sampling and analysis at generally not less than one per 25-50 m<sup>3</sup>. The frequency of testing required for classification should be confirmed by a suitably qualified environmental consultant, and will depend on the volume and consistency of the material.

Appropriate tracking of the excess soils should be conducted by the licenced contractor (refer to Section 10.4).

#### **10.4 Stockpiling of Contaminated Materials**

Excavated asbestos contaminated or potentially contaminated soils shall be temporarily stockpiled at a suitable location(s) within the site.

All stockpiles of contaminated or potentially contaminated material shall be appropriately fenced and demarcated to clearly delineate their boundaries. Stockpiles shall be lightly conditioned by water sprinkler and covered by geotextile or similar cover to prevent dust blow. Geotextile silt fences or hay bales should be erected around each stockpile to prevent losses by surface erosion where required or sediment run-off. The location and quantity of stockpiled contaminated or potentially contaminated soils should be recorded by the contractor.

The footprint of the stockpiles should also be validated via inspection and testing following removal as discussed in Section 11.

#### **10.5 Loading and Transport of Contaminated Materials**

The following procedure is recommended for the loading and transport of materials from the site (if required):

- Transport of contaminated material off the site should be via a clearly demarcated haul route;
- Removal of waste materials from the site should only be carried out by an experienced contractor holding appropriate licences, consents and approvals;
- Details of all contaminated materials removed from the site should be documented by the contractor with copies of weighbridge slips, trip tickets and consignment disposal confirmation (where appropriate). Such information should be provided to the environmental consultant responsible for site validation for reporting purposes;
- Measures should be implemented to minimise the potential for contaminated material to be spilled onto public roadways or tracked off-site on vehicle wheels.

## 10.6 Imported Fill

Imported fill used to reinstate site excavations and for the nominal capping construction should be classified as VENM, ENM, or compliance with an appropriate RRO, and assessed as being suitable for use on site from the contamination perspective by the Environmental Consultant.

## 10.7 Geotechnical Considerations

The site stripping, excavation and the placement and compaction of fill materials should be carried out with due consideration of geotechnical requirements for development. Deleterious inclusions such as organics, timber, metal, concrete (>200 mm) should be segregated from filling that may be used as engineered fill (i.e. for support of buildings or pavements).

Fill materials that will support structural loads, pavement or form structural backfill, should be placed and compacted to a suitable geotechnical specification that takes account of the intended purpose of the fill.

The geotechnical specification for earthworks should be prepared as part of the final design.

Site works should also consider the geotechnical recommendations provided in DP (2003) and DP (2016a).

## 10.8 Contingency Plan

If contaminated soil quantities are such that they cannot be capped on site, the excess materials will require stockpiling, classification, treatment (if required) and off-site disposal to a licensed landfill (to be considered if no other option).

If gross soil contamination is identified on-site during remediation works, the materials should be appropriately investigated by the environmental consultant and either managed on site (if appropriate) or disposed off-site to a licenced landfill following classification.

The CEMP should provide further details regarding contingency procedures, including incident management and unexpected finds protocol.

## 11. Validation Plan

### 11.1 Sample Collection, Handling and Analysis

#### 11.1.1 Sample Collection and Handling

Sampling is anticipated to comprise validation of imported materials (where required) to be used during construction, validation of stockpile removal, validation at the lateral and vertical extents of the contaminated materials, or for assessment and waste classification of excess excavated soils for off-

site disposal to a licenced landfill. Sampling data shall be recorded to comply with routine Chain of Custody requirements.

The general sampling, handling, transport and tracking procedures comprises:

- The use of stainless steel sampling equipment;
- The use of disposable gloves for each sampling event;
- washing of all sampling equipment in contact with the sample, in a 3% solution of phosphate free detergent (Decon 90) then rinsing with distilled water prior to each sample being collected;
- Transfer of the sample immediately into new glass jars or appropriate sealable bags for samples to be analysed for asbestos;
- Collection of 10% replicate samples for QA/QC purposes;
- Labelling of the sample containers with individual and unique identification including Project Number and Sample Number;
- Placement of the containers into a chilled, enclosed and secure container for transport to the laboratory; and
- Use of chain of custody documentation so that sample tracking and custody can be cross-checked at any point in the transfer of samples from the field to hand-over to the laboratory.

Environmental sampling and sieving for asbestos (ACM, FA and AF) will be conducted according to standard operating procedures described in the DP *Field Procedures Manual* which included:

- The use of disposable gloves for the collection of soil samples. The gloves will be replaced between each sample;
- Immediately sieving (through a 7mm sieve) collected 10L samples by a DP competent professional;
- Collection of 500 mL samples representative of the strata of the sieved samples and replacement of sieved samples to the test pit / sample location at the depth of origin (as far as practicable);
- Labelling of the sample containers with individual and unique identification including Project No., Sample No. and depth;
- Placement of the containers into enclosed and secure containers for transport to the laboratory; and
- Use of chain-of-custody documentation so that sample tracking and custody can be cross-checked at any point in the transfer of samples from the field to hand-over to the laboratory.

In addition to confirming the source of fill proposed for import, any supporting documentation must also assess analytical data against the Excavated Natural Material Order 2014, as a minimum. The Environmental Consultant will also assess the analytical data against the SAC.

The sampling frequency will depend on the volume/ area to be assessed and the availability of previous results. In general, if no applicable previous results are available the following sampling frequencies will be used. These frequencies may be reduced for large volumes/ areas or if previous results are available.

### 11.1.2 Soil Sampling Frequencies

#### Visual Inspections and Signs of Environmental Concern

All areas to be assessed/ validated will first be subject to a visual inspection.

If any signs of environmental concern (e.g. odours, staining, construction or demolition items) are observed in the area/ material being tested, further excavation or targeted sampling will be conducted as required to assess the contamination potentially associated with the observed sign of concern. This may require additional samples to those required by the testing frequencies given below.

#### Validation of ground surface:

##### Small to medium areas (<500 m<sup>2</sup>):

- Ground surface: one sample per 25-50 m<sup>2</sup> or part thereof. Where high local variation is expected, a minimum of three samples will be collected.

##### Large areas:

- Sampling on a grid at a density in accordance with the NSW EPA *Contaminated Sites: Sampling Design Guidelines* (1995).

#### Validation of excavation:

##### Small to medium excavations (base <500 m<sup>2</sup>):

- Base of excavation: one sample per 25-50 m<sup>2</sup> or part thereof; and
- Sides of excavation: one sample per 10 m length or part thereof, or at a density in accordance with double the EPA *Contaminated Sites: Sampling Design Guidelines* (1995) considering the area of the side of the excavation, whichever is the lesser. Additional samples will be collected at depths of concern where there is more than one depth of concern (e.g. multiple filling horizons).

##### Large excavations:

- Base of excavation: sampling on a grid at a density in accordance with the EPA *Contaminated Sites: Sampling Design Guidelines* (1995); and
- Sides of excavation: one sample per 10 m length or part thereof or at a density in accordance with double the EPA *Contaminated Sites: Sampling Design Guidelines* (1995) considering the area of the side of the excavation, whichever is the lesser. Additional samples will be collected at depths of concern where there is more than one depth of concern (e.g. multiple filling horizons).

#### Validation of fill beyond remediation excavations:

- Sampling on a grid at double the density in accordance with the NSW EPA *Contaminated Sites: Sampling Design Guidelines* (1995) as recommended in WA Department of Health (2009) *Guidelines for the Assessment and Remediation and Management of Asbestos-Contaminated Sites in Western Australia*. The validation of fill beyond remediation excavations will incorporate data from DP (2016b) and additional test pitting, sampling and analysis.

### Stockpiles

Validation/ assessment of stockpiled soils anticipated to include excavated materials intended for use as a capping layer (note actual frequency will be determined based on volume, contamination risk and homogeneity of the material):

- Stockpiles  $\leq 250 \text{ m}^3$ : one sample per  $25 \text{ m}^3$  with a minimum of three samples.
- Stockpiles  $> 250 - 2,500 \text{ m}^3$ : one sample per  $25-250 \text{ m}^3$ , with a minimum of ten samples.
- Stockpiles  $> 2,500 \text{ m}^3$ : one sample per  $250 \text{ m}^3$ .

#### 11.1.3 Sample Holding Times

Maximum sample holding times are as follows:

- Metals – six months;
- TRH/BTEX – 14 days;
- PAH – 14 days, and 40 days following extraction;
- Asbestos – no maximum holding time.

All samples must be collected in appropriate cooled and sealed containers.

#### 11.1.4 Validation Sample Analysis

If sampling is required for validation purposes, the samples will be analysed for the following parameters as a minimum:

- Waste classification of potentially impacted soils for off-site disposal purposes or validation of stockpile removal:
  - o Total Recoverable Hydrocarbons (TRH);
  - o Benzene, Toluene, Ethylbenzene and Xylene (BTEX);
  - o Polycyclic Aromatic Hydrocarbons (PAHs);
  - o Polychlorinated Biphenyls (PCB);
  - o Heavy Metals (arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc);
  - o Asbestos.
- Validation of lateral and vertical extent of contaminated material for areas outside capping areas:
  - o Asbestos (10L bulk sample for sieving);
  - o FA and AF.
- Validation of footprints of stockpiled contaminated material:
  - o Asbestos (10L bulk sample for sieving);
  - o FA and AF.
- Validation of fill beyond remediation excavations:
  - o Asbestos (10L bulk sample for sieving);

- o FA and AF.
- Imported fill materials, ENM (general):
  - o ENM Suite in accordance with the ENM Order 2014.
- Imported materials, VENM (general):
  - o TRH, BTEX, PAH, PCB, OCP, OPP, total phenols, asbestos.

Other RROs have their own specific requirements in terms of sampling and testing.

The suite of analytes for the assessment of imported fill materials should be confirmed by the Environmental Consultant responsible for site validation, and should consider the source of materials, and contaminants which may be present (i.e. potential contaminants of concern).

If additional contamination is identified during construction as discussed in Section 10.7, validation testing should be modified to suit the potential contaminants of concern.

## 11.2 Quality Assurance Plan

### Field QA

Quality Assurance (QA) and Quality Control (QC) procedures will be adopted throughout the field sampling programme to ensure sampling precision and accuracy and prevent cross contamination.

The environmental consultant responsible for site validation should assess sampling accuracy and precision through the analysis of at least 5% field duplicate/replicate (blind) samples, 5% triplicate (split) samples, as well as the collection of field rinsate samples of sampling equipment at a rate of one per day of sampling operations.

Appropriate sampling procedures will be undertaken to minimise the potential for cross contamination, and will include the following:

- Standard operating procedures are followed;
- Site safety plans are developed prior to commencement of works;
- Replicate field samples are collected and analysed;
- Equipment rinsate samples are analysed as part of the QA/QC programme;
- Samples are stored under secure, temperature controlled conditions;
- Chain of custody documentation is employed for the handling, transport and delivery of samples to the selected laboratory.

### Laboratory QA and QC

The NATA accredited laboratory will undertake in-house QA/QC procedures involving the routine testing of:

- Reagent blanks;

- Spike recovery analysis;
- Laboratory duplicate analysis.

### 11.3 Site Inspections

The Environmental Consultant will conduct regular site inspections during remediation works, when any issue of concern is identified and to allow inspection of the installation of the marker layer and the capping of the asbestos contaminated materials. A record of the inspections and observations will be provided as part of the Validation Assessment Report. This will include a photographic record.

### 11.4 Achievement of Data Quality Indicators

Based on the analysis of quality control samples i.e. blind and split duplicates, equipment rinsates and in-house laboratory QA/QC procedures, the following data quality indicators will be required to be achieved:

- completion of field and laboratory chain of custody documentation;
- use of experienced field staff;
- collection of appropriate validation samples and analysis of appropriate analytes;
- conformance with specified holding times;
- accuracy of spiked samples within the laboratory's acceptable range (typically 70% to 130% for inorganic contaminants and greater for some organic contaminants);
- field and laboratory duplicates samples will have a precision average of +/- 50% RPD (Relative Percent Difference);
- field blind and split duplicates will be collected at a frequency of at least 5% of all samples, and rinsate samples of field equipment will be collected at one per day of sampling;
- rinsate samples will show that the sampling equipment is free of introduced contaminants, i.e. the analytes show that the rinsate is within the normal range for deionised water.

Based on a fulfilment of the data quality indicators an assessment of the overall data quality will be presented in the final validation report.

### 11.5 Validation, Inspection and Reporting

A validation report should be prepared by a suitably qualified environmental consultant with respect to NSW EPA (2011) Contaminated Sites, "Guidelines for Consultants Reporting on Contaminated Sites" (Ref 8) and NEPM (2013) (Ref 1). An important part of site validation will be the inspection to confirm that appropriate capping has been achieved in accordance with the RAP. The report shall be submitted to Council at the completion of the remediation works program. The validation report shall confirm that the development area has been remediated to a suitable standard for the proposed aged care facility.

The validation assessment will be conducted in accordance with Data Quality Objectives (DQOs) and Quality Assurance/Quality Control (QA/QC) procedures to ensure the repeatability and reliability of the results.

The validation assessment will be planned in accordance with the following DQOs:

- State the Problem.

The problem of the validation assessment will be to assess whether the remediation and validation has been undertaken appropriately such that the site is suitable for its proposed aged care facility development.

- Identify the Decision.

Decisions to be addressed by the validation assessment will include whether the field and laboratory data is sufficient to address the objectives of the validation assessment; and whether the site is compatible with its proposed development.

- Identify Inputs to the Decision.

Inputs into the decision will include the follow:

- The CSM which identified potential contaminant sources, contaminant migration pathways and receptors to site contaminants;
- The results of previous investigations undertaken at the site;
- Site and regional geology, topography and hydrogeology;
- Site observations during the field work for the validation assessment;
- The lithology of the site;
- Field and laboratory methods and QA/QC data to assess the suitability of the environmental data;
- Analytical results for the contaminants of concern (COC); and
- Assessment of the analytical data against the SAC.
- Define the Boundary of the Assessment;

The site will be the boundary of the validation assessment.

- Develop a Decision Rule;

The decision rules to be used in assessing the objective of the validation assessment will be as follows:

- The adopted SAC were the NSW Environment Protection Authority (EPA) endorsed criteria.
- Laboratory test results for systematic soil samples were assessed individually against the adopted SAC;
- Laboratory test results for targeted soil samples were assessed individually against the adopted SAC;
- Exceedances of the SAC triggered a review of the potential risks to human health and the environment, and where a potential unacceptable risk was identified further remedial excavation or treatment was undertaken;

- The QA/QC results were evaluated with respect to the specific limits (their acceptable range, where applicable); and
- The usability of the field and laboratory test results were evaluated against the Data Quality Indicators (DQIs).
- Specify Acceptable Limits on Decision Errors;  
Potential decision errors will comprise:
  - Deciding that the analyte concentration exceeds the SAC when it truly does not;
  - Deciding that the analyte concentration is within the SAC when it truly is not;
  - Deciding that the site requires further remediation / validation when it truly does not; and
  - Deciding that the site is compatible for the proposed land use when it truly is not.

Decision errors will be minimised by the following:

- Systematic soil sample numbers comply with those recommended in the RAP;
- The sampling regime targeted each stratum identified as being potentially impacted to account for site variability;
- Sample collection and handling techniques were in accordance with standard industry practice;
- Samples were prepared and analysed by NATA-accredited laboratories, with NATA endorsed testing procedures;
- The analytical data will be assessed for usability and reliability; and
- The SAC were adopted from established and NSW EPA endorsed guidelines, which have risk probabilities already incorporated.
- Optimise the Design for Obtaining Data.  
The validation assessment design will be optimised through the following:
  - The validation assessment will be undertaken in accordance with the RAP;
  - The investigations to be undertaken by appropriately trained and experienced environmental scientists / engineers;
  - The sampling method adopted enabled collection of representative samples; and
  - NATA accredited laboratories using NATA endorsed methods were used to perform laboratory analysis.

A checklist of Data Quality Indicators (DQI) in accordance with Appendix V of the NSW EPA *Contaminated Sites Guidelines for the NSW Site Auditor Scheme* (2<sup>nd</sup> edition) (2006) will be completed as part of the validation assessment. The DQIs are:

- Documentation completeness;
- Data completeness;
- Data comparability and representativeness; and
- Data precision and accuracy.

Based on a fulfilment of the data quality objectives and indicators an assessment of the overall data quality will be presented in the validation assessment report.

Upon the completion of remediation and validation works and construction, an OSMP will be drafted for long-term management of capped materials within the development area (i.e. building slab, pavements and associated garden beds) (i.e. measures to reduce the likelihood of future disturbance, and procedures for handling/disposal in the event that identify contaminated materials are disturbed).

The OSMP will promote awareness of the contamination management and the requirement of avoiding disturbance to the capping. The OSMP will require review and approval by Council who will also place the appropriate notification on the S149 certificate for the development area.

## **12. Construction Environmental Management Plan**

### **12.1 Introduction**

The contractor should undertake the work with due regard to the minimisation of environmental effects and to meet all statutory and regulatory requirements.

The contractor shall have in place a Construction Environmental Management Plan (CEMP) so that work on the site complies with, but not limited to, the requirements of the following legislation:

- Protection of the Environment Operations Act;
- Contaminated Land Management Act;
- Dangerous Goods Act;
- Construction Safety Act;
- Work Health and Safety Act (WorkCover); and
- Council Development Approval Conditions.

The contractor shall also be responsible that the site works comply with the following conditions:

- Wastes generated at the site are disposed in an appropriate manner;
- Fugitive dust leaving the confines of the site is minimised. As a precaution, air monitoring will be conducted at the boundaries of the site to monitor the presence of airborne asbestos fibres;
- No water containing any suspended matter or contaminants leaves the site in a manner which could pollute the environment;
- Vehicles shall be cleaned and secured so that no mud, soil or water are deposited on any public roadways or adjacent areas;
- Noise and vibration levels at the site boundaries comply with the legislative requirements.

Asbestos materials have been associated with various human respiratory diseases. The risk of contracting these diseases from contact with asbestos depends entirely on the fibres becoming airborne. It is important during disturbance of potential asbestos impacted soils that the potential for generating airborne asbestos fibres should be minimised. Moreover, levels of airborne asbestos fibres

immediately outside the works area should be maintained to within the acceptable background level (i.e. <0.01 fibre/mL being the practical quantification level). As asbestos material identified on the site was generally in the form of fragments or bundles of fibre cement sheet, there is a low risk of asbestos fibres becoming airborne. Appropriate air monitoring should be conducted by the OH during remediation. The exact scope of works for the air monitoring will be dependent on the staging of works and will need to be developed collaboratively between the OH, the EC (if a different identity to the OH) and the contractor.

This air monitoring to be conducted by the OH is anticipated to include air monitors on the boundaries of the site full-time during the excavation / placement of soils impacted by ACM, FA and AF. If asbestos is detected above the acceptable background level (i.e. <0.01 fibre/mL) this will trigger a temporary stop to works to review and potentially implement additional control measures. If fugitive dust or excessive on-site and contained dust is generated during the excavation / placement of soils impacted by ACM, FA and AF this will also trigger a temporary stop to works to review and potentially implement additional control measures.

In order to achieve a minimisation of environmental effects, the following measures are recommended, and should be adopted by the appointed contractor.

The contractor's CEMP is to include:

- contingency plans to respond to site incidents;
- site management plan for the operation phase of remedial works;
- a remedial schedule and hours of operation (which will be subject to development consent conditions);
- details of relevant contacts;
- procedure(s) for dealing with deleterious materials that may affect capping of materials and/or use as fill (as per section 10.6), including waste management/recycling where relevant;
- incident management/emergency response procedures;
- any community consultation requirements.

## 12.2 Traffic Management

All vehicular traffic shall use only routes approved by Council, to and from the selected landfill where off-site disposal is undertaken. All loads shall be tarpaulin covered and lightly wetted to minimise the potential for materials or dust are dropped or deposited outside or within the site. The proposed landfill should be consulted for any additional requirements.

Each vehicle that has trafficked potentially impacted site soils within the site shall be inspected for cleanliness before being logged out as clean (wheels and chassis), or hosed down into a wheel wash or wash down bay until designated as clean when exiting the site.

Wheel wash silt residues should be collected periodically and either returned to the excavation area or included in the remediation stockpile. Such material will be treated as contaminated unless analysis proves otherwise.

Removal of waste materials from the site shall only be carried out by a licensed contractor holding appropriate licence, consent or approvals to dispose the waste materials according to the classification outlined in Reference 3.

Waste tracking should be conducted by the licensed contractor in accordance with regulatory requirements. Details of all materials removed from the site shall be documented by a contractor with copies of weighbridge slips, trip tickets and consignment disposal confirmation (where appropriate) provided to the environmental consultant responsible for site validation. A site log shall be maintained by the contractor to track disposed loads against on-site origin and location of the materials.

Truck dispatch shall be logged and recorded by the contractor for each load leaving the site. A record of the truck dispatch should be provided to the environmental consultant responsible for site validation by the contractor.

Similarly tracking and documentation of all on-site movements of material should be maintained by the contractor.

### **12.3 Excavations**

Records of all excavations and stockpile locations should be maintained. A site diary should also be maintained by the contractor to record daily progress, abnormal occurrences, incidents, and truck movements.

Asbestos contaminated material should be stockpiled at suitable locations within the site. All temporary stockpiles of contaminated material shall be secured and demarcated to clearly delineate their boundaries.

All excavations shall be made with due regard to the stability of adjacent footings and structures. It will be the contractor's responsibility to provide adequate battering, shoring and/or underpinning to protect adjacent structures (if required).

No person shall be permitted to enter an unsupported excavation where it is more than 1.5 m deep or where it is considered to be unstable, irrespective of depth.

Records of all imported filling and placement should also be maintained by the contractor.

### **12.4 Stormwater Management and Control**

Appropriate measures shall be taken to minimise the potential for potentially contaminated water or sediments to leave the site. Such measures could include:

- Construction of diversion bunds to divert stormwater from contaminated areas and contaminated soil stockpiles;
- Provision of sediment traps including geotextiles or hay bales. This would be required for contaminated soil stockpiles to prevent losses by surface erosion; and
- Construction of sediment control basins (if required).

Discharge of any waters should meet the consent conditions from the appropriate authority. This should be verified by sampling and analyses undertaken by the contractor. For example, if excavations fill with water during validation works (i.e. due to rainfall), the water will require analysis to determine appropriate options for discharge (i.e. disposal to stormwater, sewer or collection by a licensed contractor).

## 12.5 Control of Dust and Odour

Control of dust and odour during the course of the remediation works shall be maintained by the contractor and may include, but not necessarily be limited to, the following:

- The use of a water cart, as and when appropriate, to eliminate wind-blown dust;
- Use of sprays/sprinklers to prevent dust blow from stockpiles;
- Covering of stockpiles with plastic sheeting or geotextile membranes;
- Restriction of stockpile heights to 2 m above surrounding site level;
- Ceasing works during periods of inclement weather such as high winds or heavy rain;
- Regular checking of the fugitive dust and odour issues. Undertake immediate remediation measures to rectify any cases of excessive dust or odour; and
- Provision of temporary capping over site soils such as the contractor staging area.

## 12.6 Noise Control

Noise and vibration will be restricted to reasonable levels. All plant and machinery used on site should not breach statutory noise levels. Working hours will be restricted to those specified by Council.

## 13. Work Health and Safety

All site work must be undertaken in a controlled and safe manner with due regard to potential hazards, training and safe work practices. The practices outlined should generally comply with the WHS policies specified by the relevant Authorities.

All personnel on site should be required to wear the following protection as a minimum:

- Steel-capped boots;
- Safety glasses or safety goggles with side shields meeting AS1337-1992 requirements (as necessary);
- Hard hat meeting AS1801-1981 requirements; and
- Hearing protection meeting AS1270-1988 requirements when working around machinery or plant equipment if noise levels exceed exposure standards.

In the event that personnel are required to work in areas of potential contact with asbestos containing materials, the following protection will be required in accordance with the Worksafe Australia: Asbestos – Code of Practice and Guidelines Notes:

- disposable coveralls to prevent contact with asbestos materials if large volumes of asbestos material are present;
- breathing apparatus fitted with a Class P2 filter;
- steel-capped boots;
- nitrile work gloves meeting AS 2161-1978 requirements or heavy duty gauntlet gloves;
- safety glasses or safety goggles with side shields meeting AS 1337-1992 requirements (as necessary);
- hard hat meeting AS 1801-1997 requirements; and
- hearing protection meeting AS 1270-2002 requirements when working around machinery or plant equipment if noise levels exceed exposure standards.

Excavation, handling, stockpiling, transport etc. of materials containing asbestos should be undertaken by a licenced contractor in accordance with the Worksafe Australia: Asbestos – Code of Practice and Guidelines Notes, and the relevant statutory requirements such as Section 29 of the Protection of the Environment Operations (Waste) Regulation 1996. Based on the results of the previous investigations, the presence of asbestos materials is likely to be minor, and comprise bonded asbestos containing material (i.e. fibro fragments).

Due to works being undertaken within the grounds of an operating primary school, the following measures should also be considered to minimise potential WHS risks to site users:

- Stage construction activities in order to minimise the area of contaminated soils exposed at any one time;
- Provide temporary covers over exposed contaminated soils where capping cannot be completed in a timely fashion to minimise exposure risks; and
- Conduct higher risk work (i.e. stripping and exposure of contaminated soils) outside school hours or outside times of greater risk of exposure (where practical).

The contractor shall prepare a project-specific environmental management and WHS plans to supplement measures presented in this RAP.

## **14. Unexpected Finds Protocol and Contingency Plan**

### **14.1 Unexpected Finds Protocol**

All site personnel will be inducted into their responsibilities under this Unexpected Finds Protocol (UFP), which should be included in the CEMP. The contractor should ensure that field personnel are appropriately experienced in the identification of asbestos or potential asbestos so that the UFP can be suitably implemented.

All site personnel are required to report the following to the Site Manager if observed during the course of their works:

- Signs of unexpected environmental concern, e.g. presence of unexpected fibre cement, petroleum or other chemical odours, unnatural staining, potential contamination sources (such as buried drums or tanks), chemical spills.

Should the above signs of concern be observed, the Contractor will, as soon as practical:

- Place barricades around the affected area (the area of environmental concern - AEC) and cease work in that area;
- Notify any authorities needed to obtain emergency response for any health or environmental concerns (e.g. fire brigade);
- Notify the client of the occurrence;
- Notify any authorities that the Contractor is legally required to notify (e.g. EPA, Council); and
- Notify the Environmental Consultant.

The PR will notify any authorities which the Principal is legally required to notify (e.g. EPA, Council).

Following the immediate response in the UFP, one of the below contingency plans will be implemented.

## **14.2 General Contingency Plan**

The general contingency plan for the Site is as follows:

- The Environmental Consultant will inspect the AEC and determine the nature of the issue and the appropriate approach to assessing or (if appropriate) managing the issue;
- The Site Auditor will be informed, if considered necessary, of the AEC and the proposed assessment and/ or management approach;
- The Environmental Consultant will undertake an assessment considered necessary to determine the management strategy for the AEC;
- If contamination is found and remediation action considered necessary, a remediation strategy for the AEC will be prepared as an addendum to this RAP by the Environmental Consultant and provided to the Site Auditor for approval; and
- If the AEC or proposed remediation strategy is significantly different than that detailed in the RAP, the Wollongong City Council will be provided notification of the proposed works.

## **14.3 Contingency Plan for Unexpected Asbestos**

If a single fragment of asbestos cement is identified in filling, it will be removed by the Contractor for off-site disposal and a record made of the location and date of the observation. Additional inspection of the adjacent filling will be undertaken by the Contractor to look for additional fragments of asbestos

cement. The Contractor may call the Environmental Consultant or Occupational Hygienist to assist with this action.

If unbonded asbestos or multiple fragments of asbestos cement are identified in filling, the following works are to be undertaken by the Asbestos Contractor in the presence of the Occupational Hygienist and/ or Environmental Consultant, all of whom will inspect the disturbed filling for signs of asbestos containing materials (ACM) during the works;

- The initial remediation excavation will be approximately 5 m by 5 m, which will be extended as required to “chase out” any observed ACM;
- Excavation of the horizon in which the asbestos was identified and placement in a separate stockpile, which will be considered to be Asbestos Contaminated. Where the filling horizon extends to considerable depth below the ACM find, filling excavated to a depth of 1 m below the ACM find will be placed in the asbestos-contaminated stockpile. Excavation will continue below this to the depth of the impacted horizon, with any material with no signs of ACM placed in a separate “potentially asbestos-contaminated” stockpile;
- Inspection of the resulting remediation pit by the Occupational Hygienist for any signs of ACM. If ACM/ potential ACM is observed, further excavation of the impacted filling will be undertaken. Any filling which is considered to contain ACM will be placed in the asbestos-contaminated stockpile. Any filling which is considered to be potentially contain asbestos, but is considered to require laboratory analysis to confirm, will be placed in the separate potentially asbestos-contaminated stockpile pending laboratory results;
- Once all visible ACM has been removed, the Occupational Hygienist/ Environmental Consultant will collect validation samples from the excavation walls, base and potentially-asbestos contaminated stockpile at the rate given in Section 11;
- The validation samples will be analysed for asbestos at a NATA accredited laboratory;
- If the analytical results record the presence of asbestos, additional excavation and validation sampling will be required as detailed above; and
- If no asbestos is detected by the laboratory results, the hotspot will be considered to have been adequately removed. If no asbestos is observed or detected in the “potentially-asbestos contaminated”: stockpile, it will be considered to have been cleared of asbestos.

## 15. References

1. National Environment Protection Council (2013), ‘National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013’, 11 April 2013.
2. NSW EPA, Contaminated Site, “Guidelines for the NSW Site Auditor Scheme 2nd Edition”, April 2006.
3. NSW EPA, “Waste Classification Guidelines, Part 1: Classifying Waste”, November 2014.
4. NSW EPA, “Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014 – The Excavated Natural Material Order 2014”, November 2014.

5. NSW EPA, "Managing Land Contamination, Planning Guidelines, SEPP55 – Remediation of Land", 1988.
6. NSW EPA Contaminated Sites (2011), "Guidelines for Consultants Reporting on Contaminated Sites", August 2011.

## 16. Limitations

Douglas Partners (DP) has prepared this report for this project at 22 Hospital Road, Bulli in accordance with DP's proposal dated 30 June 2016 and acceptance received from Matt Inch dated 6 July 2016. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of Health Infrastructure for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during DP's previous investigations. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. The advice may also be limited by budget constraints imposed by others or by site accessibility.

This report must be read in conjunction with all of the attached and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

The contents of this report do not constitute formal design components such as are required, by the Health and Safety Legislation and Regulations, to be included in a Safety Report specifying the hazards likely to be encountered during construction and the controls required to mitigate risk. This design process requires risk assessment to be undertaken, with such assessment being dependent upon factors relating to likelihood of occurrence and consequences of damage to property and to life. This, in turn, requires project data and analysis presently beyond the knowledge and project role respectively of DP. DP may be able, however, to assist the client in carrying out a risk assessment of potential hazards contained in the Comments section of this report, as an extension to the current scope of works, if so requested, and provided that suitable additional information is made available to DP. Any such risk assessment would, however, be necessarily restricted to the environmental

components set out in this report and to their application by the project designers to project design, construction, maintenance and demolition.

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**Douglas Partners Pty Ltd**

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## Appendix A

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About This Report

# About this Report

# Douglas Partners



## Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

## Copyright

This report is the property of Douglas Partners Pty Ltd. The report may only be used for the purpose for which it was commissioned and in accordance with the Conditions of Engagement for the commission supplied at the time of proposal. Unauthorised use of this report in any form whatsoever is prohibited.

## Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

## Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;

- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

## Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

# *About this Report*

## **Site Anomalies**

In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

## **Information for Contractual Purposes**

Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

## **Site Inspection**

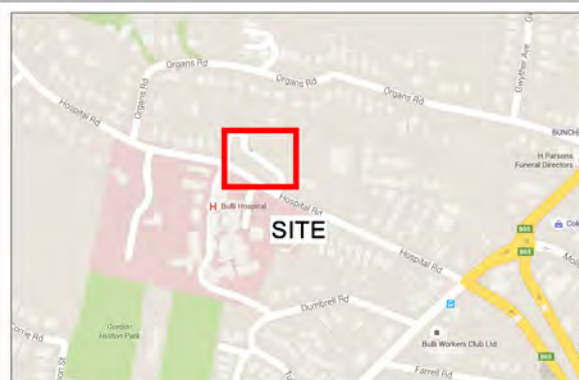
The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.

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## **Appendix B**

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Drawings 1 and 2

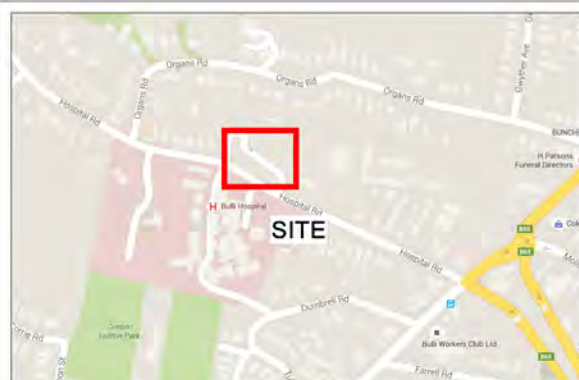


Locality Plan

Legend

- Site Boundary
- Lot Boundary
- + DP (2016b) Test Pit Location
- + DP (2016b) Test Pit Location with ACM Obs
- DP (2016b) Borehole Location
- DP (2016b) Borehole Location with ACM Obs
- + DP (2015) Test Pit Location
- DP (2015) Borehole Location
- Approximate Lateral Extent of Asbestos Contaminated Soils

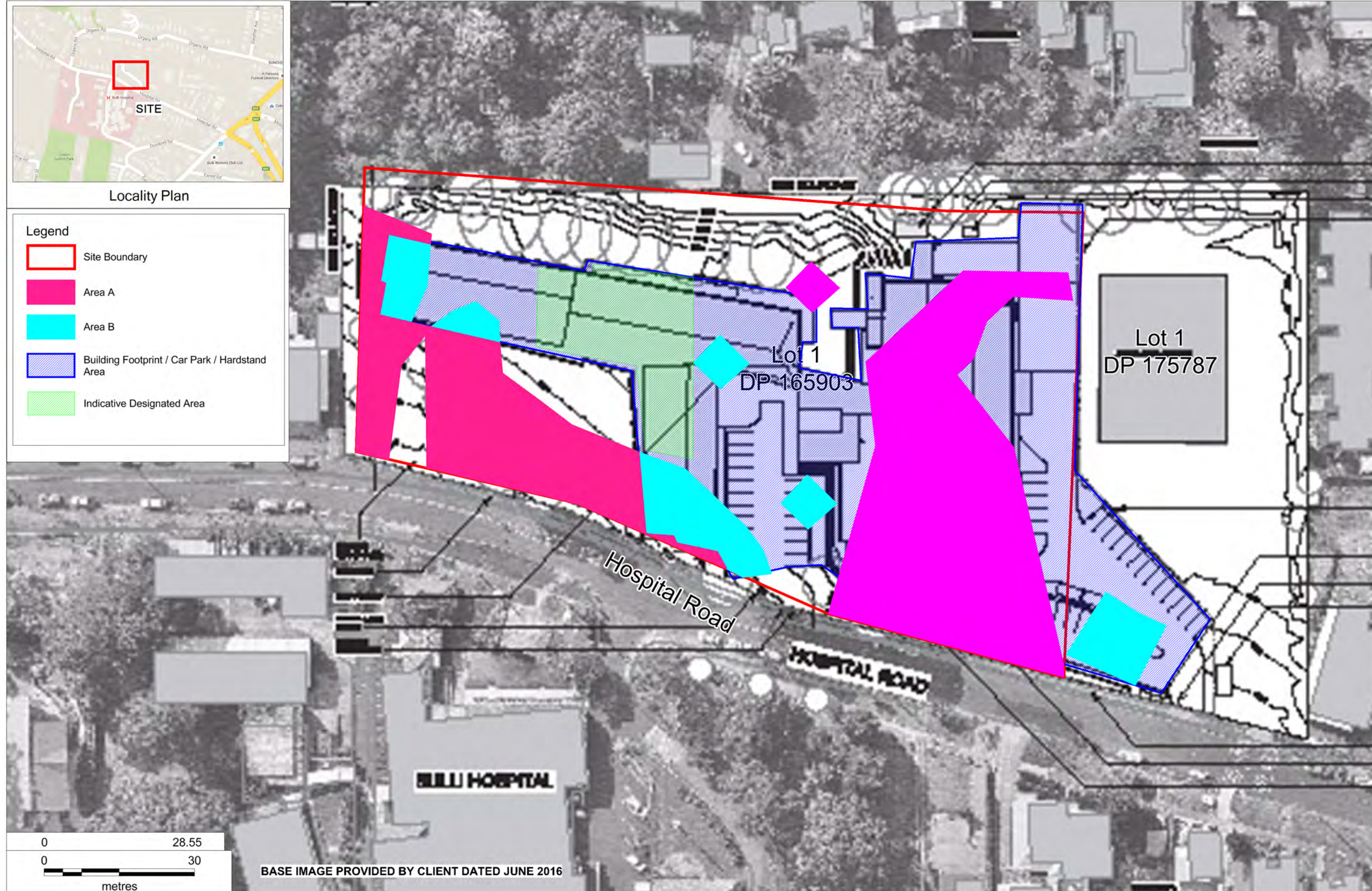




Locality Plan

Legend

-  Site Boundary
-  Area A
-  Area B
-  Building Footprint / Car Park / Hardstand Area
-  Indicative Designated Area



BASE IMAGE PROVIDED BY CLIENT DATED JUNE 2016

## Appendix B – Asbestos Management Plan

**BULLI ACCE**  
**JOB NO.1110**

ASBESTOS MANAGEMENT PLAN

18<sup>TH</sup> October 2017



**RICHARD CROOKES**  
**CONSTRUCTIONS**

Delivering  
Certainty

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## ACM Management Plan Training register

Name	Project Position	Signature	Trained by	Tool box Date
Martin Patience	Construction Manager			
Rod Burger	Construction Manager			
Ben Lynam	Project Manager			
Frank Hong	Senior Contract Administrator			
Glen Wood	Site Manager			
Joel Sinclair	Site Supervisor			
Rumbidzai Banda	Site Engineer			
Roben Naamo	Cadet			
Chris Van Luenen	WHS&E Coordinator			
Chad Lindsay	Site Supervisor			

# I Introduction

## I.1 Purpose

The management of asbestos containing materials is important to ensure the **Asbestos Containing Material** (ACM) are not damaged nor deteriorate to such an extent that site workers, public, external contractors or visitors are unnecessarily exposed to airborne asbestos fibres.

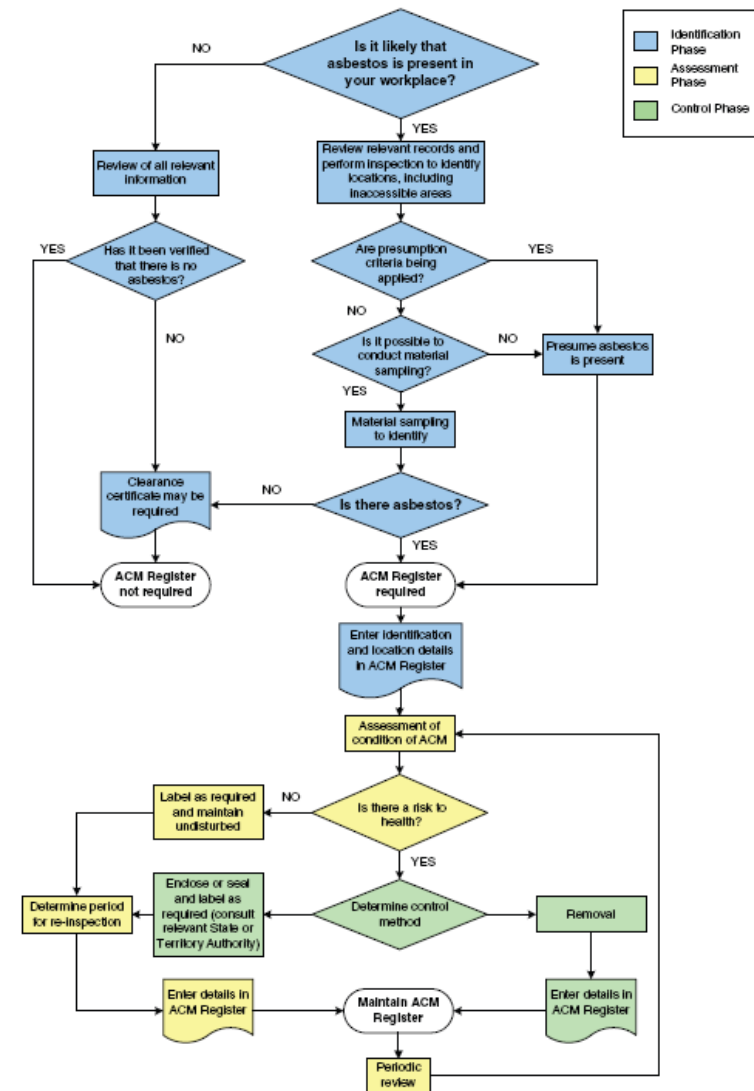
The requirements of the contractor site induction and permit to work system will aid in the management of ACM's throughout the site. Any other unexpected finds that are or could be potentially hazardous will follow the same protocol as ACM.

## I.2 General Principles

The RCC's principles of asbestos management have been adapted from general principles published in the Code of Practice for the Management and Control of Asbestos in Workplaces [NOHSC: 2018 (2005)]. These principles are summarised below:

- Consideration should be given to the removal of ACM during any renovations, refurbishments or maintenance work in preference to other control measures such as encapsulation, enclosure and sealing.
- The WHS Regulation requires all ACM within the construction area to be labelled. (Refer 6.3 Labelling)
- Where ACM is identified or presumed, the locations and type of ACM are to be recorded in the ACM Register located within the Asbestos management plan folder.
- A risk assessment must be performed on all identified or presumed ACM.
- Control measures must be established to prevent exposure to airborne asbestos fibres and should take into account the results of risk assessments conducted for the identified or presumed ACM.
- All workers and contractors on site etc. must be advised of the ACM Register at time of induction, and as requested, permitted access to the register for their review
- Only competent persons should undertake the identification of ACM.
- All workers and contractors on site where ACM are present or presumed to be present, and all other persons who may be exposed to ACM as a result of being on the premises, must be provided with full information on the occupational health and safety consequences of exposure to asbestos and appropriate control measures. The provision of this information should be recorded.
- Reasonable steps must be taken to identify all possible locations of ACM within the site.
- Once a risk assessment has been completed and controls established, a SWMS is to be developed and submitted to RCC'S site management team for approval

Figure 1: General principles of an asbestos management plan



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

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

## 2 Objectives

- Remove all high-risk asbestos items where possible.
- Deliver effective asbestos management work programs.
- Ensure that no one is exposed to airborne asbestos fibres.
- Ensure compliance with this Asbestos Management Plan.
- Ensure the asbestos database and register is accurate.
- Comply with State and Commonwealth legislation.
- Remove asbestos containing items when and where possible.

## 3 Regulatory Requirements

This asbestos management plan is consistent with removal, encapsulation, transport, and disposal or otherwise potential disturbance of asbestos containing materials. All these activities shall be performed in accordance with relevant Commonwealth and State Acts, Regulations, Codes of Practice, Advisory Standards and Industry Standards.

### 3.1 State Legislative Requirements – New South Wales/ACT

Relevant State legislation includes:

- Work Health and Safety Act 2011
- Work Health and Safety Regulation 2011

### 3.2 Code of Practice/Guides

Key Codes of Practice and Guidance Notes include:

- Code of Practice for the Management and Control of Asbestos in the Workplaces [NOHSC: 2018 (2005)].
- COP- How to Manage and Control Asbestos in the workplace-Dec 2011
- COP- How to safely remove asbestos-Dec 2011

### 3.3 RCC Requirements

- Project Managers (PM) /Site Managers (SM) must be notified before asbestos removal work commences.
- Any new asbestos identified must be explicitly notified to the PM/SM.
- All Staff and Contractors must comply with this Plan.
- Tenants and other interested parties must be notified of the asbestos removal work in advance and asbestos awareness training shall be made available to those persons affected by the asbestos work.

## 4 Organisational Responsibilities

Person/Party	Responsibility
Construction Manager (CM), Project Manager (PM)	<ul style="list-style-type: none"> <li>▪ Ensure all staff and contractors are aware of and comply with the plan.</li> <li>▪ Project management</li> <li>▪ Identification and bringing to the attention of appropriate staff, any suspect material</li> <li>▪ Ensure all contractors working on asbestos are aware of and meet the requirement of the plan.</li> </ul>
Site Manager (SM) Health Safety and Environmental Coordinator (HSE)	<ul style="list-style-type: none"> <li>▪ Obtain from Subcontractor, copy of WorkCover Notification (Requirement of RCC Asbestos removal permit)</li> <li>▪ Ensure project personnel (including contractors) are inducted</li> <li>▪ Surveying, identification and arranging for sampling of suspected asbestos containing materials by competent persons.</li> <li>▪ Training and awareness</li> <li>▪ Manage the asbestos works program and removal program</li> <li>▪ Respond to incidents</li> </ul>

Person/Party	Responsibility
	<ul style="list-style-type: none"> <li>Document preparation, recording and filing</li> <li>Manage asbestos inspection contractor</li> </ul>
Contractors (C) and Trades Staff (TS)	<ul style="list-style-type: none"> <li>Not to impact on an ACM without complying with the plan</li> <li>To bring to the attention of the SM/HSE any suspect material</li> <li>Refer to the plan for guidance to identify, manage, and remove asbestos</li> <li>Apply for Asbestos Permit to Work when performing asbestos removal work that requires notification.</li> <li>Undergo RCC Contractor Induction</li> <li>Develop a site specific asbestos removal control plan, SWMS AND Risk Assessment prior to performing the asbestos removal work</li> </ul>

## 5 Control of Asbestos Hazards

As part of the asbestos survey or subsequent resurvey, a 'Competent Person' is required to assess the risk posed by the ACM by completing a Risk Assessment; this will determine what, if any, control measures may be required. Generally, there are four control options available to select:

- Leave in-situ and manage
- Seal / encapsulate
- Enclose / isolate
- Remove

The controls are to be appropriate to the risk of the ACM in question. The following information should be used as a guideline when determining the correct control measure for management of the ACM risks.

If the ACM is friable, and there is a risk to health from exposure, it should be removed.

If the ACM is bonded and in a stable condition, encapsulation may be appropriate if the ACM is unsealed. Encapsulation is not necessarily required if the ACM is unsealed but it does provide another "barrier" to the potential release of asbestos fibre as well as prolonging the lifespan of the material by providing protection against UV and environmental elements etc.

ACM that are bonded, stable and sealed, which are unlikely to be disturbed during normal activities, can be left in-situ and managed, but need to be recorded in the ACM Register.

ACM within the works zone must be removed prior to the commencement of demolition, partial demolition, renovation or refurbishment if they are likely to be disturbed by those works. This is in accordance with the NOHSC Code of Practice for the Safe Removal of Asbestos [NOHSC: 2002 (2005)].

### 5.1 Removal of ACM

#### 5.1.1 Licensed Contractors

ACM falls into two broad categories (bonded and friable) and the category the ACM falls under will determine how the ACM is removed. If the ACM is classified as friable (e.g. sprayed limpet, pipe lagging, millboard insulation, vinyl sheet floor coverings with asbestos

backing material, etc.) it is necessary to engage a contractor who holds a current AS-A class license for friable asbestos removal. The holder of an AS-A licence is also permitted to removed Bonded ACM

If the ACM is classified as bonded ACM (e.g. asbestos cement wall linings, Super Six roof sheeting, vinyl floor tiles, Zelemite electrical boards, etc.) the ACM may be removed by the contractor who holds a current AS-B licence for bonded asbestos removal. The holder of an AS-B licence is not permitted to remove friable ACM.

### 5.1.2 WorkCover – Notification

For Bonded ACM, in quantities greater than 10m<sup>2</sup>, requiring a licensed contractor (AS-B) to complete the removal works, a WorkCover Notification is required to be lodged by the Licensed Contractor.

The Notification is required to be lodged a minimum of seven (7) working days prior to starting the removal works. WorkCover will review the application and return the first two pages, stamped with an official WorkCover approval. No works are to proceed prior to the receipt of the Notification.

RCC will require a copy of the WorkCover stamped 'Notification' prior to issuing an RCC Asbestos removal permit.

### 5.1.3 WorkCover – Permit

For all Friable removal works, regardless of quantity, a suitably licensed contractor (AS-A) must apply to WorkCover for a Permit prior to removal works progressing.

The Permit application is required to be lodged a minimum of seven (7) working days prior to starting the removal works. WorkCover will review the application and return the first two pages stamped with an official WorkCover approval and, issue a separate numbered Permit. No works are to proceed prior to the receipt of the permit.

RCC will require a copy of the WorkCover 'Permit' and the application form prior to issuing an RCC Asbestos removal permit.

### 5.1.4 Airborne Fibre Monitoring

Airborne fibre monitoring must be conducted during and after the removal of all friable ACM by an independent competent person. For Bonded ACM, air monitoring is conducted as part of the clearance certificate (where required) or as requested by RCC, client or Hygienist. Air monitoring is conducted during the removal works to check the effectiveness of control measures implemented by the contractor (e.g. isolating the removal work area with a sealed, airtight enclosure fitted with negative air generating units, etc.).

Air monitoring is also conducted after the ACM has been completely removed and the work area has passed a satisfactory visual inspection to determine whether the area is safe to reoccupy by unprotected persons.

### 5.1.5 Clearance Certificates

For all Friable ACM removal works or, as requested by the client or RCC for Bonded works, before an area can be re-occupied post asbestos removal, a clearance inspection must be carried out. The clearance inspection must be undertaken by an independent competent person only and a clearance certificate must be obtained from that competent person. Clearance monitoring is a mandatory requirement for all friable asbestos removal works and

is recommended for bonded ACM removal works particularly when the bonded ACM is located internally or near sensitive receptors.

The complete removal of all ACM must be verified with a written clearance certificate which must include details of a satisfactory clearance inspection conducted by the independent competent person. If clearance air monitoring has been conducted, the results of the clearance monitoring must be included as part of the clearance certificate as well.

### 5.1.6 Waste

All asbestos waste shall be disposed of at an approved landfill disposal site by licensed contractors, and in accordance with the requirements of The Legislation. Transport and disposal of asbestos waste shall be carried out only in a manner that will prevent the liberation of asbestos fibres in to the atmosphere.

To achieve “final completion” of an asbestos removal activity, RCC require verification that the asbestos waste has been transported and disposed of in accordance with State/Territory legislative requirements. A copy of the EPA Waste Tracking document is the required documentation for disposal, and a copy of the necessary License for carrying out this removal and disposal is the required documentation for transportation.

## 5.2 Record Keeping

RCC shall maintain detailed records of all activities relating to asbestos works which have been undertaken on site. The records kept should include:

- Copies of all asbestos survey/audit reports, including updates and amendments. (RCC ACM Registers)
- Copies of all WorkCover notifications and permits
- Risk Assessments and SWMS documents.
- RCC Asbestos removal permits
- RCC Air Monitoring and Clearance certificate records
- Records pertaining to the informing of employees/contractors about the presence of asbestos on site, and those employees have been appropriately trained in safe work procedures and practices.
- Clearance certificates indicating areas are safe to reoccupy after asbestos abatement works; and
- Airborne fibre monitoring results
- Previous versions of the asbestos register

All documentation is to be retained in the one file structure under the heading of Asbestos Management. All asbestos related records and documents are to be retained for a period of 30 years.

## 5.3 Labelling

Current State and Territory legislation specify the requirements for some form of labelling in buildings. [NOHSC: 2018(2005)] states all in-situ ACM's should be labelled where practicable. The words 'should' and 'practicable' in the Code of Practice allow some flexibility in the approach to labelling. Similar flexibility is allowed under State and Territory workplace health and safety legislation.

RCC has advised that individual labelling of ACM is to be determined by a Competent Person usually nominated by the client however may not be necessary in every instance.

All friable and high risk asbestos situations, as well as any location containing ACM's where regular maintenance or repair work is likely to be carried must be labelled.

In locations where ACM has been identified within close proximity to the work area, but not required to be removed or disturbed, should be labelled or sign posted warning of 'Asbestos containing material, do not disturb' or in wording similar.

Ref: WHS Regulation, Chapter 8, Asbestos- Clause 469

An asbestos removalist must ensure that:

- a) Signs alerting persons to the presence of asbestos are placed to indicate where the asbestos removal work is being carried out, and
- b) Barricades are erected to delineate the asbestos removal area.

## 5.4 Warning Signs

All site areas which are known or suspected to contain ACM's shall have a warning sign at every main entry into the area indicating that an asbestos register exists for the site and a point of contact must be contacted before undertaking any works.

The warning sign must be clearly visible from all directions leading onto the area.

## 5.5 Safe Work Practices

Prior to commencing any works on RCC sites, such as demolition, refurbishment, maintenance or installation of new equipment, the asbestos register must be consulted to determine if any ACM are present which may be disturbed. This ACM must be removed before commencement of the work. If unknown materials, or undocumented materials suspected of containing asbestos are encountered during building works, stop work and follow the Incident response procedures shown in figure 7.0.

If a project is likely to impinge upon ACM the principal contractor (RCC) must assess the requirement for a licensed asbestos removalist to perform the asbestos removal work. A WorkCover permit / Notification may be required as part of an RCC, Asbestos Permit to work, prior to the asbestos removal work commencing.

### 5.5.1 Maintenance Procedures

Maintenance tasks that may impact on ACM are to be performed under controlled conditions to prevent the distribution of airborne asbestos fibres. [NOHSC: 2018(2005)] has procedures for certain maintenance tasks and these must be followed. These maintenance tasks include:

- The drilling of asbestos containing materials
- Sealing, painting, coating of asbestos cement products
- Cleaning leaf litter from the gutters of asbestos cement roofs
- Replacing cabling in asbestos cement conduits or boxes
- Working on electrical mounting boards (switchboards) containing asbestos

### 5.5.2 Tools and Equipment

Tools and equipment to be used for asbestos removal jobs are required to minimise the generation of airborne asbestos fibres. High-speed abrasive power or pneumatic tools such as angle grinders, sander, saws and high speed drills must never be used. Hand tools are preferred over power tools.

At the end of the removal work, all tools should be:

- Decontaminated (i.e. fully dismantled and cleaned under controlled conditions as described in the Code, or
- Disposed of in sealed containers similar to that for disposal of the ACM waste product.

Vacuum cleaners used for asbestos cleaning must comply with:

- AS 3544-1988 (Industrial Vacuum Cleaners for Particulates Hazardous to Health) and
- AS4260-1997 High Efficiency Particulate Air Filters (HEPA) - Classification, construction and performance.

### 5.5.3 RCC Asbestos Removal Permit

An RCC Asbestos Removal Permit form must be completed for any work on ACM.

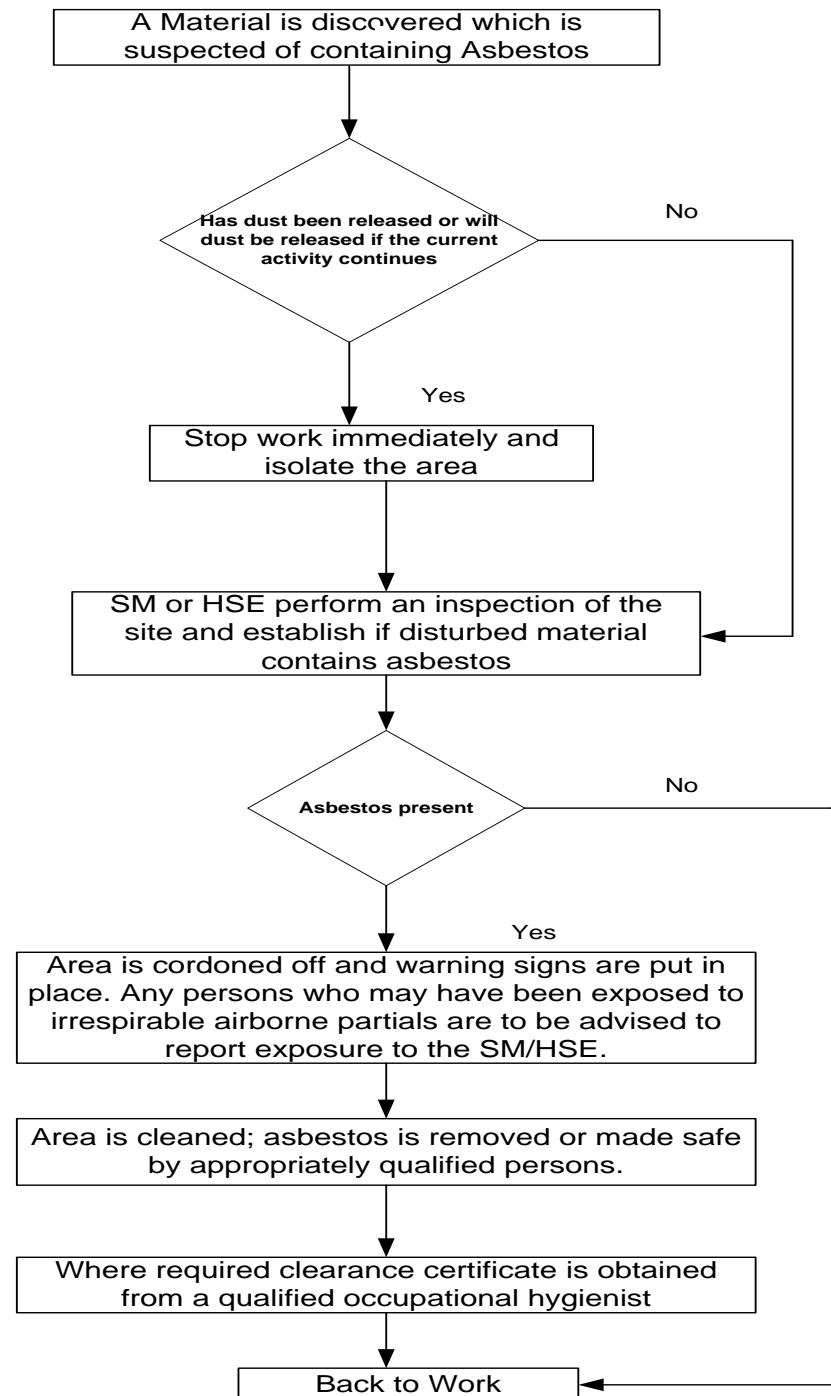
Before being issued with an Asbestos Removal Permit, individuals will be required to peruse the RCC Asbestos Management Plan and the Asbestos Register. Where practicable, contractors should be made aware of the requirements of the plan prior to tendering to ensure they allow for such requirements when quoting.

The Asbestos Removal Permit is designed to ensure appropriate work practices are employed when working with ACM. The Asbestos Removal Permit will document what ACM's are to be removed, encapsulated or otherwise protected, prior to the contracted works proceeding. The Asbestos Removal Permit will also check other requirements such as the need for barricading and airborne fibre monitoring.

The Demolisher or asbestos removal contractor will be responsible to ensure that their workers are aware of their responsibilities and abide by the requirements of the permit.

RCC's Site Manager or HSE Coordinator shall be advised immediately of any incidents of non-compliance with the RCC Asbestos Management plan or the Code.

## 6 Incident Response Flow Chart



## 7 Documentation Requirements

### 7.1 Asbestos Containing Material (ACM) Register Form 21.1a

The RCC ACM register will be generated where no report has been received from the client or when additional ACM items have been identified but not listed in previous reports.

The RCC ACM register and the clients ACM report will be monitored and signed off where required, when ACM works are completed.

Supporting information that should be included in the register is:

- Register of ACM items
- Register of items which were samples but found to contain no asbestos
- Certificates of analysis
- Photos
- Floor plans with asbestos containing items marked up

## 7.2 Asbestos Removal Permit Form 21.1b

The RCC Asbestos removal permit is required to be completed prior to any ACM removal / remedial works.

The requirements for supporting documentation are listed within the permit.

## 7.3 Asbestos Containing Material (ACM) Air Monitoring & Clearance Certificate Record Form 21.1c (Note: 1 Form per activity / item)

Asbestos Containing Material (ACM) Air Monitoring & Clearance Certificate Record is used to collate all associated documentation involved in the identification, removal, remediation, transport and disposal of logged ACM.

# 8 Training

## 8.1 Asbestos Awareness Training

Asbestos awareness training provides participants with a general overview of asbestos including history and background; asbestos types and properties; common asbestos situations; health effects; risk in perspective and management of asbestos. Conducted by RCC person, ACT region training conducted by MBA or other ATO accredited company mandatory for Act Workers.

## 8.2 Asbestos Removal Training

This course is typically provided by an external registered training organisation (RTO) to personnel who intend to remove bonded ACM, pre-requisite for obtaining a WorkCover recognised licence.

## Appendix I – 21.11 Asbestos Containing Material (ACM) Register

[illegible]

## Appendix 2 – 21.11A Asbestos Removal Permit

Project Name:		Company Performing Work:	
Contractors Contact:		Position:	
Location of works:			
Description of Work:			
RCC Asbestos Register – Item Identification number:			
<b>Asbestos Type</b>			
Bonded Less than 10m <sup>2</sup> <input type="checkbox"/>		No License or Permit / Application required	
Bonded Greater than 10m <sup>2</sup> <input type="checkbox"/> AS-B Lic. No: _____		Copy of WorkCover Stamped, Notification to be obtained from contractor prior to start.	
Friable <input type="checkbox"/> AS-A Lic. No: _____		Copy of WorkCover stamped, Permit application to be obtained from contractor prior to start.	WorkCover Permit No: _____
<b>Permit begins</b>		<b>Permit expires</b>	
Date: / /	Time: am/pm	Date: / /	Time: am/pm
Date: / /	Time: am/pm	Date: / /	Time: am/pm
Date: / /	Time: am/pm	Date: / /	Time: am/pm
Date: / /	Time: am/pm	Date: / /	Time: am/pm
<b>RCC Emergency Contact information</b>			
Name of RCC Contact:		Tel:	( )
<b>Authorisation by company representative</b>			
The above work is authorised to proceed subject to the following action being taken prior to work starting and procedures being maintained for the duration of the work.			
RCC Representative Name:		Position:	Signature:
	Yes	N/A	
Work area has been inspected prior to works proceeding			Contractor has read the requirements of the RCC, ACM Management plan
Risk Assessment completed			Disposal method established
Will the area be occupied during the works			Air conditioning / Mechanical ventilation isolated:
Is it necessary to vacate the building during the works			Electrical isolated (Written confirmation from Electrician required)
SWMS reviewed by RCC			Signage / Barricades in place
Air monitoring required			Clearance certificate required
<b>Weekly Review of Permit</b>			
	Week 1	Week 2	Week 3
Signature and position of person issuing the permit:			
Signature of the person conducting the Work:			

## Appendix 3 – 21.11B Asbestos Containing Material (ACM) Air monitoring & Clearance Certificate Record

In all Friable removal works and in other cases where requested by RCC or the client, a clearance certificate may be required post completion of ACM removal works. Clearance certificates may require air monitoring to be conducted during the removal process. All monitoring records are to be maintained and kept for a period of 30 years post completion. Separate form required for each location.

Project Name:	BULLI ACCE				Project Number :	1110	
Clearance Certificate location / item details							
RCC ACM Register No: (Refer to ACM register)	Item description, type & Location (Wall sheeting, Bonded)				Removed		Date removed
					Yes	No	
Air Monitoring Results							
Monitoring Unit ID;	Sample location	Start time (24hour)	Finish time (24 Hour)	Average flow rate (mL)	Fibres / Fields	Result Fibres/mL	
Completion sign off by competent person							
Copy of final clearance certificate attached <input type="checkbox"/>				Copy of waste transport receipt attached <input type="checkbox"/>			
Copy of waste disposal dockets attached <input type="checkbox"/>				Copy of ACM work permit attached <input type="checkbox"/>			
Name:		Position:		Signature:		Date:	

## Appendix 4 – 40.3 Safe Work Method Statement: Removal of Bonded Asbestos, scattered at random

<b>[PCBU Contractor Name, contact details]</b>		<b>Principal Contractor (PC)</b> <b>[Name, contact details]</b>	
<b>Works Manager: Contact Phone:</b>		<b>Date SWMS provided to PC:</b>	<b>Revision No:</b>
<b>Work activity/trade:</b>		<b>Project Name::BULLI ACCE</b>	
<b>HIGH RISK CONSTRUCTION WORK:</b> <b>HRCW</b>	Risk of a person falling more than 2 metres ( <i>Note: in some jurisdictions this is 3 metres</i> )	Work on a telecommunication tower	Demolition of load-bearing structure
	Likely to involve disturbing asbestos	Temporary load-bearing support for structural alterations or repairs	Work in or near a confined space
	Work in or near a shaft or trench deeper than 1.5 m or a tunnel	Use of explosives	Work on or near pressurised gas mains or piping
	<input type="checkbox"/> Work on or near chemical, fuel or refrigerant lines	Work on or near energised electrical installations or services	<input type="checkbox"/> Work in an area that may have a contaminated or flammable atmosphere
	<input type="checkbox"/> Tilt-up or precast concrete elements	<input type="checkbox"/> Work on, in or adjacent to a road, railway, shipping lane or other traffic corridor in use by traffic other than pedestrians	<input type="checkbox"/> Work in an area with movement of powered mobile plant
	<input type="checkbox"/> Work in areas with artificial extremes of temperature	<input type="checkbox"/> Work in or near water or other liquid that involves a risk of drowning	<input type="checkbox"/> Diving work
<b>Person responsible for ensuring compliance with SWMS:</b>		<b>Date SWMS received:</b>	
<b>What measures are in place to ensure compliance with the SWMS?</b>			
<b>Person responsible for reviewing SWMS control measures:</b>		<b>Date SWMS received by reviewer:</b>	
<b>How will the SWMS control measures be reviewed?</b>			
<b>Review date:</b>		<b>Reviewer's signature:</b>	

Procedure (in steps):	Possible Hazards	Control Measures
Break the job down into steps. Each of the steps should accomplish some major tasks and be logical	Situation with potential to harm – injury, illness, damage, environmental impact Eg.loss of control of plant	What actions are necessary to eliminate or minimise the hazards – elimination, substitution, isolation, engineers solutions and lastly PPE
Isolation / protection of Asbestos containing material (ACM)	Disturbance of ACM Incorrect removal	Isolate identified material by removing workers from the area and barricading off minimum radius of 5 metres – Danger tape. Warning signage to be placed at the barrier to area warning of ACM Restrict access to one entry point ONLY Asbestos register to be updated in accordance with ACM Register. Initiate RCC ACM works permit process
Establish works area / removal area	Unauthorised entry to areas	Identify the boundary for the works area i.e the location where ACM is to be removed from and identify with danger tape and signage advising ACM removal in progress. Identify area for removal site i.e. the isolated region around the works, identify with danger tape & signage warning of restricted access ACM removal works in progress.
Protection of surrounding areas / adjoining structures	Adjoining areas contaminated by removal process	Prior to any removal: Protection in the form of 200 micron plastic to be secured to protect adjoining finishes (Floors / walls) Isolation / lock out of mechanical ventilation required prior to starting
Sealing of ACM prior to removal	Disturbance of ACM Water run off Electrical outlets i.e. switches, lights, outlets, alarms etc.	Ensure all electrical items are isolated from supply. Ensure all Any drains within the area to be protected. PPE as identified above. Low pressure coarse spray to be applied to all faces / edges. A mixture of water & PVA solution or detergent or paint can be used as a wetting agent. Ensure surface is saturated but minimise run off Ensure ACM is saturated through it's full depth prior to removal / disturbing. Spray all accessible voids where dust may exist
Removal process	Damage to sheets General disturbance Manual handling	Determine methodology for removal Remove any loose sections prior to removing fixed sheets. Ensure all disturbed areas remain saturated, re-apply dampening method as required. Avoid breaking sheets where possible. Should sheets continually break, reassess method of removal. Support sheets prior to removing fixings

		Where possible, remove nails / fixings or punch nail heads through sheeting. 2 person lifts for heavy or awkward materials. PPE as specified above.
Packaging waste	Packages become loose and tear Materials spill onto ground Manual handling	<b>For small pieces</b> , ACM to be packaged into man-handleable packages, enclosed in heavy duty 200 micron plastic. (Bag or wrap) Where possibility of tearing is identified 2 layers may be required. Bags to be labelled with appropriate warnings similar to ' Caution Asbestos' or Asbestos within, do not open bag. Where bags are used, opening to be twisted and folded over and fixed with tape or other means. <b>For larger sections</b> , skips may be used but must be in good condition. Skip is to be lined in 2 layers of 200 micron plastic. ACM must be kept wet. Once skip is full, it's contents must be sealed with the plastic sheeting.
Clean up	Adjoining areas contaminated by removal process Manual handling	Ensure all disturbed areas remain saturated, re-apply dampening method as required. Start from the top and work down cleaning ledges, sills & high flat areas that ACM can settle. Remove any loose items. Start cleaning and removing plastic from furthest workpoint from exit working towards the exit point. The use of an Asbestos vacuum is permitted for dry decontamination cleaning. All waste to be disposed of in Same way to ACM. (Lined bin, plastic bag 200 micron) All PPE to remain on till area is decontaminated. Scrape / clean off excess materials from boots, tools etc with damp rag, into Asbestos waste bag. All disposable PPE to be placed in Asbestos waste bag and not re-used.
Disposal of waste	Incorrect disposal of waste	Materials to be disposed of at registered waste management facility, capable of receiving Hazardous waste. Receipts of waste disposal to be collected and recorded in Asbestos register.
Other items as identified		

Project

Company

I/we the undersigned, employees of \_\_\_\_\_, declare that I/we have attended "Work Activity Training" in the tasks to be performed on this project and have had an opportunity to participate in the development / review of the SWMS. We acknowledge that all work will be performed in the manner described within the Safe Work Method Statement.

[illegible]

<b>Project: (List Project Name)</b>		<b>Signed by Senior Management Company Rep.</b>	
<b>Contractor:</b> Richard Crookes Constructions. 214 Willoughby Rd, Crows Nest 2065		<b>Signature: (Who has reviewed the SWMS)</b>	
<b>Description of Work: SWMS - Removal of BONDED Asbestos containing material ONLY (ACM) quantity less than 10 square metres</b>		<b>Title: (Your title)</b>	
<b>(Non licensed - Minor works)</b> <b>Revision date: .....</b>		<b>Date: (Date reviewed prior to release)</b>	

<b>Potential Environmental Impacts:</b> Air (odour, dust, fumes) <input checked="" type="checkbox"/> Spills to ground <input checked="" type="checkbox"/> Noise <input type="checkbox"/> Soil Erosion <input type="checkbox"/> Vibration <input type="checkbox"/> Contamination/Haz materials <input checked="" type="checkbox"/> Spills to drains/waterways <input checked="" type="checkbox"/> Traffic / community <input type="checkbox"/> Flora <input type="checkbox"/> Fauna <input type="checkbox"/> Waste: <input checked="" type="checkbox"/> Other:	<b>Safety Equipment</b> Fire extinguishers <input type="checkbox"/> Barricades <input checked="" type="checkbox"/> Ventilation <input type="checkbox"/> Lighting <input type="checkbox"/> Ladders/mobile scaffold <input type="checkbox"/> Traffic control <input type="checkbox"/> Welding screens <input type="checkbox"/> Dust extraction <input type="checkbox"/> Emergency response <input type="checkbox"/>	<b>Permits</b> Hot Work <input type="checkbox"/> Excavation <input type="checkbox"/> Confined Space <input type="checkbox"/> Tag out / Lock out <input type="checkbox"/> Formwork stripping <input type="checkbox"/> Fall Arrest Systems <input type="checkbox"/> Scaffold <input type="checkbox"/> Other: RCC Asbestos Permit to Work	<b>Personal Protective Equipment (PPE)</b> Hard Hat <input checked="" type="checkbox"/> High Vis. Clothing <input type="checkbox"/> Steep capped boots <input checked="" type="checkbox"/> Face Shield/Welding Shield <input type="checkbox"/> Safety Glasses <input checked="" type="checkbox"/> Gloves <input checked="" type="checkbox"/> Hearing Protection <input type="checkbox"/> Fall Protection/Harness <input type="checkbox"/> Other Task Specific: Face mask - Type 2 Cartridge, Disposable overalls (Non - Velcro type).
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Procedure (in steps):	Possible Hazards	Risks	Inherent Risk Score (risk with no controls)	Control Measures	Residual Risk Score (risk after controls in place)	Resp. Person
Break the job down into steps. Each of the steps should accomplish some major tasks and be logical	Situation with potential to harm – injury, illness, damage, environmental impact Eg.loss of control of plant	List Eg. Damage to plant, buildings etc, injury or death, spills	Refer to RCC Risk Assessment Calculator F 21.5 Score 1, 2, 3	What actions are necessary to eliminate or minimise the hazards – elimination, substitution, isolation, engineers solutions and lastly PPE	Refer to RCC Risk Assessment Calculator F 21.5 Score 1, 2, 3	
Isolation / protection of Asbestos	Disturbance of ACM	Dust inhalation	1	Isolate identified material by removing	3	HSE

**Risk Scores: 1= Immediately Stop work until controls in place, 2 =High priority controls in place as soon as practicable, 3= Low risk, planned re assessment of risk**

Procedure (in steps):	Possible Hazards	Risks	Inherent Risk Score (risk with no controls)	Control Measures	Residual Risk Score (risk after controls in place)	Resp. Person
containing material (ACM)	Incorrect removal	Long term health effects Cross contamination Whole of site closure		workers form the area and barricading off minimum radius of 5 metres – Danger tape. Warning signage to be placed at the barrier to area warning of ACM Restrict access to one entry point ONLY Asbestos register to be updated in accordance with ACM Register. Initiate RCC ACM works permit process		SM
Establish works area / removal area	Unauthorised entry to areas	Workers exposed to ACM	2	Identify the boundary for the works area i.e the location where ACM is to be removed from and identify with danger tape and signage advising ACM removal in progress. Identify area for removal site i.e. the isolated region around the works, identify with danger tape & signage warning of restricted access ACM removal works in progress.	3	SM, HSE Competent Person
Protection of surrounding areas / adjoining structures	Adjoining areas contaminated by removal process	Workers exposed to ACM	1	Prior to any removal: Protection in the form of 200 micron plastic to be secured to protect adjoining finishes (Floors / walls) Isolation / lock out of mechanical ventilation required prior to starting	3	Competent Person
Sealing of ACM prior to removal	Disturbance of ACM	Cross contamination	2	Ensure all electrical items are isolated	3	Competent

Risk Scores: 1= Immediately Stop work until controls in place, 2 =High priority controls in place as soon as practicable, 3= Low risk, planned re assessment of risk

Procedure (in steps):	Possible Hazards	Risks	Inherent Risk Score (risk with no controls)	Control Measures	Residual Risk Score (risk after controls in place)	Resp. Person
	Water run off Electrical outlets i.e. switches, lights, outlets, alarms etc.	to other areas Electrocution Explosion Slips / falls		from supply. Ensure any drains within the area are protected. PPE as identified above. Low pressure coarse spray to be applied to all faces / edges. A mixture of water & PVA solution or detergent or paint can be used as a wetting agent. Ensure all exposed surfaces (where exposed) are saturated but minimise run off, prior to removal / disturbing. Ensure ACM is saturated (where exposed), prior to removal / disturbing. Spray all accessible voids where dust may exist		Person
Removal process	Damage to sheets General disturbance Manual handling	Workers exposed to ACM Dust generation Cross contamination to other areas Strains / cuts	1	Determine methodology for removal Remove any loose sections prior to removing fixed sheets. Ensure all disturbed areas remain saturated, re-apply dampening method as required. Avoid breaking sheets where possible. Should sheets continually break, reassess method of removal. Support sheets prior to removing fixings Where possible, remove nails / fixings or punch nail heads through sheeting. 2 person lifts for heavy or awkward	3	Competent Person

Risk Scores: 1= Immediately Stop work until controls in place, 2 =High priority controls in place as soon as practicable, 3= Low risk, planned re assessment of risk

Procedure (in steps):	Possible Hazards	Risks	Inherent Risk Score (risk with no controls)	Control Measures	Residual Risk Score (risk after controls in place)	Resp. Person
				materials. PPE as specified above.		
Packaging waste	Packages become loose and tear Materials spill onto ground Manual handling	Workers exposed to ACM Dust generation Whole of site closure Environmental damage  Strains / cuts	1	<b>For small pieces</b> , ACM to be packaged into man handle-able packages, enclosed in heavy duty 200 micron plastic. All asbestos waste must be double bagged or wrapped in 2 layers of 0.2mm plastic Bags to be labelled with appropriate warnings similar to 'Caution Asbestos' or Asbestos within, do not open bag. Where bags are used, opening to be twisted and folded over and fixed with tape or other means.	3	Competent Person
Clean up	Adjoining areas contaminated by removal process Manual handling	Workers exposed to ACM Dust generation Environmental damage Strains	1	Ensure all disturbed areas remain saturated, re-apply dampening method as required. Start from the top and work down cleaning ledges, sills & high flat areas that ACM can settle. Remove any loose items. Start cleaning and removing plastic from furthest work point from exit working towards the exit point. The use of an Asbestos vacuum is permitted for dry decontamination cleaning. All waste to be disposed of in Same	3	SM HSE Competant Person

Risk Scores: 1= Immediately Stop work until controls in place, 2 =High priority controls in place as soon as practicable, 3= Low risk, planned re assessment of risk

Procedure (in steps):	Possible Hazards	Risks	Inherent Risk Score (risk with no controls)	Control Measures	Residual Risk Score (risk after controls in place)	Resp. Person
				<p>way to ACM. (Lined bin, plastic bag 200 micron)</p> <p>All PPE to remain on till area is decontaminated.</p> <p>Scrape / clean off excess materials from boots, tools etc with damp rag, into Asbestos waste bag.</p> <p>All disposable PPE to be placed in Asbestos waste bag and not re-used.</p>		
Disposal of waste	Incorrect disposal of waste	<p>Environmental contamination</p> <p>Environmental fines imposed</p> <p>People exposed</p> <p>Commercial disgrace</p>	1	<p>Materials to be disposed of at registered waste management facility, capable of receiving Hazardous waste.</p> <p>Receipts of waste disposal to be collected and recorded in Asbestos register.</p>	3	SM
Other items as identified						

Details of Site Supervisory staff		
Name:	Qualification:	Certificates of Competence / WorkCover Approvals required:

Training Required to Complete Work
General WHS Induction Training
Work activity training – (Asbestos awareness training)
SWMS Training
Manual Handling training
Personal protective equipment
Other: RCC Asbestos Management Plan

Plant & Equipment: (Log books to be supplied)	

Codes of Practice, Legislation, etc. applicable :
Act:    Work Health & Safety Act 2011 Protection of the Environment Operations Act 1997
Regulation: Work Health & Safety Regulation 2011
Codes of Practice: COP For the safe removal of Asbestos [NOHSC:2002(2005)] COP- How do manage and control asbestos in the workplace-Dec 2011 COP- How to safely remove asbestos- Dec 2011
Hygienists report, if submitted.

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## Appendix C – Estimate of Quantities

### 18.2b Waste Management Plan - Construction

RICHARD CROOKES  
CONSTRUCTIONS

**Project:** BULLI AGED CARE CENTRE OF EXCELLENCE

**Project No.** 1110

TYPE OF WASTE ONSITE		REUSE & RECYCLING			DISPOSAL	
Type of Material	Estimated Volume	ONSITE	OFFSITE	Accumulated Volume (update Bi-monthly)	CONTRACTOR	Accumulated Volume (update Bi-monthly)
Contaminated soils	3000m3	Capped on site	nil			
Asphalt/Road Base	760m3	Disposed of				
Excavated VENM	1500m3	To be reuse for fill and landscaping where possible. Topsoil to be weed free.	Beneficial reuse			
Green Waste	500m3		Green waste facility			
Bricks	50m3		Recycling			
Concrete	30m3	Reused on site	Recycling			
Timber – type	30m3					
Plasterboard	60m3					
Metals	30m3		Recycling if quantity viable			
Other: glass, appliances/fittings	10m3					

<b>Total</b>	5970m3		<b>Total</b>		<b>Total</b>	
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% WASTE REUSED (TARGET 80%)	85		% WASTE REUSED (TARGET 80%)	
% WASTE DISPOSAL TO LANDFILL	15		% WASTE DISPOSAL TO LANDFILL	



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