



Remediation Action Plan

7A -11 Racecourse Road, 1-3 Faunce
Street & 38-50 Young Street, West
Gosford

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REMEDIATION ACTION PLAN

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Introduction

1.0 INTRODUCTION

Stantec Australia Pty Ltd (Stantec) were engaged by Waluya Pty Ltd ("the client") to prepare a Remediation Action Plan (RAP) for the property located at 7A -11 Racecourse Road, 1-3 Faunce Street & 38-50 Young Street, West Gosford ("the site").

The site currently contains a single detached residential dwelling, three former stable structures and an open space area used occasionally as overflow parking for the neighbouring Gosford Racecourse. The proposed site redevelopment is use as a bus depot and is expected to accommodate bus parking, with associated servicing workshops, office administration and staff parking.

Stantec has previously completed a Preliminary Site Investigation (PSI) and Detailed Site Investigation (DSI) for the site which identified asbestos in soil impacts that require management to make the site suitable for the intended use. These impacts include friable asbestos in surficial soils adjacent west of the main stables structure, in the northwest corner of the site, and isolated asbestos in soil fragments across open space areas.

1.1 PURPOSE AND OBJECTIVES

The purpose of this RAP is to identify and outline methodologies to appropriately manage the friable and bonded ACM contamination at the site to allow Waluya Pty Ltd to proceed with the planned site redevelopment.

The objective of this RAP is to set remediation objectives and document the process to remediate the site.

1.2 SCOPE OF WORK

The preparation of this RAP included the following scope of work:

- Review of previously prepared site reports to review and identify:
 - Site features and extents;
 - A conceptual site model (CSM); and
 - What further assessment, if any, is required.
- Propose and evaluate options for remediation of the identified asbestos in soil contamination and recommend the preferred remediation strategy;
- Detail the implementation of the preferred remediation strategy including:
 - Identifying legislative, planning and permitting requirements;
 - Develop a Construction and Waste Management Plan outlining environmental controls required for the duration of the remediation works and to be implemented alongside the existing Construction Environmental Management Plan (CEMP);
 - Identify environmental, site, occupational health and safety (OHS) control measures and community consultation requirements associated with implementation of the preferred remedial strategy;



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Introduction

- Preparation of this Remediation Action Plan document outlining the above in accordance with the (NSW EPA, 2020) *Consultants reporting on contaminated land: Contaminated land guidelines*.

1.3 GUIDELINES AND LEGISLATION

This RAP and the remediation and validation requirements were completed in accordance with the requirements included in the following guidelines and legislation:

- National Environment Protection (Assessment of Site Contamination) Measure (NEPM). National Environment Protection Council (NEPC) 1999, Amendment 2013;
- State Environmental Planning Policy (Resilience and Hazards) 2021;
- NSW EPA (2014) *Waste Classification Guidelines. Part 1: Classifying Waste*;
- NSW EPA (2017) *Guidelines for the NSW Auditor Scheme (3rd edition)*. New South Wales Environment Protection Authority, September 2017;
- NSW EPA (2020) *Consultants reporting on contaminated land; Contaminated land guidelines*. New South Wales Environment Protection Authority;
- NSW EPA *Contaminated Land Guidelines Sampling design part 1 – application*. New South Wales Environment Protection Authority (EPA, August 2022).
- Safework NSW (2022) *Code of Practice: How to Safely Remove Asbestos*;
- Standards Australia (2005) *Australian Standard AS 4482.1-2005 – Guide to the investigation and sampling of sites with potentially contaminated soil. Part 1: Non-volatile and semi-volatile compounds*. Standards Australia, Homebush, NSW;
- Standards Australia (1999) *Australian Standard AS 4482.2-1999 - Guide to the sampling and investigation of potentially contaminated soil. Part 2: Volatile substances*. Standards Australia, Homebush, NSW;
- WorkCover NSW (2014) *Managing asbestos in or on soil*.



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Site Identification

2.0 SITE IDENTIFICATION

2.1 SITE DETAILS

Details related to the site are included in **Table 2-1** below whilst site features and surface contours are shown on **Figure 2** in **Appendix A**.

Table 2-1 Site Identification Details

Item	Details			
Site Address	7A-11 Racecourse Road, 1-3 Faunce Street and 38-50 Young Street, West Gosford, NSW 2250			
Approximate Site Area	2.1 ha			
Title Details	▪ Lot 1, DP651249 ▪ Lot 6, DP801261 ▪ Lot 11, DP758466 ▪ Lot 12, DP1100110 ▪ Lot 13, DP1100206 ▪ Lot 14, DP1100206 ▪ Lot 15, DP1100216 ▪ Lot 16, DP1079150 ▪ Lot 18, DP1100223 ▪ Lot 20, DP758466 ▪ Lot 71, DP810836 ▪ Lot 72, DP810836 ▪ Lot 73, DP810836 ▪ Lot 74, DP810836.			
Local Government Area (LGA)	Central Coast Council			
Land Zoning	The site is entirely zoned as B6 (Enterprise Corridor) under the <i>Central Coast Local Environment Plan</i> (LEP) 2022. The zone has the following objectives: • To promote businesses along main roads and to encourage a mix of compatible uses. • To provide a range of employment uses (including business, office, retail and light industrial uses). • To maintain the economic strength of centres by limiting retailing activity. • To provide for residential uses, but only as part of a mixed use development. • To provide primarily for businesses along key corridors.			
Site Coordinates – Site Corners (GDA2020 MGA56)	Northing	Easting	Northing	Easting
	6300554.1	344666.3	6300734.9	344595.5
	6300563.8	344609.2	6300784.6	344616.6
	6300568	344609.9	6300787.6	344621.3
	6300573.4	344609.3	6300774	344701.3
	6300579.5	344571.1		
Current Land Use	The site currently contains grassed areas with a perimeter of remnant unmanaged bushland, areas of hard stand, several empty buildings and an unsealed driveway. The buildings comprise a two-storey dwelling and several associated buildings for enclosing horses.			
Proposed Land Use	Bus depot including parking for 96 buses, staff parking, administration office and facilities, and maintenance/servicing workshops.			



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Site Identification

2.2 SURROUNDING LAND USE

The land uses immediately surrounding the site have remained consistent throughout PSI and DSI site activities and are summarised below in **Table 2-2** and shown in **Figure 2, Appendix A**.

Table 2-2 Surrounding Land Use

Direction	Land Use or Activity
North	Racecourse Road and Faunce Street with commercial and recreational (tennis courts and golf course) land use and Narara Creek further north.
East	Young Street with low-density residential and commercial properties and Waterview Park nature reserve further east.
South	Commercial and low-density residential properties and Central Coast Highway further south and Brisbane Water beyond.
West	Racecourse Road and Gosford Racecourse and Narara Creek further west.

2.3 SITE DESCRIPTION

The site and regional context are summarized in detail in the previous DSI (Stantec, 2023b), however key features and observations are summarized below:

- The site was observed to have an overall slope southwest, though eastern and northern areas of the site appeared generally flat as a result of landscaping and filling activities.
- The site surface was generally covered by a combination of grass, gravel and concrete/asphalt surfaces associated with historical building slabs and roads. Graveled areas were observed to include anthropogenic materials such as brick, likely coal washery reject and crushed rock gravels, suggesting potential fill material.
- Some portions of the site were overgrown with long grass and woody trees or shrubs, therefore the ground surface could not be thoroughly inspected. Overgrown areas were generally associated with embankments along site boundaries and the edges of possible fill platforms.
- There were six (6) buildings on the site at the time of inspection and intrusive works:
 - Residential building: double story, contains asbestos building materials (Getex, 2020)
 - Garage: one story, brick
 - Horse arena: open, metal roofing
 - Enclosed horse stables and detached shed: single story, contains asbestos in building materials (Getex, 2020), brick, besser block and welded mesh sheets
 - Open horse stables: single story, contains asbestos in building materials (Getex, 2020), besser block and welded mesh sheets.
- Fly-tipping of building materials and other miscellaneous materials was observed along the borders of the site (predominantly north and east). The steep embankment between the graveled area (north-east portion of site) and open stable contained evidence of fly-tipping. This area contained materials such as concrete chunks, tyres, bricks, metal sheeting/objects. A large pallet of deteriorating Medium Density Fibreboard (MDF), carpet off-cuts and newspapers was observed amongst vegetation, south-east of the graveled area.



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Previous Investigations

3.0 PREVIOUS INVESTIGATIONS

Three previous reports were reviewed as part of this assessment:

- Getex Pty Ltd (2020). *Asbestos Building Materials Register and Management Plan for 9A-11 Racecourse Road, West Gosford NSW 2250*. Prepared for Busways Group Pty Ltd. Issued 12 December 2020. Report Number 1122.07.ASSR.
- Stantec Australia Pty Ltd (2023a). *Preliminary Site Investigation – 7a-11 Racecourse Road and 32-50 Young Street, West Gosford*. Prepared for Waluya Pty Ltd. Issued 27 March 2023.
- Stantec Australia Pty Ltd (2023b). *Detailed Site Investigation – 7A -11 Racecourse Road, 1-3 Faunce Street & 38-50 Young Street, West Gosford*. Prepared for Waluya Pty Ltd. Issued 6 July 2023.

A summary of the findings from the previous investigations are provided below in **Table 3-1**.

Table 3-1 Summary of Previous Investigations

Sections	Details
<i>Asbestos Building Materials Register and Management Plan, December 2020</i> (Getex, 2020)	
Objectives	The objective of the survey was to determine the type, condition and extent of asbestos building materials that may be present and prepare an asbestos building materials register and asbestos management plan for the site.
Scope of Works	The scope of works for the Asbestos Materials Survey included the following: ▪ Inspect all accessible areas of the site and identify any suspected asbestos containing materials (ACM). ▪ Sample materials suspected to contain asbestos. ▪ Compile an asbestos register for the site. ▪ Provide advice regarding ongoing management of asbestos materials identified in the survey. Areas of the site not accessed included the following: ▪ Height restricted areas. ▪ Gas, electrical, chemical or pressurised service liens. ▪ Within service shafts, ducts and wall cavities. ▪ Areas obstructed by installed equipment. ▪ Locked areas to which no key was available at the time of the inspection. Further investigation of these areas is required if refurbishment or demolition activities within these areas are to proceed.
Key Findings	Non-friable asbestos of varying condition was detected in building materials at the northern stable, north-eastern shed, southern stable, house and garage. Generally, these areas were considered low to medium risk. Areas of high risk included areas containing friable asbestos, which was recorded in materials (i.e. detritus and soils) below drip lines of existing poor condition asbestos roofing or material at the northern stable, southern stable and north-eastern shed.



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Previous Investigations

Sections	Details
Preliminary Site Investigation, March 2023 (Stantec, 2023a)	
Objectives	The purpose of the investigation was to address the requirements by DPE for a PSI to be completed for the site to gather preliminary contamination information; the objectives of the PSI were to assess whether contamination has the potential to exist on site and whether further investigation is required.
Key Findings	Based on the results of this investigation the following known contaminating sources and activities have been identified: ▪ Deteriorating asbestos building materials in buildings/structures and proximal soils ▪ Cutting and fill materials of unknown quality or quantity across site ▪ Fly-tipped demolition and other wastes across the site ▪ Historical use as a materials storage and/or laydown area across the eastern portion of site in 1965-1991 (south-east) and 1994-2010 (north-east) including demolished buildings and foundations ▪ Historical use as a layover carpark for the Gosford Racecourse ▪ Historical industrial activities up gradient and in proximity to site (i.e. motor garages) ▪ Potential presence of two abandoned underground storage tanks, historically containing flammable liquids. Based on potentially completed Source-Pathway-Receptor (SPR) linkages these sources are considered to pose a potential risk to the following receptors: ▪ Current site users and future site users under a commercial and industrial setting ▪ Future demolition and construction workers undertaking excavations on site. ▪ Soil dependent biota. The identified potential sources of contamination were preliminarily classified as having a low or medium likelihood of complete exposure pathway for human and ecological receptors. Despite this, the information provided in this report was preliminary in nature and did not confirm actual conditions or potential contaminant concentrations through sampling and analysis of potentially impacted media.
Recommendations	The following recommendations were identified to manage potential contamination issues that may inform future land development planning approvals and construction design of the site: ▪ Conduct a Detailed Site Investigation (DSI) to confirm the presence of contaminant sources and contaminated materials within the identified sources. The DSI would seek to determine if a risk to human and ecological receptors exists, whether there is the potential for offsite migration of any identified contaminants and/or if management and consideration is required during construction. ▪ Undertake a historical titles search of the site which may provide pertinent information in regards to whether the underground storage tanks exist on site. If confirmed, attempt to locate, sample during the DSI fieldwork. It is further recommended that additional groundwater wells be installed to assess groundwater the conditions beneath the site. ▪ In the event the DSI identifies CoPC above the adopted site criteria investigation levels, the site may require further investigation in the form of a Data Gap Investigation (DGI). This would further clarify the risk to human and ecological receptors and/or recommend appropriate site remediation measures that can be implemented to mitigate potential impacts on human health and the environment, coupled with management and consideration required during construction. ▪ An updated Hazardous Building Materials (HBM) survey should be undertaken prior to any demolition to assess the condition of hazardous building materials and areas identified in the Getex, 2020 Asbestos Building Materials Register and Management Plan. Any information on asbestos clearance and/or remediation activities for friable soils on site, if available should be identified and provided.



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Previous Investigations

Sections	Details
	All materials that are to leave the site intended for waste disposal or beneficial re-use must be classified in accordance with the NSW EPA <i>Waste Classification Guidelines</i>, (November 2014) and/or applicable NSW EPA <i>Resource Recovery Orders</i>.
Detailed Site Investigation, July 2023 (Stantec, 2023b)	
Objectives	The purpose of this report was to outline an intrusive assessment undertaken to identify actual or potential contamination within the site. The objectives of this assessment and report included: - Review of land titles to verify findings of the PSI and identify any new potential contamination sources; - Undertaking an investigation program to identify whether contamination impacts are present and if so, to what extent; and - Preparation of this report to outline the results of the investigation program and provide: - A statement on the suitability of the site for the proposed use; and - Provide recommendations on any future actions including management, remediation or further investigation.
Key Findings	- Friable asbestos in soil contamination was identified west of the stables structure within the site that presents an unacceptable risk to human users of the site and will require management. Materials in this area are preliminarily classified as Special Waste (Asbestos) General Solid Waste (non-putrescible) for the purposes of offsite disposal. - Bonded asbestos in soil fragments were identified at three locations across the site, at TP106_0.5, TP113_0.1 and TP125_0.1. - Metals, TRH and PFOS contamination of soil and groundwater was identified in exceedance of adopted Tier 1 ecological criteria but are not considered to present an unacceptable risk to site users under the proposed land-use. - From the findings of this investigation, with the exception of areas impacted by friable asbestos in soil, the site is suitable for the proposed land-use as a bus depot with predominately hardstand cover. Areas impacted by friable asbestos can be made suitable following implementation of the recommendations outlined below.
Recommendations	Based on the findings of the DSI the following was recommended: - Preparation of a Remediation Action Plan (RAP) that outlines the methodology for the remediation of the asbestos in soil contamination across the site. - Upon completion of the remediation works a Validation Assessment should be undertaken to confirm removal of asbestos contamination and suitability of impacted areas for the proposed site use. - Where it is intended to use groundwater for any purpose, in particular application to landscape areas, undertake further assessment of groundwater contamination. - If no further assessment of groundwater is required, then groundwater wells should be decommissioned by grouting to surface in accordance with relevant guidance. - Identified contamination and appropriate mitigations during construction should be considered within the Construction Environmental Management Plan (CEMP). This would include: - Guidance on the identification and management of additional asbestos finds. - Guidance on appropriate interactions with groundwater, including dewatering, where necessary. - An unexpected finds protocol for any other contamination issues that may not have been identified by this assessment.



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Previous Investigations

3.1 SUMMARY OF CONTAMINATION EXTENT

Based on the above summarized reports contamination requiring management has the following extents:

- Friable asbestos in soil has been constrained to surficial soils adjacent west of the main stables structure, this was initially identified by Getex (2020) and confirmed / delineated by Stantec (2023b). Impact is to surface soils in the drip line of the stables structure and the inferred source is the weathering of asbestos fibres from asbestos fibre cement roofing materials on the stable. It is estimated approximately 40 m³ of material is impacted.
- Bonded asbestos fibre cement fragments in shallow and fill soils across the site identified by Stantec (2023b). The source of these impacts is unclear at this time and may include:
 - Historic building and demolition practices;
 - Uncontrolled filling with impacted materials; and
 - Illegal tipping and dumping on the site (fly tipping).

Asbestos containing materials are commonly associated with construction and demolition waste (i.e. bricks, timber frames, concrete, etc) though within the site this cannot be considered a reliable indicator as significant quantities of brick were identified inferred to be predominately associated with the historical land-use as a brickworks. The extent of this impact is poorly defined, however based on the limited number and shallow location of finds, the impact is likely not extensive through the site though potential for further finds during construction works exists.



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Conceptual Site Model

4.0 CONCEPTUAL SITE MODEL

A conceptual site model (CSM) provides an assessment of the fate and transport of contaminants of potential concern within the context of site-specific surface and subsurface conditions with regard to their potential risk to human health and the environment. Risk to human health and the environment is identified through complete Source – Pathway – Receptor (SPR) linkages. In order to identify SPR linkages the CSM considers site specific factors including:

- Source(s) of contamination
- Identification of contaminants of concern associated with past (and present) source(s)
- Site specific information including soil type(s), depth to groundwater, inferred groundwater flow direction and surface water bodies and interactions
- Location of any identified sources relative to the proposed site development
- Actual or potential receptors considering both current and future land use for the site, adjacent properties and any sensitive ecological receptors.

Based on a review of the desktop site history information, site walk-over observations, and sample results the following CSM has been developed showing potential SPR linkages considered to be potentially complete or incomplete under our understanding of the current and future land use.

4.1 DATA GAPS AND UNCERTANTIES

Based on the findings of the PSI and DSI investigations, the following data gaps were identified:

- Sampling in the vicinity of the stables and other structures in the north-west of the property has been constrained by the presence of hardstand and structures. Prior to and following demolition further assessment may be warranted in these areas to assess for asbestos in soil impacts from damaged and weathered structures.
- Assessment in wooded areas and on steep slopes has not been undertaken due to difficulties in access for machinery and limited safe access options for field personnel. Following clearing further assessment may be warranted if further potential indicators of contamination are identified.



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Conceptual Site Model

Table 4-1 Revised Conceptual Site Model

Potential Contamination Source	Impacted Media	Contaminants of Concern	Potential Exposure Pathway	Receptors	Likelihood of Complete Exposure Pathway
Deteriorating asbestos building materials in buildings/structures and proximal soils	Surficial soils in the surrounds of buildings and structures (i.e. drip lines of roof gutters) containing asbestos.	Friable asbestos in soil.	- Direct contact - Inhalation of asbestos fibres due to damage and disturbance of asbestos.	Human: - Current and future site users under and ongoing commercial / industrial setting - Future demolition and construction workers within the site.	High: Asbestos (friable) has confirmed within surficial soils at the site in areas adjacent west of the stable.
Cutting and fill materials of unknown quality or quantity across site Fly-tipped demolition and other wastes across the site Historical use as a materials storage and/or laydown area across the eastern portion of site in 1965-1991 (south-east) and 1994-2010 (north-east) including demolished buildings and foundations	- Soils - Groundwater	Human: - Asbestos Ecological: - Zinc (soil) - TRH F2 (soil) - Mercury (water) - Copper (water) - Nickel (water) - Zinc (water)	- Direct contact - Incidental ingestion - Inhalation of volatile organic compound (VOC) vapours and asbestos fibres.	Human: - Current and future site users under and ongoing commercial / industrial setting - Current and future construction workers undertaking excavations onsite. Ecological: - Soil dependent biota.	Low to moderate: Potentially complete in the event of any direct interaction with impacted media (i.e. excavations, use as growth medium).



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Conceptual Site Model

Potential Contamination Source	Impacted Media	Contaminants of Concern	Potential Exposure Pathway	Receptors	Likelihood of Complete Exposure Pathway
Historical industrial activities upgradient and in proximity to site (i.e. motor garages)	Groundwater	PFOS	- Direct contact - Incidental ingestion - Vapour intrusion.	Ecological: Soil dependent biota.	Low: PFOS has been identified and confirmed in groundwater across the site and inferred to be from an offsite source. Groundwater is unsuitable for onsite use for irrigation and watering of landscaped areas.



REMEDIATION ACTION PLAN

Remediation objectives and criteria

5.0 REMEDIATION OBJECTIVES AND CRITERIA

The purpose of the proposed remediation activities is to mitigate any potential risk of asbestos exposure within the site to current and future site users including construction.

The remediation objectives are:

- To ensure the identified contaminated material is managed in accordance with best and most sustainable practices to reduce health risk to site users to an acceptable level; and
- Following management, to demonstrate via validation sampling and clearance inspections, that any potential health risk to site users has been reduced to an acceptable level.

5.1 SOIL VALIDATION TARGETS

The soil validation targets for the proposed remediation are based on the *National Environment Protection (Assessment of Site Contamination) Measure* (NEPM) 1999, as amended 2013, in relation to investigation levels for soil in the assessment of site contamination (NEPC, 2013).

With the exception of asbestos in soil, where necessary, validation targets will be adopted based on the Health Investigation Level (HIL) / Health Screening Level (HSL) D – Commercial /Industrial, guideline criteria tabulated within Section 6, Schedule B1 of the NEPM (NEPC, 2013).

For asbestos in soil impacts the following validation targets have been identified for soil:

- No visible asbestos in final surface soils;
- Bonded asbestos / asbestos containing material (ACM) in soil – <0.05% weight for weight (w/w);
- Friable asbestos / asbestos fines (AF) / fibrous asbestos (FA) – <0.001% w/w

5.1.1 Aesthetics

Soils remaining on-site must also comply with the aesthetic requirements provided in Section 3.6, Schedule B1 of the NEPM (NEPC, 2013). The general assessment considerations include:

- The risk for a person to be injured by metal, glass or other sharp objects;
- That chemically discoloured soils or large quantities of various types of inert refuse, particularly if unsightly, may cause ongoing concerns to site users;
- The depth of any residue in relation to the final surface of the site; and
- The need for and practicality of any long-term management of foreign material.

Soils remaining within the site should be such that at the surface there is no detectable odour, identifiable staining or large quantities of inert waste that would cause concern under the proposed future land use.

5.2 IMPORTED MATERIALS

It must be demonstrated that any soil materials imported to the site during the proposed development do not contain any asbestos in any form, meet aesthetic criteria, and must also meet the criteria of a



REMEDIATION ACTION PLAN

Remediation objectives and criteria

NSW EPA Resource Recovery Exemption / Order (such as Excavated Natural Material (ENM)), meet the definition of Virgin Excavated Natural Material (VENM) or be otherwise suitable for import (i.e. growth medium material under AS 4419:2018 *Soils for landscaping and gardening purposes* (Standards Australia, 2018)).

5.3 EXPORTED MATERIALS

Waste classification assessment will be required for any soil materials that need to be exported or disposed off-site during the development in accordance with the NSW EPA (2014) *Waste Classification Guidelines*. Based on the presence of asbestos, the material on-site is not suitable for off-site beneficial re-use under a Resource Recover Exemption / Order or under legislation.

For waste materials characterised through chemical analyses, the analyte concentrations are to be assessed against the criteria outlined in Table 1 and Table 2 of the *Waste Classification Guidelines* (NSW EPA, 2014). As long as assessment results from the DSI (Stantec, 2023b) remain current (i.e. no changes occur to the site which may impact the contamination status) these results may be used to support the preparation of a waste classification, however further assessment of excavated and stockpiled soils may be necessary depending on the final volume disposed and observations during remediation.

All materials are to be disposed of at a landfill appropriately licenced to accept the final material waste classification provided.



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Remediation Options

6.0 REMEDIATION OPTIONS

The potentially applicable soil remedial strategies were evaluated in accordance with the remediation hierarchy, which is based on Section 6(16) of the NEPM (NEPC, 2013) and endorsed by the NSW EPA.

1. On-site treatment of soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level;
2. Off-site treatment of excavated soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level, after which the soil is returned to the site;

If the above is not practicable, then,

3. Consolidation and isolation of the soil on-site by containment within an appropriate barrier;
4. Removal of contaminated soil to an approved site or facility, followed, where necessary replacement with imported fill; and/or
5. Where an assessment indicates that remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy.

6.1 REMEDIAL OPTIONS ASSESSMENT

The remedial options listed above are evaluated below in **Table 6-1** which consider the available remedial options for asbestos impact identified at the site.

Table 6-1 Remediation option evaluation

Remedial Option	Discussion	Acceptable yes / no
Option 1: On-site treatment	This option includes on-site treatment of soil, such as via sieving and grading to allow for removal of ACM via 'emu picking' and reduce risk from asbestos to an acceptable level. This approach may be suitable to manage risks associated with bonded fragments in site soils. Asbestos containing materials must be identified and removed prior to disturbance of the soils to minimize opportunities damage and release of respirable fibres. This approach is not suitable for friable asbestos.	<u>Acceptable</u> for bonded asbestos impacts. Not acceptable for friable asbestos impacts.
Option 2 Off-site treatment of excavated soil	This option includes off-site treatment of soil, such as via sieving and grading to allow for removal of ACM via 'emu picking' and reduce risk from asbestos to an acceptable level. This option is specifically excluded by the NSW EPA (NSW EPA, 2022) and asbestos impacted materials may only leave the site for disposal to landfill.	Not acceptable



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Remedial Option	Discussion	Acceptable yes / no
Option 3 Isolation of the soil on-site by containment	This option includes the encapsulation and/or capping of impacted soils with marker and capping layers designed to be appropriate to the contaminant, this may include soil or concrete. This remedial strategy relies on removing the completed receptor pathways to soil with asbestos. This strategy would necessitate leaving quantities of impacted soil at the site and will require a long-term, though generally passive, legally enforceable environmental management plan (EMP). Based on the small volumes of material requiring management, while this approach could be suitable it is not the preferred approach due to the ongoing management obligations.	<u>Potentially Acceptable</u>
Option 4 Excavation and off-site disposal of impacted soil	This option includes the excavation and transportation of soil to an off-site facility licensed to accept the waste. The volume of material is tracked through waste docket and weight tickets at the receiving facility. For bonded asbestos impact, this approach will be effective in removing the contaminants from the site. However, as the extent of impact is fill is unknown and based on available information, these impacts only fail against soil validation targets where they remain in surface soils. This approach would be cost prohibitive depending on the volumes of bonded asbestos impacted fill to be disposed of. This is considered the most suitable approach for the friable asbestos in soil impact based on the small volume of the impact and the absence of long term management obligations following completion	<u>Acceptable for friable asbestos impacts.</u> <u>Potentially acceptable for bonded asbestos impacts.</u>
Option 5 Do-nothing with Environmental Management Plan	This option would involve leaving identified contamination in-situ and implementing an Environmental Management Plan (EMP). This approach is unsuitable under any ongoing land use for friable asbestos in soil impact, due to the potential for mobilization of respirable asbestos fibres off-site in windy conditions or via surface runoff. Due to the potential for damage to surface fragments of bonded asbestos by vehicle traffic, while this impact could remain on-site without treatment, vehicle access and use of the site would need to be limited.	Not acceptable. The do-nothing option will not reduce contaminant of concern concentrations to an appropriate level for the proposed development under the current and future land uses.

Based on the evaluation above, implementation of a combination of Remedial Options 1, 3 or 4 could mitigate the potential risks with the identified asbestos impact in a timely and cost-efficient manner. The advantages and disadvantages of these options are compared below.

6.2 REMEDIAL OPTION COMPARISON

Options available for the remediation of impacted soils are assessed in **Table 6-2** below.



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Table 6-2 Remediation option comparison

Option	Description	Advantages	Disadvantages
1	On-site treatment	Cost effective, reduces volumes of material requiring management to asbestos containing materials only. Suitable for minor bonded asbestos impact to shallow soils below HSL levels. Reduces risk to site workers throughout construction and during future land use. Once necessary earthworks are completed to establish site levels no further works are required. Where less than 10 m² of asbestos containing material (ACM) requires removal a licenced removalist is not required.	Unsuitable for friable asbestos impacts. May require ongoing asbestos works conditions during initial ground disturbance works. May require ongoing and regular attendance at site throughout construction by an asbestos removalist and / or occupational hygienist / environmental consultant to remove and confirm removal of incidental finds. Where finds are not identified prior to disturbance this may result in damage and release of fibres or contamination of unimpacted materials with asbestos.
3	Consolidation and isolation of the soil on-site by containment	Minimises potential risks to human health and environment. More economically viable for larger volumes of material. Suitable long-term remediation option. By retaining material onsite, import and export volumes can be reduce along with associated costs.	Ongoing management required to ensure continuing successful encapsulation. Additional engineering of containment within final design and construction which is likely to be impractical within the current design and site constraints. The containment cell must be registered on the S.10 certificate and therefore become legally enforceable. Ongoing enforcement of management to ensure maintenance of containment. Contamination to remain on a site with a sensitive proposed land-use with high potential for public concern.



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Option	Description	Advantages	Disadvantages
4	Excavation and off-site disposal of impacted soils	Minimises potential risks to human health and environment. More economically viable for smaller, localised areas of contamination with soils classified as General Solid Waste. Suitable long-term remediation option. Removes liability for ongoing management.	Costs of off-site disposal at a licensed facility. Potential for larger quantities of material than expected to require disposal. Prohibitive waste classifications, such as Special Waste (Asbestos), limiting options and increasing costs for disposal facilities. Excessive approach for minor bonded asbestos impact below HSL levels to shallow soils. Costs to import soil for construction purposes (if required). Not a sustainable approach to the management of the contamination on the site as it involves high energy cost to excavate, transport, and deposit in landfill thereby using valuable space. Potentially unsuitable when attempting to retain large trees growing in impacted material as there is difficulty in removing contaminated soils near tree roots without causing distress or death.



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6.3 PREFERRED REMEDIATION OPTION

Based on the analysis provided in **Table 6-1** and **Table 6-2** the preferred remedial approach is Option 1 (on-site treatment) for bonded asbestos impacts in shallow soils, and Option 4 (off-site disposal) for friable asbestos impact adjacent west of the stables. These options are preferred based on their proportionality to the identified contamination impact, their effectiveness in mitigating risk to site users, and the elimination of long-term management obligations upon completion.



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7.0 REMEDIATION STRATEGY

The preferred remediation option, as outlined in **Section 6.3**, is the on-site treatment of bonded asbestos impact and offsite disposal of friable asbestos impacted soils. The following outlines the broad stages of the remediation approach:

1. Interim mitigations of friable asbestos;
2. Remediation contractor is selected;
3. Removal of asbestos source materials and excavation of friable asbestos in soil followed by removal to an appropriately licensed premises;
4. Surface walkover and “emu pick” prior to construction;
5. Asbestos clearance inspection;
6. Validation of remedial excavations following the removal of contaminated materials;
7. Validation of imported soils (if any).

Details on each remediation stage are outlined in **Section 7.1** to **Section 7.6**, below with and contingency planning is included in **Section 7.7**. A Remediation Environmental and Waste Management Plan is included in **Section 8.0**. Potential risks to site workers during construction can be managed through OHS practices which are detailed in **Section 9.0**.

7.1 INTERIM MEASURES

Interim mitigation measures are necessary to immediately reduce the risk to site users and occupants resulting from friable asbestos in soil impact adjacent west of the stables. As long as the asbestos cement roofing materials remain on the stables, fibres will continue to be generated which may present a respirable fibre risk and will continue to impact soils in the drip line. As a result, interim mitigation measures should remain in place until the source material is removed and impacted soils have been removed from site.

Measures to be implemented include:

- Undertake exposure air monitoring to ensure that no respirable fibres are airborne in the vicinity of the stables and impacted soils while asbestos materials and impacted soils remain in place.
- Maintenance of grass cover in impacted area to maintain soil cohesion and reduce dust.
 - Application of an impermeable cover (i.e. plastic) is not recommended as any fibres falling from the roofing material may be carried in run-off during rain and extend impact to soils.
- Install drainage barriers (bundling, sandbags, etc.) to reduce potential for washout of impacted sediments.
- During dry and windy conditions lightly wet soil with water to reduce dust and potential airborne fibre generation.
- Installation of fencing or barricades with appropriate signage to prevent access to site occupants and visitors.



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7.2 REMEDIATION CONTRACTOR SELECTION

Based on the presence of asbestos in soil, a SafeWork NSW-licensed asbestos removalist will need to be engaged to supervise the removal of asbestos impacted soils. Engagement of this removalist may be undertaken either directly by Waluya Pty Ltd or their principal construction contractor. Due to the identification of friable asbestos in the vicinity of the stables a Class A removalist licensed to manage friable asbestos will be required for works in this area.

The extent of bonded asbestos in soil is likely <10 m², as a result removal activities can be undertaken by a “competent person”¹ in the identification and removal of asbestos. It is recommended however that any removal activities are undertaken by a Class B removalist as a minimum to ensure that best practice is followed throughout.

In addition to the removalist, an occupational hygienist will need to be engaged to undertake clearance inspections and respirable asbestos fibres air monitoring for the period of the friable asbestos removal. This is typically managed by the asbestos removal contractor. As friable asbestos has been identified a Licensed Asbestos Assessor (LAA) is required for impacts to soil west of the stables. Clearance inspections for remaining bonded asbestos impacts should be undertaken by an occupational hygienist, environmental consultant or any other suitably qualified “competent person”.

While this RAP does not consider the requirements for management of asbestos and hazardous building materials in site structures these have been addressed in the *Asbestos Building Materials Register and Management Plan* (Getex, 2020). As SafeWork NSW licensing requirements for the management of asbestos in soil and in structures are the same, it is recommended that any relevant removalists and consultants are engaged to address activities under both the management plan and this RAP to ensure consistency of approach.

Finally, an independent environmental consultant (such as Stantec) must be appointed to provide guidance on the implementation of this RAP and undertake validation sampling and reporting following completion of remediation works.

7.3 ASBESTOS REMOVAL

7.3.1 Asbestos in structures

Prior to undertaking remediation of asbestos impacted soils, asbestos materials in structures identified in the *Asbestos Building Materials Register and Management Plan* (Getex, 2020) must be removed from site. Where soils are remediated first but these potential source materials remain impacts to soils will continue. In addition, even when undertaken using best practice it is not always

¹ **Competent person**

From SafeWork NSW, a competent person is someone who has acquired through training or experience the knowledge and skills of relevant asbestos removal industry practice and holds the following:

- a certification in relation to the specified VET course for asbestos assessor work, or
- a tertiary qualification in occupational health and safety, occupational hygiene, science, building, construction or environmental health.



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possible during asbestos removal activities to prevent impacts to soils from the liberation of fibres or fragments.

While removal from structures should occur first, both removal from structures and remediation of soils can occur as a single removal activity without the need to demobilise and remobilize contractors.

7.3.2 Friable asbestos in soil

Soils west of the stables (indicated on **Figure 2, Appendix A**), identified as impacted by friable asbestos will be subject to excavation and off-site disposal in accordance with the relevant NSW legislation and the NSW EPA (2014) *Waste Classification Guidelines*. Prior to works commencing a Waste Classification Certificate should be prepared to allow direct disposal of soils. Data collected as part of the DSI (Stantec, 2023b) may be used to prepare this waste classification, however prior to preparation of a waste classification using this data a site inspection must be undertaken as a minimum to ensure no change to site conditions which would impact the suitability of these results (i.e. new contaminant sources or changes in the extent or volume of impacted material).

The removal process will be undertaken through the following process:

- Under the direction of a Class A removalist, establish the area as an asbestos removal zone, with appropriate controls, barricades and signage.
 - The LAA should also provide input here and commence air monitoring.
- To minimise generation of fibres during disturbance, soils should be lightly wetted prior to excavation commencing.
- Using an excavator with a toothless or “gummy” bucket, gently scrape back soils from the base of the western stable wall to approximately 1 m beyond the edge of the roof overhang (drip line). Soils should be removed to depth of approximately 0.1 to 0.15 m.
- To minimize material handling, soils should be directly loaded into a truck before being covered and transported to a facility licensed by the NSW EPA to receive Special Waste (Asbestos) at the appropriate chemical classification.
- Following completion of soil removal, the area should be inspected by the LAA to ensure all impacted soil material has been removed prior to control measures being dismantled.
 - Validation sampling must also be undertaken as detailed in **Section 7.4**.

7.3.3 Bonded asbestos in soil

Prior to commencement of construction, bonded asbestos impact across the remaining areas of the site should be managed via an “emu pick”. This process involves a “competent person” or licensed removalist undertaking a site walkover and removing any visible fragments of asbestos containing material, in accordance with methodologies presented in relevant guidance. This process can be undertaken for the whole site as a single event or in stages as areas are prepared for occupation by construction activities.

During initial earthworks and excavation of site soils to establish construction levels a spotter (a “competent person” or licensed removalist) must be employed to visually assess soils for asbestos impact. For minor impacts (single fragments) asbestos may be collected and works continue however where substantial impact is identified (multiple fragments) or suspected (i.e. fly-tipping or demolition



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waste) works are to stop and an occupational hygienist (surface impact) or environmental consultant (surface and soil impact) engaged to identify next steps.

Following any bonded removal works and / or establishment of final site levels a clearance inspection is to be undertaken to verify that final ground surfaces are free of visible asbestos prior to construction proceeding.

7.3.4 Asbestos removal controls

Asbestos removal controls will be determined by the nominated licenced asbestos removalist with the methodology and safety controls outlined in an Asbestos Works Management Plan (AWMP) and an Asbestos Removal Control Plan (ARCP). The methodology for removal should be undertaken in accordance with the following Guidelines, Acts, Regulations, and Codes of Practice:

- Work Health and Safety Act 2011.
- Work Health and Safety Regulation 2017.
- SafeWork NSW – *How to Safely Remove Asbestos, Code of Practice* (2022).
- WorkCover NSW – *Managing asbestos in or on soil* (2014).
- SafeWork NSW – *How to Manage and Control Asbestos in the Workplace, Code of Practice* (2022).

Typical controls during management of asbestos in soils include dust suppression measures (water sprinklers, hand held sprinkler hoses and/or a fogger) to maintain materials adequately damp to mitigate against dust generation. High pressure air or water systems with potential to saturate, aerosolise or otherwise mobilise are not to be used.

7.3.4.1 Requirement for air monitoring during asbestos in soil excavations

Asbestos fibres are only a risk to humans via the inhalation of individual respirable fibres. As a result, asbestos fibres bonded in cement (bonded ACM) represent a much lower risk to health than fibrous asbestos that has been mechanically disintegrated. Due to the fact that asbestos fibres are only a risk to human health if inhaled, control of the risks from airborne asbestos fibres is closely tied to the control of dust at the site.

Section 3.11: When is air (control) monitoring required? of the *How to Safely Remove Asbestos, Code of Practice* (Safework NSW, 2022) notes that, as per Clause 475 of the Work Health and Safety Regulation 2017, the only circumstances where air monitoring is mandatory is during the removal and management of friable asbestos. Air monitoring is recommended however during the removal of >10 m² of bonded ACM or where works are taking place in a public location.

7.4 VALIDATION OF REMEDIATION

Following removal of friable asbestos impacted soils, remediation works will require validation to confirm that all impacted materials have been removed. Validation will include the following stages:

- Clearance inspection to be undertaken by the selected LAA to confirm that no visible evidence of asbestos-impacted materials remains on residual site surfaces.



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- Where visual indications of asbestos impacted material remain, these must be addressed (i.e. removed from site) before proceeding to the next stage.
- Following a successful clearance inspection, the nominated environmental consultant must attend site to undertake visual inspection and sampling of residual surface to confirm that no trace asbestos impacts remain and that the remedial method has been otherwise adhered to. Confirmation will include the collection of samples to be assessed for AF/FA asbestos in soil as per the NEPM (NEPC, 2013) methodology at a NATA-accredited laboratory.
- Sampling methodology must be undertaken at the rates outlined in **Table 7-1** with reference to the Data Quality Objectives (DQO) and Data Quality Indicators (DQI) summarised in **Appendix B**.
 - The environmental consultant is to be made aware of any indicators of other potential contamination identified during remediation works. These can include, but are not necessarily limited to, odours, staining, unexpected waste finds and illegal tipping before and during site works. Where these are identified then the remediation and validation sampling method are to be updated as appropriate.

Table 7-1 Validation Soil Sample Criteria

Item	Sample Location	Sample Frequency	Laboratory Analyses	Validation Criteria
Soil validation primary sample	Base of excavation	1 sample per 25 m ²	Asbestos (NEPM methodology)	Asbestos – below HSL D thresholds, specified in Section 5.1 . Where other contaminant indicators are identified during remediation or construction, chemical analytes to be less than HIL-D.
	Wall of excavation for excavations >0.25 m deep	1 sample per 10 lineal metres and (where deeper than 1 m) per 1 vertical metre (10 m ²)		

The remediation will be considered successful only when analysed samples confirm that no asbestos remains on site. Only following confirmation that all asbestos impacted material has been removed by visual inspection and sample analysis will the nominated environmental consultant provide advice that the asbestos removal controls can be removed.

7.5 VALIDATION OF IMPORTED SOILS

Should any soil materials be imported onto the site for the proposed development then they will need to have supporting classification documentation and be validated to meet the site validation criteria outlined in **Section 5.2** and meet the definition and requirements of assessment for a NSW EPA Resource Recovery Order, VENM or other suitable material, such as growth medium.

Classification documentation must include material source, volume and descriptions, sampling methodology and laboratory analysis results and certificates. All documentation should be verified by the nominated environmental consultant.



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Each load of approved imported material must be inspected by an appropriately experienced and qualified individual to confirm the material is consistent with the description of the accompanying classification certificate and meets the definitions of relevant classification. In addition to the importers documentation, imported materials must also be sampled and analysed at a minimum rate of one sample per 1,000 m³ with at least three samples per source. Sampling should be conducted in a manner consistent with the DQO and DQI outlined in **Appendix B**. Material must also be considered geotechnically and aesthetically suitable by the environmental consultant and project geotechnical engineer.

A register of imported material is to be maintained and reconciled by the site manager and supplied to the environmental consultant which will include the origin of the material, classification type, volumes, date of importation, haulage contractor name, photographs, tracking of use and placement, and a description of imported material. This register is to be supplied to the environmental consultant and is to form part of the site remediation and validation report. Analysis should include the following common contaminant analytes as a minimum in addition to any analytes specified in the relevant classification (if applicable): total recoverable hydrocarbons (TRH), polycyclic aromatic hydrocarbons (PAH), metals and asbestos. All results should be below the guidelines of the relevant classification.

For VENM materials, metals should be below the applicable NSW background levels as published in *Trace Element Concentrations in Soils from Rural and Urban Areas of Australia*, Contaminated Sites Monograph Series No. 4, 1995, Olszowy et al, and organic compounds should be reported as a non-detect at the standard laboratory method via a NATA-accredited laboratory certificate.

7.6 REPORTING

The validation of the site should be documented by the occupational hygienist and environmental consultant in the form of the following:

- Clearance Certificates, to be prepared consistent with Section 3.10 of the *Code of Practice: How to safely remove asbestos* (Safework NSW, 2022) for any asbestos removal activities; and
- A Validation Report, to be prepared consistent with the *Consultants Reporting on Contaminated Lands: Contaminated Land Guidelines* (NSW EPA, 2020)

In addition to the above documentation the following should also be captured, and held securely for a minimum of 7 years or as long as required by project approvals.

- Waste classification and waste tracking
 - All waste classification and waste tracking documentation compiled during the site remediation works will be prepared in accordance with relevant NSW EPA regulatory guidelines. All waste classification certificates, waste tracking and disposal records will be included within the relevant validation report for each remediation zone.
- Other documentation
 - Any information relating to site preparation and development, unexpected finds, and remediation validation should be collated for summary and inclusion within the final Validation Report. Such information may include photographs, survey records, design and as-builts.



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7.7 REMEDIATION CONTINGENCY PLAN

As with any remedial scope of work, unanticipated events or outcomes may be encountered during the remedial program. Stantec has developed contingencies throughout the RAP to mitigate risks associated with potential issues that may arise during the remedial works. Contingency items considered for the current remediation are summarised in **Table 7-2** noting that there may be other unforeseen circumstances that may arise during the course of the works.

Any variation from the remedial methodology noted above is to be approved by the nominated environmental consultant prior to implementation.

Table 7-2 Remedial Works Contingency Plan

Potential Issue	Contingency Measures
Additional potential sources of impact are discovered during establishment of site levels or validation	Additional sampling will target the location of the potential sources (if identified). The analytical suite may be adjusted based on the nature of the potential source. The Unexpected Finds Protocol summarized in Section 8.5 will be communicated to the remedial / construction contractor and followed during the construction phase of the project
Potential contamination continues past the site boundary	It is noted that potentially impacted fill materials have not been confirmed to be constrained within the site boundary. Additional sampling may be necessary to delineate the extent of fill materials if remediation excavations identify site fill material extends beyond the site boundary.
Unintentional release of impacted soils	Construction of appropriate erosion and sedimentation controls around any excavations and stockpiles. Weather forecasts must be monitored throughout the course of the remedial works to anticipate any significant storm events. Works may be suspended if large volumes of rain are anticipated. Soil stockpiles and excavations must be sufficiently covered prior to any storm event.
Imported material is determined unsuitable	If identified prior to entry onto site material is to be stopped at the site gate and returned to the point of origin. If emplaced prior to being determined unsuitable, material is to be isolated and demarcated. If stockpiled prior to removal offsite the stockpile area/s should be lined to avoid contact with unimpacted ground surfaces. Any material leaving site must undergo waste classification to allow for appropriate disposal off-site.



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Remediation environmental and waste management plan

8.0 REMEDIATION ENVIRONMENTAL AND WASTE MANAGEMENT PLAN

The following sections include a Remediation Environmental and Waste Management Plan which provides measures required to minimise the potential impact of works on the local environment, site workers and third parties. In all cases, environmental issues must be managed by the Principal Contractor in accordance with good environmental management practices with periodic supervision and documentation by the appointed environmental consultant. The purpose of these measures is to prevent site workers, the public and environmental exposure to potential health risks associated with these works.

8.1 HERITAGE CONSTRAINTS

Areas and objects of heritage significance are not known to exist at the site however an assessment of these items is beyond the scope of assessments completed by Stantec to date. Despite the absence of known areas and objects, the remedial and validation works will need to be considerate of unexpected finds.

8.2 STOCKPILE MANAGEMENT

Soil may require stockpiling during the remediation; stockpiles must be tracked according to the origin and storage of the stockpile, including any stockpiles of imported materials e.g. ENM etc. Stockpiles to be in place longer than 24 hours are to be contained and covered and placed on an impervious base.

The stockpile(s) should be clearly labelled, with stockpiles known or suspected of containing contaminated material appropriately identified with warning signage. Stockpiles of contaminated material should be placed on an impervious membrane, kept less than 2 m in height, and covered to prevent mobility of airborne dust and particulate. Any stockpiled asbestos contaminated material should be dampened and covered with either geofabric layer or equivalent, which is to be disposed of as asbestos waste after completion of asbestos works.

Stockpiles are to be contoured to minimise the loss of material during rainfall, with upgradient drainage and levee banks installed to divert water flows around the stockpile. Silt fencing, silt fabric drain covers, and hay-bales are to be appropriately placed and installed to avoid sediment loading of stormwater drains and pipes. The installation of these controls is to be undertaken in accordance with the Landcom (2004) "Blue Book" and the site stockpile, erosion and sediment management plans. Stockpiles should be monitored for evidence of failure, run-off, erosion, and dust generation and mitigated appropriately.

8.2.1 Waste disposal tracking

Tracking of waste movements around the site and material transported off-site for disposal is a critical component to demonstrate that the remedial strategy is being implemented appropriately. Waste tracking will be achieved through use of waste disposal dockets, survey of stockpiled materials or



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excavations and photographic documentation of movements of soil around and on/off-site. An environmental scientist should be on-site to monitor the remedial works and to check with the site manager that appropriate waste tracking procedures are being employed.

8.3 EXCAVATION WATER MANAGEMENT

While unlikely to be intersected as part of the remediation works outlined in this RAP, groundwater has been encountered on the site assessed to be impacted by per-fluoroalkyl substances (PFAS).

If accumulated water (either groundwater or rainfall) is to be extracted from excavations, then it is to be managed in accordance with applicable guidelines and criteria including those set-out by the local water authority. This may include assessment by a suitably qualified environmental consultant to determine suitability for discharge and re-use on-site or extraction and disposal off-site at an appropriately licensed liquid waste facility as per the NSW EPA (2014) *Waste Classification Guidelines*.

8.4 AIR AND DUST

8.4.1 Odours

Due to the nature of contamination identified on site, it is not anticipated that nuisance odours will be generated. Should odour be generated that is likely to impact sensitive receptors, such as neighbouring residents, on-site spraying of the excavated material with a suitable odour suppressant (i.e. Anotec) will be undertaken to minimise any odour. Other options that may also be employed are:

- A reduction in the size of the excavation face that is open at any one time to reduce the surface area generating the odour;
- Location of any temporary stockpiles of impacted soil as far as possible (and in the predominant down-wind direction) from sensitive receptors;
- Smothering of the odours by covering the portion of the site that is generating the odour; and
- Watering the stockpiles and excavations to minimise volatile emissions.

8.4.2 Dust control

The Principal Contractor will be responsible for ensuring that excavation, loading, carting, and stockpiling operations are dust free. This may include (but is not limited to):

- Stockpile protection;
- Water application on stockpiles and access roads;
- Limiting the area of exposed excavations and surfaces; and
- Wind fences around earthworks areas.

In the event that excessive dust is generated during any operations on-site, the works will cease and modifications to the process will be made before the operation is resumed. There must be no observable dust transported off-site.



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8.5 UNEXPECTED FINDS

Site workers (including remedial contractors and the nominated environmental consultant) must be vigilant for materials that may impact the soil suitability for the proposed land use, particularly for soils intended to remain following remediation works. Unexpected finds include, but are not limited to, odour, visual contamination (e.g. soil staining or discolouration), anthropogenic materials (i.e. large quantities of building materials), asbestos containing material, underground storage tanks (UST), or any other suspect materials. Any unexpected finds will be reported to the Site Manager immediately. Additionally, the site owner/occupier should be informed as soon as practical following an unexpected find.

If an unexpected find is discovered during excavations the Contractor shall:

- Cease all work in that vicinity;
- Remove workers from the vicinity and limit access to the area (i.e. fencing, bunting or signage);
- An experienced environmental consultant should be contacted to assess the potential risks associated with the Unexpected Finds and provide appropriate management options; and
- Investigate the nature of the risk of the materials, determine the appropriate response and document the actions in accordance with contractual obligations.

In the event of a serious unexpected find, which could cause immediate harm to human health and/or the environment, Central Coast Council, and NSW EPA may need to be informed.

In the event potential heritage items are encountered during excavations, works will cease and the Site Manager notified.

8.6 STORMWATER

8.6.1 Erosion and sediment control

Cleared areas and exposed excavations may promote erosion. The following erosion and sediment controls will be implemented:

- Limiting the extent of cleared areas and exposed excavations;
- Backfilling of excavated areas as soon as practicable;
- Diversion of stormwater from active areas using hay bales or sediment fences;
- Covering of temporary stockpiles with plastic (HDPE) and placement of silt socks around excavations when necessary;
- Covering open stormwater grates in the vicinity of stormwater pits and excavations with silt fences or other appropriate materials;
- Placement of stockpiles away from footpaths, roadways, kerbs, access ways, drainage lines, and slopes;
- Minimising translocation of contaminated soils throughout the site by ensuring excavator operators do not track over contaminated areas;
- If possible, a single vehicle entry and exit to minimise translocating soil;



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- Depending on the volume of soil to be excavated, rumble strips may be required at the site access in order to prevent contaminated soil being transported off-site.

The installation of these controls is to be undertaken in accordance with the Landcom (2004) "Blue Book".

8.7 NOISE

The hours of operation will comply with Council requirements to control noise from site works, typically:

- 7am to 5pm Monday through Friday
- 8am to 1pm Saturdays.
- No work is permitted on Sundays or public holidays.

8.8 LAND DISTURBANCE

Works include excavation, loading, carting and stockpiling operations of associated soils. These works shall be carried out in an orderly manner to minimise impact to the surrounding residences.

- Excavation - the removal of soil shall be performed by the appointed excavation contractor using an excavator. If a transport truck is not on-site during excavation and soil will need to be temporarily stockpiled, no contaminated soils should be placed on areas validated as suitable for the proposed land use. In these locations, soils shall be excavated and placed on a suitable plastic liner or on concrete surfaces in discrete, trackable stockpiles prior to off-site disposal. Stockpiles should be segregated for each potential contamination source.
- Loading and Carting – the loading of the stockpile material shall occur with an appropriately sized loader, and drop heights should be minimised. The trucks and trailers shall be covered for transport as deemed necessary, and shall meet any other statutory requirements.

8.9 GENERAL

The appointed Principal Contractor shall ensure compliance with relevant Safework NSW guidelines and Occupational Health and Safety Regulations. The Principal Contractor shall also ensure compliance with any amendments to the Act or Regulations during the project duration.

The Principal Contractor shall monitor and control the access of all persons to the site and ensure that no unauthorised persons enter the site during remedial works (wherever practicable). All site personnel and visitors will be inducted and shall wear appropriate personal protective equipment (PPE).

The appointed Principal Contractor shall undertake additional underground and overhead service location specifically in areas surrounding the remediation location.

Any open excavation(s) are to be barricaded in accordance with the NSW Occupational Health and Safety Act; Clause 16 (1) and the Construction Safety Regulation Section 73, as administered by Safework NSW.



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The appointed Principal Contractor shall install warning signs on the barricades surrounding any open excavations or active work areas with machine interactions.

8.9.1 Vehicles

The appointed Principal Contractor shall ensure all vehicles are suitably contained and covered in the transport of all debris, spoil, rubbish and materials to or from the site, such that spillage or contamination of adjoining and other areas or property shall be prevented.

Vehicles shall also be maintained to prevent the transfer of mud or wastes onto adjacent streets or other areas. If wheel treads contain significant quantities of site soils the contractor will manually remove and appropriately dispose. A cattle grid, tyre wash or similar removal method should be considered at the site entrance / exit.

8.9.2 Traffic control

The Principal Contractor shall supply signs and safety cones; erect at the appropriate entry and exit points; and maintain these devices in good condition. Excavation works, stockpiles and other hazards, shall be individually barricaded at all times. The site will be fully fenced to exclude public.

8.9.3 Refuse disposal

All site refuse, including food, equipment wrappings, unused materials, etc. shall be handled and disposed of appropriately into a skip.

8.9.4 Site security

The site shall be secured by a lockable fence around the perimeter of the site and access to the site is to be restricted. All excavations and above-ground remediation equipment will be barricaded with reflective barricades, with pertinent reflective signage. Keys to the gate will be restricted to approved personnel.

Fencing should be sufficient to prevent unauthorised access including illegal tipping and dumping by the public which may exacerbate site contamination issues.

8.9.5 Training

Low environmental awareness of site workers may result in environmental impact including cross contamination of soil layers and off-site movement of contaminated soil. Accordingly, staff awareness training, inductions and daily toolbox meetings shall be conducted by the Principal Contractor with assistance from the Proponent and Site Supervisor.

8.9.6 Roles and responsibilities

8.9.6.1 Proponent/Land Owner

A summary of the proponent's role and responsibilities includes:



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Remediation environmental and waste management plan

- Overall responsibility for the project development and outcomes of the RAP;
- Becomes the Principal Contractor unless assigned to an appropriate Third Party;
- Liaison with neighbours and other stakeholders;
- Engagement and/or approval of Site Manager, Site Remediation Contractor, and environmental consultant to oversee, implement, and monitor progression of the RAP;
- Engagement of contractors to perform further investigation works, and any subsequent contaminated soil disposal and site rehabilitation works as required;
- Provision of health and safety measures for site personnel and the works area; and
- Maintain relevant records associated with the RAP.

8.9.6.2 Site Manager

A Site Manager, who is an individual familiar with the site development construction and implementation of environmental controls, is to be appointed to take responsibility for implementation of this RAP at the site during excavation of impacted soils. The Site Manager's duties include:

- Complete control of all site activities;
- Workplace health and safety Induction for all site attendees;
- Regular inspection of the site and site activities;
- Maintenance of a daily activities record;
- Implementation and compliance with the RAP;
- Maintaining routine correspondence with the site owner, remediation contractor and environmental consultant on progress of site remediation;
- Liaison with site personnel/contractors and the proponent regarding progress of works;
- Provide and maintain a photographic record of works and results; and
- Identification, reporting and management of the rectification of any non-conformances with the RAP.

8.9.6.3 Remediation contractor

The remediation contractor is to be engaged for the remediation works and must:

- Undertake all works in compliance with the provisions of the RAP;
- Liaise with Site Manager and environmental consultant regarding progress of works;
- Report any environmental incidents and unexpected finds to the Site Manager;
- Collate all project documentation including landfill disposal dockets (where relevant); and
- Conduct works in accordance with the Site OH&S plan.

8.9.6.4 Environmental Consultant

An environmental consultant knowledgeable with the RAP, the NSW EPA and legislative framework should be appointed by the client and involved in providing contaminated land advice through the project.

The Environmental Consultant's duties are to include:

- Regular inspection of the site and site activities as requested by the Client or Site Manager;



REMEDIATION ACTION PLAN

Remediation environmental and waste management plan

- Undertake validation inspections, sampling and prepare validation reports;
- Completion of daily field notes when requested to attend the site;
- Provision of on-site advice with regard to implementation and compliance with the RAP;
- Liaison with site personnel/contractors and the client regarding progress of works;
- Provide and maintain a photographic record of works and results when attending the site; and
- Documenting, reporting and advice on the rectification of any RAP non-conformances.



REMEDIATION ACTION PLAN

Occupational health and safety

9.0 OCCUPATIONAL HEALTH AND SAFETY

9.1 OHS PLANNING AND PREPARATION

Prior to mobilising to complete the remedial works, the Principal Contractor and appointed remedial contractor will develop site and project specific Health and Safety Plans (HSPs), Safe Work Method Statements (SMWS) and Job Safety Analyses (JSAs) for the scope of works to be undertaken. The OHS documentation will detail measures to mitigate potential risks to site workers, third parties and the local environment during the remedial works. General, minimal OHS procedures to be implemented during the remedial works are outlined as follows:

- The identified asbestos contamination only presents a risk to human health upon the inhalation of “respirable fibres”. Control measures should be implemented to minimise dust and fibre generation, and minimise unavoidable exposure to dust. This can include moistening (but not saturation) of soils during excavation and load out, minimizing drop heights where handling soils, avoiding of double handling of material, covering of material between handling, and use of respirators / dust masks and other personal protective equipment (PPE);
- Protective footwear (steel capped boots) to be worn on site at all times;
- Hearing protection should be worn during soil removal activities (or when working in the vicinity of heavy plant/machinery);
- Unauthorised access should be limited by ensuring that security gates are locked at the completion of each day’s work;
- Personnel are not to enter excavations (>1m depth) at any time; and
- PPE shall be provided in sufficient quantities to provide for the duties of each on-site individual.

9.2 INCIDENT MANAGEMENT PLAN

Emergency response includes pre-emergency planning, lines of authority and communication, emergency recognition and prevention, site control, evacuation routes, decontamination and first aid.



REMEDIATION ACTION PLAN

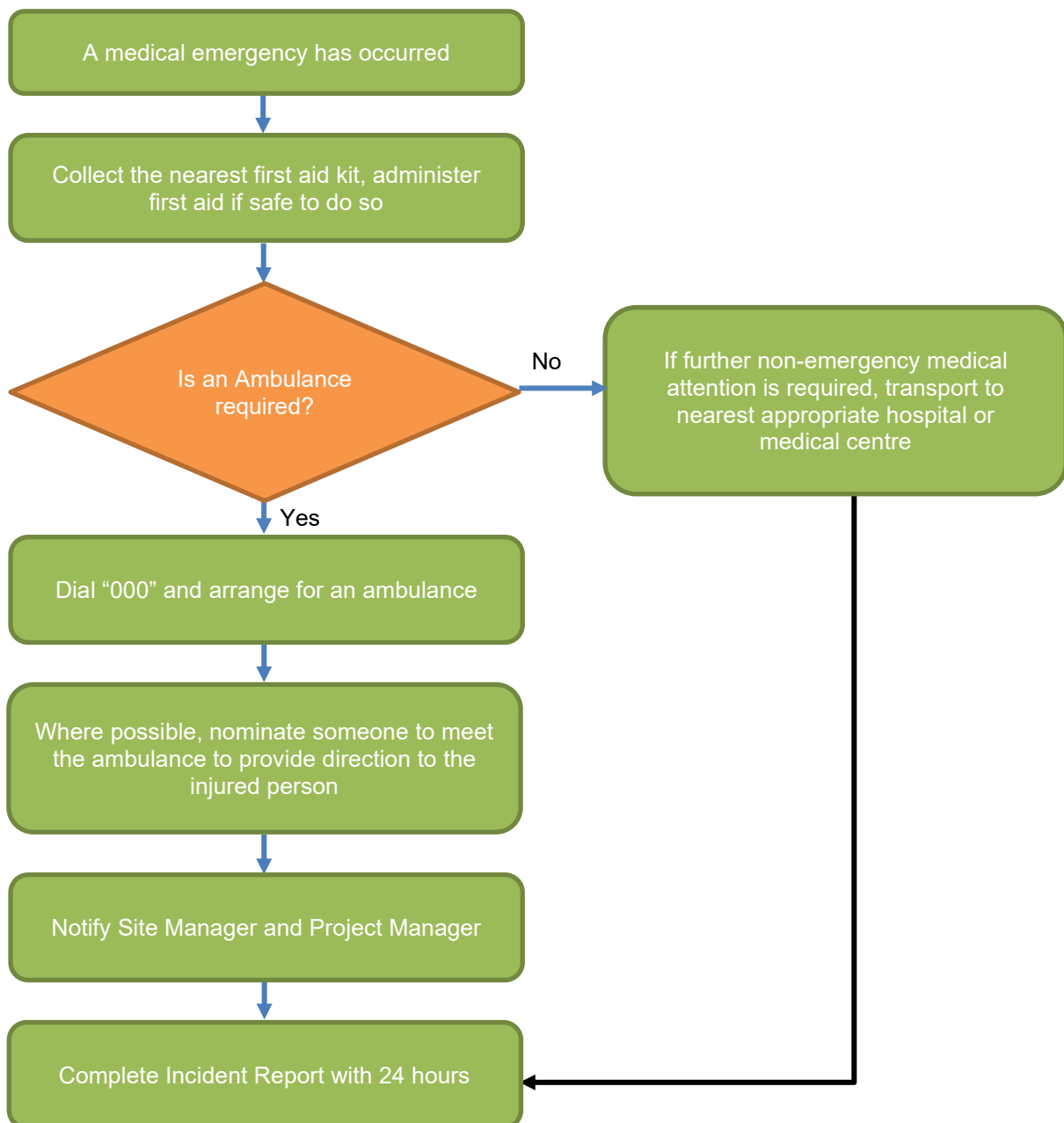
Occupational health and safety

9.2.1 Medical emergency / serious injury

In the event of an accident or an emergency situation involving a serious injury or medical emergency, immediate action must be taken by the first person to recognise the event (refer to flowchart below).

A portable and fully-stocked first aid kit shall be retained on site at all times.

In the event of a fatality, the Police, Site Manager, and Project Manager shall be notified immediately.

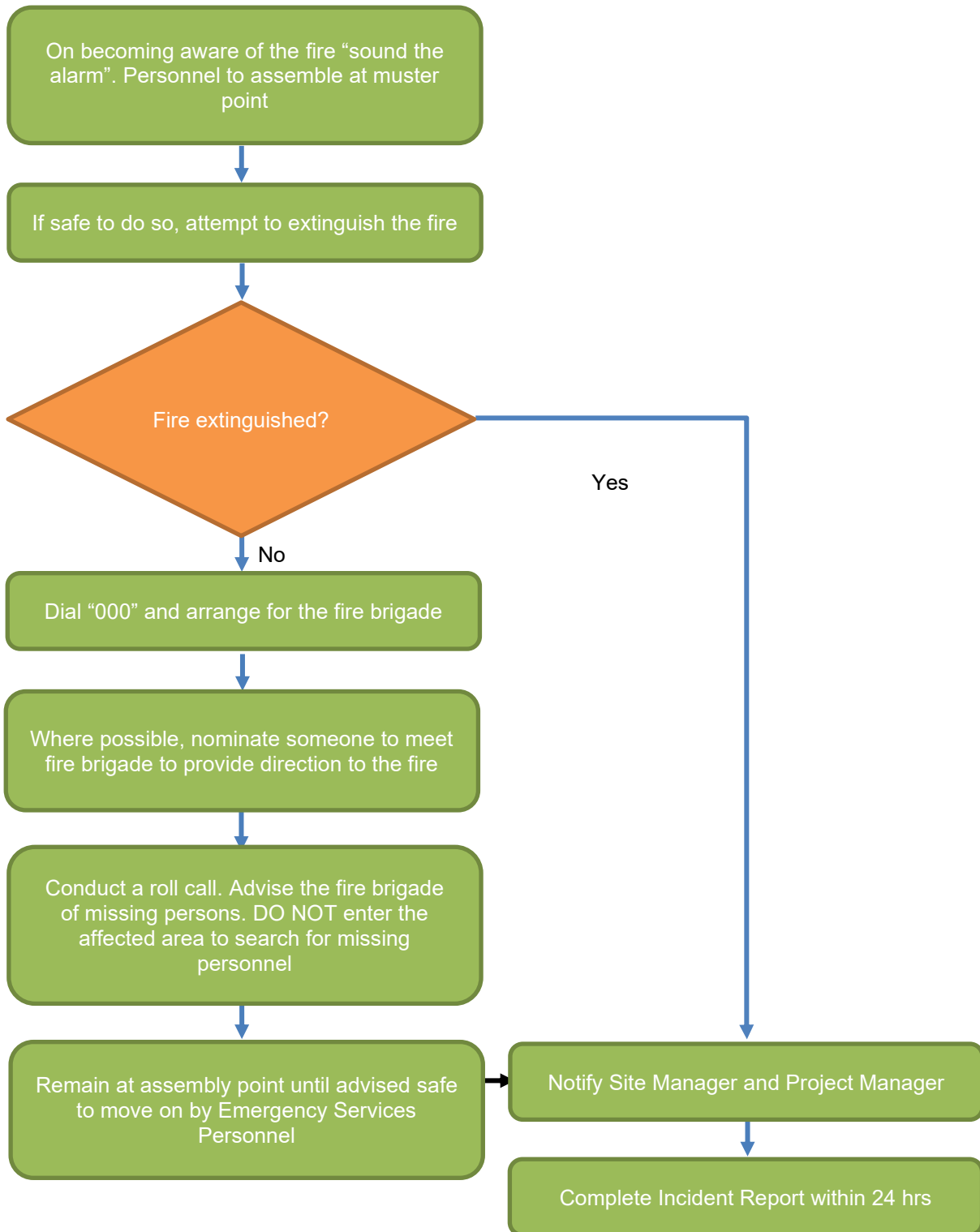


REMEDIATION ACTION PLAN

Occupational health and safety

9.2.2 Fire

In the event of a fire, the actions outlined in below shall be taken:

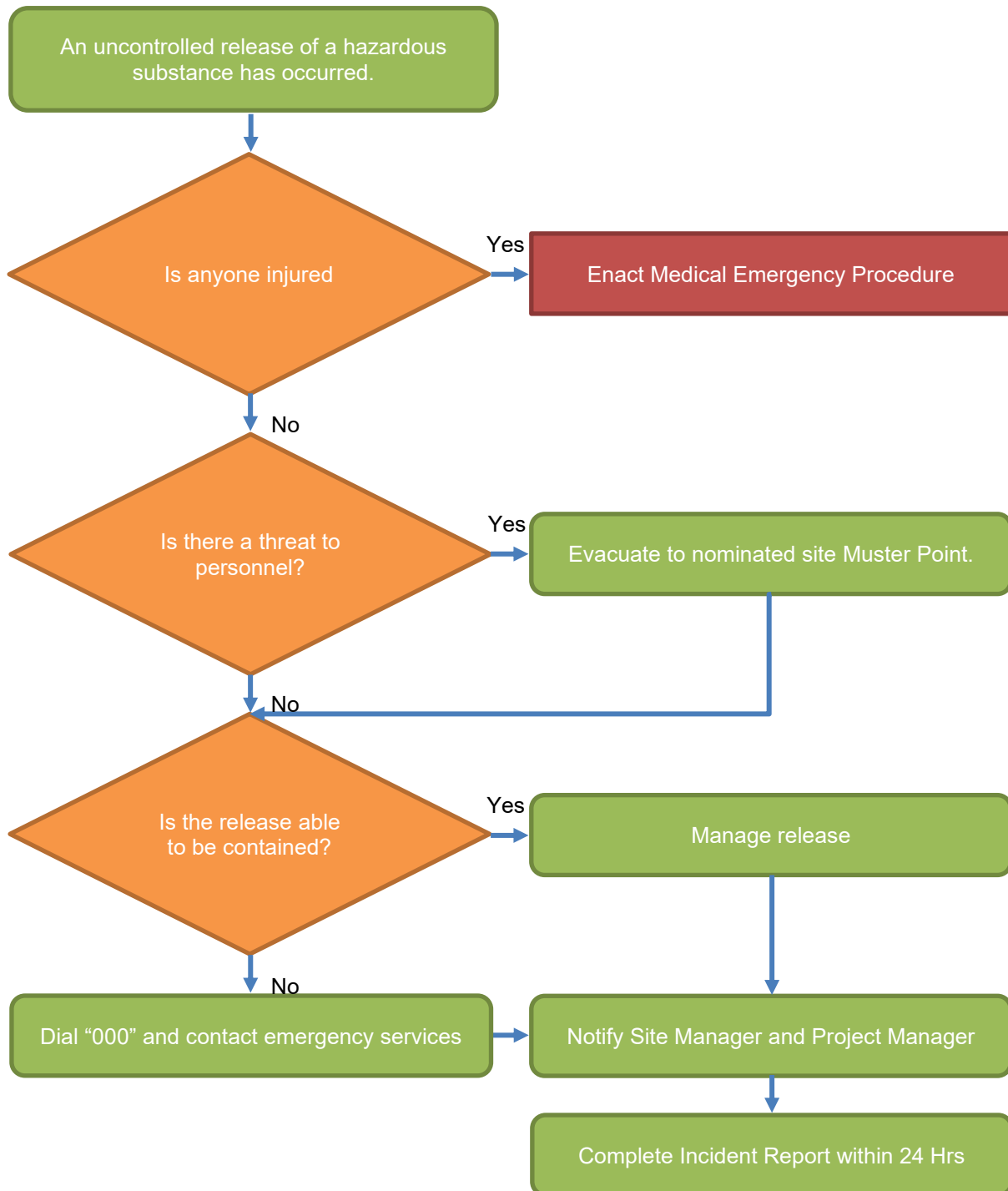


REMEDIATION ACTION PLAN

Occupational health and safety

9.2.3 Environmental incident

In the event of an environmental incident, the actions outlined below shall be taken:



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Occupational health and safety

9.3 INCIDENT REPORTING

All site workers and attendees are required to verbally report incidents, accidents and near-misses to the Site Manager and Project Manager immediately after an event has occurred. It is the responsibility of the Site Manager to notify the Proponent immediately after the occurrence of an incident and to complete a written incident report within 24 hours including notification to appropriate individuals and authorities (i.e. HSE and Management teams, SafeWork NSW and NSW EPA). Additional investigations may be necessary should a serious incident occur.

9.4 COMMUNITY CONSULTATION

Stantec does not anticipate that significant community consultation will be required during the course of the remedial and validation works. Should this assumption change, a detailed Community Consultation Plan may be developed to manage communications with third parties.



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Regulatory approvals / licences

10.0 REGULATORY APPROVALS / LICENCES

10.1 REGULATORY COMPLIANCE REQUIREMENTS

Regulations and sources of regulatory guidance relevant to this remediation programme relate to waste management, environment protection and occupational health and safety.

10.1.1 Waste management

The remediation program must comply with the following legislation and policies:

- Waste Avoidance and Resource Recovery Act 2001
- Protection of the Environment Operations (waste) Regulation 2005
- NSW EPA (2014) Waste Classification Guidelines

10.1.2 Asbestos Works

The remediation of asbestos impacted soils must be carried out in a manner compliant with national, state and local environmental regulations, including the:

- NSW Work Health and Safety Act 2011;
- NSW Work Health and Safety Regulation 2017;
- Protection of the Environment Operations Act 1997;
- Contaminated Land Management Act 1997
- Safework NSW – How to Safely Remove Asbestos, Code of Practice (2022).
- Safework NSW – How to Manage and Control Asbestos in the Workplace, Code of Practice (2022).
- Safework NSW – How to Manage Work Health and Safety Risks, Code of Practice (2019).

10.1.3 Planning controls

Planning controls applicable to the proposed remediation are provided in the following:

- Central Coast Local Environmental Plan 2022
- State Environmental Planning Policy (Resilience and Hazards) 2021

The proposed remedial works are to be managed as Category 2 remediation as per the State Environmental Planning Policy (Resilience and Hazards) 2021 definition as the works are to be undertaken under existing approvals for the site development, with no specific development application required.



REMEDIATION ACTION PLAN

Conclusions

11.0 CONCLUSIONS

Stantec was engaged by the client to prepare this Remediation Action Plan to guide the remediation of identified asbestos in soil impacts at the site. Due to factors including the absence of effective treatment methods for the identified contamination and the small volumes of impacted material identified, the remediation methodology identified as most suitable was a combination of on-site treatment (emu pick) for bonded asbestos and off-site disposal (friable asbestos and impacted soils) of impacted materials.



REMEDIATION ACTION PLAN

Limitations

12.0 LIMITATIONS

This report has been prepared for the client, and their agents and the local council planning authority for the purpose of guiding and informing the remediation programme. Use of the report by other parties for different purposes shall be at their own risk. Whilst the assessment has used current industry practice to characterise the nature and extent of contamination at this site, and the author is satisfied with the quantity and quality of the information presented as the basis for this report, the Stantec cannot guarantee completeness or accuracy of any data, descriptions or conclusions based on information provided to it by others.

The agreed scope of this assessment has been limited for the current purposes of the Client. The remedial approach presented in this RAP may not remediate all types of contamination occurring in all areas of the site.

This Document has been provided by Stantec subject to the following limitations:

- This Document has been prepared for the particular purpose outlined in Stantec's proposal and no responsibility is accepted for the use of this Document, in whole or in part, in other contexts or for any other purpose;
- The scope and the period of Stantec's services are as described in Stantec's proposal, and are subject to restrictions and limitations. Stantec did not perform a complete assessment of all possible conditions or circumstances that may exist at the site;
- Conditions may exist which may limit the effectiveness of the proposed remedial approach, including geologic and hydrologic conditions, the presences of services or other underground infrastructure. Accordingly, more than one phase of remediation may be required to achieve the goals of this RAP;
- In addition, it is recognised that the passage of time affects the information and assessment provided in this Document. Stantec's opinions are based upon information that existed at the time of the production of the Document. It is understood that the services provided allowed Stantec to form no more than an opinion of the actual conditions of the site at the time this Document was prepared and cannot be used to assess the effect of any subsequent changes in the quality of the site, or its surroundings, or any laws or regulations.
- Where data supplied by the client or other external sources, including previous site investigation data, have been used, it has been assumed that the information is correct unless otherwise stated. No responsibility is accepted by Stantec for incomplete or inaccurate data supplied by others.
- Stantec may have retained sub consultants affiliated with Stantec to provide services for the benefit of Stantec. To the maximum extent allowed by law, the Client acknowledges and agrees it will not have any direct legal recourse to, and waives any claim, demand, or cause of action against, Stantec's affiliated companies, and their employees, officers and directors.

This RAP is not any of the following:

- A Site Audit Report or Site Audit Statement as defined under the *Contaminated Land Management Act, 1997*;



REMEDIATION ACTION PLAN

Limitations

- A Preliminary Site Investigation or Detailed Site Investigation sufficient for a Site Auditor to be able to conclude a Site Audit Report and Site Audit Statement;
- A total assessment of the site to determine suitability of the entire parcel of land at the site for one or more beneficial uses of land.



REMEDIATION ACTION PLAN

References

13.0 REFERENCES

- Getex. (2020). *Asbestos Building Materials Register and Management Plan, 9A-11 Racecourse Road, West Gosford NSW 2250*. Report Ref: 11222.07.ASSR: Getex Pty Ltd.
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- NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure (NEPM), As amended 2013*. National Environment Protection Council (NEPC).
- NSW EPA. (2014). *Waste Classification Guidelines, Part 1: Classifying Waste*. NSW Environment Protection Authority.
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- Standards Australia. (2018). *AS 4419:2018 - Soils for landscaping and garden use, Fourth Edition*. SAI Global Ltd.
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- Stantec. (2023b). *Detailed Site Investigation, 7A -11 Racecourse Road, 1-3 Faunce Street & 38-50 Young Street, West Gosford*. Report Ref: 300304375_DSI_RevA: Stantec Australia Pty Ltd.



APPENDIX A

Figures



Regional Vicinity

Racecourse Road
West Gosford, New South Wales

Project Code: 3000304375-GS-003
Drawn By: AC, Checked By: SM
Rev: 01
Date: 2023-01-31

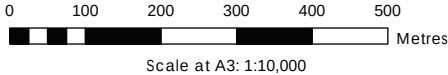
Legend

- Site Boundary
- Watercourse
- Cadastre

DRAFT - NOT FOR CONSTRUCTION

Notes:
1. Map displayed in GDA2020 MGA Zone 56

- References:
- 1. Aerial imagery - MetroMap (September, 2022)
 - 2. Cadastre - NSW SS (2022)
 - 3. Watercourses - NSW SS





Sampling and Soil Exceedance Plan

Racecourse Road
West Gosford, New South Wales

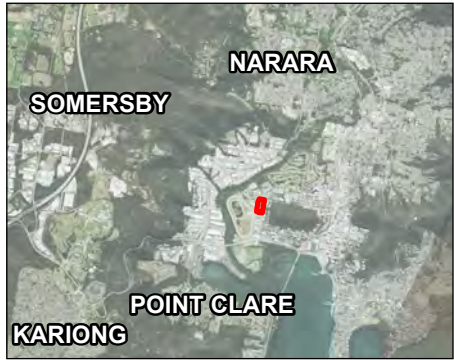
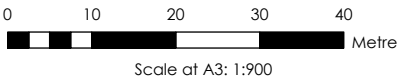
Project Code: 3000304375-GS-005
Drawn By: MMM, Checked By: JE
Figure: 2 | Rev: 01
Date: 2023-07-04

Legend

- Site Boundary
- Cadastre
- Friable Asbestos in Soil Impact
- Sample Type
 - Hand Auger
 - Monitoring Well
 - Test Pit
 - ACM Fragments in Soil
 - Ecological Exceedance - Zinc
 - Ecological Exceedance - TRH F2

Notes:
1. Map displayed in GDA2020 MGA Zone 56

References:
1. Aerial imagery (MetroMap, (Sept 2022)
2. Cadastre (NSW SS, 2022)



APPENDIX B

Sampling DQO and DQI

REMEDIATION ACTION PLAN

Appendix B Sampling DQO and DQI

Appendix B SAMPLING DQO AND DQI

A.1 DATA QUALITY INDICATORS

The following Data Quality Indicators (DQIs), are to be adopted in accordance with the requirement of the *Schedule B2 Guideline on Site Characterisation* of the ASC NEPM (2013). The DQIs outlined in the table below assist with decisions regarding the contamination status of the site, including the quality of the laboratory data obtained.

Data Quality Indicators

QAQC Measure	Field Quality Indicator	Laboratory Quality Indicator
Precision: A quantitative measure of the variability (or reproducibility) of data,	SOPs are appropriate and complied with. Field duplicates and Blind field duplicates are collected and analysed at a rate of 5% (1 per 20 samples). Use of calibrated equipment.	Laboratory analyses of laboratory and inter-laboratory duplicates, field duplicates, laboratory prepared volatile trip spiles. Relative Percent Difference (RPD) calculation results: <30% Relative Percentage Difference (RPD). The RPD values are calculated using the following equation: $RPD = \frac{ C_O - C_R }{[(C_O + C_R) / 2]} \times 100$ Where, C _O = Analyte concentration of the original sample C _R = Analyte concentration of the duplicate sample
Accuracy: A quantitative measure of the closeness of reported data to the "true" value	SOPs are appropriate and complied with. Use of calibrated equipment. Field interlaboratory duplicates sampled and analysed at a rate of 1 per 20 samples. <50% Relative Percentage Difference (RPD) for volatile contaminants. Analysis of rinsate sample collected at rate of 1 per day.	Laboratory holds NATA-accreditation for the analyses. Laboratory holds ANSI accreditation for isotope analysis. Laboratory limit of reporting is below the adopted investigation level. Laboratory analysis of: field blanks, rinsate blank, reagent blank, method blank, matrix spike, matrix spike duplicate, surrogate spike, reference material, laboratory control sample, laboratory-prepared spikes. The nominal acceptance limits on laboratory control samples are: Laboratory spikes: 70-130% recovery for metals 60-140% for organics Laboratory duplicates. If contaminant concentration is: < 10 x PQL, no RPD limit 10-20 x PQL, RPD is 0% to 50% >20 x PQL, RPD is 0% to 20% Laboratory surrogates: 60-140% recovery. Laboratory blanks: <PQL Laboratory control samples, 70-130% recovery



REMEDIATION ACTION PLAN

Appendix B Sampling DQO and DQI

QAQC Measure	Field Quality Indicator	Laboratory Quality Indicator
Representativeness: The confidence (expressed qualitatively) that data are representative of each media present on site and the conditions encountered in the field	Appropriate media sampled. Preservation and storage of samples upon collection and during transport to the laboratory occurs. Sampling is undertaken by an experienced sampler.	Blank samples run in parallel with field samples to confirm there are no unacceptable instances of laboratory artefacts. Review of RPD values for field and laboratory duplicates to provide an indication that the samples are generally homogeneous, with no unacceptable instances of significant sample matrix heterogeneities The appropriateness of collection methodologies, handling, storage and preservation techniques will be assessed to ensure/confirm there was minimal opportunity for sample interference or degradation (i.e. volatile loss during transport due to incorrect preservation / transport methods). Rinsate samples used when sampling equipment is reused have analytical results <LOR.
Completeness: A measure of the amount of useable data from the data collected during the fieldwork program	All critical locations sampled. All samples collected (from grid and at depth). Standard operating practices (SOPs) appropriate and complied with. Sampling is undertaken by an experienced sampler. Suitable records of field work are documented. Completed laboratory sample chain-of-custody and documentation.	All critical samples are analysed according to the SAQP. All COPC are analysed. Appropriate methods and PQLs are implemented. Sample documentation is complete. Samples are analysed within holding times.
Comparability: The confidence (expressed qualitatively) that data may be considered to be equivalent for each sampling and analytical event	Same SOP is used on each field occasion. Climatic conditions are documented. Experienced sampler Sample type, preservation and handling are consistent at sampling events. Use of calibrated equipment.	Sample analytical methods used (including clean-up) Sample PQLs (justify/quantify if different) Same laboratories are used and justification is given where differences occur. Same analytical methods, Practical Quantification Limits (PQLs), and units of measurement are used.

A.2 QUALITY ASSURANCE / QUALITY CONTROL

To meet the DQIs outlined above, the following additional Quality Assurance / Quality Control (QA/QC) procedures are to be undertaken.

Summary of QA/QC processes

Requirement	Comments
Equipment calibration	Provision of calibration certificates. The scientific instruments that are used for the site are to be calibrated by the manufacturer.
Equipment decontamination	Decontamination of sampling equipment where needed. Sampling equipment that is not disposable, such as hand tools, is to undergo the following decontamination process:



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Appendix B Sampling DQO and DQI

Requirement	Comments
	Wash equipment in soapy water that contains a mixture of water and Decon 90, with the objective to remove sediments and particulate from the equipment. Rinse decontaminated equipment with potable or deionised water.
Soil logging	Logging soils in general accordance with AS1726 including sample information recorded on the sampling sheets.
Sample media identification	Samples marked with a unique identifier including project number, sample location, depth and date.
QA/QC Field duplicates/triplicates/field blanks and trip spikes	Duplicate samples collected at a rate of 1 every 20 primary samples completed at the primary intra-laboratory; and triplicate samples at a rate of 1 every 20 samples to be analysed at the secondary inter-laboratory. One laboratory provided trip blank and trip spike is to be submitted at a rate of 1 per sample dispatch.
Sample preservation	Collected soil and water samples are to be placed in a chilled icebox with ice for storage and transport to the laboratory.
Chain of Custody (COC documentation	COC forms detailing sample identification, collection date, sampler and laboratory analysis required. The COC form is to be signed off and returned to Stantec by the laboratory staff upon receipt of all the samples.
NATA accredited methods	NATA accredited laboratories are to be used for analysis of samples in accordance with NATA accredited methods where applicable.
Trip blank / spike	A laboratory supplied trip blank and trip spike is to be submitted for analysis at a rate of at least one per sample dispatch.

