Asbestos Management Plan, Mulga Downs Station, Pilbara, Western Australia

Mulga Downs Iron Ore Mine – Western Australia

Hancock Prospecting Pty Ltd
ABN 69 008 676 417

EPBC Assessment Number: 2022/09255
EPA Assessment Number: 2326

19 December 2024

Revision Register

REV	DATE	DESCRIPTION	PREPARED BY	REVIEWED BY	AUTHORISED BY
0	April 2023	Draft Management Plan for EPA and DCCEEW initial review.	JBS&G Australia	V Campagna	
1	June 2023	Draft Management Plan for EPA initial review.	JBS&G Australia	V Campagna	
2	November 2023	Draft Management Plan for DCCEEW initial review.	JBS&G Australia	L Taylor	
3	December 2024	Draft Management Plan to incorporate DMA RFI feedback.	JBS&G Australia	L. Taylor	B. McGuire

Declaration of Accuracy:

In making this declaration, I am aware that section 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) makes it an offence in certain circumstances to knowingly provide false or misleading information or documents to specified persons who are known to be performing a duty or carrying out a function under the EPBC Act or the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth). The offence is punishable on conviction by imprisonment or a fine, or both. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

Signed	B McGuire
Full name (please print)	Brett McGuire
Organisation (please print)	HanRoy
Date	19/12/2024

Table E- 1: Asbestos Management Plan Summary

Proposal Name	Asbestos Management Plan (AMP, the Proposal)
Proponent Name	Hancock Prospecting Pty Ltd (HPPL, the Proponent)
Short Description	The Proposal is for the development of the MDIOM, located 210 km south of Port Hedland and 180 km north west of Newman in the Pilbara Region of Western Australia. The Proposal includes but is not limited to the following: • The development of a series of above and below water table mine pits; • Ore processing facility; • Groundwater abstraction for water supply (for the mine and all associated infrastructure) and for the dewatering to facilitate the recovery of ore below water table in the mine pits; • Surplus water management with discharge of excess water via managed aquifer recharge (MAR); • Mineral waste management (waste rock dumps (WRD), and tailings storage facilities (TSFs)); • Infrastructure to manage surface water (diversion of creeks and surface water flows); • Linear infrastructure (haul roads, powerlines, pipelines and conveyor corridors); • Mine associated infrastructure and support facilities (including, but not limited to accommodation camp, energy supply infrastructure, airstrip; wastewater treatment plant; landfill, offices, workshops, laydown areas, etc.); and • Transport of the ore via the Great Northern Highway to Port Hedland for export. The Great Northern Highway transport option will enable commencement of the Mulga Downs Iron Ore Mine. Future transport options (e.g. rail) will be subject to a separate referral.
Ministerial Statement Number	To be determined *Note: This document has been prepared to support the EPA's and the Commonwealth DCCEEW's assessment of the Proposal*.
EP Act Assessment No.	2326
EPBC Reference No.	2022/09255
Purpose of CSFMP	To provide a management framework for conservation significant vertebrate fauna and their habitats to avoid, minimise and mitigate potential adverse impacts associated with the implementation of the Proposal.
Key environmental factor/s and objectives relevant to this CSFMP	**Terrestrial Fauna:** "*To protect terrestrial fauna so that biological diversity and ecological integrity are maintained"* **Flora and Vegetation**: *To protect flora and vegetation so that biological diversity and ecological integrity are maintained.* .
Controlling Provisions - MNES	• Threatened species and communities (s.18 & s.18A). • Migratory Species (s.20 & s.20A).
Condition clauses	This CSFMP satisfies item 10 of the Environmental Scoping Document (ESD) for the Proposal under EP Act Assessment No. 2326. Given the Proposal is under assessment (Part IV of EP Act) and as a Controlled Action under EPBC Act. Approval from approval conditions are yet to be issued.
Key components in the CSFMP	An outcome and objective-based management plan addressing the following: • Limits clearing of conservation significant fauna habitat.

	• Protection of Category 4 caves for conservation significant bat species.
	• Minimise clearing of conservation significant fauna habitat required for implementation of the Proposal.
	• Minimise declines in significant fauna habitat as a result of dust emissions from the Proposal.
	• Minimise declines in the condition of habitat that supports significant fauna as a result of:
	  ◦ altered fire regimes;
	  ◦ weed invasion;
	  ◦ altered surface water drainage and flows .
	• Minimise disturbance to native fauna from noise, vibration and lighting during Proposal implementation.
	• Minimise decline in conservation significant fauna due to predation from introduced fauna (including cane toads) as a result of the Proposal.
	• Use of saline water (> 50,000 mg/L TDS) for dust suppression.
	• Establishment of a Fauna Habitat Exclusion Zone (FHEZ).
	• Minimise incidental mortality or injury of conservation significant terrestrial fauna from clearing activities, vehicle strike or mining related activities resulting from the Proposal.
	• Minimise conservation significant terrestrial fauna population decline due to entrapment within mine infrastructure and equipment, as a result of the Proposal.
	Note this CSFMP is to move towards outcome based as the residual impacts are finalised.

Proposed construction date	Construction of the Proposal is anticipated to commence at the beginning of FY2025 (subject to approvals) and is forecast to take approximately two years.
CSFMP required pre-construction?	Yes

TABLE OF CONTENTS

TABLES

FIGURES

Abbreviations

Term	Definition
ACM	Asbestos Containing Material
ACD	Asbestos Containing Dust
AF	Asbestos Fines
AMP	Asbestos Management Plan
APEC	Areas of Potential Environmental Concern
AWS	Automatic weather station
BIF	Banded Iron Formation
BoM	Bureau of Meteorology
CSM	Shire of Ashburton
DER	Department of Environmental Regulation
DMIRS	Department of Mines, Industry Regulation and Safety
DoH	Department of Health
DWER	Department of Water and Environmental Regulation
ESA	Environmental Site Assessment
FA	Fibrous Asbestos
HPPL	Hancock Prospecting Pty Ltd
JBS&G	JBS&G Australia Pty Ltd
NEPC	National Environmental Protection Council
NOA	Naturally Occurring Asbestos
PPE	Personal Protective Equipment
PSI	Preliminary Site Investigation
SLR	SLR Consulting Australia Pty Ltd
SPR	Source-pathway-receptor
VAR	Voluntary Auditor's Report
WA	Western Australian
WAMA	Wittenoom Asbestos Management Area

1 Introduction

JBS&G Australia Pty Ltd (JBS&G) was engaged by Hancock Prospecting Pty Ltd (HPPL) to prepare an Asbestos Management Plan (AMP) with an 'unexpected finds'[1] procedure to manage suspected asbestos containing materials (ACM) within the proposed Development Envelope and Conceptual Footprint for the Mulga Downs Iron Ore Mine and Mulga West groundwater bore field (Proposal) (**Figure 1**).

This AMP was recommended following the results of the below asbestos assessment and investigation reports:

- JBS&G 2022a, *Asbestiform Minerals and Asbestos Containing Material, Preliminary Environmental Site Assessment – Scoping Document, Mulga Downs Iron Ore Mine and Borefield, Pilbara, Western Australia*, Report prepared for Hancock Prospecting Pty Ltd, 54533 / 146,642.
- JBS&G 2022b, *Asbestiform Minerals and Asbestos Containing Material, Preliminary Environmental Site Assessment (ESA), Mulga Downs Iron Ore Mine and Borefield, Pilbara Western Australia*, Report prepared for Hancock Prospecting Pty Ltd, 54533 / 147,801.

1.1 Background

HPPL require an AMP to assist the regulatory permitting process for the Proposal (i.e., approval under Part IV and Part V of the WA Environmental Protection Act 1986 [EP Act]). At a meeting between HPPL, JBS&G and Department of Water and Environmental Regulation (DWER) on 13 July 2022, DWER confirmed the presence of ACM on the Mulga Downs Pastoral Station is the result of known and suspected utilisation of asbestos material sourced from historical mining locations in the Wittenoom, Yampire and other gorges near the Development Envelope. DWER indicated an assessment of asbestiform minerals was required, due to the possibility of natural erosion/dispersion (e.g., water dispersal in drainage lines and air dispersal downwind of historical mine and tailing facilities) from the gorges, as well as from potential miscellaneous use and/or dumping of tailings.

The asbestos investigation (JBS&G, 2022b) comprised the collection of eight concrete samples and 64 soil samples from 32 locations (one sample collected at the surface and one sample collected from 0.3 m bgl at each location). Eight concrete samples and 32 soil samples (one soil sample per location) were submitted for laboratory analysis for asbestos. The concrete samples were collected from old stock bores and wells, where the concrete appeared weathered or degraded. Concrete samples were collected from Hancocks Bore (PACM 1), Two Mile Bore (PACM 2), Old Station Bore (PACM 3), Macros Bore (PACM 4), East Wooley Bore (PACM 5), Murrays Well (PACM 6), Calamina Well (PACM 7), Vegas Bore (PACM 8).

Laboratory analysis identified asbestos (crocidolite asbestos) in three of the eight concrete samples from Old Station Bore, Murrays Well and Calamina Well. Laboratory analysis also identified very low-level asbestos, below detection limits (< 0.01%w/w) in one soil sample (Sample ID 10_0.1), described as a 'loose fibre bundle' of crocidolite.

As the asbestos investigations identified bonded ACM (non-friable [cannot be broken or crumbled by hand pressure]) within the Development Envelope, an AMP was recommended to be prepared to control the potential

[1] An unexpected find is contamination that is unlikely to occur at a site and cannot reasonably be anticipated, investigated or assessed in accordance with regulatory requirements.

release of asbestos fibres from on-site structures. The AMP includes appropriate procedures for the decommissioning and removal of ACM structures. Furthermore, although the investigation undertaken by JBS&G (2022b) did not include the investigation of roadways, no asbestos tailings or suspect ACM (beyond the identified structures) were observed during the site investigation. While the potential for unidentified dumping can't be discounted, the current available information indicates that the unacceptable risk to site receptors from miscellaneous dumping of ACM tailings is low and can be managed through the preparation and implementation of an unexpected finds procedure within this AMP.

This AMP comprises:

- **Section 7.1** to **7.4:** General asbestos management measures;
- **Section 7.5:** Procedures for Decommissioning and Removal of Known ACM at Old Station Bore, Murrays Well and Calamina Well. This accounts for smaller areas (< 10 m2) of ACM and larger areas (> 10 m2) of ACM in **Appendix D**;
- **Section 7.6**: Unexpected Finds Procedure for ACM. This accounts for smaller areas (< 10 m2) of ACM and larger areas (> 10 m2) of ACM in **Appendix D;**
- **Section 7.7**: Unexpected Finds Procedure for Fibrous Asbestos (FA)2 and/or Asbestos Fines (AF)3. This may be associated with the potential presence of asbestos in waste tailings in roads, illegal dumping and the unintended surfacing of natural asbestiform minerals from any onsite drilling;
- **Section 7.8**: Air Monitoring.

Table **1**-**1** provides a summarised description of the Proposal. **Figure 1** shows the regional location of the Proposal.

1.2 Definitions

Department of Health (DoH) (2021) provides descriptions of asbestos in different conditions. For this report, all natural 'unbonded' asbestiform minerals identified within the Development Envelope are considered to be FA/ In addition, fibrous asbestos is any material containing asbestos that is wholly or in part friable (can be broken or crumbled by hand pressure), including any previously non-friable asbestos asbestos-containing material that is in a severely degraded condition such that it can be broken or crumbled by hand pressure. Where asbestos has been historically brought onto the Development Envelope (e.g., asbestos tailings) and may have been used in ancillary building material (e.g., roads, laydown areas), for the purpose of this report, all un-bonded asbestiform minerals are considered to be FA.

JBS&G has utilised the term ACM when discussing the use of bonded asbestos as part of the built form (i.e., concrete as a base for structures, etc.).

[2] Fibrous asbestos is any material containing asbestos that is wholly or in part friable (can be broken or crumbled by hand pressure) (DoH, 2021).
[3] Asbestos fines relate to the size of asbestos contamination present (smaller than 7 mm x 7 mm) within a soil sample. AF includes loose fibre bundles of asbestos as well as small pieces of friable and non-friable material such as asbestos cement fragments mixed within the soil (DoH, 2021).

JBS&G consider these areas to represent a point source of contamination (where identified) and that ACM at these locations may also be fibrous.

Table 1-1: Proposal Summary

Proposal title	Mulga Downs Iron Ore Mine (Proposal)
Proponent name	Hancock Prospecting Pty Ltd (HPPL)

Short description	The Proposal is for the development of the Mulga Downs Iron Ore Mine (MDIOM) located approximately 210 km south of Port Hedland and 180 km north west of Newman in the Pilbara Region of Western Australia. The Proposal includes and is not limited to the following:
	• The development of a series of above and below water table mine pits;
	• Ore processing facility;
	• Groundwater abstraction for water supply (for the mine and all associated infrastructure) and for the dewatering to facilitate the recovery of ore below water table in the mine pits;
	  • Surplus water management with discharge of excess water via managed aquifer recharge (MAR);
	  • Mineral waste management (waste rock dumps (WRD), and tailings storage facilities (TSFs);
	  • Infrastructure to manage surface water (diversion of creeks and surface water flows);
	  • Linear infrastructure (haul roads, powerlines, pipelines and conveyor corridors);
	  • Mine associated infrastructure and support facilities (including, but not limited to accommodation camp, energy supply infrastructure, airstrip; wastewater treatment plant; landfill, offices, workshops, laydown areas, etc.); and
	  • Transport of the ore via the Great Northern Highway to Port Hedland for export. The Great Northern Highway transport option will enable commencement of the Mulga Downs Iron Ore Mine. Future transport options (e.g. rail) will be subject to a separate referral.

1.3 Objective

The AMP is prepared to minimise asbestos disturbance and the possible distribution or spreading of asbestiform minerals and ACM throughout site works and activities within the Development Envelope. It is designed to prevent/manage the release of fibres from known potentially asbestos containing structures and provides management guidance for removal of asbestos containing structures and unexpected finds regarding ACM, FA and/or AF.

The purpose of this AMP is to outline the Proponent's approach to managing potential impacts on conservation significant terrestrial fauna and supports the assessment of the Proposal under both the *Environmental Protection Act 1986* (EP Act) and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

1.4 Accredited Contaminated Site Auditor

JBS&G understands that an accredited contaminated sites auditor[4] (Jeremy Hogben – Senversa) has been engaged to review JBS&G (2022a) and JBS&G (2022b). Based on the review of these documents, the auditor

[4] Accredited by the Western Australian (WA) Department of water and Environment Regulation (BEWR) as a Contaminated Sites Auditor under Section 69 of the Contaminated Sites Act 2003.

supports the need for the development of this AMP, particularly regarding management protocols for unexpected finds. The auditor will provide a Voluntary Auditor's Report (VAR). JBS&G note that where an audit is voluntary, it could become mandatory based on the outcomes of the work and the VAR.

1.5 Stakeholder Engagement

HPPL has identified and has ongoing engagement and consultation with key government agencies, Aboriginal Traditional Owners, Industry and Community Groups. If additional stakeholders are identified, they will be contacted, provided with information in relation to the Proposal, and invited to make comment. HPPL will maintain and continue to update its stakeholder register

2 Site details

2.1 Site Identification

The site is within the Mulga Downs Pastoral Station, approximately 210 kilometres (km) south of Port Hedland and 180 km northwest of Newman, in the Pilbara Region of Western Australia (WA) (refer **Table 2-1**). The Development Envelope comprises an area of approximately 40,650 ha and comprises the Mine Area and bore field. The Mine Area in the east, is separated from the bore field in the west, by approximately 7 km. Site location and features are provided on **Figure 1, Figure 2 and Figure 3.**

The Mulga Homestead is a registered contaminated site adjacent the Development Envelope, on its northern boundary along Mulga Downs Road. The Mulga Downs Homestead and area surrounding the homestead including the helicopter pad and airstrip (ID 20175) was classified under the *Contaminated Sites Act 2003* as 'Contamination – Remediation Required' since October 2008. The site was classified due to the presence of free asbestos fibres and asbestos fibre bundles in surface soils around the station homestead and buildings. Some remediation of the site had been undertaken including the removal of 120 tonnes of asbestos contaminated soil. Further investigations in 2018 noted asbestos fibres were present in soils around the homestead at concentrations exceeding the fibrous asbestos and asbestos fines criteria (for any land use) as specified in DoH (2009). The site has been fenced off with appropriate signage to prevent unauthorised access and disturbance.

An abandoned infrastructure area within the Development Envelope is also classified as Contaminated – Remediation Required under the *Contaminated Sites Act 2003*. This site is about 3 km south of the Mulga Downs Homestead. This site is classified as free asbestos fibres were present in surface soils around abandoned infrastructure.

The locations of these sites classified as 'Contaminated – Remediation Required' are on **Figure 2**. Areas identified as 'Contaminated – Remediation Required' shall be investigated and managed in accordance with the contaminated sites guidelines; 'Assessment and management of contaminated sites' (DWER 2021) and the 'Guidelines for the Assessment, Remediation and Management of Asbestos Contaminated Sites in Western Australia' (DoH 2021).

Table 2-1: Site Identification Details

Category	Details
Station	Mulga Downs Pastoral Station
Occupier	HPPL
Tenure	Mulga Downs (M47/1621, E 47/2117, L 45/316, L 45/380, L 45/384 and E 47/2044) Mt Florance Pastoral Station (E 47/1315) Mt Hooley Pastoral Station (E 47/1315)
Municipality	Shire of Ashburton
Zoning	Rural Other purposes infrastructure Public purposes water and drainage

This AMP applies to further identified asbestos containing structures as well as unexpected asbestos finds.

2.2 Surrounding Land Use

Surrounding land use comprise:

- Unallocated Crown Land (native vegetation);
- Community reserves (Youngaleena Community, located 8.5 km south of the Development Envelope; and Wirrlimurra Community, located 6.4 km east of the Development Envelope);
- Pastoral Lease (Mulga Downs, Mt Florance and Hooley Pastoral Stations);
- Auski Roadhouse (22.5 km southeast of the Development Envelope);
- Karijini National Park (7.6 km south of the Development Envelope);
- Mungaroona Range (13 km north of the Development Envelope); and
- Tom Price (located approximately 110 km southwest of the Development Envelope).

The 'close' town of Wittenoom is approximately 13 km south of the Development Envelope. Wittenoom was degazetted in 2007 and closed in 2013.

2.3 Site History Information

The Mulga Downs Pastoral Station has been in operation since at least 1891 and is understood to have been in the Hancock family since the mid-1900's. Initially used as a sheep station, the property has since been utilised as a cattle station. A review of historical ownership certificates was not undertaken, on the basis this was considered unlikely to directly impact the outcomes of the assessment.

The Mulga Downs Homestead is understood to have been constructed circa early 1900s. Additional ancillary infrastructure to support the operation of the station has been progressively constructed over time, including most notably the construction of the airstrip. Formal infrastructure documented within the Development Envelope is presented on **Figure 3**. This may not be indicative of all anthropogenic infrastructure on the site over the lifespan of station operation (i.e., historical demolition, transient equipment, etc.). JBS&G undertook a preliminary review of available historical aerials, however, based on the quality of most historical aerial images and the size of the Development Envelope relative to each built structure, limited information was able to be obtained. As such, these aerial images have not been presented herein.

GHD (2006) provides a non-technical summary relating to the management of asbestos contamination from the Yampire, Wittenoom and Colonial mines. These historical mines are shown in **Figure 3**. The report commissioned by the Department of Industry and Resources and the Department of Local Government and Regional Development, suggests asbestiform mineral deposits were extracted between 1937 and 1966. The mines were closed in 1966, when all activity ceased. GHD (2006) estimated that over 150,000 tonnes of asbestos were extracted during this time, with the residual tailings (estimated to be 3,000,000 tonnes) left after processing ceased. The waste tailings, understood to contain approximately 5% asbestos, were used in the construction of the Wittenoom town, Wittenoom airstrip and amenities. These asbestos tailings were also used for construction

on the Mulga Downs Pastoral Station, including the construction of roads, the adjacent airstrip, and potentially other built form on site.

The Wittenoom Asbestos Management Area (WAMA) was established in 2008 following the provision developed by GHD (2006). The town of Wittenoom was degazetted in June 2007, with the last 14 free hold Lots compulsorily acquired through the *Wittenoom Closure Act 2022*. The purpose of the *Wittenoom Closure Act 2022* is to demolish remaining structures and manage the risks prosed by the area.

2.4 DWER Records

A search of the DWER contaminated Sites Database under Contaminated Sites Act 2003 showed the Mulga Downs Homestead, adjacent the Development Envelope to be classified as 'Contaminated – Remediation Required' and an area of abandoned infrastructure, within the Development Envelope, also classified as 'Contaminated- Remediation Required'. These sites were discussed in JBS&G (2022b).

3 Relevant Legislation and Guidelines

Identification, handling and management of asbestos and asbestos containing materials (ACM) is regulated under various legislative and regulatory instruments and guidelines, listed below:

- Government of Western Australia (1986), Environmental Protection Act 1986.
- Government of Western Australia (1992), Health (Asbestos) Regulations 1992.
- Government of Western Australia (1996), Occupational Safety and Health Regulations (1996).
- Government of Western Australia (2003), Contaminated Sites Act 2003.
- Government of Western Australia (2004), Environmental Protection (Controlled Waste) Regulations 2004.
- Government of Western Australia, Department of Environment (2011), A guideline for managing the impacts of dust and associated contaminants from land development sites, contaminated sites remediation and other related activities.
- Government of Western Australia, Department of Water and Environmental Regulation (DWER) (2021), Assessment and management of contaminated sites, November 2021.
- Government of Western Australia, Department of Environment Regulation (DER) (2017), Identification, reporting and classification of contaminated sites.
- Government of Western Australia, Department of Health (DoH) (2009), Guidelines for the Assessment, Remediation and Management of Asbestos Contaminated Sites in Western Australia.
- Government of Western Australia, Department of Health (DoH) (2011), Recommended Procedures for Laboratory Analysis of Asbestos in Soil, Western Australia.
- Government of Western Australia, Department of Water and Environmental Regulation (DWER) (2019). Landfill Waste Classification and Waste Definitions 1996 (as amended 2019), December 2019.
- National Environment Protection Council (NEPC) (2013), National Environmental Protection (Assessment of Site Contamination) Measure 1999, as amended in 2013.
- National Environment Protection Council (NEPC) (2021), National Environmental Protection (Ambient Air Quality) Measure (as amended 2021).

The “Guidelines for the Assessment, Remediation and Management of Asbestos Contaminated Sites in Western Australia” (DoH, 2021) provide guidance in handling asbestos and ACM in compliance with the above regulations and for assessment, remediation and management of asbestos in Western Australia. These guidelines provide the basis for this AMP.

4 Environmental Setting

4.1 Topography

The Development Envelope sits between 390 and 410 m AHD and is bound by the Chichester Range to the North and the Hamersley Range to the South, on the northern flanks of the Fortescue Valley. The Chichester Range comprises low-lying hills which rise approximately 30 to 40 m above the level of the adjacent Fortescue River flood plain.

4.2 Hydrology

The Development Envelope is within the Goodiadarrie Swamp Catchment of the Lower Fortescue River Valley. The incised drainage lines through the Chichester Range discharge into a series of alluvial fans and across the sheetwash plains characterised by the Jamindie Land System. These drainage lines spread out and become braided as they flow into and across the various alluvial fans and clays that exist along the valley. The multiple discharge points have contributed to the complex surface water environment that exists in this section of the Lower Fortescue River Valley.

Similarly, drainage lines existing within the Hammersley Range to the south discharge into large alluvial fans spread across the southern flank of the Lower Fortescue River Valley, draining from the incised drainage lines contained within larger gorges such as Wittenoom Gorge and Kalamina Gorge.

The surface water flow regime emanates from the Chichester and Hamersley Ranges (**Figure 4**), as it intersects with the Development Envelope.

Figure 4 presents 10 m contours, however, it is noted that the catchments have been derived based on Lidar survey data, extending approximately 5 km to the south of the DE. Lidar extends approximately 2 km south of the Development Envelope, however, does not extend all the way to the Hamersley Ranges and the gorges. Furthermore, it is noted that the Lower Fortescue River forms the base of the Valley between the two ranges. To that end, the potential for erosion/deposition of natural asbestiform minerals from the Wittenoom, Yampire and other gorges to be present north of the Lower Fortescue River are considered low.

Figure 4 shows the area modelled in the baseline scenario from the AQ2 Pty Ltd hydrology and hydrogeology pre-feasibility study[5]. AQ2 indicate that based on the modelling undertaken, the surface flows from Wittenoom Gorge typically bypass the two claypans (Koodjeepindarranna and Gnalka Gnoona freshwater claypans) by preferentially flowing on the western side of the alluvial fan. Drainage lines from the Hamersley Range (Wittenoom Gorge) tend to spread out and become braided where they flow across the alluvial fan (being the Lower Fortescue River Valley). While these drainage lines often appear to follow a preferential path from smaller, frequent runoff events, there is the potential that during large flow events, surface water flow will break out of the preferential channel and spread out across the alluvial fan. As such, there are multiple discharge

[5] AQ2 (2022), *Mulga Downs Site Water Management (Hydrology & Hydrogeology) Pre-Feasibility Study* 13 July 2022

points from these catchments that contribute to a complex wetland mosaic in the Fortescue Valley which over time, will become modified based as erosion/sedimentation processes take place.

4.3 Regional Geology

The bedrock within the Development Envelope comprises rocks of the Hamersley and Fortescue Groups. The Jeerinah Formation (Fortescue Group) and Marra Mamba Iron Formation outcrop in Chichester Range on the northern side of the Fortescue Valley. The Wittenoom Formation subcrops beneath the valley floor and is overlain by the Brockman Iron Formation, which is a banded iron formation (BIF) within the Hamersley Range to the south. Tertiary deposits infill the valley; collectively known as 'detritals', comprising alluvium, colluvium (both with varying degrees of iron cementation), pisolite, clay and calcrete; there is also lateritic hard cap development of Tertiary age on basement rocks that may be ferricrete (goethite) and calcrete / silcrete[6].

Mine Earth Pty Ltd undertook a waste rock characterisation[7] for the Proposal, concluding the mineralisation is primarily associated with the Nammuldi Member of the Marra Mamba Formation (that outcrops along the lower flanks of the Chichester Range), although, there is also mineralisation in the overlying Tertiary detrital deposits.

Asbestiform minerals are widely distributed in Western Australia. Amphibole and serpentine minerals are major components of mafic and ultramafic rocks found in Western Australia's "greenstone belts". In the Pilbara, amphibole minerals may be encountered in the BIF of the Hamersley Basin (DMP 2015). More specifically crocidolite (the source of "blue" asbestos) is typically associated with the Dales Gorge Member of the Brockman Iron Formation (Grubb 1971). Though a thin (5 mm) band of crocidolite has also previously been identified in the Marra Mamba Iron Formation in the western Fortescue Valley (Barnett & Commander 1986).

On the basis the ore body is located within the Marra Mamba Iron formation outcrop to the north of the Lower Fortescue River Valley, where the Brockman Iron Formation is absent, intersection of natural asbestiform minerals onsite (i.e. within the Brockman Iron Formation) during mining operation is considered to be low. The stratigraphic column for the Hammersley Group is provided in **Plate 4-1**. However, based on anecdotal information from HPPL, it is understood asbestiform minerals were identified in approximately nine (9) exploration holes in the Malaya Well (E47 2117) tenement area (**Figure 1** and **Figure 2)** outside the Development Envelope. It is not known which geological unit comprised these asbestiform minerals, however, it is understood these asbestiform minerals were identified at approximately 100 – 120 m bgl. In each case the exploration holes were abandoned once the mineral was identified. Based on the known potential natural asbestiform minerals within the Brockman Iron Formation, onsite exploration teams implement a strict policy of terminating exploration upon encountering the Brockman Iron Formation.

[6] AQ2 (2020) Mulga East Baseline Water Studies. Prepared for Strategen JBS&G / Hancock Prospecting Pty Ltd

[7] Mine Earth (2021), *Mulga East Phase 1 Waste Rock Characterisation Assessment*, 14 October 2021

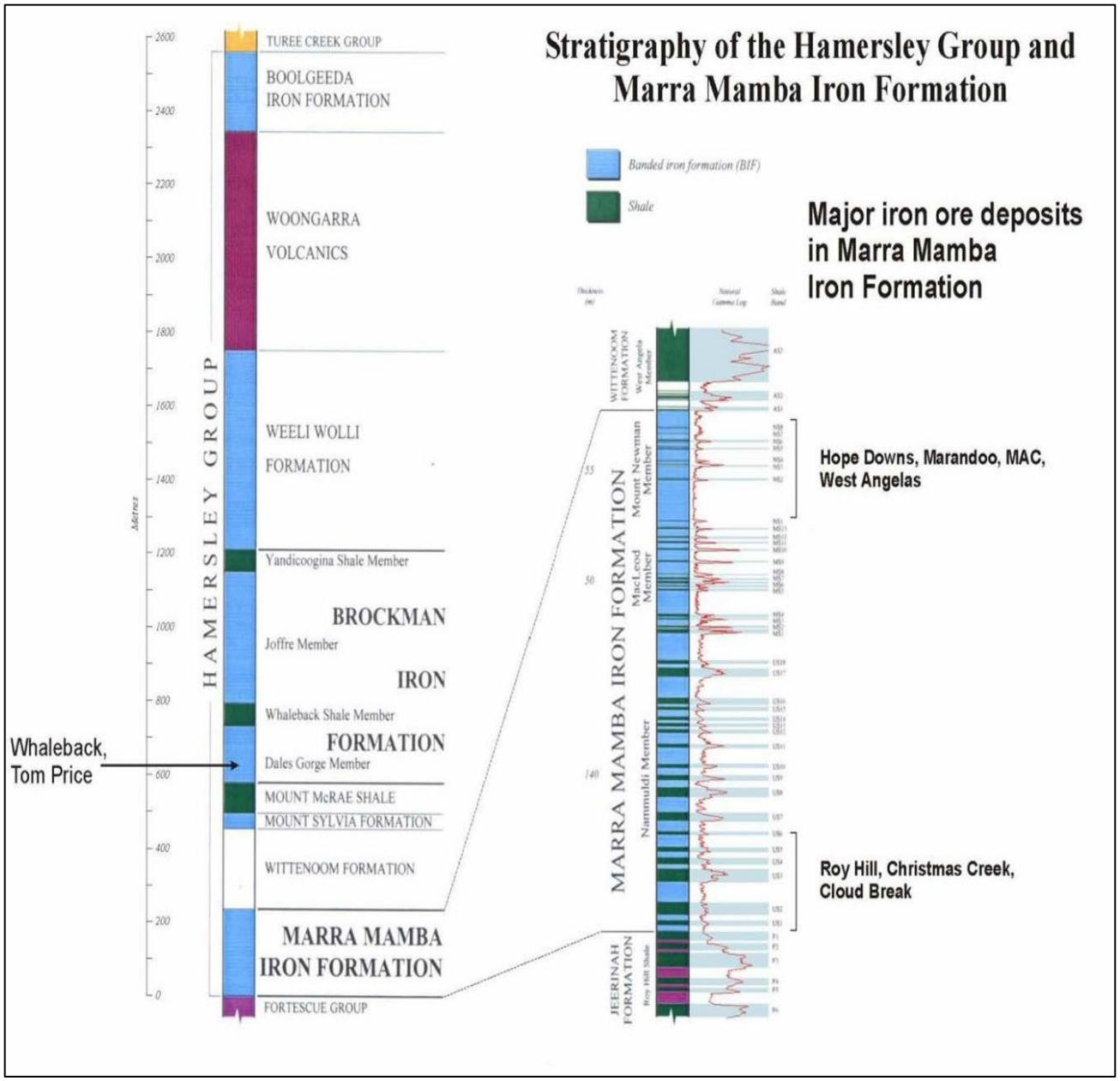

Plate 4-1 Stratigraphy of the Hamersley Group (Source Mine Earth [2022])

4.4 Regional Climate

SLR Consulting Australia Pty Ltd (SLR) prepared a baseline air quality report[8] during 2019 and 2021. SLR reviewed climatic data from the automatic weather station (AWS) operated by the Bureau of Meteorology (BoM) at Wittenoom (Station 05026, open 1949-2019). The following summarises the key findings of the SLR report.

[8] SLR (2021), *PHASE 2 MULGA EAST IRON ORE PROJECT Ambient Air Quality Monitoring Program, May 2019 - February 2021, Technical Report*, 18 March 2021 (Ref: 675.11414-R04-v3.0)

- The mean maximum temperatures range from approximately 24°C in the dry season (May to October) to 40°C in the wet season (November to April), while mean minimum temperatures range from approximately 11°C in the dry season to 26°C in the wet season.
- Rainfall varies significantly between the wet (November to April) and dry seasons (May to October). The highest rainfall occurs from December to March, with January recording the highest mean rainfall of 116 mm. The lowest rainfall occurs between April and November, with September recording the lowest mean rainfall of 2.9 mm. The highest monthly rainfall recorded between 2019 and 2021 was 470 mm, recorded in January 2012.
- The highest frequency of winds are from the eastern and the south southwestern quadrants. There is minimal change in the wind distribution between the wet and dry seasons. Windrose data from the baseline monitoring period is presented on **Plate 4-2**.

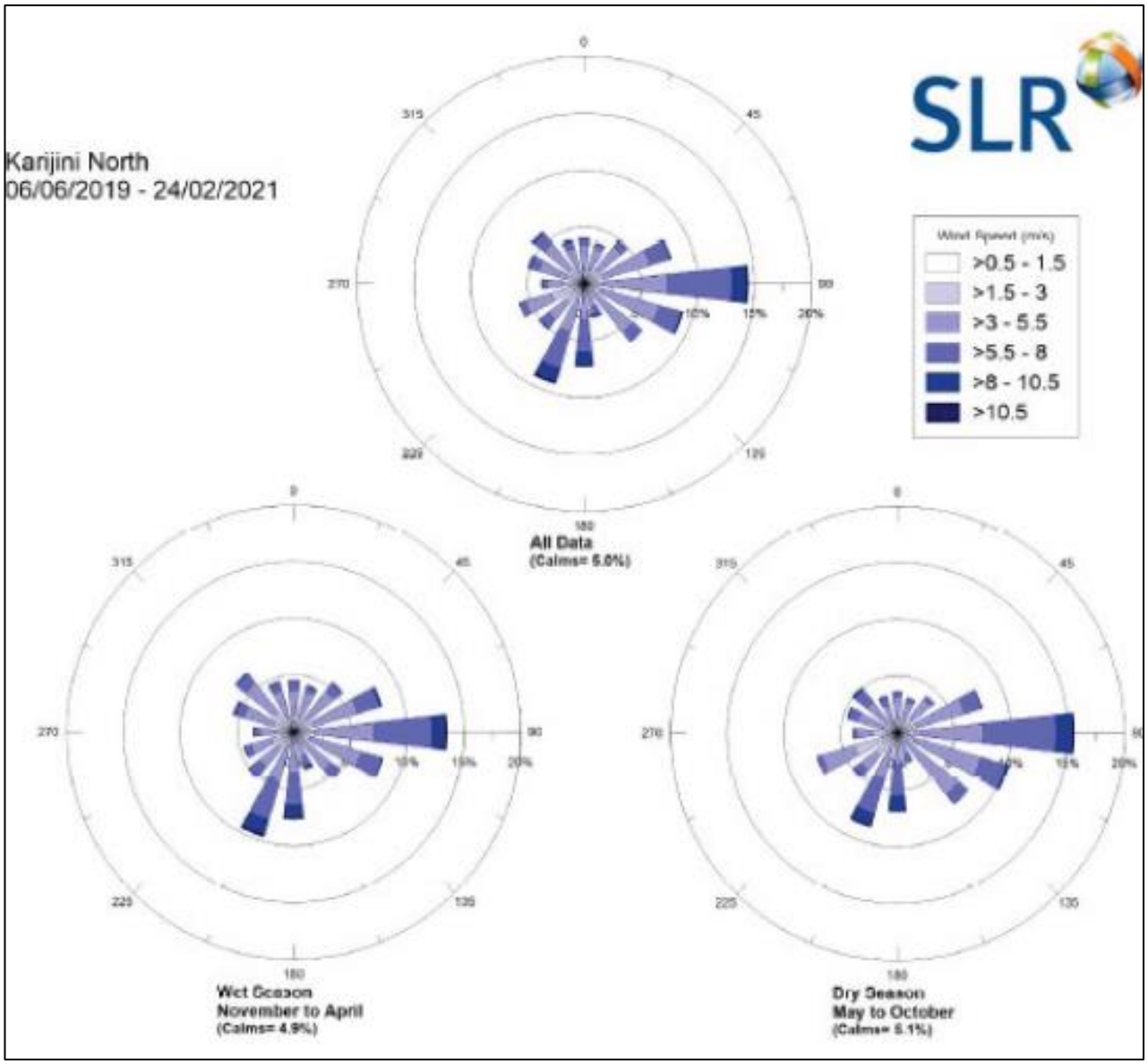

Plate 4-2 Wind Rose for period between 6/06/2019 and 24/02/2021 (Source SLR [2021])

5 Previous Investigations

A review of previous reports regarding natural asbestiform minerals and/or ACM were summarised in a JBS&G report (2022b). These were used to support the scope and asbestos investigation completed in JBS&G (2022b).

This AMP is based on the findings in JBS&G report (2022b), which also included an updated asbestos related contamination conceptual site model (CSM) for the Development Envelope. This CSM is replicated in Section 6 of this report.

A summary of the findings in JBS&G (2022b) is provided below:

- A site inspection was completed, and site structures visually assessed for ACM. As the Development Envelope is about 40,653 ha, the scope of works follows the broad process for contamination assessments as outlined in the ASC NEPM, however, not all aspects of a typical Preliminary Site Investigation (PSI) described within Schedule B2 have been considered.
- Asbestos sampling was completed in accordance with the SAQP, which targeted areas where the potential for the deposition of asbestiform minerals was likely to be highest.
- A total of 32 soil samples were analysed by the laboratory. A single loose fibre bundle of crocidolite in the soil was detected in a single sample, however, the asbestos concentration in the sample, and every other soil sample, was below the laboratory LOR and adopted assessment criteria.
- A total of eight concrete samples were analysed by the laboratory. The laboratory analysis confirmed the presence of ACM in three samples collected from Old Station Bore, Murrays Well and Calamina Well. Laboratory analysis also confirmed the presence of organic fibres not asbestos fibres. Given the relatively small size and scale of the observed infrastructure, the amount of asbestos release in the event of disturbance is likely to be minor. The potential unacceptable risk to site receptors from ACM within site structures is low and can be managed via the preparation and implementation of an AMP.
- ACM is known to have been dumped near the Development Envelope. No ACM (including bags of tailings) or other consolidated waste storage areas were advised by HPPL or observed during the site works. While the potential for unidentified dumping can't be discounted, the current available information (lines of evidence) indicates that the unacceptable risk to site receptors from miscellaneous dumping of ACM tailings is low and can be managed via the preparation and implementation of an unexpected finds procedure within the AMP.
- Based on the information obtained, it is considered unlikely that an unacceptable risk will be posed to site receptors from the presence of asbestos at the site.
- As the investigation identified ACM in some site structures, it was recommended that an AMP be developed and implemented to prevent the release of fibres from these structures during operation and detail the appropriate procedures for decommissioning and removal of the structures from the site.
- As ACM is known to have been dumped near the Development Envelope, and the CSM considers the potential for associated fibrous ACM at and around these areas (if identified) likely, it is recommended that an unexpected finds procedure be prepared detailing the management measures to be implemented if tailings or other asbestos containing waste materials are observed in the Development Envelope.

6 Conceptual Site Model

A complete exposure pathway must exist for a contamination risk to be present. This may comprise the following elements:

- areas of potential environmental concern (APEC); this may include primary sources such as known registered contaminated sites within the Development Envelope and secondary sources such as bags of ACM tailings and built form constructed with ACM or natural asbestiform fibres in soil or sediment;
- a transport mechanism (pathway) between the source and the receptor (for example inhalation of natural asbestiform or ACM fibres);
- an exposure point where a receptor encounters contamination; and
- an exposure route (for example inhalation).

6.1 Sources

Known sources of ACM include known registered contaminated areas within the Development Envelope. Suspected sources of ACM include anthropogenic activities within the Development Envelope, which may include:

- use of ACM within anthropogenic built forms other than those already recorded as registered contaminated sites;
- miscellaneous dumping of ACM tailings; and
- unintended surfacing of natural asbestiform minerals from the onsite exploration drilling program.

Suspected sources of natural asbestiform within the Development Envelope may include:

- deposition of natural asbestiform within the Lower Fortescue River Valley, via surface water runoff from the Hamersley Ranges; and
- deposition of natural asbestiform via airborne migration.

It is noted that GHD (2006) states that wind erosion and transport of asbestos is less significant than waterborne migration in terms of the mass of material that can migrate, although, windborne asbestos can be more significant in terms of the health risk associated with respirable fibres in air.

6.2 Potential Receptors

The following receptors were identified as potentially relevant to the Development Envelope:

- current on-site workers (Mulga Downs Station and Proposal exploration team) and site visitors;
- future excavation/maintenance workers near ancillary infrastructure associated with the Proposal; and
- future excavation/maintenance workers near inferred resource/proposed pits.

For this assessment, JBS&G has not considered ecological receptors.

6.3 Potential Pathways

Anthropogenic ACM has historically been dumped within the Development Envelope at specific locations, as indicated by DWER. However, specifics relating to the location of this dumping were not provided. In addition, natural asbestiform minerals may have migrated to the Development Envelope via surface water flow or airborne transport.

Exposure pathways are limited to the inhalation of asbestos fibres.

6.4 Potential Pollutant Linkages

Table 6-1 summarises the potentially complete source – pathway – receptor linkages from JBS&G (2022). This asbestos related conceptual site model is used to support the development of this AMP.

Table 6-1: Asbestos Conceptual Site Model for Mulga Downs Iron Ore Mine

Source	Receptor	Pathway	SPR	Justification
Deposited natural asbestiform within the Lower Fortescue River Valley in the Development Envelope, via surface water runoff from the Hamersley Ranges	Current on-site workers and site visitors.	Inhalation of fibres	Unlikely	Soil sampling was targeted towards areas where the potential for the deposition of asbestiform minerals was considered to be highest. A single loose fibre bundle of crocidolite in the soil was detected in a single sample, however, the asbestos concentration in the sample, and every other sample, was below the laboratory LOR and adopted assessment criteria. In the absence of any asbestos detections or exceedances, the potential risk to site receptors is considered to be low.
	Future excavation/maintenance workers proximal to ancillary infrastructure associated with the Proposal.	Inhalation of fibres	Unlikely	
	Future excavation/maintenance workers proximal to the inferred resource/proposed pits.	Inhalation of fibres	Unlikely	Based on the location of the inferred resource/proposed mine pits, relative to the inferred surface water divide of the Lower Fortescue River Valley and flow paths from the Hamersley Ranges, it is considered unlikely that natural asbestiform will be present within surface soil proximal to the inferred resource/proposed pits. Soil sampling and analysis shows that asbestos concentrations in soil is below the laboratory LOR and adopted assessment criteria.
Deposited natural asbestiform within the Development Envelope, via airborne migration and deposition	Current on-site workers and site visitors	Inhalation of fibres	Unlikely	JBS&G notes that GHD (2006) inferred the deposition of natural asbestiform via airborne migration was less significant when compared to migration and deposition via surface water erosion. JBS&G also notes that the dry climate (and corresponding lack of consistent vegetation cover that consolidates topsoil) and historical grazing land use would ultimately have reduced the likelihood that natural asbestiform minerals
	Future excavation/maintenance workers proximal to ancillary infrastructure associated with the Proposal.	Inhalation of fibres	Unlikely	

				would have accumulated in significant quantities. Soil sampling and analysis shows that asbestos concentrations in soil is below the laboratory LOR and adopted assessment criteria.
	Future excavation/maintenance workers proximal to the inferred resource/proposed pits.	Inhalation of fibres	Unlikely	Based on the location of the inferred resource/proposed pits relative to the inferred source (i.e., primarily the tailings structures within the Hammersley Range; and the Lower Fortescue River Valley as a secondary source with significantly less volume) and the prevailing wind direction (i.e., from the east), it is considered unlikely topsoil proximal to the inferred resource/proposed mine pits will contain significant natural asbestiform. Soil sampling and analysis shows that asbestos concentrations in soil is below the laboratory LOR and adopted assessment criteria.
Use of ACM within anthropogenic landforms located within the Development Envelope	Current on-site workers and site visitors.	Inhalation of fibres	Unlikely	ACM is known to have been utilised in the construction of roadways and built form within the Development Envelope. Notwithstanding, only a limited number of locations have been assessed (i.e., the Homestead and surrounding areas). A few site structures have confirmed the presence of ACM, however, the site structures are limited in size and the release of fibres is likely to be low. Other unidentified structures containing ACM may exist within the Development Envelope. An AMP should be prepared and implemented to prevent the release of fibres from these structures during operation and detail the appropriate procedures for decommissioning and removal of the structures from the site. Assessment of roadways was not completed as part of the site assessment; however, no suspect tailings were observed during the site works.
	Future excavation/maintenance workers proximal to ancillary infrastructure associated with the Proposal.	Inhalation of fibres	Unlikely	
	Future excavation/maintenance workers proximal to the inferred resource/proposed pits.	Inhalation of fibres	Unlikely	
Miscellaneous dumping of ACM tailings within the Development Envelope	Current on-site workers and site visitors.	Inhalation of fibres	Unlikely	ACM is known to have been dumped either deliberately or as an accident within locations proximal to the Development Envelope. No bags of tailings or other consolidated waste storage areas were observed by HPPL or during the site works. However, the potential for these to be present cannot be completely discounted. An unexpected finds procedure should be prepared detailing the management measures to be implemented if tailings or other asbestos containing waste materials are observed in the Development Envelope.
	Future excavation/maintenance workers proximal to ancillary infrastructure associated with the Proposal.	Inhalation of fibres	Unlikely	
	Future excavation/maintenance workers proximal to the inferred resource/proposed pits.	Inhalation of fibres	Unlikely	

Unintended surfacing of natural asbestiform resultant from the onsite exploration drilling program.	Current on-site workers and site visitors.	Inhalation of fibres	Unlikely	The exploration drilling program has implemented strict management procedures relating to the intersection of lithology containing natural asbestiform. On the basis the predominant exploration has occurred within the Chichester Range where the Brockman Iron Formation underlies the mineralised geology, and in consideration of the management measures implemented, it is considered unlikely that significant natural asbestiform would be present at exploration locations within the Development Envelope. Anecdotal information provided by the HPPL indicates the exploration bores where asbestiform minerals were identified, and the bores terminated, were located within the Malaya Well (E47 2117) tenement area within the WAMA, which is outside of the development envelope.
	Future excavation/maintenance workers proximal to ancillary infrastructure associated with the Proposal.	Inhalation of fibres	Unlikely	
	Future excavation/maintenance workers proximal to the inferred resource/proposed pits.	Inhalation of fibres	Unlikely	

7 Asbestos Management

This part of the AMP comprises the following sections.

- **Section 7.1 to 7.4**: General guidance regarding training, roles responsibilities, PPE and waste risk classification.
- **Section 7.5:** Procedures for Decommissioning and Removal of Known ACM at Old Station Bore, Murrays Well and Calamina Well. Controls and procedures are detailed regarding small scale (< 10 m2) asbestos removal where no asbestos removal licence is required and where a licence (Class A or Class B) is required to undertake the asbestos removal.
- **Section 7.6**: Unexpected Finds Procedure for ACM. Controls and procedures are detailed regarding small scale (< 10 m2) asbestos removal where no asbestos removal licence is required and where a licence (Class A or Class B) is required to undertake the asbestos removal.
- **Section 7.7**: Unexpected Finds Procedure for Friable Asbestos and Asbestos Fines. This requires the services of a Class A licenced asbestos removalist.
- **Section 7.8**: Air Monitoring.

7.1 Training

Site personnel must undergo asbestos awareness training as detailed in **Table 7-1**. Records of employee training and competency assessments should be maintained and available for review by relevant agencies. Asbestos awareness training should be included in site induction for new employees.

The asbestos training must include the blow subject matter:

- asbestos awareness training;
- understanding of the nature and extent of site-specific asbestos contamination;
- controls and notifications to be followed;
- how to prevent exposure to contamination, including:
    - dust control measures;
    - handling and disposal procedures;
    - selection and use of personal protective equipment and clothing;
    - personal and equipment decontamination procedures; and
    - emergency procedures.

As per DoH (2021), all persons involved in asbestos remediation works must be adequately trained and/or appropriately licenced for the task. The following is a summary of when an asbestos removal licence is required and where no licence may be required, as per the Work Health and Safety Commission (2022) *How to Safely Remove Asbestos: Code of Practice*.

- A Class A asbestos removal licence can remove any amount or quantity of asbestos or ACM, including:
    - Any amount of friable asbestos or ACM;

- Any amount of asbestos containing dust (ACD); and
- Any amount of non-friable asbestos or ACM.

- A Class B asbestos removal licence[9] can remove:
  - any amount of non-friable asbestos or ACM; and
  - any amount of ACD associated with the removal of non-friable asbestos or ACM.
- No asbestos removal licence is required for removal of:
  - up to 10 m2 of non-friable asbestos or ACM;
  - ACD that is:
    - associated with the removal of less than 10 m2 of non-friable asbestos or ACM;
    - not associated with the removal of friable or non-friable asbestos and is only a minor contamination; and
  - naturally occurring asbestos at a mine.

Table 7-1: Asbestos Awareness Training

Item	Training requirements	Comments
Site history	Previous asbestos mining and the likely occurrence of asbestos in the region	Focus on awareness
Health hazards	Routes of exposure and health impacts from exposure to asbestos	Focus on prevention of exposure
Controls	Measures utilised at the Site to minimise exposure to asbestos	Includes engineering and operational controls, and use of personal protective equipment (PPE) for safe handling of ACMs identified in construction and demolition material/waste
Visual inspections	Procedures employed at the Site for visually inspecting wastes to identify ACM	Visual inspections carried out at each stage of the waste acceptance and downstream processes
Identification of ACM	Physical features of ACM	Trainees to be safely shown various types of ACM and identifying features described
ACM management practices	Full understanding of this AMP	Covers all aspects of this Asbestos Management Plan
Legislative awareness	Provide an awareness of legislative and regulatory obligations relevant to the Site	The primary obligations reside in the Environmental Licence and Occupation Health and Safety legislation and regulations.

[9] Regulation 473 of the Work Health and Safety (General) Regulations 2022 requires Class A licence holders to engage a licensed asbestos assessor to conduct a clearance inspection of the asbestos removal area.

7.2 Roles and Responsibilities

This section outlines the responsibilities of the following parties in managing the risk of asbestos:

- site owner;
- site workers and contractor (or any party undertaking site works); and
- Environmental Consultant/Scientist.

7.2.1 Site Owner

The Site Owner will:

- if appropriate, ensure a person in a senior management position in the organisation is appointed to administer the AMP. This person will have the responsibility for ensuring the provisions of this AMP are carried out;
- ensure an Asbestos Register is maintained and updated for the site;
- undertake the necessary asbestos awareness training for the Development Envelope;
- seek expert advice where appropriate;
- ensure that site workers and contractors are aware of this AMP and associated procedures and protocols are implemented;
- maintain records and documentation relevant to the AMP;
- ensure community consultation and stakeholder engagement will be conducted as per existing HPPL procedure[10]; and
- inform any nearby communities of any disruptions and respond appropriately to all enquiries and complaints.

7.2.2 Site Workers and Contractors

Site workers and contractors will:

- undertake the necessary asbestos awareness training for the Development Envelope;
- seek expert advice where appropriate
- have appropriate asbestos removal licence, where applicable;
- undertake work in accordance with this AMP; and
- prepare applicable health and safety or environmental management plans and applicable work completion reports (clearance inspection of asbestos removal sites).

[10] HPPL has identified and has ongoing engagement and consultation with key government agencies, Aboriginal Traditional Owners, Industry and Community Groups. If additional stakeholders are identified, they will be contacted, provided with information in relation to the Proposal, and invited to make comment. HPPL will maintain and continue to update its stakeholder register.

7.2.3 Environmental Consultant

Where appropriate, it is recommended that a suitably qualified environmental scientist/ consultant with experience in the management of asbestos is consulted. The role of the Environmental Consultant would include:

- environmental monitoring works (validation sampling and analysis) and advice in accordance with the AMP;
- update the AMP as required;
- respond to environmental incidences;
- review and monitor task-specific management plans; and
- prepare appropriate reporting.

7.3 Personal Protective Equipment

All personnel within an area where asbestos has been identified or where there is potential risk of exposure to asbestos contaminated soil, must wear appropriate PPE.

Appropriate PPE may include:

- safety glasses;
- disposable gloves;
- half face (class P2) disposable or particulate filter (cartridge) respirator; and
- disposable coveralls.

PPE should be made from materials that provide protection against fibre penetration and not from wool or other materials that attract fibrous dusts.

At the end of the asbestos removal work, upon leaving the asbestos removal area, all PPE must be disposed of as asbestos waste or decontaminated and stored in heavy duty sealed double bags before being removed from the asbestos removal site to be laundered by a laundry with facilities for laundering asbestos contaminated materials. Further detail on appropriate PPE is provided in Section 4.5 of Work Health and Safety Commission (2022).

7.4 Waste Risk Classification

As part of the pre-acceptance tasks, DWER Guidelines (2021) require each load of imported material or clean fill be classified (by a Site person) regarding the risk of that material being contaminated with asbestos and ACM. The source and type of each imported material or clean fill load is identified on the declaration documentation provided by the driver. That information informs the risk classification using the risk classification matrix shown in **Table 7-2.**

Table 7-2: Risk Classification Matrix (DWER, 2021)

Risk Classification Matrix			
	Type of load		
Material type	**Commercial**	**Public, utes, cars and trailers***	**Skip bins**
Clean concrete (without formwork)	Low	High	High
Clean brick	Low	High	High
Clean bitumen/ asphalt	Low	High	High
Mixed construction waste	High	High	High
Mixed demolition waste	High	High	High

7.5 Procedures for Decommissioning and Removal of Non-friable ACM Structures from the Site

It is understood that the waste tailings from previous nearby historical asbestos mines comprised ~5% asbestos and were partly used in the construction of Mulga Downs Pastoral Station, including the construction of certain roads, the adjacent airstrip and potentially other built forms within the Development Envelope. A limited number of locations were assessed by JBS&G with identified ACM (crocidolite asbestos) in three of the eight concrete samples from Old Station Bore, Murrays Well and Calamina Well (JBS&G 2022b). A photo log is provided in Appendix A. These site structures are limited in size and the release of fibres is likely to be low. The investigations previously undertaken do not indicate the presence of friable asbestos or notable asbestos impacts to soil around these structures.

The primary objective of this section of the AMP is to appropriately manage known (e.g., Old Station Bore, Murrays Well and Calamina Well, shown in **Figure 5**) ACM structures for the protection of nearby workers and for the decommissioning and removal of these structures.

The following control and procedural measures are outlined for where there is < 10 m^2 of ACM, where an asbestos removal licence is not required and for where there is > 10 m^2 of ACM where an asbestos removal licence is required. It is up to the site worker to determine whether there is estimated to be more or less than 10 m^2 ACM before proceeding. In the event that multiple areas of < 10 m^2 of ACM are identified and managed in the same event (with > 10 m^2 of ACM requiring management), then the works should be undertaken in accordance with the procedural measures in Section 7.5.2 for the management of > 10 m^2 of ACM.

It should be noted that the concept of <10 m^2 of ACM relates to common asbestos cement bonded sheets of approximately 7 mm thickness (~0.07 m^3) containing ~15% asbestos weight/weight (w/w). Where ACM such as concrete is the source of asbestos then it is likely to have lower surface area and, in this case, much lower

asbestos content than asbestos cement bonded sheets, however, if fibres are released from the demolition of structures, this will trigger the need for licenced asbestos removal. The potential release of fibres could be safely managed with wetting down procedures before demolition. Regardless of the actual asbestos percentage it is recommended that the procedure for greater than 10m^2 is adopted, where this is uncertain.

While still hazardous, asbestos that is 'part of' or 'wholly contained' within a building or other structure does not meet the definition of 'contaminated' and is not required to be reported under the CS Act, however, other legislative controls apply. Based on available information, the decision-making criteria for reporting more extensive soil contamination under the CS Act has not been considered to be triggered. Should there be an area identified as containing significant soil contamination, advice should be sought from an appropriately qualified environmental consultant.

7.5.1 Control Measures for Management of Small-Scale Asbestos Containing Material (< 10 m^2)

- Obtain a copy of the asbestos register for the Development Envelope before starting any asbestos removal work. This should be obtained from the person with management or control of the workplace. This register should be a dynamic document, where it is updated as required, to always keep it current and up to date.
- Demarcate the area around Old Station Bore, Murrays Well and Calamina Well with temporary fencing, bunting or similar and treated as a no-entry area unless appropriate personal protective equipment (PPE) is worn. Signage should also be displayed to inform people where the asbestos removal area is and limit access. An example of an asbestos removal sign can be found in Section 4.2 of Work Health and Safety Commission (2022).
- Ensure the correct tools, equipment and PPE are used.
    - Wear PPE as per **Section 7.3**.
    - Prohibited tools and equipment include high pressure water sprays and/or compressed air on asbestos or ACM, unless for firefighting or fire protection purposes. Other equipment and tools that generate dust such as high-speed abrasive power and pneumatic tools and brooms and brushes must also not be used on asbestos unless the use of the equipment is enclosed when used or the equipment is designed or used in a way that captures or suppresses airborne asbestos fibres.
    - In addition to any equipment required to complete a particular task, the following asbestos management equipment may be required before work begins: disposable cleaning rags, water or water spray bottle, sealant (e.g., polyvinyl acetate [PVA]), suitable asbestos waste container and warning signs and /or PVC barrier tape.
    - For further information refer to Section 4.4 Tools and Equipment in Work Health and Safety Commission (2022).
- For the decommissioning and/or removal of disused/obsolete structures at Old Station Bore, Murrays Well and Calamina Well, breakage of concrete containing asbestos (bonded asbestos, and there is little free fibre present) will be unavoidable but should be minimised if possible. Use the wet method to remove asbestos where practicable. Further information on the wet method can be found in Section 4.3 of Work Health and Safety Commission (2022).
- Contain and label asbestos waste and dispose of it as soon as reasonably practicable at a site licensed to accept asbestos waste. In general, a small number of fragments can be carefully collected, secured in a labelled, heavy-duty plastic bag or wrapped in heavy-duty plastic (minimum 0.2 mm thickness) for transport and disposal to a licensed waste facility. ACM must be disposed to an approved landfill in accordance with

the *Landfill Waste Classification and Waste Definitions 1996* (As amended) (December 2019). The contractor can remove soils impacted by asbestos by placing it into HDPE lined skip bins, which are sealed before transport. Waste tracking records and disposal dockets should be retained to document the removal works.

- Ensure that PPE and clothing used in asbestos removal work and contaminated with asbestos is handled in accordance with the WHS Regulations.
- All visible ACM debris should be removed from the area such that any risk of asbestos fibre inhalation has been effectively eliminated.
- For the decommissioning and/or removal of structures at Old Station Bore, Murrays Well and Calamina Well, soil validation may be required. Validation that the surfaces around these areas following the removal of these structures are not contaminated may need to be undertaken as outlined in Section 6.8 Validation Sampling (DoH 2021)
- A non-friable asbestos removal checklist is provided by the Department of Mines, Industry Regulation and Safety (DMIRS) (Appendix B) and an *Information Sheet: Asbestos contaminated soils* (Appendix C), published by Work Safe Australia and DMIRS should be followed where appropriate.

7.5.2 Control Measures for Management of Asbestos Containing Material (>10 m^2)

A licensed Class B asbestos removalist is required for the removal of > 10 m^2 non-friable asbestos or ACM. Refer to controls and procedure in Appendix D for removal of > 10 m^2 non-friable asbestos or ACM.

7.6 Unexpected Finds Procedure for Managing of Non-friable ACM

The investigations previously undertaken do not indicate the presence of friable asbestos or notable asbestos impacts to soil. Since, a limited number of locations were assessed by JBS&G (2022b), this section serves as an unexpected finds procedure for where non-friable ACM may be encountered within the Development Envelope.

The following control and procedural measures are outlined for where there is < 10 m^2 of ACM, where an asbestos removal licence is not required and for where there is > 10 m^2 of ACM where an asbestos removal licence is required. It is up to the site worker to determine whether there is estimated to be more or less than 10 m^2 ACM before proceeding.

The concept of < 10 m^2 of ACM relates to common asbestos cement bonded sheets of approximately 7 mm thickness (~0.07 m^3) containing ~15% asbestos weight/weight (w/w). Where ACM such as concrete is the source of asbestos then it is likely to have lower surface area and, in this case, much lower asbestos content than asbestos cement bonded sheets, however, the demolition process is likely to increase potential fibre release (this could be safely managed e.g., with appropriate wetting down procedures) and thus may trigger a requirement of a Class B asbestos removal licence.

7.6.1 Control Measures for Management of Small-Scale Asbestos Containing Material (< 10 m^2)

- Obtain a copy of the asbestos register for the Development Envelope before starting any asbestos removal work. This should be obtained from the person with management or control of the workplace. This register should be a dynamic document, where it is updated as required, to always keep it current and up to date.
- Add the unexpected find to the asbestos register.

- Demarcate the area around an unexpected find with temporary fencing, bunting or similar and treated as a no-entry area unless appropriate personal protective equipment (PPE) is worn. Signage should also be displayed to inform people where the asbestos removal area is and limit access. An example of an asbestos removal sign can be found in **Section 4.2** of Work Health and Safety Commission (2022).
- Ensure the correct tools, equipment and PPE are used.
    - Wear PPE as per **Section 7.3**.
    - Prohibited tools and equipment include high pressure water sprays and/or compressed air on asbestos or ACM, unless for firefighting or fire protection purposes. Other equipment and tools that generate dust such as high-speed abrasive power and pneumatic tools and brooms and brushes must also not be used on asbestos unless the use of the equipment is enclosed when used or the equipment is designed or used in a way that captures or suppresses airborne asbestos fibres.
    - In addition to any equipment required to complete a particular task, the following asbestos management equipment may be required before work begins: disposable cleaning rags, water or water spray bottle, sealant (e.g., polyvinyl acetate [PVA]), suitable asbestos waste container and warning signs and /or PVC barrier tape.
    - For further information refer to **Section 4.4** Tools and Equipment in Work Health and Safety Commission (2022).
- Use the wet method to remove asbestos where practicable. Further information on the wet method can be found in **Section 4.3** of Work Health and Safety Commission (2022).
- Contain and label asbestos waste and dispose of it as soon as reasonably practicable at a site licensed to accept asbestos waste. ACM must be disposed to an approved landfill in accordance with the *Landfill Waste Classification and Waste Definitions 1996* (As amended) (December 2019). The contractor can remove soils impacted by asbestos by placing it into HDPE lined skip bins, which are sealed before transport.
- Ensure that PPE and clothing used in asbestos removal work and contaminated with asbestos is handled in accordance with the WHS Regulations.
- All visible ACM debris should be removed from the area such that any risk of asbestos fibre inhalation has been effectively eliminated.
- Validation sampling is required following the non-friable asbestos removal to show these areas are not contaminated as outlined in Section 6.8 Validation Sampling (DoH 2021)
- A non-friable asbestos removal checklist is provided by the DMIRS (Appendix B) and an Information Sheet: Asbestos contaminated soils (Appendix C), published by Work Safe Australia and DMIRS should be followed where appropriate.

7.6.2 Control Measures for Management of Asbestos Containing Material (>10 m^2)

A licensed Class B asbestos removalist is required for the removal of > 10 m2 non-friable asbestos or ACM.

Appropriate community consultation and stakeholder engagement should be conducted as per existing HPPL procedure. HPPL has identified and has ongoing engagement and consultation with key government agencies, Aboriginal Traditional Owners, Industry and Community Groups. If additional stakeholders are identified, they will be contacted, provided with information in relation to the Proposal, and invited to make comment. HPPL will maintain and continue to update its stakeholder register;

Refer to controls and procedure in Appendix D for removal of > 10 m^2 non-friable asbestos or ACM.

7.7 Unexpected Finds Procedure for Friable Asbestos or Asbestos Fines

It is understood that the waste tailings from previous nearby historical asbestos mines comprised ~5% asbestos and were partly used in the construction of Mulga Downs Pastoral Station, including the construction of certain roads, the adjacent airstrip and potentially other built forms within the Development Envelope. The Mulga Downs Homestead, outside the northern boundary of the Development Envelope along the Mulga Downs Road, and an area of abandoned infrastructure, within the Development Envelope and ~ 3 km south of the Mulga Downs Homestead, are classified as 'Contaminated - Remediation Required' under the *Contaminated Sites Act 2003*. These sites are classified due to the identification of free asbestos fibres in surface soils. Some transportation of this asbestos may occur down-gradient of these sites from overland flow. It is also known that dumping of ACM has been reported near the Development Envelope. The CSM in JBS&G (2022b) states that the potential for associated fibrous ACM at and around these areas (if identified) is considered likely.

The asbestos in untreated waste tailings (e.g., not in a cement matrix) is considered FA or AF, as such an unexpected finds procedure for FA and AF is developed as part of this AMP.

This 'unexpected finds' procedure may also be applied in the event of unintended surfacing of natural asbestiform minerals from the onsite exploration drilling program. It is understood naturally occurring asbestos (NOA) is present within some of the geological units around the Development Envelope, particularly the Dales Gorge Member of the Brockman Iron Formation. It is also understood that anecdotal information provided by HPPL indicated asbestiform minerals were identified in nine (9) exploration holes in the Malaya Well (E47 2117) tenement area (**Figure 1**). The asbestiform mineral was identified at approximately 100 – 120 m bgl, and in each case the exploration holes were abandoned once the mineral was identified. Information regarding the geological unit of these observations or bore locations have not been provided. It is important to note that the Dales Gorge Member does not underlie the Conceptual Footprint for the Mulga Downs Iron Ore Mine.

A Class A licensed asbestos removalist is required for the removal of any amount of friable asbestos. The following control and procedural measures are summarised for an unexpected find of FA or AF:

- areas where potential FA or AF are identified should be clearly demarcated with temporary fencing, bunting or similar and treated as a no-entry area unless appropriate PPE is worn;
- community consultation and stakeholder engagement conducted as per existing HPPL procedure. **HPPL** has identified and has ongoing engagement and consultation with key government agencies, Aboriginal Traditional Owners, Industry and Community Groups. If additional stakeholders are identified, they will be contacted, provided with information in relation to the Proposal, and invited to make comment. HPPL will maintain and continue to update its stakeholder register;
- the site owner should engage the services of a Class A licensed asbestos removalist; and
- the controls and procedure in Appendix D should be followed.

7.8 Airborne Asbestos Fibres and Air Monitoring

Where levels of airborne asbestos fibres are predicted (e.g., Class A asbestos removal), DoH (2021) provides some available dust control measures that may include but are not limited to:

- wetting with an agent designed to suppress the release of particulates / fibres;
- using dust suppressants or covers on soil stockpiles;

- installing wind barriers or suitable height;
- using sheltered areas wherever possible;
- full enclosure structures around dust generating activities;
- monitoring meteorological conditions and modifying or stopping work when they are adverse;
- regulating activities at a site and / or speed of vehicles;
- restricting or minimising access to contaminated areas, especially by vehicles; and
- implementing a community dust complaint and response system.

Air monitoring, which involves the collection of air samples to support assessment of levels of airborne asbestos fibres, must be undertaken before and during Class A asbestos removal as per Section 3.11 of Work Health and Safety Commission (2022). The site owner should ensure a dust monitoring plan and asbestos air quality monitoring plan are prepared by a qualified environmental consultant or occupational hygienist. A licensed asbestos assessor must undertake the air monitoring of the asbestos removal area in accordance with the following:

- National Occupational Health and Safety Commissions 2005, *Guidance note of the membrane filter method for estimating airborne asbestos fibres*.

Where respirable asbestos fibre levels exceed the action levels in Table 2 of Work Health and Safety Commission (2022) (refer to below **Table 7-3**), regardless of whether asbestos removal has started, the actions in Table 2 must be undertaken.

The site owner must ensure the results of air monitoring are communicated to all workers and health and safety representatives of the workplace.

Table 7-3: Air Monitoring Action Levels from Work Health and Safety Commission (2022)

Table 2 Air monitoring action levels

Action level	Control	Action
Less than 0.01 fibres/mL	No new control measures are necessary	Continue with control measures.
At 0.01 fibres/ml or more than 0.01 fibres/mL but less than or equal to 0.02 fibres/mL	1. Review	Review control measures.
	2. Investigate	Investigate the cause.
	3. Implement	Implement controls to eliminate or minimise exposure and prevent further release.
More than 0.02 fibres/ mL	1. Stop removal work	Stop removal work.
	2. Notify regulator	Notify the relevant regulator by phone followed by a written statement that work has ceased and the results of the air monitoring.
	3. Investigate the cause	For example, conduct a thorough visual inspection of the enclosure (if used) and associated equipment in consultation with all workers involved with the removal work.
	4. Implement controls to eliminate or minimise exposure and prevent further release	For example, extend the isolated/barricaded area around the removal area/enclosure as far as reasonably practicable until fibre levels are at or below 0.01 fibres/mL, wet wipe and vacuum the surrounding area, seal any identified leaks (e.g. with expandable foam or adhesive (cloth or duct) tape) and smoke test the enclosure until it is satisfactorily sealed.
	5. Do not recommence removal work until further air monitoring is conducted	Do not recommence until fibre levels are at or below 0.01 fibres/mL.

8 Performance Monitoring and Reporting

The AMP is prepared to control asbestos disturbance and the possible distribution or spreading of asbestiform minerals and ACM throughout site works and activities. It is designed to prevent the release of asbestos fibres from known potentially asbestos containing structures and provides management procedures for unexpected finds regarding ACM, FA and/or AF.

The following records should be maintained in respect of management of asbestos for the Development Envelope.

- The site owner needs to maintain and update an Asbestos Register for the site. In the event a licensed asbestos removalist is required, they will request a copy of the Asbestos Register for the site. The Asbestos Register is a dynamic document, that should be kept up to date.
- A logbook is to be maintained by the Site Owner or the Site Owner's Representative, documenting site works training records.
- Excavations shall be inspected/validated prior to backfill to ensure no visible ACM.
- All waste management documentation (e.g., waste transfer dockets & landfill receipts), shall be reviewed and retained on file.
    - Wastes rejected due to inadequate documentation, including refusal to provide signed waste declaration document.
    - Wastes removed from Site to a licenced disposal facility due to unacceptable asbestos contamination.
    - Product stockpile inspection, sampling and laboratory analysis results.
- Products exported to end users.
- All environmental sampling and monitoring works shall be formally documented by an approved Environmental Consultant and a report provided to the Site Owner and other relevant stakeholders.
- Any records relevant to the traceability of asbestos and ACM materials at the Site.
- Any records of complaints, visible dust emissions, dust monitoring, equipment maintenance, etc, are maintained as part of the Site environmental and operational management system.
- Audit findings.

9 Limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only and has been based in part on information obtained from the client and other parties.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

JBS&G accepts no liability for use or interpretation by any person or body other than the client who commissioned the works. This report should not be reproduced without prior approval by the client or amended in any way without prior approval by JBS&G, and should not be relied upon by other parties, who should make their own enquires.

Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements.

Limited sampling and laboratory analyses were undertaken as part of the investigations undertaken, as described herein. Ground conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site. Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS&G reserves the right to review the report in the context of the additional information.

10 Bibliography

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11 Figures

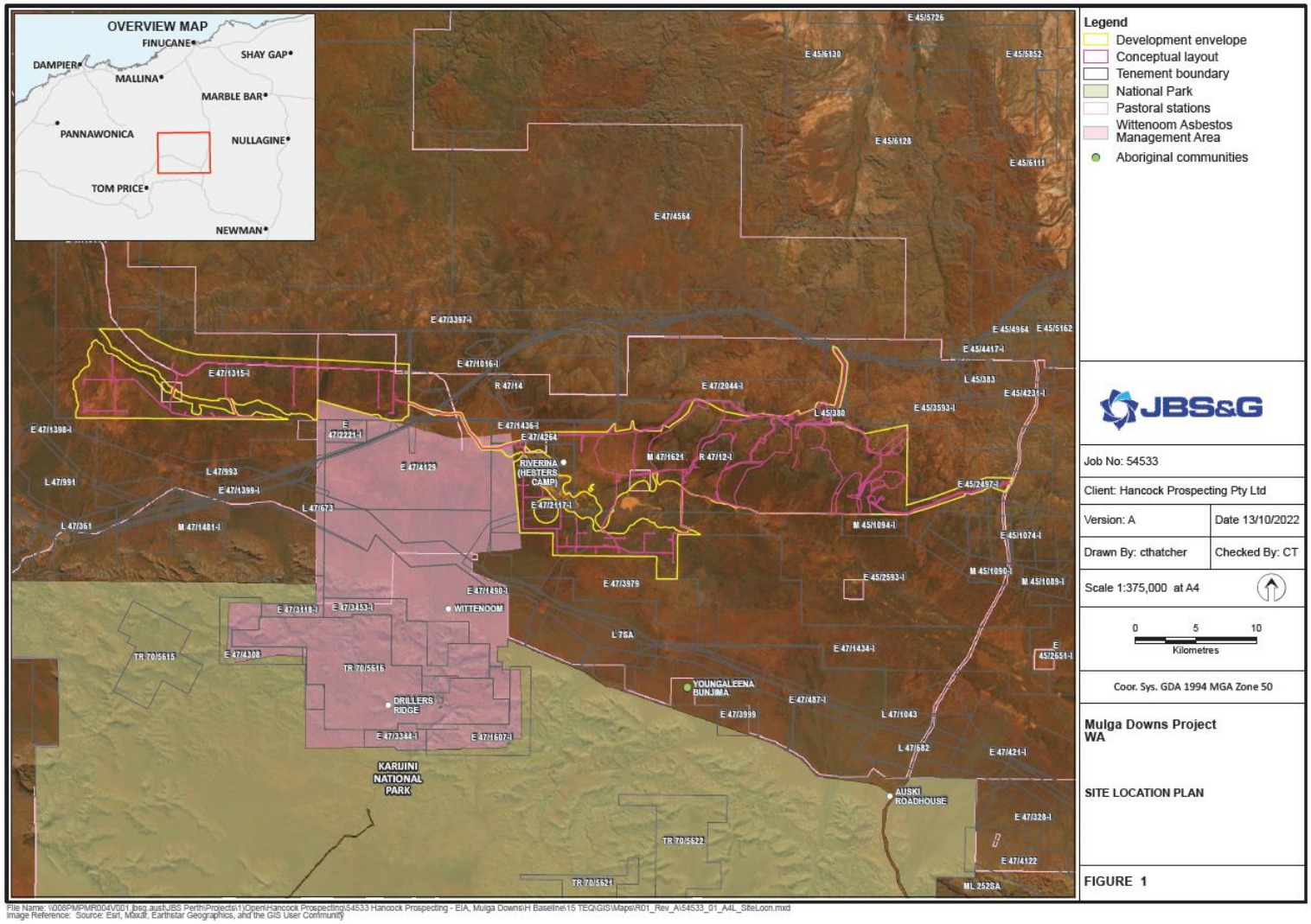

Figure 1 Site Location Map

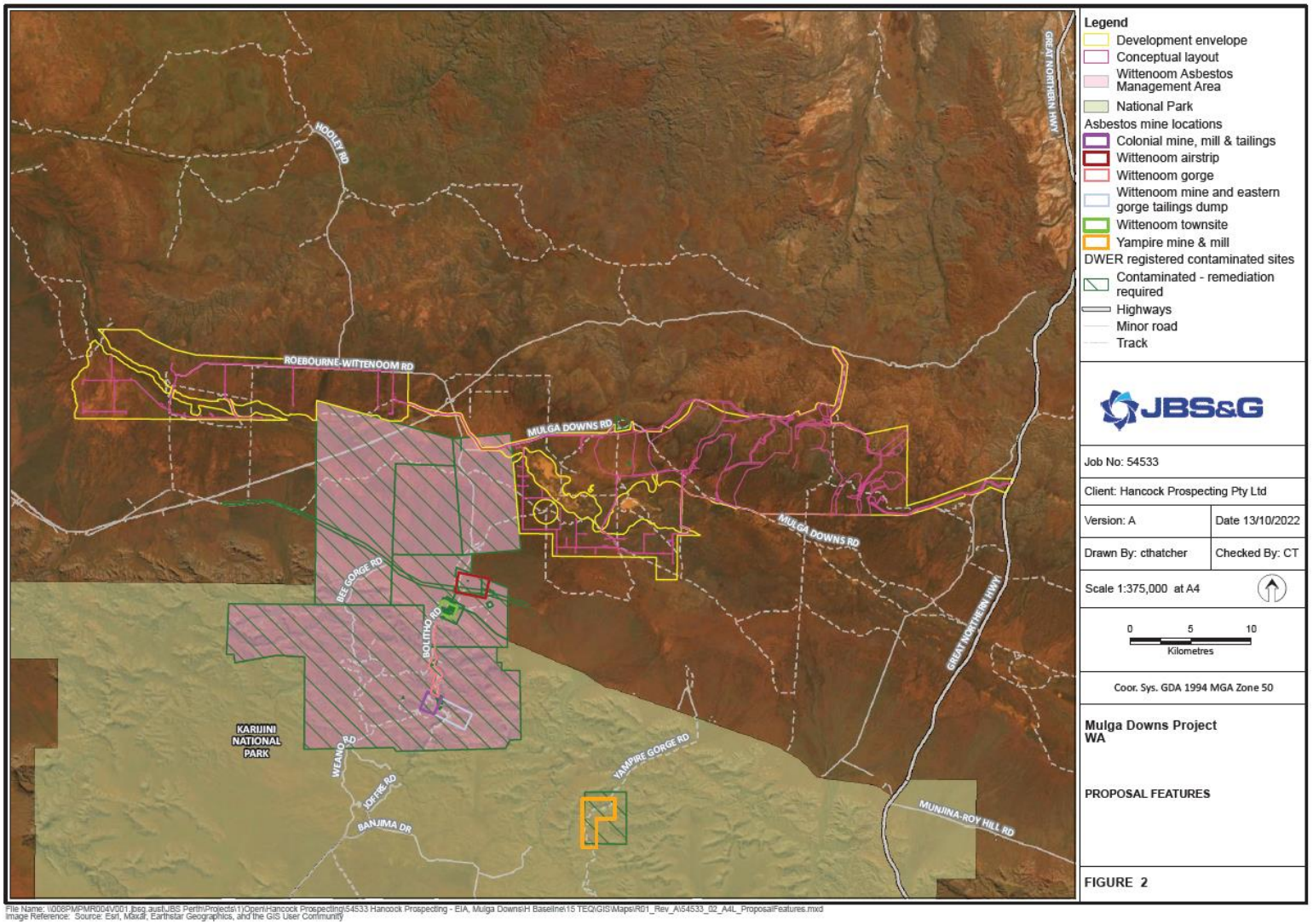

Figure 2 Proposal Features

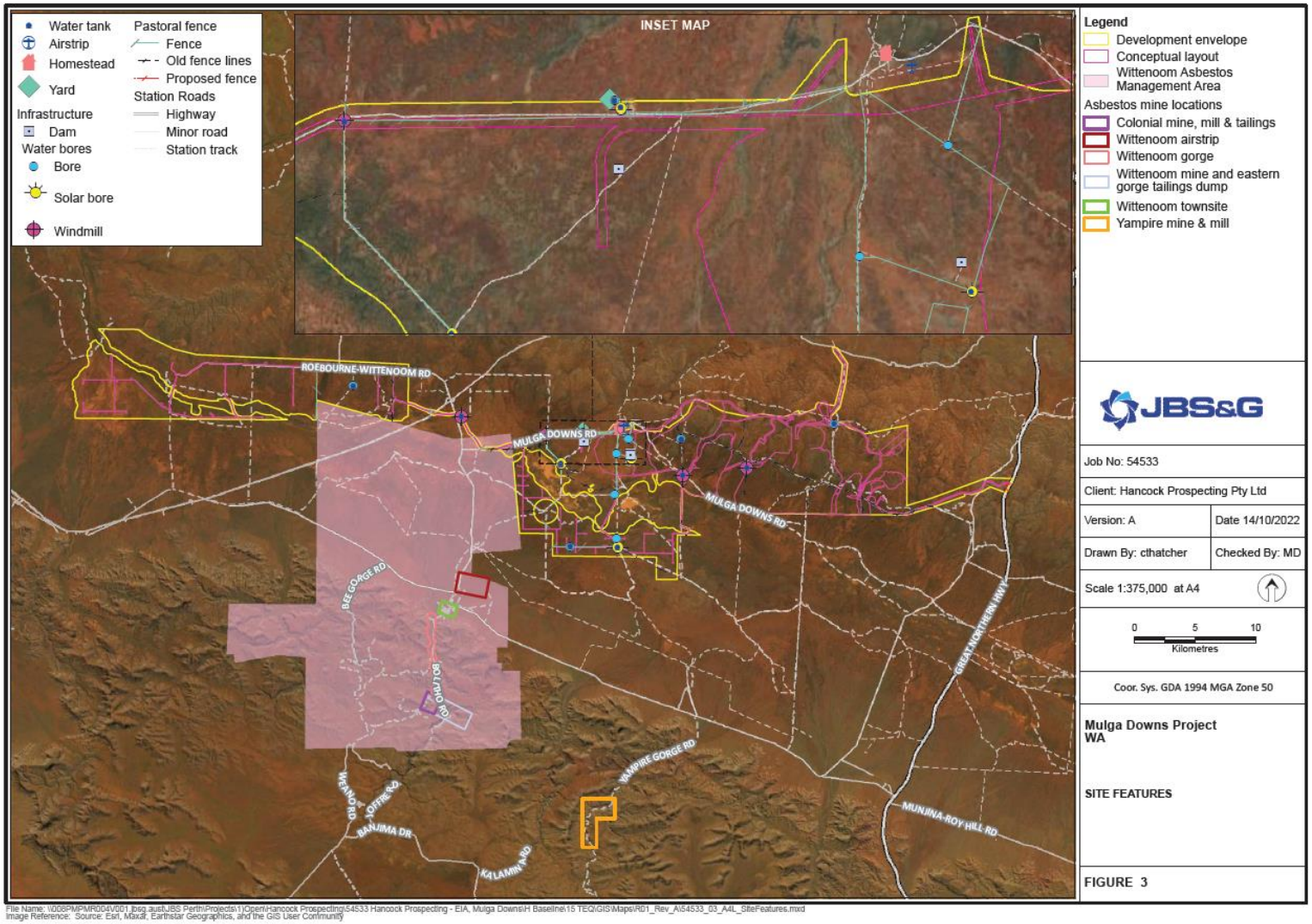

Figure 3 Site Features

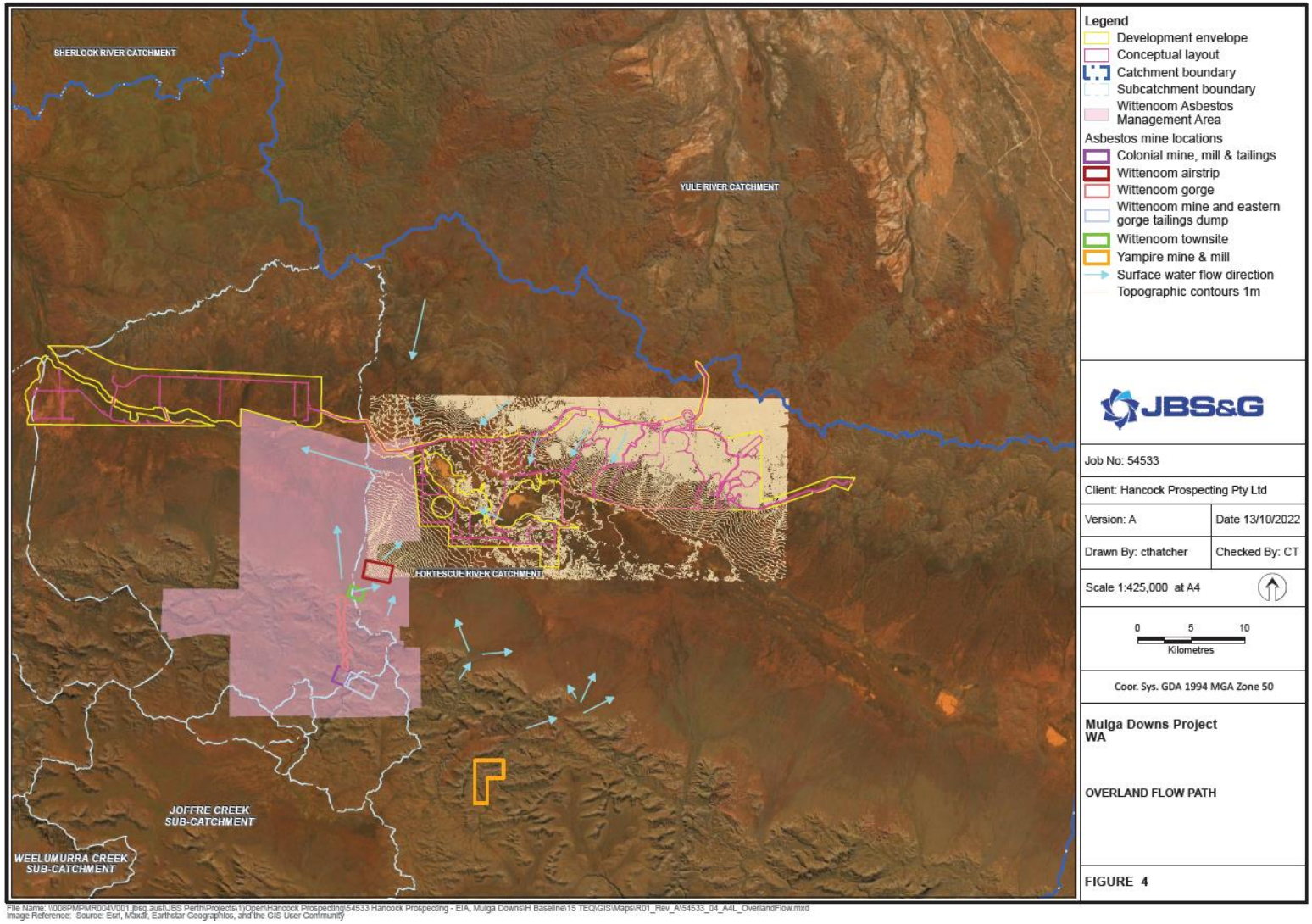

Figure 4 Overland Flor Path

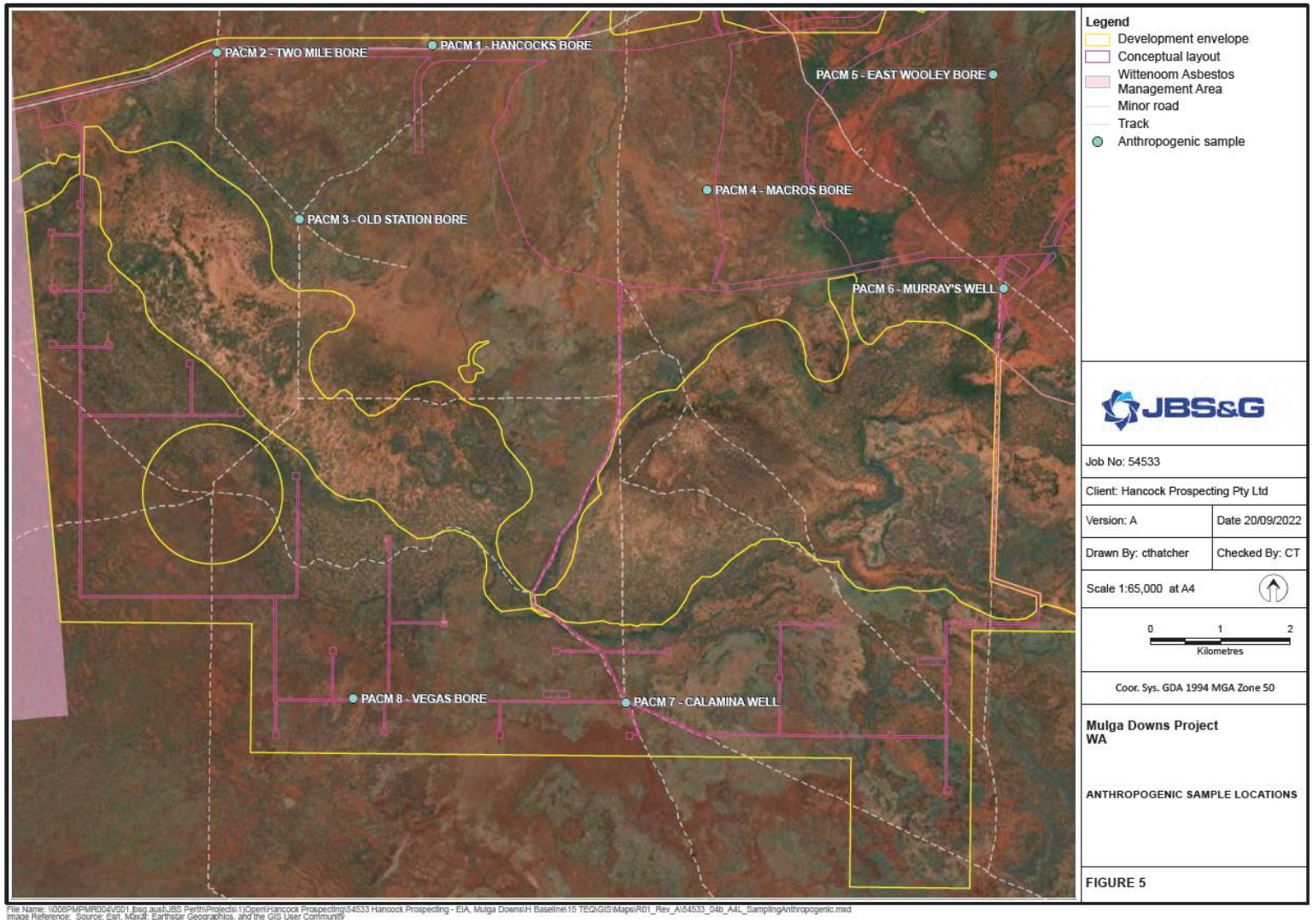

Figure 5 Anthropogenic Sample Locations

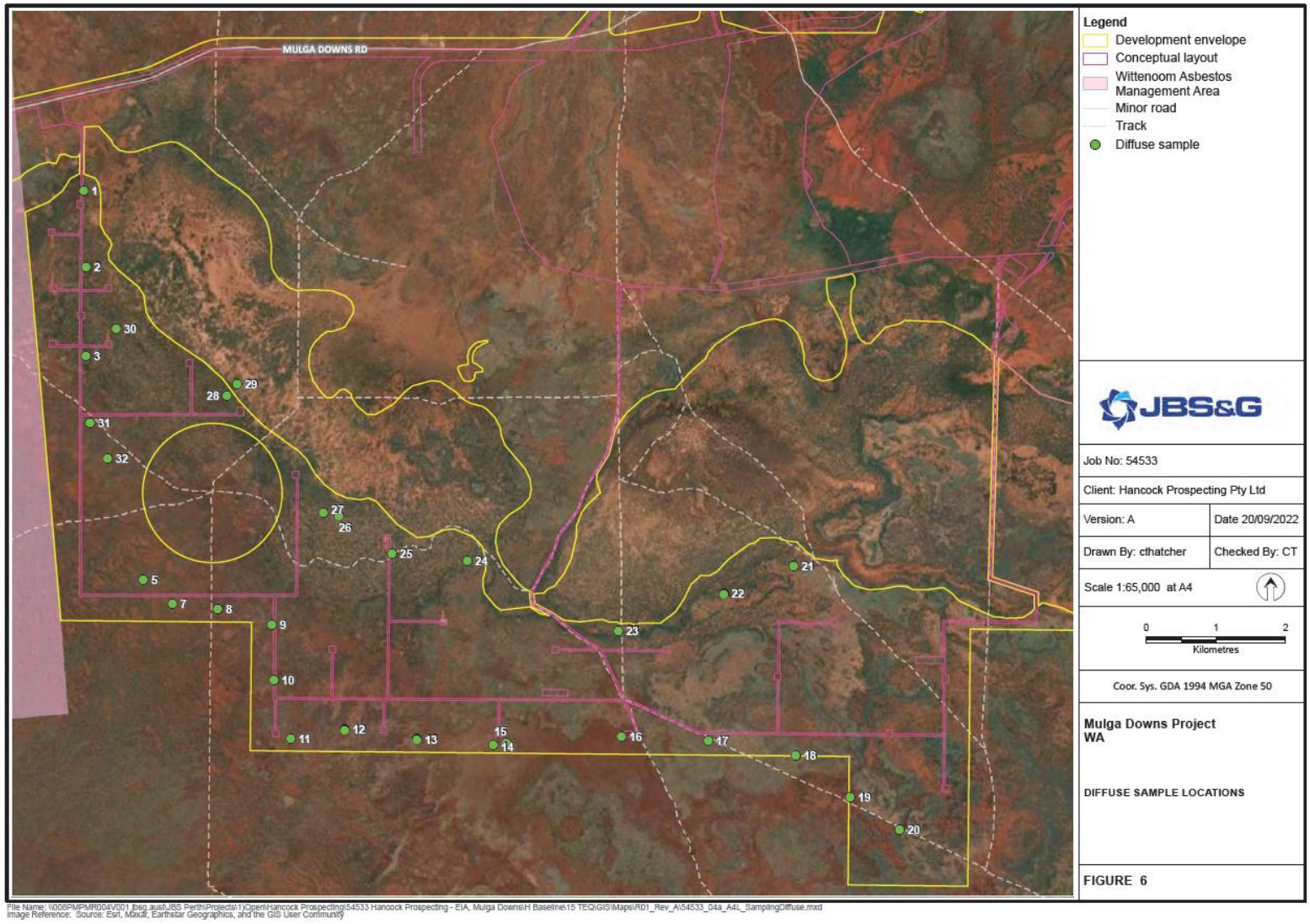

Figure 6 Diffuse Sample Location

Appendix 1 Site Photographs

OLD STATION BORE (PACM 3) – ASBESTOS DETECTED

Visual Inspection –
Concrete tank stand, evidence of cracking, weathering.
No fencing around structure.

Laboratory Analysis –
Crocidolite asbestos detected.

JBS&G

Job No: 54533	
Client: Hancock Prospecting	
Version: Rev A	Date: 22.02.2023
Drawn By: LP	Checked By: JN
Not to Scale	
Coord. Sys n/a	
Mulga Downs	
APPENDIX B	

OLD STATION BORE (PACM 3) – ASBESTOS DETECTED

Visual Inspection – Concrete tank stand, evidence of cracking, weathering.
No fencing around structure.

Laboratory Analysis – Crocidolite asbestos detected.

JBS&G

Job No: 54533	
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Version: Rev A	Date: 22.02.2023
Drawn By: LP	Checked By: JN
Not to Scale	
Coord. Sys n/a	
Mulga Downs	
APPENDIX B	

OLD STATION BORE (PACM 3) – ASBESTOS DETECTED

Visual Inspection – Concrete trough, evidence of cracking, weathering. Potential ACM present. No fencing around structure.

Laboratory Analysis – Crocidolite asbestos detected.

JBS&G

Job No: 54533	
Client: Hancock Prospecting	
Version: Rev A	Date: 22.02.2023
Drawn By: LP	Checked By: JN
Not to Scale	
Coord. Sys n/a	
Mulga Downs	
APPENDIX B	

OLD STATION BORE (PACM 3) – ASBESTOS DETECTED

Visual Inspection – Concrete trough, evidence of cracking, weathering. Potential ACM present. No fencing around structure.

Laboratory Analysis – Crocidolite asbestos detected.

JBS&G

Job No: 54533	
Client: Hancock Prospecting	
Version: Rev A	Date: 22.02.2023
Drawn By: LP	Checked By: JN
Not to Scale	
Coord. Sys n/a	
Mulga Downs	
APPENDIX B	

Visual Inspection – Background two storage tanks. Foreground Bore but no ACM identified.

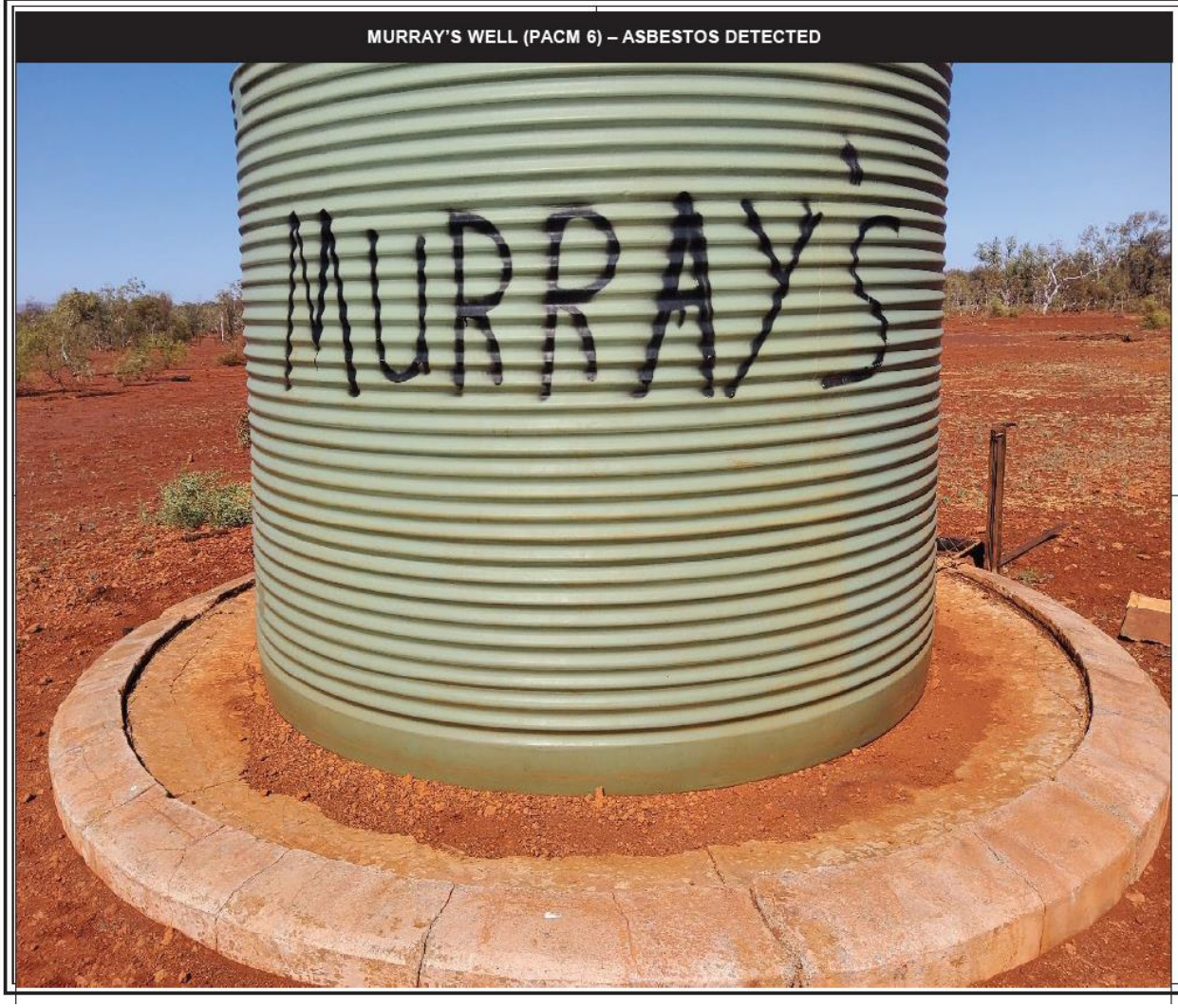
Laboratory Analysis – Crocidolite asbestos detected.

JBS&G

Job No: 54533	
Client: Hancock Prospecting	
Version: Rev A	Date: 22.02.2023
Drawn By: LP	Checked By: JN
Not to Scale	
Coord. Sys n/a	
Mulga Downs	

APPENDIX B

MURRAY'S WELL (PACM 6) – ASBESTOS DETECTED



Visual Inspection –
Concrete tank stand, evidence of cracking, weathering.
No fencing around structure.

Laboratory Analysis –
Crocidolite asbestos detected.

JBS&G

Job No: 54533	
Client: Hancock Prospecting	
Version: Rev A	Date: 22.02.2023
Drawn By: LP	Checked By: JN
Not to Scale	
Coord. Sys n/a	
Mulga Downs	

APPENDIX B

MURRAY'S WELL (PACM 6) – ASBESTOS DETECTED

Visual Inspection – Background two storage tanks. Foreground Storage Tank but evidence of cracking, weathering. Background, Bore and solar panel but no ACM identified.

Laboratory Analysis – Crocidolite asbestos detected.

JBS&G

Job No: 54533	
Client: Hancock Prospecting	
Version: Rev A	Date: 22.02.2023
Drawn By: LP	Checked By: JN
Not to Scale	
Coord. Sys n/a	
Mulga Downs	
APPENDIX B	

MURRAY'S WELL (PACM 6) – ASBESTOS DETECTED

Visual Inspection – Concrete trough, evidence of cracking, weathering. Potential ACM present. No fencing around structure.

Laboratory Analysis – Crocidolite asbestos detected.

JBS&G

Job No: 54533	
Client: Hancock Prospecting	
Version: Rev A	Date: 22.02.2023
Drawn By: LP	Checked By: JN
Not to Scale	
Coord. Sys n/a	
Mulga Downs	

APPENDIX B

MURRAY'S WELL (PACM 6) – ASBESTOS DETECTED

Visual Inspection –
Concrete tank stand, evidence of cracking, weathering.
No fencing around structure.

Laboratory Analysis –
Crocidolite asbestos detected.

JBS&G

Job No: 54533	
Client: Hancock Prospecting	
Version: Rev A	Date: 22.02.2023
Drawn By: LP	Checked By: JN
Not to Scale	
Coord. Sys n/a	
Mulga Downs	
APPENDIX B	

CALAMINA WELL (PACM 7) – ASBESTOS DETECTED

Visual Inspection –
Concrete tank stand, evidence of cracking, weathering.
No fencing around structure.

Laboratory Analysis –
Crocidolite asbestos detected.

JBS&G

Job No: 54533	
Client: Hancock Prospecting	
Version: Rev A	Date: 22.02.2023
Drawn By: LP	Checked By: JN
Not to Scale	
Coord. Sys n/a	
Mulga Downs	

APPENDIX B

CALAMINA WELL (PACM 7) – ASBESTOS DETECTED

Visual Inspection –
Concrete tank stand, evidence of cracking, weathering.
No fencing around structure.

Laboratory Analysis –
Crocidolite asbestos detected.

JBS&G

Job No: 54533	
Client: Hancock Prospecting	
Version: Rev A	Date: 22.02.2023
Drawn By: LP	Checked By: JN
Not to Scale	
Coord. Sys n/a	
Mulga Downs	
APPENDIX B	

CALAMINA WELL (PACM 7) – ASBESTOS DETECTED

Visual Inspection –
Concrete tank stand, evidence of cracking, weathering.
No fencing around structure.

Laboratory Analysis –
Crocidolite asbestos detected.

JBS&G

Job No: 54533	
Client: Hancock Prospecting	
Version: Rev A	Date: 22.02.2023
Drawn By: LP	Checked By: JN
Not to Scale	
Coord. Sys n/a	
Mulga Downs	
APPENDIX B	

CALAMINA WELL (PACM 7) – ASBESTOS DETECTED

Visual Inspection – Fragment from concrete tank stand, evidence of cracking, weathering. No fencing around structure.

Laboratory Analysis – Crocidolite asbestos detected.

JBS&G

Job No: 54533	
Client: Hancock Prospecting	
Version: Rev A	Date: 22.02.2023
Drawn By: LP	Checked By: JN
Not to Scale	
Coord. Sys n/a	
Mulga Downs	
APPENDIX B	

Appendix 2 – Non-Friable Asbestos Removal Checklist (DMIRS)

Government of **Western Australia**
Department of **Mines, Industry Regulation and Safety**

Removal Checklist - Non Friable Asbestos

(Non-friable means that the asbestos containing material is not in powder form, and when dry does not crumble by hand pressure).

safety checklist

Check	yes	no	n/a
Planning & Preparation			
Is an asbestos removal licence required? (Required if more than 10 m^2)	☐	☐	☐
If a license is required, is a copy of the licence available on site?	☐	☐	☐
Has the scope of work been documented with the client? (ie what is being removed, what is being left, any asbestos debris already present, access to water, what area will be restricted)	☐	☐	☐
Have persons in adjoining properties been advised of removal works? (advised, but not mandatory)	☐	☐	☐
Has a safe work method statement (SWMS) been written? (after site inspection to include site specific hazards)	☐	☐	☐
Have all workers been trained in the hazards of asbestos, safe work methods, and the SWMS / JSA for the job and the training recorded?	☐	☐	☐
Has the asbestos register been consulted where available?	☐	☐	☐
Have the asbestos removal boundaries been established and barriers used where practicable?	☐	☐	☐
Have entry points to the asbestos work area been signposted in accordance with AS1319?	☐	☐	☐
Have electrical and lighting installations in the asbestos removal area been disconnected, removed or de-energised by a licensed electrician?	☐	☐	☐
Are hand tools either non-powered or low-powered and designed to capture or suppress dust? (NO high speed tools – grinders, sanders, saws)	☐	☐	☐
Is suitable PPE available? (Minimum - coveralls, Class P2 respirator, safety boots), gloves where assessed as necessary?	☐	☐	☐
Does the asbestos vacuum cleaner comply with *AS/NZS 60335.2.69 Industrial vacuum cleaners* and e.g a class H industrial cleaner with a HEPA filter? (NO domestic vacuum cleaners used)	☐	☐	☐
Has the work area been prepared by removing all items as far as practicable and covering any remaining items with heavy duty plastic sheeting?	☐	☐	☐
Are drop sheets used where practicable?	☐	☐	☐
Has an area for wrapping waste ACM been prepared and heavy duty sheeting (200µm minimum thickness) laid out or heavy duty asbestos waste bags provided?	☐	☐	☐
For indoor work, is air conditioning turned off and openings to other parts of the building sealed?	☐	☐	☐
For outdoor work, are openings to buildings closed where practicable?	☐	☐	☐
Prior to removal, has the ACM been saturated by water containing a wetting agent (eg detergent), via a low pressure spray? OR has a tinted PVA coating been applied?	☐	☐	☐
Is run-off of the wetting agent minimised to avoid contamination issues?	☐	☐	☐
If a wet method of removal cannot be used (due to live electrical conductors or roof work) have the following controls been implemented or considered by a risk assessment? • PVA coating (tinted to show coverage) prior to removal • ACM removed in small sections with limited disturbance	☐	☐	☐

WORKSAFE

Mason Bird Building, Level 1, 303 Sevenoaks St (cnr Grose Ave), Cannington WA 6107
Locked Bag 100, EAST PERTH WA 6892
Telephone:1300 307877 Email: safety@dmirs.wa.gov.au
Internet: www.commerce.wa.gov.au/worksafe

• Work area is enclosed and under negative pressure • All personnel involved in the removal are using full-face positive pressure air supplied respirators • Waste material is placed immediately into wetted containers.			
Has all the equipment being used for the asbestos removal been maintained in accordance with the manufacturer's instructions?	☐	☐	☐
Has all of the equipment being used for the asbestos removal been inspected before commencing removal work?	☐	☐	☐
Where air monitoring has been identified as appropriate, has a competent person, independent from the removalist, been selected to conduct air monitoring?	☐	☐	☐
Are the *NOHSC Codes of Practice for the Safe Removal of Asbestos* and *Management and Control of Asbestos in Workplaces* available on site?	☐	☐	☐
Asbestos Removal			
Is controlled wetting of the ACM continuing during removal (for dust suppression)?	☐	☐	☐
Is removal conducted with minimal breakage of ACM?	☐	☐	☐
Has a waste disposal plan been developed to include safe transport to the waste disposal site and any specific requirements of the disposal facility?	☐	☐	☐
Has asbestos waste been wrapped/contained until it can be removed and disposed of?	☐	☐	☐
Are waste bags tied off securely, and waste packs fully sealed with heavy duty tape?	☐	☐	☐
Are the waste packs or bags labelled with an appropriate warning? (eg. CAUTION – ASBESTOS - DO NOT DAMAGE OR OPEN PLASTIC)	☐	☐	☐
Are records of disposal kept?	☐	☐	☐
Decontamination			
Has a visual clearance been conducted to ensure there is no visual evidence of dust or debris? (Check ledges, tops of duct work, crevices and cracks in the floor/wall)	☐	☐	☐
Has the workplace been decontaminated using a wet method?	☐	☐	☐
Have all tools used during the asbestos removal process been decontaminated? (if tools cannot be decontaminated or are to be used for other ACM removal, they should be tagged, double bagged and correctly labelled)	☐	☐	☐
Has disposable asbestos contaminated PPE been double bagged for disposal?	☐	☐	☐
Has footwear worn during asbestos removal been thoroughly cleaned? (use of an asbestos vacuum and/or wet wiped)	☐	☐	☐
Has respiratory protective equipment been used until all contaminated clothing has been thoroughly vacuumed or disposed of?	☐	☐	☐
Has personal decontamination been conducted in the asbestos work area to avoid re-contamination? (Minimum – wash face, arms, hands. Shower if available)	☐	☐	☐
Has a joint walk through the removal area with the client been conducted at the end of the job, to check both agree the area is visually clean?	☐	☐	☐
Soil Contamination			
Has the removal area and work area been carefully visually inspected and any remnant ACM collected for disposal?	☐	☐	☐
Will hand picking and/or raking sufficiently remove remnant ACM? (if not, removal of the top soil may be necessary)	☐	☐	☐
Has soil been dampened down before hand picking of ACM or raking occurs?	☐	☐	☐
Is appropriate PPE being worn while handling waste ACM?	☐	☐	☐
Has the ACM and disposable PPE been double bagged and disposed of as asbestos waste?	☐	☐	☐
Have decontamination procedures (as above) been followed?	☐	☐	☐

Other sources of information

WorkSafe www.worksafe.wa.gov.au

Legislation

- The Occupational Safety and Health Regulations 1996

Codes of practice

- Management and control of asbestos in workplaces [NOHSC: 2018]
- Safe removal of asbestos. 2nd edition. [NOHSC: 2002]

Guidance

- Asbestos – Health Surveillance – A Guide for Employers

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Appendix 3 Information Sheet: Asbestos Contaminated Soils

Government of Western Australia
Department of Mines, Industry Regulation and Safety

WorkSafe
Western Australia

INFORMATION SHEET

Asbestos contaminated soils

This information sheet provides advice for people with management or control of a workplace where soil is contaminated with asbestos containing material (ACM) and those involved in inspecting, removing, managing or disposing of asbestos contaminated soils at workplaces.

A workplace is any location where a business or undertaking carries out work and includes any place where a worker goes, or is likely to be. It includes residential premises when paid work is occurring at that site.

This information sheet deals with soils that are contaminated with ACM. It does not cover naturally occurring asbestos at a workplace.

Background

When asbestos is found in soil, it is usually as a result of:

- inadequate asbestos removal work or demolition
- degradation of a building or structure on site
- legacy or recent illegal dumping
- waste burial
- past use of contaminated fill/top soil.

Asbestos in soil poses a risk to the health of workers if the fibres become airborne and are then inhaled. The likelihood of exposure depends on the:

- quantity and distribution
- condition – whether it is non-friable (bonded) or friable (crumbles under hand pressure, non-bonded)
- level of disturbance
- systems of work and controls used to limit the release and inhalation of asbestos fibres.

Non-friable asbestos is asbestos that is bound tightly in a matrix (e.g. asbestos cement fencing, eaves). Non-friable asbestos may become friable after severe degradation, such as during a fire or as a result of a chemical 'attack'.

Friable asbestos refers to asbestos that can be broken up using hand pressure. Examples include asbestos pipe lagging, asbestos fibres spread by high pressure cleaning of asbestos cement or fire damaged asbestos cement sheeting that has fragmented.

Friable asbestos presents a greater health risk than non-friable due to the increased chance of fibre release.

Inspection and assessment

Asbestos contaminated soils must be inspected by a competent person, such as a consultant, who has acquired through training, qualification or experience, the relevant knowledge to carry out the task. The level of detail required for an inspection depends on a number of factors, including:

- background knowledge of the site
- the likely amount and type of asbestos contamination (including sampling and analysis where necessary)
- the likely source of the asbestos contamination.

Residential sites with contamination can be reported to the local government authorised officer (environmental health officer) who has powers to regulate asbestos contamination under the Health (Asbestos) Regulations 1992.

For extensive or legacy asbestos contamination, the site should be reported under section 11 of the *Contaminated Sites Act 2003*. For more information on reporting and assessment of contaminated sites, refer to the Department of Health's *Guidelines for the Assessment, Remediation and Management of Asbestos Contaminated Sites in Western Australia*.

Removal

Under the Work Health and Safety (General) Regulations 2022, recent or minor, small scale workplace soil contamination can be removed using safe systems of work.

Removal of non-friable asbestos in soil contamination of 10 square metres or more (total asbestos surface area) may be conducted by a Class A or Class B asbestos licence holder. If the asbestos contamination is friable or mixed friable/non-friable, a Class A asbestos licence holder must be engaged. An independent consultant may also be required to assess and manage the site to address the client's compliance with environmental legislation.

Table 1 Asbestos removal licensing requirements

Type of asbestos	Quantity	Removal requirements
Non-friable only	Total amount of asbestos containing material in soil is less than 10 m² (total surface area)	Removal licence not required Safe systems of work required, including training and supervision
Non-friable only	Total amount of asbestos containing material in soil is equal to or greater than 10 m² (total surface area)	Class A or Class B asbestos licence holder Safe systems of work required, including training and supervision Licence holders must comply with conditions of the licence

Type of asbestos	Quantity	Removal requirements
Friable only or mixed friable and non-friable	Visible contamination of friable asbestos greater than trace levels (trace levels relate to AS 4964:2004 *Method for the qualitative identification of asbestos in bulk samples* (0.1g/kg) – total quantity and distribution of friable asbestos through the soil needs to be considered)	Class A asbestos licence holder Safe systems of work required, including training and supervision Licence holders must comply with conditions of the licence
Minor contamination	As determined by risk assessment (refer to Safe Work Australia – *Minor contamination of asbestos-containing dust or debris* and WA Department of Health)	

It is important to note that soil remediation work is a specialised activity and may require additional competency, skills and resources. The selection of a Class A or Class B licence holder should consider the resources, skills and experience required for soil remediation work. Controls and safe systems of work in accordance with work health and safety legislation must be used during the removal of asbestos in soils.

Controls for removal work that is not small-scale or minor should include, but not be limited to:

- appropriate planning (e.g. preparation of an asbestos management plan/safe work method statement for the site)
- selecting mobile plant with cabin air filters where practicable
- restricting access to the work site
- isolating and securing the removal work area using signs and barriers
- implementing systems to control cross contamination of ACM between vehicles and uncontaminated areas of the site, including buildings
- controlling dust with dust suppression techniques (e.g. water and wetting agents)
- providing information and training for workers on hazards and safe work practices to minimise exposure
- selecting and providing the correct personal protective equipment and respiratory protective equipment
- implementing decontamination procedures for workers and equipment.

Following asbestos removal, the adequacy of the work will need to be assessed and a clearance conducted. The clearance must be conducted by an independent competent person (ICP) who has knowledge, training and experience in asbestos removal and holds certification for asbestos assessor work or a relevant tertiary qualification.

For soils contaminated with friable asbestos, the ICP must be a licenced asbestos assessor (LAA). Independent means the ICP or LAA must not be involved in the removal of asbestos for that specific job or be involved with the asbestos licence holder removing the asbestos for that specific job.

The soil validation will depend on the remediation approach adopted and the form of asbestos. Sampling should be conducted to check that the decontamination is complete. Air monitoring should be conducted based on risk to ensure exposure controls are effective.

For more information on soil validations, refer to the Department of Health's *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*.

Transport/disposal

Asbestos is classified as a controlled waste, as listed in Schedule 1 of the Environmental Protection (Controlled Waste) Regulations 2004.

Prior to transport, all asbestos contaminated soils must be wet down and covered or contained to minimise the risk of dust and fibres becoming airborne during transport. Moderate watering should be used such that the soil does not wash away or cause stability issues during transport.

Contaminated asbestos soils must be contained and labelled in accordance with Schedule 9 clause 8 of the WHS (General) Regulations 2022 before the waste is removed from site or prior to transport to a licensed waste facility.

Appropriate systems of work must be applied to decontaminating vehicles used to transport asbestos contaminated soils.

Managing asbestos in soils in situ

Where appropriate, ACM contamination may be contained on site in compliance with the *Contaminated Sites Act 2003*, associated regulations and guidelines administered by the Department of Water and Environmental Regulation. In such situations, the site would be classified under section 13 of the Act and a memorial placed on the title.

Containment of asbestos on site does not relate to asbestos that is part of a building or structure, or to fly tipped/dumped asbestos, and this must be removed in accordance with work health and safety legislation.

In certain circumstances, the site may be registered on a public access database and subject to mandatory disclosure requirements at sale or lease. A site management plan (SMP) may be required to describe appropriate measures for managing the disturbance of contaminated soil and to protect future site workers and users.

An SMP should include:

- information on the location of ACM contamination, including coordinates and depth
- inspection and maintenance of a barrier above the contaminated soil
- notification of workers in the area prior to work commencing, so that a safe system of work can be implemented
- established safe work practices for identifying and repairing any damage to the barrier.

Further information

Work Health and Safety Commission

- *How to safely remove asbestos: Code of practice*

Department of Mines, Industy Regulation and Safety

- Asbestos FAQs
- Asbestos regulators and information sources

Department of Health

- *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*

Department of Water and Environment Regulation

DWER regulates contaminated sites and seeks advice from the Department of Health on asbestos or other contaminants of public health concern as required.

- *Asbestos controlled waste fact sheet*

Asbestos Safety and Eradication Agency

- Search for disposal facilities

Safe Work Australia

- *Minor contamination of asbestos-containing dust or debris*

Appendix 4 Management of ACM Requiring Licensed Asbestos Removalist

- Obtain a copy of the asbestos register for the Development Envelope before starting any asbestos removal work. This should be obtained from the person with management or control of the workplace. This register should be a dynamic document, where it is updated as required, to always keep it current and up to date.
- Demarcate the area around the ACM impacted area with temporary fencing, bunting or similar and treated as a no-entry area unless appropriate personal protective equipment (PPE) is worn. Signage should also be displayed to inform people where the asbestos removal area is and limit access. An example of an asbestos removal sign can be found in Section 4.2 of Work Health and Safety Commission (2022).
- A licenced asbestos removalist (Class A or Class B) should be engaged in accordance with regulatory standards, such as Safe Work Australia (2011) and Work Health and Safety Commission (2022). Work Health and Safety Commission (2022) states:
    - Class A Licence: Can remove any amount or quantity of asbestos or ACM including:
        - Any amount of friable asbestos or ACM
        - Any amount of ACD
        - Any amount of non-friable asbestos or ACM
    - Class B Licence: Can remove:
        - Any amount of non-friable asbestos ACM
        - Any amount of ACD associated with removal of non-friable asbestos or ACM
- The licenced asbestos removalist must also obtain a copy of the asbestos register for the Development Envelope.
- The site owner and licensed asbestos removalist should ensure an asbestos removalist supervisor is readily available or present when the works are being carried out by the licenced asbestos removalist.
- The licenced asbestos removalist must prepare an asbestos removal control plan before the start of the works. This plan should include:
    - how the asbestos removal will be carried out, including the method, tools, equipment and PPE to be used; and
    - the asbestos to be removed (location, type and condition).
- The asbestos removal control plan should be completed in collaboration with the asbestos removalist supervisor, who will be supervising the works, the person who commissioned the work, the person with management or control of the workplace and the workers, including health and safety representatives.
- The asbestos removal control plan should be provided to the person who commissioned the work and ensure a copy is accessible for onsite staff. This plan must also be made available for inspection under the WHS Act, according to the Work Health and Safety Commission (2022).
- The licensed asbestos removalist must notify the regulator (DWER Contaminated Sites Branch) in writing at least 5 days before the work starts. The details of this correspondence should follow Section 3.6 of Work Health and Safety Commission (2022).
- The licensed asbestos removalist must ensure appropriate decontamination facilities are in place
- The licensed asbestos removalist must ensure waste containment and disposal procedures are in place

- The site owner needs to:
  - Inform all relevant parties, with sufficient information, about the asbestos removal.
  - Ensure clearance inspections are conducted and clearance certificates are obtained for any licensed asbestos removal work in accordance with Work Health and Safety Commission (2022)
    - Clearance inspections must be carried out and clearance certificates issued by an independent competent person, for asbestos work of more than 10 m2 of nonfriable asbestos
    - A clearance certificate must be issued before the area can be re-occupied for demolition or other work
  - Ensure air monitoring is conducted, where appropriate, as per Section 0 Air Monitoring
- If Class A asbestos removal work is undertaken, a licenced asbestos assessor must carry out the following work, as per the Work Health and Safety Commission (2022)
  - Air monitoring, as per Section 7.8 Air Monitoring
  - Clearance inspections for Class A asbestos removal work
  - Issuing clearance certificates in relation to Class A asbestos removal work
- Validation: Following asbestos removal, soil validation may be required to assess the adequacy of the work and facilitate clearance certificates being issued. Validation that the surfaces around these areas following the removal of these structures are not contaminated may need to be undertaken as outlined in Section 6.8 Validation Sampling (DoH 2021).