MINERAL RESOURCES

MT MARION LITHIUM PROJECT

NATIVE VEGETATION CLEARING PERMIT APPLICATION

MINERAL RESOURCES LIMITED

14 NOVEMBER 2024 VERSION 01

DOCUMENT INFORMATION

The purpose of this document is to provide supporting information for Mineral Resources Limited's application for a Native Vegetation Clearing Permit (NVCP) and address the requirements as prescribed under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*.

Contact

Acknowledgement of Country

MinRes is committed to reconciliation and recognises and respects the significance of Aboriginal and Torres Strait Islander peoples' communities, cultures, and histories. MinRes acknowledges and respects Aboriginal and Torres Strait Islander peoples as the traditional custodians of the land.

EXECUTIVE SUMMARY

Mineral Resources Limited (MinRes) is applying for a new Native Vegetation Clearing Permit (NVCP) (Purpose Permit), under Mt Marion Lithium Management Pty Ltd, to allow for expansion of the existing mining operations at the Mt Marion Lithium Project (the Project)(**Figure 1**).

This application is to allow for the clearing of 330 ha within a Purpose Permit Area of 488 ha for mining purposes (the Proposal). The Purpose Permit Area is adjacent to an existing Clearing Permit held by MinRes – CPS 8632/3, which was issued by the Department of Water and Environmental Regulation (DWER). CPS 8632/3 is partially situated on Freehold land, therefore not regulated under the *Mining Act* 1976.

This NVCP application is situated entirely on Mining Act tenure, and has therefore been submitted to the Department of Energy, Mines, Industry Regulation and Safety (DEMIRS) for assessment.

The Mt Marion Lithium Project is located within the Shire of Coolgardie, approximately 40 kilometres (km) south of Kalgoorlie in the Goldfields region of Western Australia (WA) (**Figure 1**)

The proposed Purpose Permit Area excludes any formal waterbodies and conservation reserves. The closest wetlands to the Purpose Permit Area are the ephemeral salt lake systems: Brown Lake, occurring approximately 19 km to the northwest; and Lake LeFroy, occurring approximately 23 km to the southeast. The nearest conservation estate is the Yallari Timber Reserve located 8 km to the west and southwest of the Purpose Permit Area.

Surveys undertaken over the Purpose Permit Area are outlined below:

Fauna and Short-Range Endemic (SRE) Surveys

- Mt Marion Mining Tenements Terrestrial Fauna Surveys – Basic Fauna and Targeted Malleefowl, Chuditch and ABAB Surveys (SLR Consulting, 2024b)
- Round 1 SRE Invertebrate Survey at the Mt. Marion Lithium Project (Bennelongia, 2024)
- Targeted Survey for the Arid Bronze Azure Butterfly – Supplementary Surveys Mt Marion (SLR Consulting, 2024c)
- Review of Fauna Assessments within the Mt Marion Lithium Project (Bamford Consulting Ecologists, 2019)
- Mount Marion Lithium Project Malleefowl Survey. (Bamford Consulting Ecologists, 2020)
- Mt Marion Fauna Assessment (Bamford Consulting Ecologists, 2022a) which partially covers the Purpose Permit Area
- Mount Marion Lithium Project Malleefowl Survey (Bamford Consulting Ecologists, 2022b).

Flora and Vegetation Surveys

- Mt Marion MinRes Tenements: Detailed Flora & Vegetation Assessment (Spectrum Ecology, 2024a)

- Reconnaissance Flora and Vegetation Survey for the Mt Marion Project Area (Native Vegetation Solutions, 2019)
- Mt Marion Project Reconnaissance Flora and Vegetation Assessment (Ecologia, 2022). which covers part of the Purpose Permit Area.

There are no Threatened or Priority Ecological Communities within 50 km of the Purpose Permit Area.

No Threatened flora, as gazetted under the *Biodiversity Conservation Act 2016* (BC Act) or Threatened plant taxa pursuant of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) have been identified within the Purpose Permit Area. No Priority species were identified within the Purpose Permit Area.

No introduced flora was recorded in the Purpose Permit Area.

The Spectrum Ecology (2024) surveys identified a total of 25 major vegetation groups within the recent flora and vegetation survey; seven of these vegetation units occur within the Purpose Permit Area. All vegetation groups are common and well represented through the Eastern Goldfields subregion. The vegetation community that dominates the Purpose Permit Area is Eucalypt woodlands over mixed shrublands on broad loamy plains and low rises. This vegetation type is typical of the region and not considered to be unusually diverse.

Spectrum Ecology mapped the vegetation condition ranging from Pristine to Degraded within the survey area, with the majority of the Purpose Permit Area (58 %) being Excellent. A desktop assessment completed as part of the flora and vegetation survey indicated that three pre-European vegetation associations present in the proposed clearing area are all above the 30% threshold at a state, bioregional and subregional level (Native Vegetation Solutions, 2019)

Four fauna species of conservation significance were recorded or a likely resident within the SLR Consulting (2024) survey area (**Table 13**):

- Malleefowl (*Leipoa ocellata*) listed as Vulnerable at both a state and federal level – **Recorded within surveys**, the closest mound is 1.5 km outside the Purpose Permit Area.
- Inland Hairstreak Butterfly (*Jalmenus aridus)* listed as Priority 1 under the BC Act – **Recorded within surveys** - the closest occurrence is 2.5 km outside the Purpose Permit Area
- Arid Bronze Azure Butterfly (*Ogyris petrina*) listed as Critically Endangered at both a state and federal level - **High likelihood of occurrence.**
- Carnaby's Cockatoo (*Zanda latirostris*) listed as Endangered at both a state and federal level - **Medium likelihood of occurrence**

The Purpose Permit Area contained three Fauna Habitats with the majority being well represented across the wider region. The only Habitat of significance within the Purpose Permit Area are Drainage Lines, with up to 9.8 ha (0.3 % of Drainage Lines Surveyed by SLR) to be impacted.

In accordance with the *Native Vegetation Clearing Regulations 2004* (WA), an assessment against the 10 principles for the clearing of native vegetation was undertaken and concluded that the clearing of up to 330 ha of native vegetation for the Project is not likely to be at

variance with any of the Principles. The environmental impacts of the proposal involving the clearing of native vegetation can be adequately managed by the MinRes Environmental Management System (EMS).

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ABBREVIATIONS

Abbreviation	Definition
AER	Annual Environmental Report
BC Act	*Biodiversity Conservation Act 2016*
BOM	Bureau of Meteorology
CE	Critically endangered
DCCEEW	Department of Climate Change, Energy, the Environment and Water (Commonwealth)
DBCA	Department of Biodiversity, Conservation and Attractions (WA)
DEC	Department of Environment and Conservation (WA) now DWER
DEMIRS	Department of Energy, Mines, Industry Regulation and Safety (WA)
DPIRD	Department of Primary Industries and Regional Development
DWER	Department of Water and Environmental Regulation (WA)
EMS	Environmental Management System
EN	Endangered
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EP Act	*Environmental Protection Act 1986*
EPA	Environmental Protection Authority
ha	Hectare
IBRA	Interim Biogeographic Regionalisation for Australia
IBSA	Index of Biodiversity Surveys and Assessments
km	Kilometre
LAP	Land Activity Permit
LGA	Local Government Area
m	Metre
MCP	Mine Closure Plan
MI	Migratory Species
Mining Act	*Mining Act 1978*
MinRes	Mineral Resources Limited
NVCP	Native Vegetation Clearing Permit
NVS	Native Vegetation Services
PEC	Priority Ecological Community
PDWSA	Public Drinking Water Source Area
PMI	Process Minerals International Pty Ltd
PMST	Protected Matters Search Tool
RIM	Reed Industrial Minerals Pty Ltd

RIWI Act	*Rights in Water and Irrigation Act 1914*
ROM	Run of Mine
SRE	Short-range endemic
TEC	Threatened Ecological Community
TSF	Tailings Storage Facility
VT	Vegetation Type
Vu	Vulnerable
WA	Western Australia
WONS	Weeds of National Significance

GLOSSARY

Term	Definition
Purpose Permit Area	The Development Envelope of 488 ha.
Disturbance Footprint	The indicative area in which 330 ha of clearing is to occur subject to this application
Completely Degraded	The structure of the vegetation is no longer intact, and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees and shrubs (Environmental Protection Authority, 2016).
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing (Environmental Protection Authority, 2016).
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks (Environmental Protection Authority, 2016).
Flora Survey Area	The area covered by (Spectrum Ecology, 2024a) and (Spectrum Ecology, 2024b) (**Figure 7).**
Fauna Survey Area	The area covered bySLR Consulting (2024b), which covers 30,924 ha (**Figure 14**)
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by frequent fires; the presence of some very aggressive weeds at high density; partial clearing; dieback; grazing (Environmental Protection Authority, 2016).
Pristine	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement (Environmental Protection Authority, 2016).
Project	Mount Marion Lithium Mine
Proposal	The clearing of 330 ha of native vegetation subject to this application
Very good	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing (Environmental Protection Authority, 2016).

1. INTRODUCTION

Mineral Resources Limited (MinRes), under Mt Marion Lithium Management Pty Ltd, is applying for a new Native Vegetation Clearing Permit (NVCP)(Purpose Permit) to allow for expansion of the existing mining operations at Mt Marion Lithium Project (the Project). A Purpose Permit Area is being requested (this Application) over Mining Tenements M15/841, M15/999 and L15/353. The Mt Marion Mine is currently operating under CPS 8632-3, which is adjacent to this Purpose Permit Area.

To date, approximately 1107.8 hectares (ha) has been disturbed under multiple clearing permits and other instruments at Mt Marion.

The objective of this Application is to facilitate the expansion of the Mt Marion Lithium Mine and request a new Purpose Permit Area of 488 ha to facilitate clearing of 330 ha (32 ha of which is existing disturbance) within this Purpose Permit Area (**Figure 1**).

Environmental values, including a summary of supporting biological surveys completed to support this application, are provided in **Section 5**. An assessment of the proposed clearing against the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* Clearing Principles is provided in **Table 16**, which considers the key surrounding environmental characteristics and analysis of the relevant supporting biological surveys.

1.1 Project Background

MinRes manages and operates the Project under a Build-Own-Operate life-of-mine mining services contract. The Project is jointly owned by MinRes (50%) via its subsidiary Process Minerals International (PMI) and one of the world's largest lithium producers, Ganfeng Lithium Co. Ltd (50 %). The joint venture Proponent is named Mt Marion Lithium Management Pty Ltd.

Approval for the Project was obtained under the Mining Act via Mining Proposal (MP) REGID 28674, granted on 2 February 2012, with clearing of approved infrastructure areas commencing in June 2012. The Project is currently operating under Mining Proposal Registration ID 120019, approved 14 March 2024. A new Mining Proposal is being sourced to covered clearing activities listed in this application.

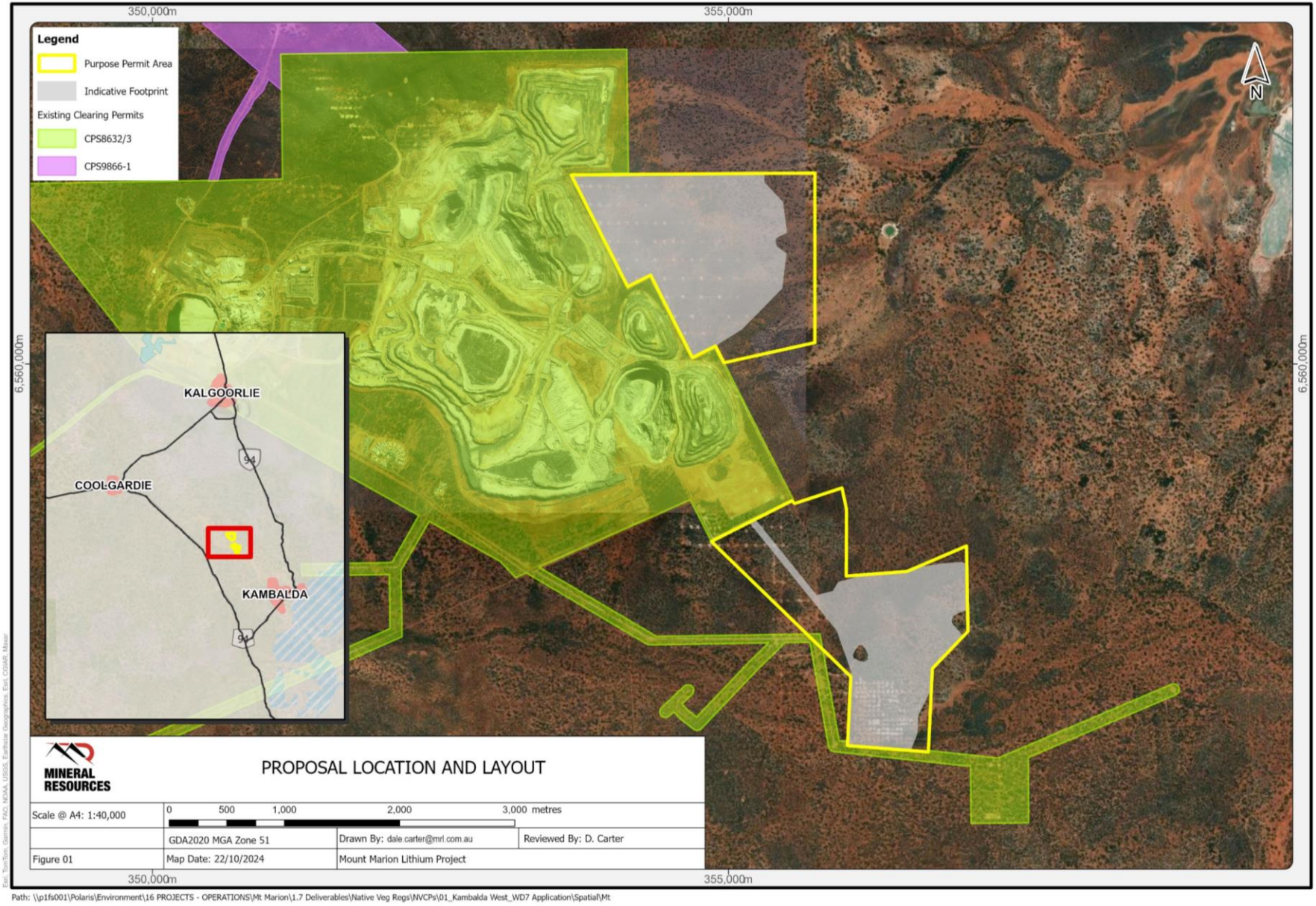

Figure 1: Proposal Location and Layout

1.2 Permit History

A summary of historical NVCP revisions at Mt Marion under MinRes/ PMI is detailed in **Table 1**. None of the permits listed below overlap the Purpose Permit Area proposed under this application.

Table 1: NVCP Application History

Permit - CPS	Issued	Expiry	Allocation (ha)	Cleared (ha) under permit
3549/1	24/07/2010	31/03/2014	150	102.33
5245/2	9/01/2013	17/11/2022	200	1.89
6770/1	5 /11/2015	28/11/2020	292.23	400.76
6770/2	21/07/2016	28/11/2025	450	
8632/1	13 /12/2019	12/01/2030	600	497.09
8632/2	4/05/2023	12/01/2030		
8632/3	13 /12/2023	12/01/2030		
10813/1	Pending	-	302	-
Total Cleared Under MinRes Permits				**1,002.07**

1.3 Legislative Framework

The clearing of native vegetation in Western Australia is regulated under Part V of the *Environmental Protection Act 1986* (EP Act) and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*. In addition to the matters considered in accordance with section 51O of the EP Act, MinRes also has regard to the following statutes, polices and guidelines:

Legislation of relevance for assessment of native vegetation clearing:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Conservation and Land Management Act 1984* (WA) (CALM Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Soil and Land Conservation Act 1945*
- *Rights in Water and Irrigation Act 1914*
- *Aboriginal Heritage Act 1972*.

Other policies and guidance documents relevant to the Project include:

- Environmental Offsets Policy (Government of Western Australia, 2011)
- A guide to the assessment of applications to clear native vegetation (Department of Environmental Regulation, 2014)
- Procedure: Native vegetation clearing permits (Department of Water and Environmental Regulation, 2021)
- Technical guidance – Flora and Vegetation Surveys for Environmental Impact Assessment (Environmental Protection Authority, 2016)
- Technical guidance – Terrestrial Vertebrate Fauna Surveys for Environmental Impact Assessment (Environmental Protection Authority, 2020) Approved Recovery Plans for threatened species.

Currently the Mt Marion mine operates under the approvals outlined in **Table 2**.

Table 2: Existing Approvals for Mt Marion

Process	Approval Authority	Relevant Legislation
Mount Marion Hamptons Mining Proposal – Registration ID 120019	DEMIRS	*Mining Act 1978*
Mine Closure Plan – Registration ID 120019	DEMIRS	*Mining Act 1978*
Native Vegetation Clearing Permit Multiple Clearing Permits Currently Held	DWER	Part V Division 2 of the EP Act 1986
Section 26D and 5C licence to construct bores and abstract groundwater (amendment under assessment)	DWER	*Rights in Water and Irrigation Act 1914*
Prescribed Premises Licence (L9037/2071/1) amendment	DWER	Part V of the EP Act 1986

1.4 Stakeholder Consultation and Other Planning Matters

MinRes recognises the value of building positive relationships with key stakeholders and the communities in which it is active. It seeks to engage early, openly, honestly and regularly with the communities impacted by its operations and consider their views in its decision-making with respect to key planning, operational and closure aspects.

A wide variety of stakeholders have been identified within the Purpose Permit Area and include:

- Pastoral Lease Holders
- Native Title Groups
- Other Mining Tenement Holders
- Other Stakeholders (surface rights)
- Statutory Authorities, Government, Business and Community Bodies.

Early consultation regarding the Project has occurred and is ongoing with both the DEMIRS and the Shire of Coolgardie. The Purpose Permit Area lies wholly within the Marlinyu Ghoorlie (WC2017/007) Native Title determination.

No Heritage sites registered under the *Aboriginal Heritage Act 1972* are located within the Purpose Permit Area, (**Figure 2**). **Table 3** lists the status of Lodged Heritage Sites within the Purpose Permit Area, this site will be avoided under this Proposal.

Multiple heritage sites with the status still under review have been identified within the Purpose Permit Area, under an assessment completed by Terra Rosa Consulting early 2024. All Heritage Sites, regardless of status will be avoided with minimum 25m avoidance buffers places around all Heritage Sites.

Table 3: Lodged Heritage Sites

Tenement/Area	AHIS	Name	Type	Status
M15/841	40641	MRL23_010	Artifacts/ Scatter	Lodged. This site will be avoided under this proposal.

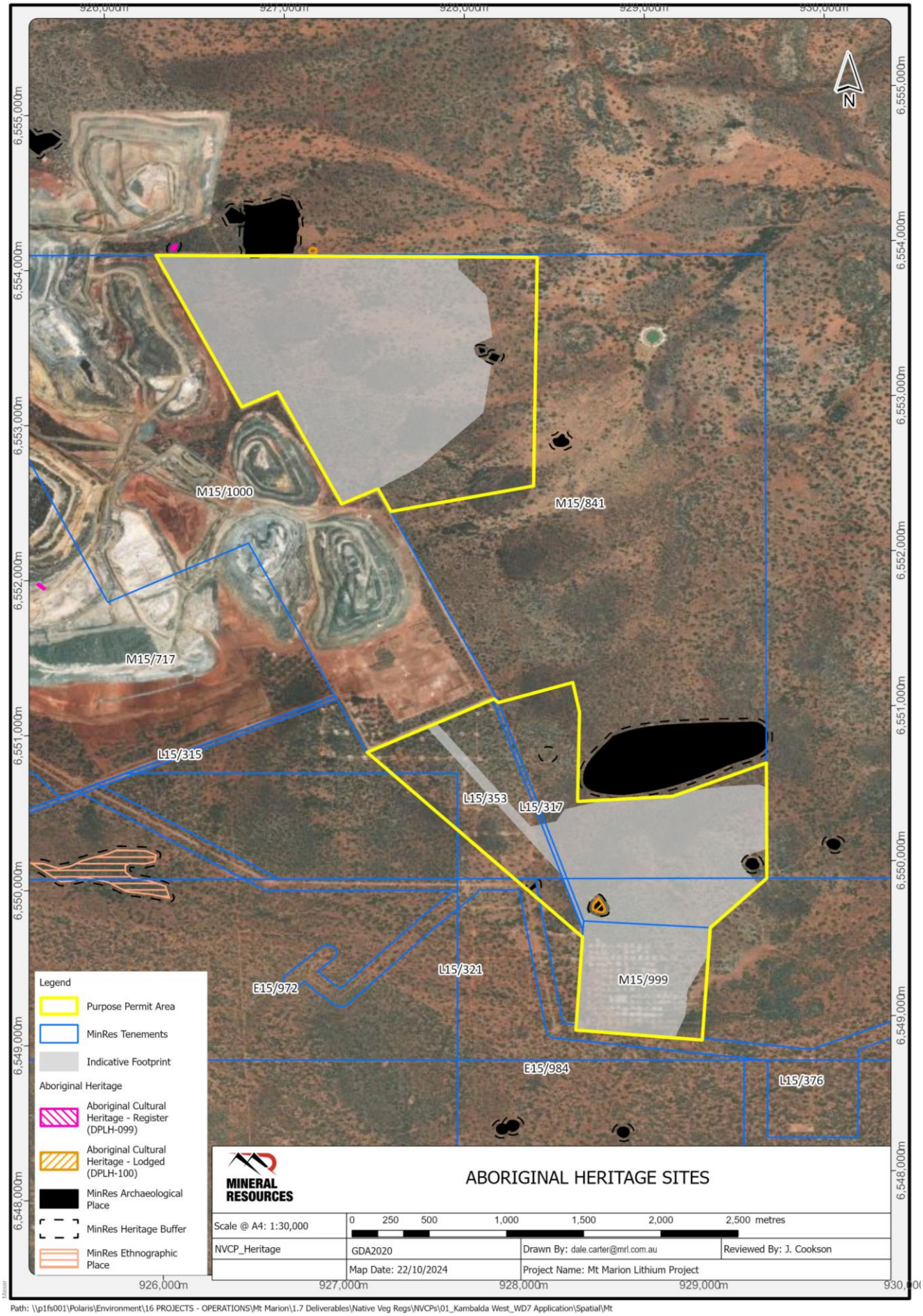

Figure 2: Aboriginal Heritage Sites

2. PURPOSE AND METHODOLOGY

2.1 Description of Proposed Activities

The Purpose Permit Area has been split into two areas:

- North Area (236 ha): MinRes are proposing expanding a Waste Rock Dump into tenement M15/841
- South Area (252 ha): MinRes are proposing to open a new mining area on M15/999, with the waste dump and supporting infrastructure located north of the pit on M15/841 with a haul road/ access road located on L15/353.

MinRes are proposing to clear up to 330 ha under this proposal (this includes 32 ha of existing disturbance (**Table 12**), which will be recorded as new land clearing under this Permit)

2.2 Method of Vegetation Disturbance

MinRes will ensure all clearing and ground disturbance is carried out in accordance with its Land Activity Permit (LAP) and Land Clearing Procedures. Noting this, the following methods of vegetation clearing will be implemented during the construction phase of the Project:

- Prior to clearing, a Project specific internal LAP will be completed and signed off by the Environmental Department and other key internal stakeholders.
- Clearing areas will be delineated in accordance with the Project specific internal LAP, the clearing will be surveyed and demarcated with survey pegs and flagging tape.
- Vegetation will be removed prior to topsoil striping. Vegetation will generally be cleared 'blade up' with bulldozers or graders within the Purpose Permit Area.
- The upper 200 mm (topsoil) of the soil profile will be stripped (where appropriate) and placed in stockpiles (paddock dumped not greater than 2 m in height with adequate distance between them to create a series of mounds and toughs).
- Subsoil will also be stripped, where appropriate, and stockpiled separately to ensure adequate capping and growth media is collected.
- Machinery operators will aim to minimise the frequency and intensity of soil handling, so they do not compromise the structural integrity of the material. Handling of topsoil will be minimised, particularly when wet.
- Soil stripping is planned to occur as close as possible to the development of land into the final land use.

2.3 Rehabilitation and Maintenance

MinRes will implement its approved Mine Closure Plan (MCP) (Current Approved MCP is Reg ID 120019, however a new Mining Proposal and MCP is being prepared to support activities in this Clearing Permit) in accordance with *Mine Closure Plan Guidance – How to prepare in accordance with Part 1 of the Statutory Guidelines for Mine Closure Plans* (Department of Mines Industry Regulation and Safety, 2020). Progressive rehabilitation has been undertaken and will continue over the life of the mine. An appropriate rehabilitation plan incorporating surface treatments and seed selection, collection, storage, and management will be implemented.

Landforms constructed will be designed to be safe and non-polluting and constructed so that final shape, size, stability, and ability to support local native vegetation are comparable to natural landforms in the area.

Weed and hygiene management measures will be implemented prior to ground disturbing equipment arriving on site to minimise the risk of spreading or introducing weeds within the proposed Purpose Permit Area.

The following topsoil management measures will be undertaken:

- Available topsoil stripped from all clearing areas and stockpiled for use during rehabilitation.
- Material movement and storage incorporated in mine planning.
- Respreading of stockpiled topsoil and vegetation over rehabilitation areas as soon as they become available.
- Pre-stripping of topsoil not to be undertaken in wet conditions.
- Topsoil stripping depth will be pre-determined.
- Topsoil stockpiled to a height of no more than 2 m in height or other evidence-based restrictions.
- Topsoil stockpiles located away from drainage channels and trafficable areas, and appropriately signed and recorded for future reference.
- Consider other growth media, and seed pellets where necessary.

2.4 Indicative Timeline

Subject to approval, clearing for the Project under this permit is anticipated to commence in quarter one of 2025. An indicative implementation schedule is shown in **Table 4**.

Table 4: Indicative development schedule for the Project

Stage	Indicative Timing
Commence clearing	Q1 2025
End clearing activities	FY 2029
Commence decommissioning and closure	FY 2040

3. PROJECT DESCRIPTION

3.1 Regional Setting

The Purpose Permit Area is located within the Coolgardie Botanical District of the Southwestern Interzone. This botanical district is predominantly Eucalypt woodland, becoming open towards the more calcareous soils, where a cover of saltbush-bluebush is evident. The landscape is gently undulating consisting of a deeply weathered surface, dry creeks, and low hills with areas of low elevation consisting of salt lakes and dunes.

3.2 Survey Area and Purpose Permit Area

This application is for a Purpose Permit Area of 48 ha, with a requested Disturbance Footprint of 330 ha (**Figure 1).**

The below surveys were completed in 2024 at Mt Marion, covering an area of 30,924 ha:

- Mt Marion – MinRes Tenements: Detailed Flora and Vegetation Assessment (Spectrum Ecology, 2024a) - this encompassed most of the previous flora and vegetation survey area assessed previously by Native Vegetation Solutions (2019)
- Mt Marion – Hamptons Tenements: Detailed Flora and Vegetation Assessment (Spectrum Ecology, 2024b) (This survey is North of the Purpose Permit Area, provided for regional context only).
- Mt Marion Mining Tenements Terrestrial Fauna Surveys: Basic Fauna and Targeted Malleefowl, Chuditch, and Arid Bronze Azure Butterly (ABAB) Surveys (SLR Consulting, 2024b)
- Mt Marion Hampton Tenements Terrestrial Fauna Surveys: Basic Fauna and Targeted Malleefowl, Chuditch, and Arid Bronze Azure Butterly (ABAB) Surveys (SLR Consulting, 2024a) (This survey is North of the Purpose Permit Area, provided for regional context only).
- Targeted Survey for Arid Bronze Azure Butterfly (ABAB) Supplementary Surveys – Mt Marion (SLR Consulting, 2024c)
- Round 1 SRE Invertebrate Survey at the Mt. Marion Lithium Project (Bennelongia, 2024).

Recent and past fauna surveys can be found in **Appendix B-D** and recent and past flora surveys can be found in **Appendix E-F**.

3.3 Tenure and Land Access

The Project occurs within mining lease M15/841 and M15/999 and miscellaneous licence L15/353.

- Mt Marion Lithium Pty Ltd is a 50:50 Joint Venture (JV) between Mineral Resources Limited and Ganfeng International Co. Ltd.
- A.C.N. 665 883 509 Pty Ltd is a 100% owned subsidiary of Mineral Resources Limited.

Tenement and occupier details are provided in **Table 5** and **Appendix A**. The total area covered by Project tenure is 983.5 ha.

Table 5: Land Tenure

Identifier	Current Area[1]	Term Granted	Ownership	Status	Expiry
M15/841	866.4 ha	19/08/1996	A.C.N. 665 883 509 PTY LTD	Live	18/08/2038
M15/999	50.3 ha	20/08/2009	Mt Marion Lithium Pty Ltd	Live	19/08/2030
L15/353	66.65	5/09/2017	Mt Marion Lithium Pty Ltd	Live	04/09/2038

[1] Area as per tenement summary reports

3.4 Proximity to DBCA Managed Lands

There are four conservation areas occurring within the vicinity of the Purpose Permit Area (**Figure 6)**

- Kambalda Nature Reserve (approximately 6.5 km to the southeast)
- Yallari Timber Reserve (approximately 7.2 km to the west and southwest)
- Karamindie State Forest (approximately 8.0 km to the northwest)
- Kambalda Timber Reserve (approximately 8.0 km to the southeast).

The closest Department of Biodiversity, Conservation and Attractions (DBCA) managed land is the Kambalda Nature Reserve, a C Class Reserve located on the western side of the Kambalda Township. This Nature Reserve is vested by the Conservation Commission for the purposes of Conservation of Flora and Fauna.

Due to the distances from the Purpose Permit Area, it is considered unlikely that the proposed clearing will impact these areas. There are no Environmentally Sensitive Areas (ESAs) within, or in proximity to, the proposed Purpose Permit Area.

3.5 Regional Land Use

The proposed Purpose Permit Area is located within the Goldfields region of Western Australia which consists of predominately mining, prospecting, forestry and pastoralist land uses. The Goldfields Woodlands are described as having an exceptionally high diversity of Eucalyptus species, with as many as 170 species occurring in the bioregion (Cowan, 2001). The Purpose Permit Area lies within the Coolgardie Vegetation System. All woodlands in the Coolgardie System have been logged in the past for mining timber and firewood and current vegetation is secondary growth regenerated from seed and coppice (Beard, J. S, 1972).

The Purpose Permit Area occurs within the Woolibar Pastoral Lease (**Figure 3**).

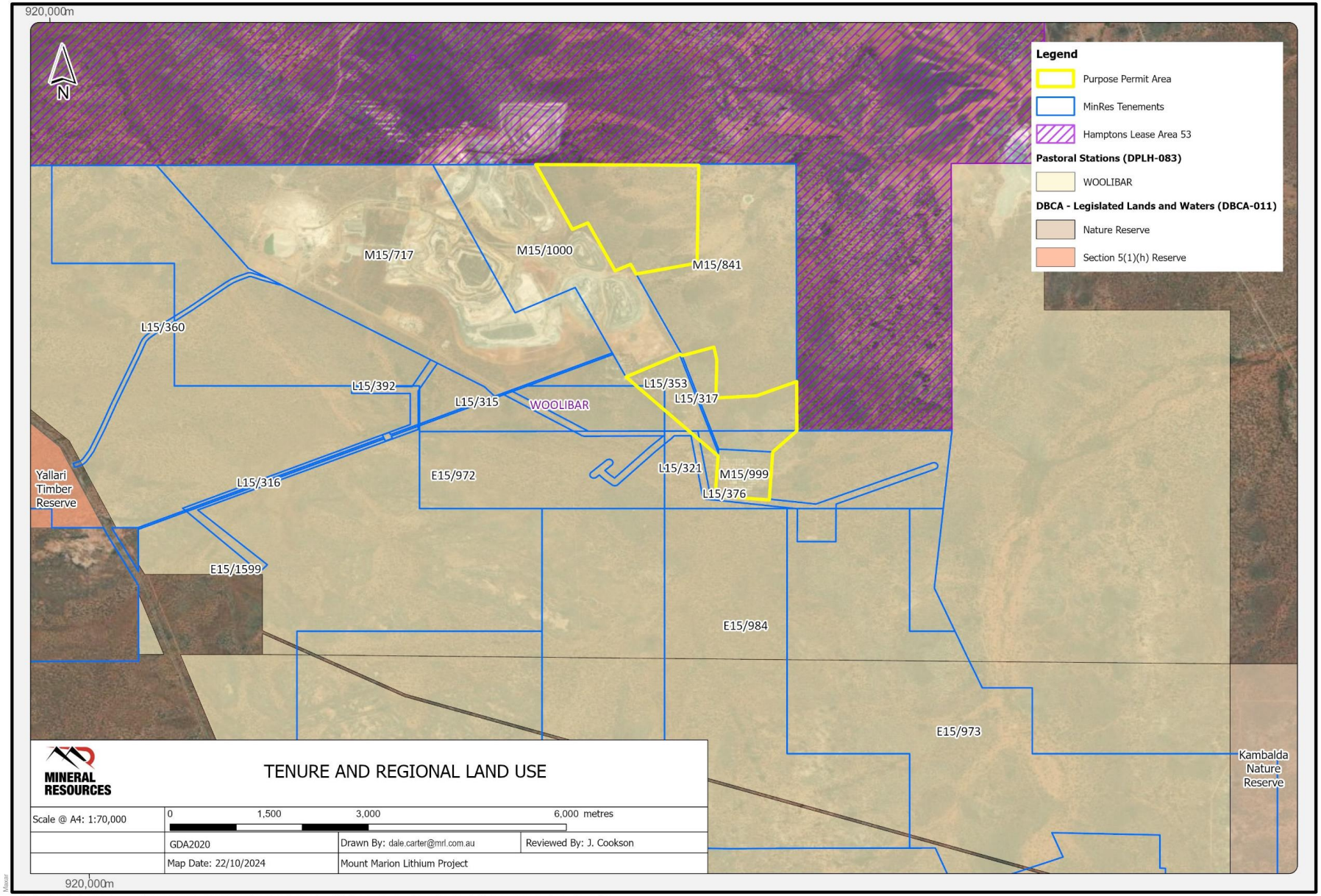

Figure 3: Regional Land Use
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4. ENVIRONMENTAL SETTING

4.1 Climate

Typically, the climate is characterised as being arid to semi-arid Mediterranean, with mainly winter rainfall as well as summer thunderstorms. The area receives approximately 250-300 mm of rainfall per year. The nearest official meteorological weather station with the most complete and up to date information is Kalgoorlie- Boulder Airport, which is located approximately 32 km north of the survey area (BoM, Bureau of Meteorology, 2023)

The annual average rainfall at Kalgoorlie is 267.7 mm over an average 39.9 rain days. Average rainfall varies across the months, with slightly larger rainfall events falling between January to March and May to July, and the least rainfall received in September. The mean annual minimum temperature at Kalgoorlie is 11.7 °C and the mean annual maximum temperature is 25.3 °C. The coldest temperatures occur in July (mean minimum temperature 5.1 °C), the hottest is January (mean maximum temperature 33.7 °C) and diurnal temperature variations are relatively consistent throughout the year. A summary of monthly averages for temperatures and rainfall recorded at Station 4106 is shown in **Figure 4**.

Figure 4 Monthly maximum and minimum temperatures, rainfall and windspeed (BoM,2022)

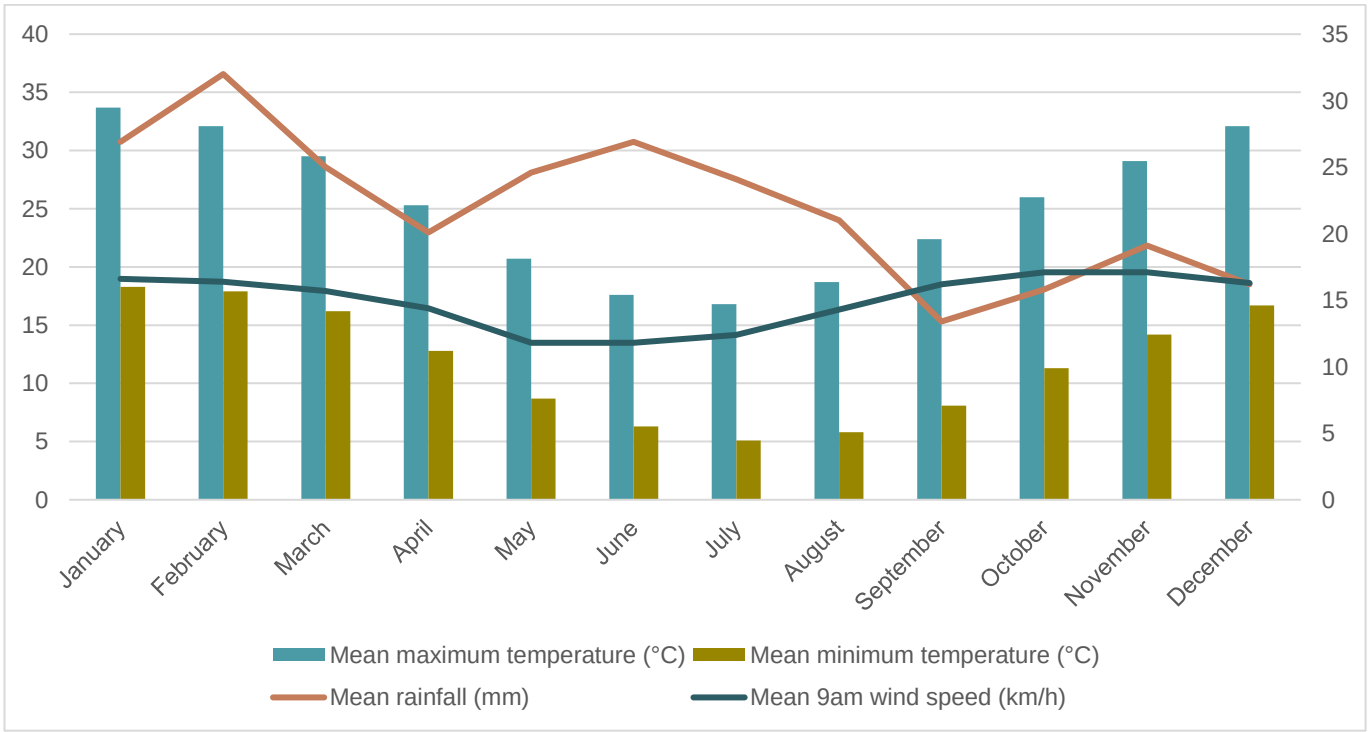

Figure 4 Monthly maximum and minimum temperatures, rainfall and windspeed (BoM,2022)

4.2 Underlying Geology

The underlying geology of the subregion is gneiss and granites that have eroded into a flat plane covered by tertiary soils and with scattered exposed bedrock. Calcareous earths are the dominant soil group and cover much of the plains and greenstone areas (Cowan 2001). The vegetation associated with this underlying geology typically consists of Mallees, Acacia thickets and shrub-heaths on sandplains. Diverse Eucalyptus woodlands occur around salt lakes, on ranges, and in valleys. Salt lakes support dwarf shrublands of samphire. Woodlands and Dodonaea shrubland are known to occur on basic granulites of the Fraser Range some distance to the southeast of the survey (CALM, 2002).

The geology of the area is dominated by a north-northwest trending Archaean metamorphosed ultramafic flow sequence of sheared talc amphibole chlorites to high magnesian basalts and interflow sediments. The sequence is intruded by shallow west dipping pegmatites emanating from the large Karamindie granitic intrusion to the southwest of the Project Area.

4.3 Soils and Soil Landscapes

The northern section of the Purpose Permit Area is hilly with the highest point being Mt Marion immediately to the north of M15/841. The tenement slopes to the southeast with the landforms becoming gently undulating and changing to broad drainages and outwash plains.

In the hilly areas of the northern parts of the tenement the soils are skeletal gravelly silty clays dominated by sub-outcrop and outcrop of the ultramafic flow sequences. Colluvial sandy loams and clay loams have developed in the southern areas of the tenements on the gently undulating areas and outwash plains. Sandy loams dominate in areas of granites and pegmatites.

The Purpose Permit Area is located across the Kambalda Zone in the Kalgoorlie Province soil landscape region of the Department of Industries and Regional Development (DPIRD) system, which has been described at the regional level as undulating plains (with some sandplains, hills and salt lakes) on the granitic rocks and greenstone of the Yilgarn Craton (DPIRD, Department of Primary Industries and Regional Development, 2022). Soil landscape mapping identified six soil landscape types in the Purpose Permit Area which are described in **Table 6** and shown in **Figure 5.**

Table 6: Soil Landscape Map Descriptions (DPIRD 2022)

Soil Landscape Zone	Soil Landscape System	Map Unit Name	Description
265 Kambalda Zone	265g4	BB5	Rocky ranges and hills of greenstones-basic igneous rocks
265 Kambalda Zone	265l8	My154	Undulating country on acid volcanic rocks and sedimentary materials
265 Kambalda Zone	265k9	Mx43	Gently undulating valley plains and pediments; some outcrop of basic rock

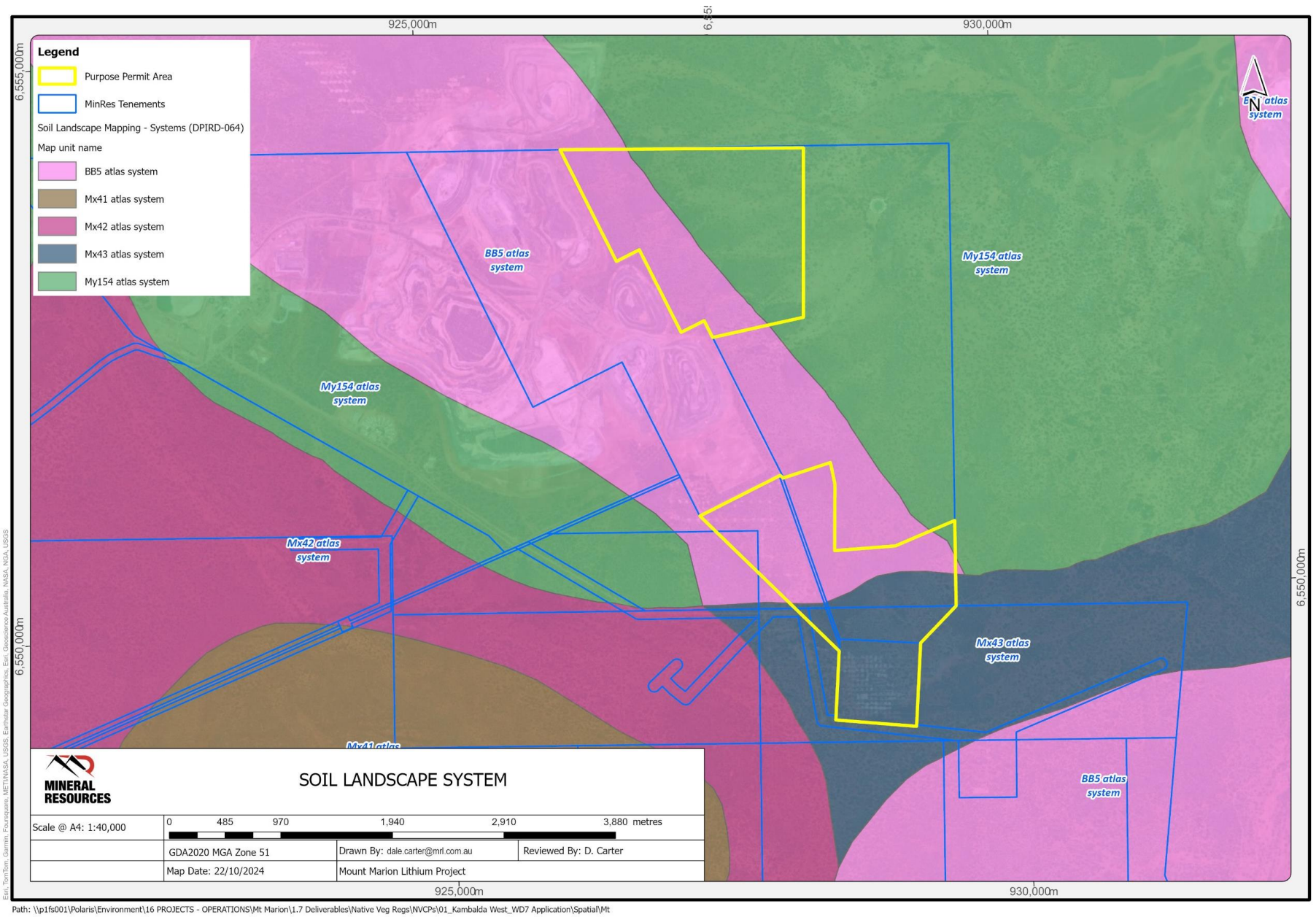

Figure 5: Soil Landscape System

ENV-TS-RP-0653

4.4 Surface Water

There are no wetlands or permanent surface water bodies in the Purpose Permit Area. Surface drainage is to the east, down incised drainage lines in the northern part of M15/841 and to the southeast along broad drainages in the southern part of the tenement.

A minor, non-perennial water course runs through M15/999 (Geoscience Australia, 2024), flowing east towards Lake Lefroy.

As there are no surface water bodies or major drainage systems in the Purpose Permit Area. Drainage either broadens out to sheet flow, evaporates or infiltrates to groundwater. Surface water flows onsite are ephemeral and occur only after high rainfall events. Impacts to surface water flows are mitigated through the construction of site drainage infrastructure, including culverts. The risk from water management issues is mitigated and attenuated, as all runoff and drainage within the mining impact zone is contained with bunded areas and clearing footprints.

The nearest water bodies are located over 10 km to the north of the proposed clearing area (Lake Douglas, Lake Red and Lake Brown) as and Lake Lefroy located 20 km southeast, shown in **Figure 6.**

4.5 Groundwater

Aquifers in the Goldfields region comprise two principal types, a fractured rock aquifer of weathered and fractured bedrock, and the sedimentary aquifer of buried palaeochannels. The fractured rock aquifer comprises granitic and gneiss, pegmatite and dolerite dykes, mafic and ultramafic volcanic and metasedimentary rocks (greenstones). These rocks are of low primary porosity and permeability where saturated. In general, fractured rock aquifers tend to be limited aquifers with groundwater contained in localized, structurally controlled zones related to rock competence, with limited storage capacity.

The palaeochannel comprises of a sequence of unconsolidated, medium to coarse quartz sands to clayey sands and gravels, known as the Wollubar Sandstone. The Wollubar Sandstone has both primary porosity and permeability and represents the best target for groundwater supply in the area. The unconsolidated sandstone is confined by the relatively impermeable, weathered Perkolili Shale, comprising a thick sequence of mottled, grey, red brown clay and minor sandy clay. The Wollubar Sandstone, and Goldfield's area palaeochannels, are postulated to act as a drainage system for the surrounding weathered and fractured rock basement.

The water table is below 100 m in depth in the northern part of the tenements and below 20-70 m in the southern areas. The Project's Woolibar borefield accesses the Wollubar Palaeochannel, which is part of the greater Roe Palaeochannel system (Golder, 2019). The confined nature of the palaeochannel results in potentiometric head around 10 m below the natural surface in lower lying valley settings. Groundwater quality in the palaeochannel is of poor quality and hypersaline.

4.6 Land Degradation

Land degradation caused by land clearing and associated activities can cause changes in soil health and landscape functionality including salinity, erosion, acidification, and contamination.

This has the potential to ultimately alter the fundamental ability of the land to support biodiversity, ecological processes, conservation significant species, as well as cultural values, anthropogenic uses, and economic growth (Environmental Protection Authority, 2007)

The Purpose Permit Area is outside the Land Capability Mapping of the DPIRD land evaluation standards, to assess land degradation and potential land use (van Gool, 2005)

The mining development associated with this Project has the potential to locally exacerbate land degradation during operations however regional impacts are anticipated to be minimal when compared to the extensive use of land for Pastoral activities in the Goldfields. The implementation of mitigation measures during operations, and planned rehabilitation works (as per DEMIRS MCP) will reduce land degradation impacts and as such it's expected that significant land degradation will not occur as a result of this Proposal. Mitigation measures to be implemented are summarised below.

- The proposed Disturbance Footprint is optimised and restricted to areas required and will ensure open areas are minimised.
- Weed hygiene measures will be implemented for all ground disturbing equipment mobilised to the Project to prevent the spread of any potential weed species.
- The potential risk is from uncontrolled runoff and the channelisation of sheet flow from mining developments can cause overland gullying and drilling. This risk, however, will be mitigated as all runoff and drainage within the Purpose Permit Area is contained with internal catchments or controlled through bunding and erosion control infrastructure. Culverts and mine design will allow for ephemeral surface flows to flow during high rainfall events to minimise impacts from erosion and pooling water. These controls will occur in the operational stages and post mining.
- Specific recommendations and rehabilitation targets for different soil types will ensure the most successful revegetation outcomes. Clearing will be undertaken in stages prior to land use development to reduce the potential for any wind or water erosion impacts. Due to cleared areas being completed, developed, and utilised there will be no open soil resources to potentially lead to areas of acidification or salinity.
- The post mining landforms will be rehabilitated; surfaces with rocky mantles will be designed to control and appropriately manage runoff.

Mitigation measures to be implemented are summarised in **Section 7.**

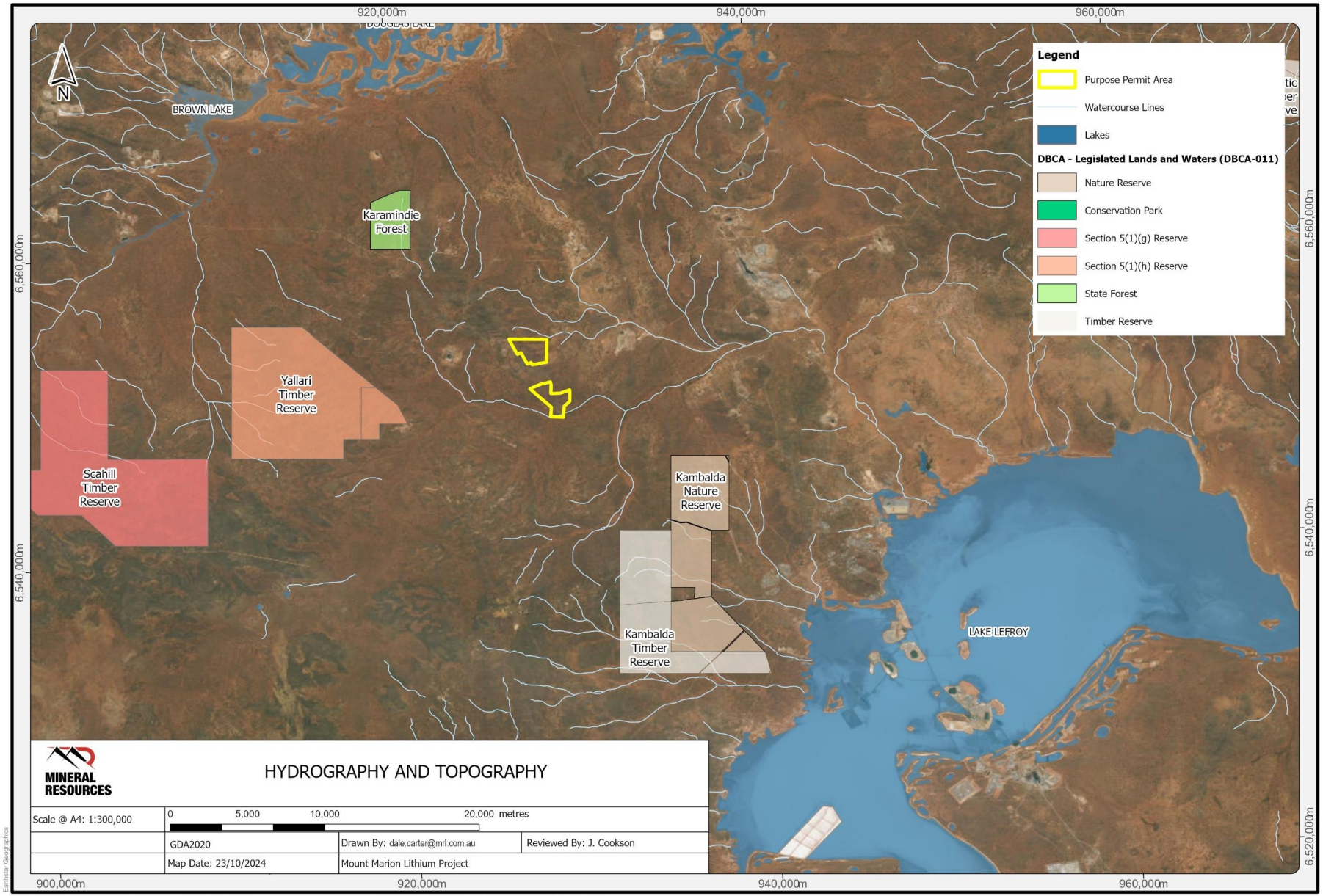

Figure 6: Hydrography and Topography

5. FLORA AND VEGETATION

Spectrum Ecology were engaged to complete a Detailed Flora and Vegetation survey in 2023, with primary field surveys occurring between September to October 2023, with supplementary surveys occurring April 2024. The objective of these surveys, and assessment, was to expand the survey footprint and to revise and reassess historic surveys conducted by Native Vegetation Solutions (NVS) in 2019 to align with EPA requirements for survey timeframes.

The Spectrum Ecology (2024) assessment included a review of all previous flora and vegetation survey efforts and findings, prior to completing field surveys. The works also included an in-depth assessment of works completed and an update of conservation status to ensure compliance with current legislative requirements. The outcome of this work was a split into three separate reports, covering the Purpose Permit Area and broader region (reports provided in **Appendix E - F**. The Spectrum (2024) assessment was split into two reports (**Figure 7**), due to data sharing agreements with third parties:

- MinRes Tenements Report (Spectrum Ecology, 2024a): IBSASUB-20241106-A6E05653
- Hamptons Tenements Report (Spectrum Ecology, 2024b): IBSASUB-20241106-B8EFC59F

A potential limitation with the survey works was identified due to a section in the south-western corner of the survey area having recently been burnt, limiting quadrats in this area. Other potential limitations included restricted access to survey locations due to heritage constraints, these limitations do not apply to the Purpose Permit Area.

Locally experienced botanists were used for the surveys, with extensive survey efforts through a range of seasons and a large database of resources for the grater Coolgardie Bioregion. Flora and Vegetation surveys were conducted in accordance with Environmental Factor Guideline-Flora and Vegetation (EPA 2016a) and Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment (EPA 2016b).

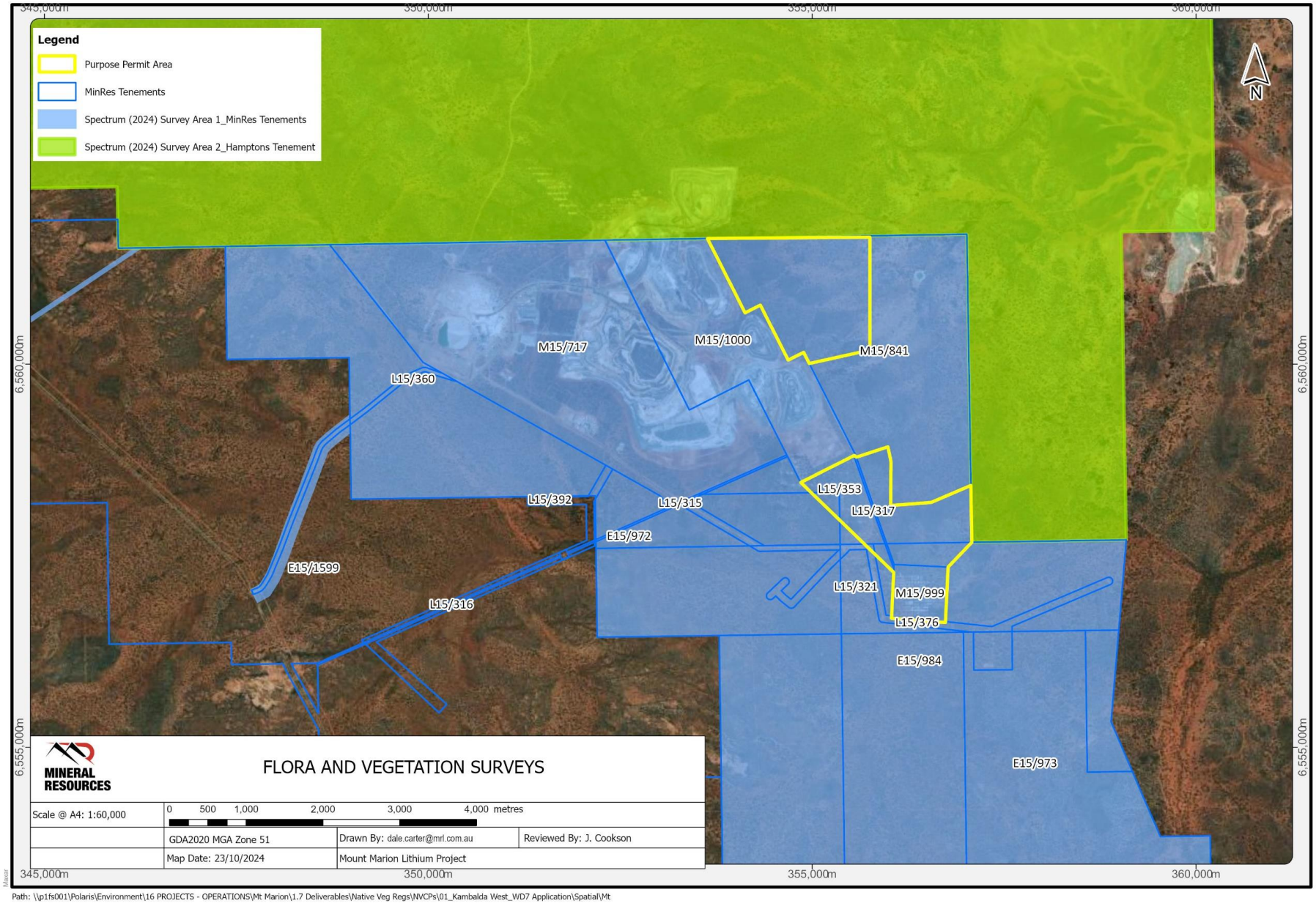

Figure 7: Flora and Vegetation Survey Area

5.1 Desktop Assessment

The desktop study was undertaken by Spectrum Ecology to provide background information on the flora and vegetation of the broader Mt Marion area. Database searches, as described in **Table 7**, of the DBCA databases as well as the Department of Climate Change, Energy, the Environment and Water (DCCEEW) EPBC Act Protected Matters Search Tool (PMST) were undertaken to compile a list of potential Threatened or Priority species and Threatened Ecological Communities (TECs) or Priority Ecological Communities (PECs) that may occur in the Proposal area.

Table 7: Flora and Vegetation Database Searches (Spectrum Ecology, 2024a)

Potential Environmental Constraints	Database search
Matters of National Environmental Significance	• EPBC Act PMST, 50 km radial search
Threatened and Priority species and TECs and/or PECs	• DBCA Threatened and Priority Flora database, 85 km radial search (**Figure 8**) • DBCA Communities Database – 100 km radial search
Biodiversity	• Dandjoo Biodiversity Data Platform – 50 km radial search • IBSA Database – 50 km radial search

The results of the database searches are summarised below:

- EPBC Act Protected Matters search:
  - The Purpose Permit Area could be suitable habitat for the Endangered plant *Gastrolobium graniticum* (Granite Poison). However, this species is restricted to granite outcrops, which were not identified within the Survey Area.
  - No TECs are known to occur within the Survey Area or within a 1 km buffer.
- DBCA Database search:
  - No TECs and/or PECs have been recorded within the Survey Area or surrounding area.
  - 67 potential Priority Flora species within a 40 km radius of the Survey Area. However, none of these known locations are within the Proposed Clearing Area (**Figure 8**).
  - Three potential Threatened Flora species (*Acacia sciophanes, Gastrolobium graniticum* and *Tetratheca spenceri*) are found within a 40 km radius of the Survey Area. However, none of these known locations are within the Survey Area.

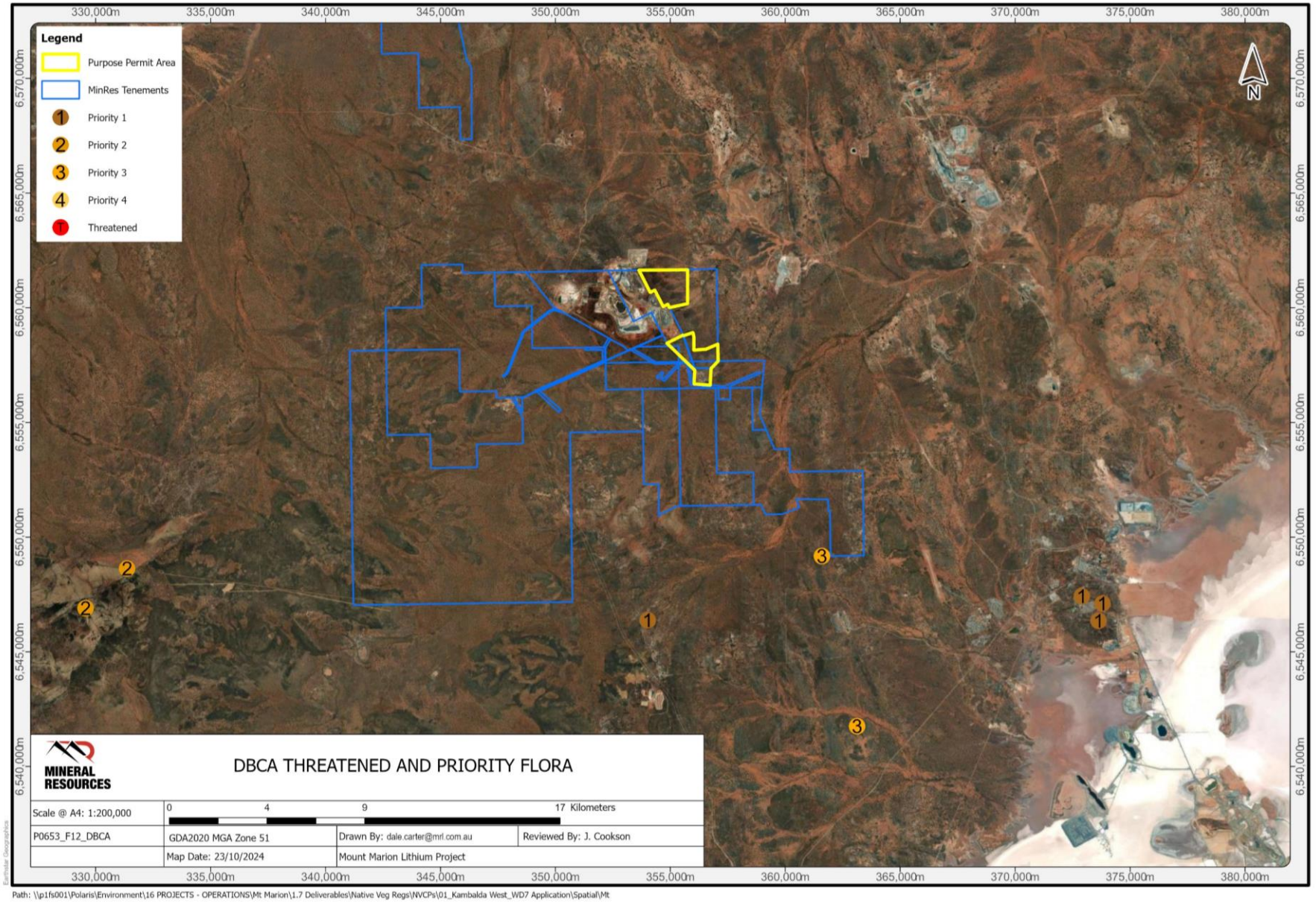

Figure 8: DBCA Threatened and Priority Flora Records

5.2 Vegetation Communities and Condition

5.2.1 Pre-European Vegetation

Pre-European vegetation mapping was originally undertaken by (Beard, 1975) at various scales across WA. A total of five Beard Vegetation Associations have been identified within the Purpose Permit Area as shown in **Table 8.**

Table 8: Vegetation System Associations within the Proposed Purpose Permit Area

Beard Vegetation Association Description	Pre-European Extent (ha)	Remaining (ha)	% Remaining	Extent in the Purpose Permit Area (ha)
COOLGARDIE 9 - Medium woodland; coral gum (E. *torquata*) & Goldfields blackbutt (*E. lesouefii*)	98,770.16	95,687.65	96.88	350
BINNERINGE_9 - Medium woodland; coral gum (E. *torquata*) & Goldfields blackbutt (*E. lesouefii*)	104,235.51	103,041.47	98.85	16
COOLGARDIE_936 - Medium woodland; salmon gum	57,830.44	57,458.79	99.36	123

According to EPA Guidance Statement No. 33, the national target is to have clearing controls in place to prevent the removal of ecological communities which are below 30% remaining (of the pre-European extent). The EPA considers it is important that ecological communities are maintained above the threshold level of 30% of the original pre-clearing extent of each community, as communities below this threshold level show the species loss appears to accelerate exponentially at the ecosystem level (EPA 2008). At all levels (state, bioregion, subregion and Local Government Area [LGA]) the associations found within the Purpose Permit Area have between 70 – 100 % of their spatial area remaining post European settlement (Govt of Western Australia, 2013) These figures are well above the 30% EPA threshold.

Table 8 illustrates that the Purpose Permit Area is not within an area that has been extensively cleared and is not significant as a remnant of native vegetation.

The clearing of an additional 302 ha for the proposed mine expansion will not reduce the pre-European extent remaining to below 30%. Additionally, aerial imagery and the mapping associations found within the Purpose Permit Area (**Figure 9**) illustrate that the proposed clearing is not likely to fragment any of the vegetation association. The vegetation association extends significantly beyond the Purpose Permit Area.

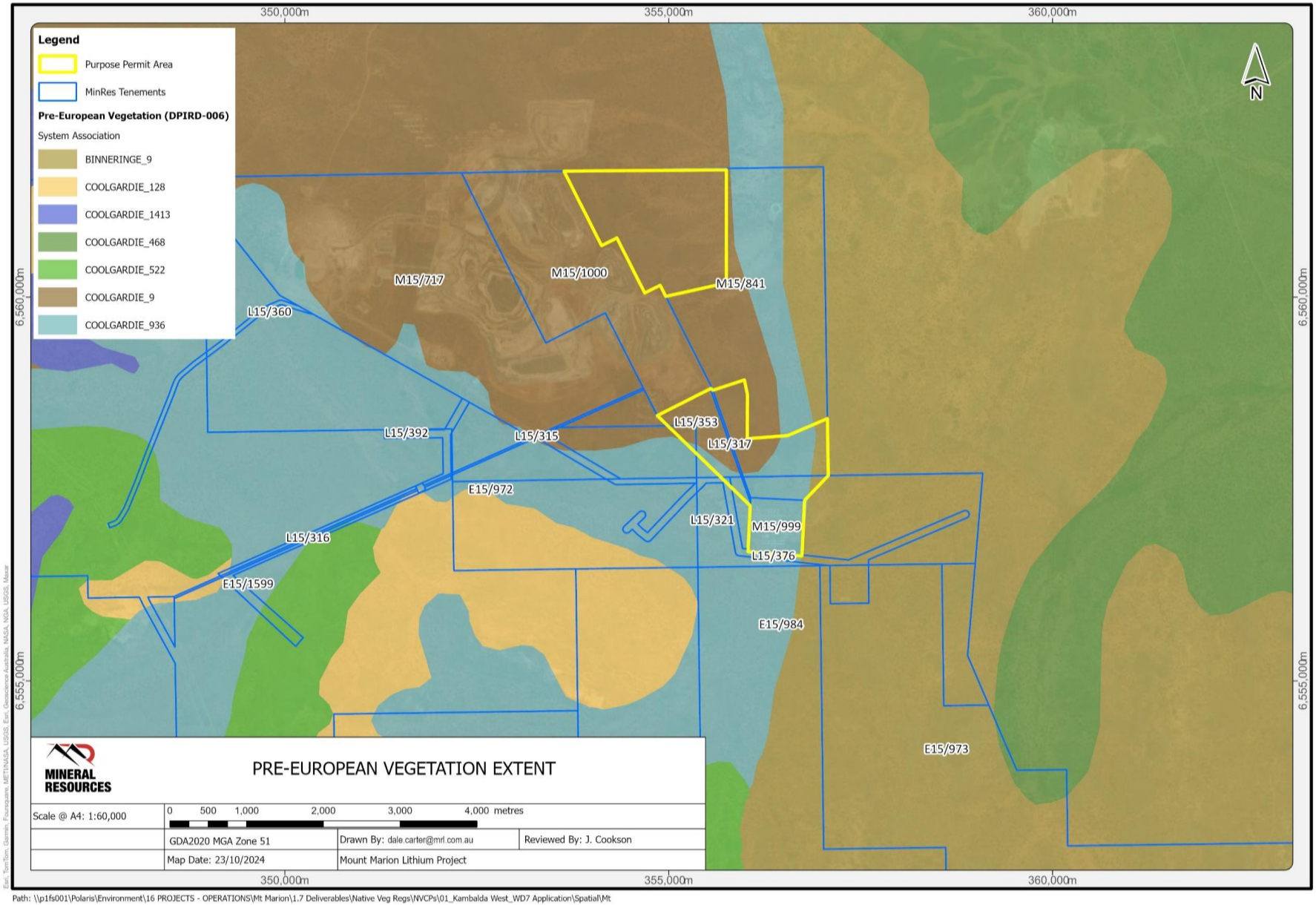

Figure 9: Pre-European Vegetation Extent

5.2.2 Vegetation Communities

A total of 25 Vegetation groups were identified from the Spectrum (2024) survey, seven of which were within the Purpose Permit Area (**Table 9** and **Figure 10**). All vegetation groups are common and well represented through the Eastern Goldfields subregion. **Table 9** calculates the potential cumulative impacts to vegetation communities from this Proposal and the adjacent Clearing Permit CPS 8632.

The vegetation community that dominates the Purpose Permit Area is Eucalypt woodlands over mixed shrublands on broad loamy plains and low rises. This vegetation type is typical of the region and not considered to be unusually diverse.

The one vegetation type within the Purpose Permit area has potential local or regional significance:

- **VT13**: considered locally and regionally significant - and provides a role as refuge for the locally and regionally significant *Lepidosperma* sp. Kambalda (A.A. Mitchell 5156) (P2). Up to 5.13 % of the mapped extent of this unit might be cleared under this Permit.
    - Note: Up to 3.85 % if the vegetation unit might be cleared under Clearing Permit CPS 8632/3, for a cumulative total of 8.98% of the VT13 unit potentially disturbed.

Table 9: Extent of Vegetation Communities in Survey Area

Vegetation Group	Vegetation ID	Total Surveyed (ha)	Within the Purpose Permit Area (ha)	Within Disturbance Footprint (ha)	Potentially cleared under CPS 8632 (ha)	Proposed Veg unit remaining (ha)	% of Surveyed Veg Unit Disturbed
Completely Degraded[1]	**Completely Degraded**	1,753.86	19.62	19.62	N/A	N/A	N/A
Eucalyptus salmonophloia, Eucalyptus salubris mid open woodland, over *Cratystylis subspinescens* mid sparse shrubland, over *Atriplex vesicaria, Maireana glomerifolia, Tecticornia disarticulata* low sparse shrubland	**VT05**	1,777.3	5.12	0.44	0.00	1,776.86	0.03 %
Eucalyptus lesouefii, Eucalyptus torquata, +/-Eucalyptus stricklandii low open woodland with *+/-Acacia burkittii* tall sparse shrubland, over *Alyxia buxifolia, Dodonaea lobulata, Eremophila oppositifolia subsp. angustifolia mid* sparse shrubland, over	**VT13**	2893.93	178.62	148.5	111.45	2,633.98	8.98 %
Eucalyptus salmonophloia, Eucalyptus lesouefii mid open woodland with *Eremophila dempsteri, Exocarpos aphyllus* tall sparse shrubland, over *Senna artemisioides subsp. filifolia, Atriplex nummularia subsp. spathulata, Eremophila scoparia mid sparse*	**VT15**	7567.36	188.25	116.24	9.99	7,441.13	1.67 %
+/-Eucalyptus griffithsii, Eucalyptus salmonophloia mid open woodland with *Eremophila interstans subsp. virgata, Exocarpos aphyllus* tall sparse shrubland, over *Senna artemisioides subsp. filifolia, Eremophila ionantha, Acacia leptopetala* mid sparse	**VT16**	705.31	10.07	0.83	0.11	704.36	0.13 %
Eucalyptus lesouefii mid woodland with *Melaleuca sheathiana* tall open shrubland, over *Eremophila scoparia, Exocarpos aphyllus, Senna artemisioides* subsp. *filifolia* mid sparse shrubland, over *Olearia muelleri, Acacia erinacea* low sparse shrubland	**VT18**	618.11	61.18	35.36	1.7	581.05	5.99 %
Eucalyptus salubris, Eucalyptus clelandiorum, +/-Eucalyptus salmonophloia low woodland, over *Senna artemisioides subsp. filifolia, Eremophila scoparia, Exocarpos aphyllus* mid sparse shrubland, over *Eremophila caperata, Eremophila parvifolia subsp.*	**VT19**	916.28	5.71	5.70	2.63	907.95	0.91 %

[1] Note: The Disturbed area recorded by Spectrum Ecology (Flora and Vegetation) and SLR Consulting (Fauna) varies. Clearing of historic disturbance will be classified as new land clearing under this permit.

Vegetation Group	Vegetation ID	Total Surveyed (ha)	Within the Purpose Permit Area (ha)	Within Disturbance Footprint (ha)	Potentially cleared under CPS 8632 (ha)	Proposed Veg unit remaining (ha)	% of Surveyed Veg Unit Disturbed
Eucalyptus celastroides, *Eucalyptus transcontinentalis*, *Eucalyptus salubris* mid woodland, over *Eremophila scoparia*, *Senna artemisioides subsp. filifolia*, *Eremophila ionantha* mid sparse shrubland, over *Olearia muelleri*, *Acacia leptopetala*, *Eremophila*	**VT21**	4071.94	19.60	3.34	117.42	3,951.18	2.96 %
TOTALS		N/A	**488.17**	**330.02**	N/A	N/A	N/A

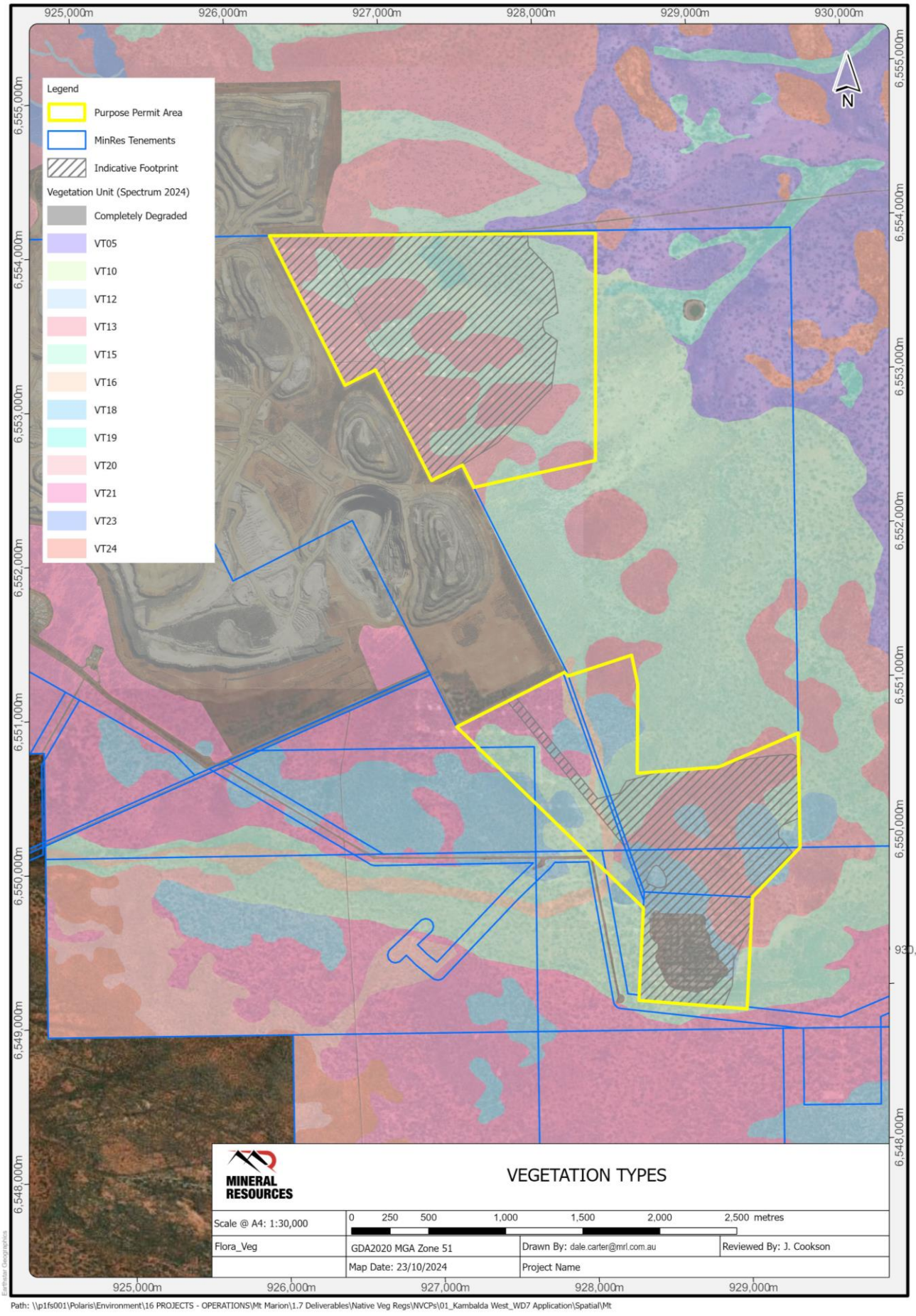

Figure 10: Vegetation Types

5.2.3 Vegetation Condition

Spectrum (2024) classified vegetation condition using the scale recommended for the Southwestern Interzone Botanical Province, vegetation condition and scale criteria listed below:

- **Pristine**: Pristine or nearly so, no obvious signs of damage caused by human activities since European settlement.
- **Excellent:** Vegetation structure intact disturbance affecting individual species and weeds are no-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.
- **Very Good:** Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging, and grazing.
- **Good:** Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it, Disturbance to vegetation caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback, and grazing.
- **Degraded:** Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback, and grazing.
- **Completely Degraded:** The structure of the vegetation is no longer intact, and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees and shrubs.

The current Spectrum Ecology (2024a) vegetation condition areas are shown in **Table 10** and mapped in **Figure 11.**

Table 10: Vegetation Condition

Vegetation Condition	Within Purpose Permit Area (ha)
Spectrum (2024)	
Pristine	169.32
Excellent	283.33
Completely Degraded	35.52

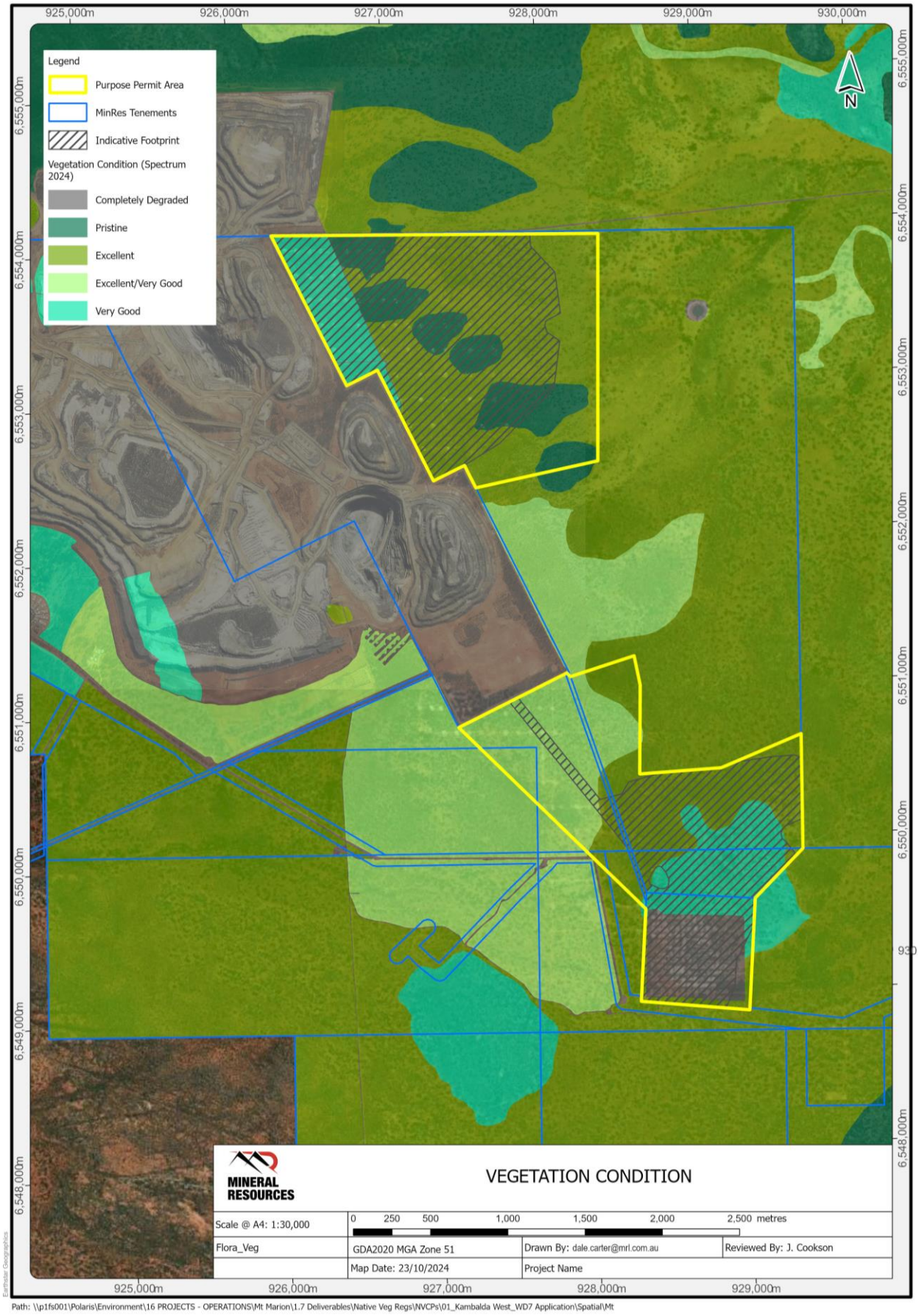

Figure 11: Vegetation Condition Mapping

5.3 Flora

The below number of species were recorded within the two Spectrum (2024) survey areas:

- MinRes Tenements Survey: 38 Families, 114 Genera, 239 Taxa (230 Native, 9 Introduced)
- Hamptons Tenements Survey: 48 Families, 147 Genera, 313 Taxa (290 Native, 23 Introduced).

5.3.1.1 Conservation Significant Flora

No Threatened flora species pursuant to the EPBC Act and/or gazetted as Threatened pursuant to the BC Act were recorded during the survey.

No priority flora species were identified within the Purpose Permit Area (**Figure 12**). The below priority flora species were identified within 2 km of the Purpose Permit Area:

- *Eucalyptus urna* subsp. *xesta* (P3): Located 500 m outside the Purpose Permit Area
- *Eucalyptus websteriana* subsp. *norsemanica/websteriana (*P1): Located 1.5 km outside the Purpose Permit Area
- *Ricinocarpos digynus* (P1): Located 1.6 km outside the Purpose Permit Area
- *Lepidosperma* ?sp. Kambalda (A.A. Mitchell 5156) (P2): Located 1.8 km outside the Purpose Permit Area
- *Acacia websteri* (P1): Located 2 km outside the Purpose Permit Area

Sandalwood (*Santalum spicatum*) has been identified 500 m outside the Purpose Permit Area, although not a threatened or priority species, Sandalwood is a controlled species under the BC Act and will have a 50 m avoidance buffer assigned to it if encountered.

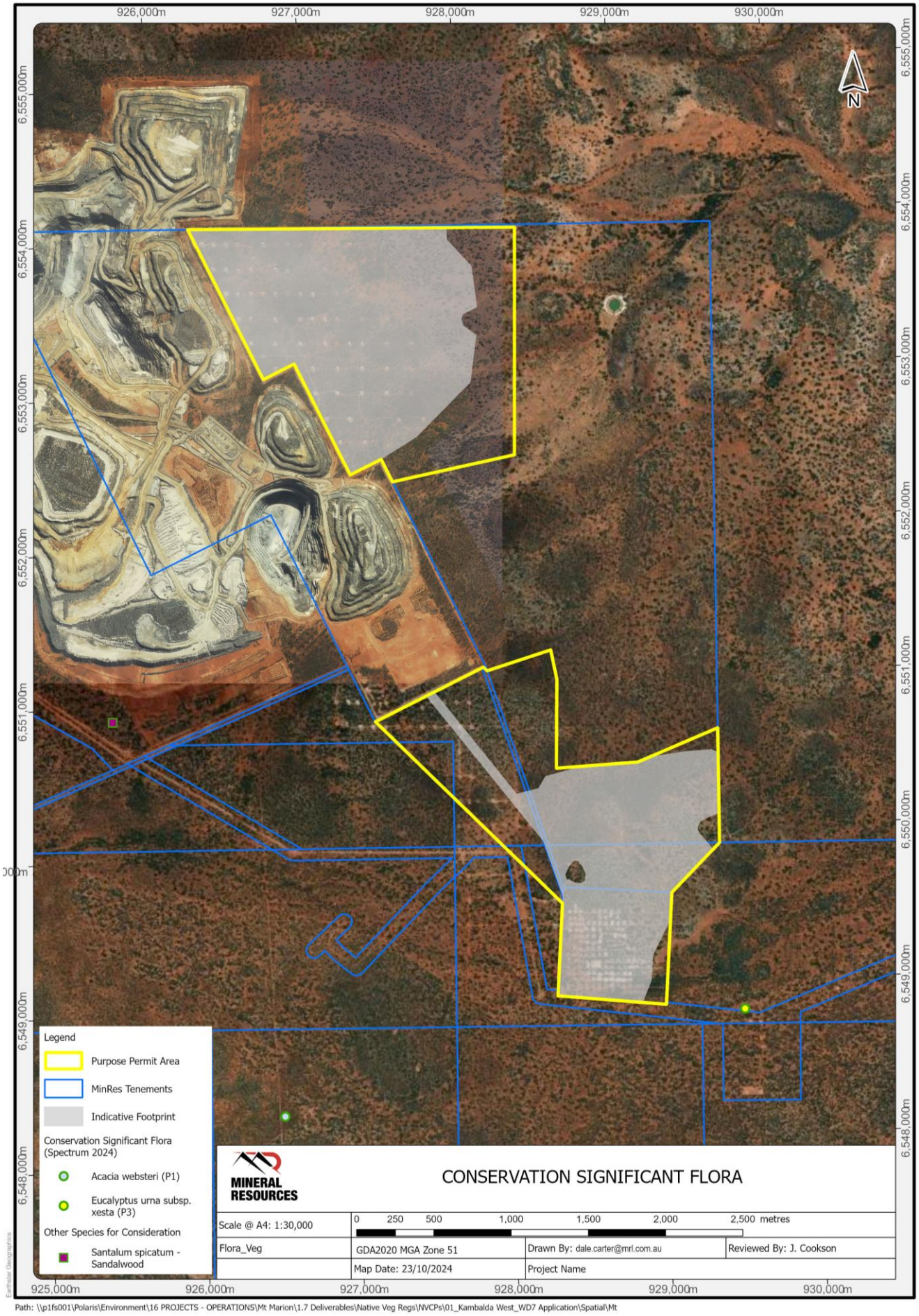

Figure 12: Conservation Significant Flora

5.3.1.2 Introduced Flora

Spectrum (2024) identified the below weed species during field surveys (**Figure 13**); however, no weed species were identified within 1 km of the Purpose Permit Area.

- *Agave americana*
- *Asphodelus fistulosus*
- *Carrichtera annua*
- *Cenchrus ciliaris*
- *Centaurea melitensis*
- *Cuscuta epithymum*
- *Datura ferox*
- *Dittrichia graveolens*
- *Eragrostis curvula*
- *Erodium cicutarium*
- *Heliotropium europaeum*
- *Hypochaeris glabra*
- *Lysimachia arvensis*
- *Medicago minima*
- *Medicago polymorpha*
- *Oligocarpus calendulaceus*
- *Oncosiphon suffruticosum*
- *Pentameris airoides subsp. airoides*
- *Rostraria cristata*
- *Rumex vesicarius*
- *Salvia verbenaca*
- *Schismus arabicus*
- *Sonchus oleraceus*
- *Tamarix aphylla*
- *Xanthium spinosum*
- *Vulpia muralis*

Two Weeds of National Significance (WoNS) were identified during the Spectrum 2024 surveys:

- *Tamarix aphylla* (Athel Pine)- *Declared Pest – s22(2):* No control category management (Department of Primary Industries and Regional Development, 2019): Identified 4 km outside Purpose Permit Area.
- *Xanthium spinosum* (Bathurst Burr) - *Declared Pest - s22(2):* This species has a category 3 management requirement in the Coolgardie IBRA bioregion (Department of Primary Industries and Regional Development, 2020). This species was identified 22 km outside the Purpose Permit Area.

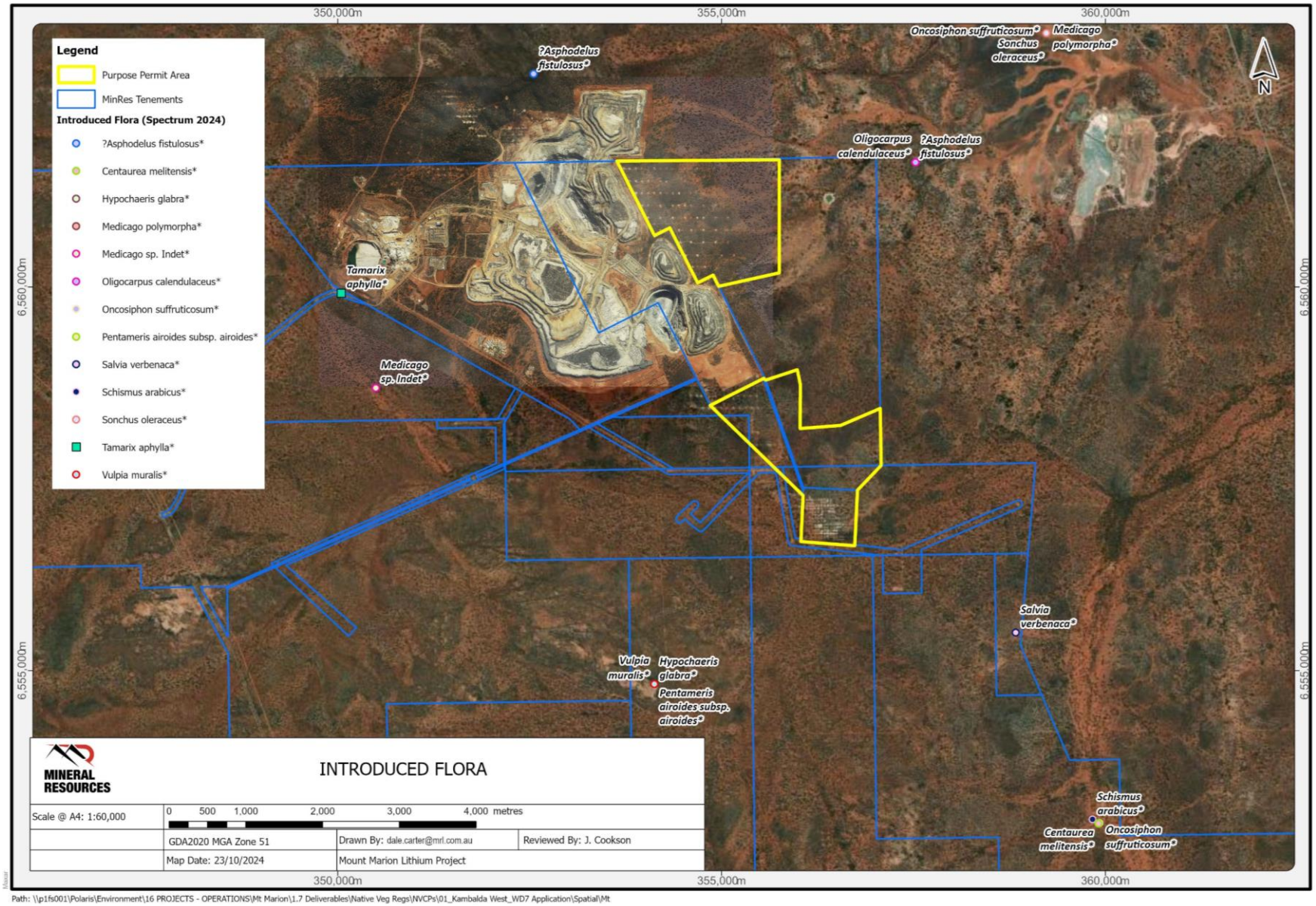

Figure 13: Introduced Flora

6. FAUNA AND HABITAT

SLR Consulting were engaged in 2023 to complete a Detailed Fauna Assessment over the mining tenements area and Hamptons lease area along with targeted surveys for the below species:

- Malleefowl (*Leipoa ocellata*)
- Chuditch (*Dasyurus geoffroii*)
- Arid Bronze Azure Butterfly (ABAB) (*Ogyris subterretris petrina*).

The survey reports can be found in **Appendix B** and **Appendix C**. The objective of these surveys, and assessment, was to expand the survey footprint and to revise and reassess historic surveys (conducted by Bamford Consulting) to align with EPA requirements for survey timeframes.

SLR were also engaged to undertake a targeted survey for the ABAB (**Appendix D**). The objective of this survey was to delineate the previously discovered colonies of *Camponotus* sp. nr. *terebrans* within the Survey Area and, if the colonies are suitable to support the ABAB, to conduct a targeted ABAB search during the supplementary survey period in accordance with relevant guidelines.

Current and previous survey areas are mapped in **Figure 14**. The below Survey data has been submitted to IBSA (please note this Purpose Permit Area is entirely within the Mt Marion MinRes Tenements Survey Area):

- Mt Marion Hamptons Tenements - Terrestrial Fauna Survey: IBSA- 2024-0351
- Mt Marion MinRes Tenements - Terrestrial Fauna Survey: IBSA- 2024-0352.

No limitations were identified by SLR Consulting with the survey works completed across the Project areas due to comprehensive and detailed survey efforts, the experience and knowledge of the survey teams, identification to taxon level of all fauna identified and extensive local and regional surveys and studies. Fauna and Habitat surveys have been undertaken in accordance with guidelines and recommendations set out by the Western Australian Environmental Protection Authority (EPA) on fauna surveys and EPBC Act legislation.

6.1 Desktop Assessment

A desktop assessment undertaken by SLR Consulting (2024b) prior to the field survey, involved a literature review and database searches to identify previously recorded significant fauna, and significant fauna likely to occur within the survey area (

Table 11).

Significant fauna taxa identified during the desktop assessment were assessed to determine the likelihood of their occurrence within the Survey Area before and after the field survey. Results of the search are listed in **Table 13**.

Table 11: Fauna Survey Area Database Searches (SLR 2022)

Potential Environmental Constraints	Database search
Matters of National Environmental Significance	• EPBC Act PMST, 50 km radial search
Threatened and Priority species	• DBCA Database, 100 km radial search • NatureMap Database Search, 100 km radial search

The database searches and literature review identified potential significant terrestrial vertebrate fauna taxa which may occur within the Desktop Study Area, using the below criteria:

- **Recorded**: The taxon was recorded within the Survey Area during the current survey.
- **Previously Recorded**: The taxon has been previously recorded within the Survey Area according to database search or literature review results.
- **High** (Likely to occur): There are existing records of the taxon near the Survey Area (within 20 km), suitable habitat is present within the Survey Area, and the taxon has been recorded within the Desktop Study Area in the last 15 years.
- **Medium** (May occur): There are existing records of the taxon within the Desktop Study Area, however, the taxon does meet the criterion for high likelihood, or suitable habitat within the Survey Area is marginal or limited in extent, or the taxon has not been recorded within the Desktop Study Area in the last 15 years.
- **Low** (Unlikely to occur): Suitable habitat is not present within the Survey Area, or the taxon is very infrequently recorded in the locality despite reasonable previous search effort, or the taxon is believed to be extinct or locally extinct.

Threatened and Priority fauna species identified during the desktop assessment are mapped in **Figure 15**.

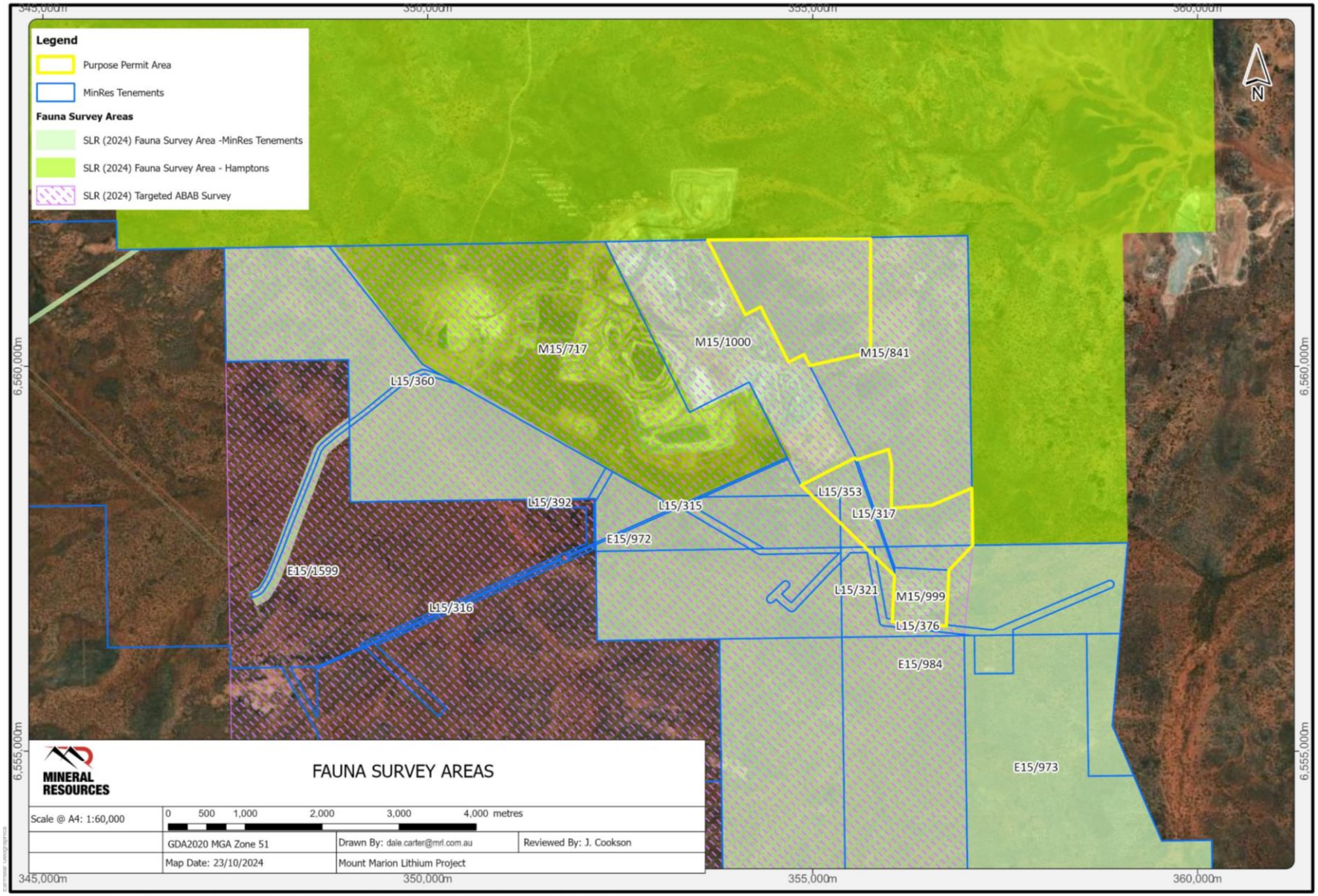

Figure 14: Fauna Survey Areas

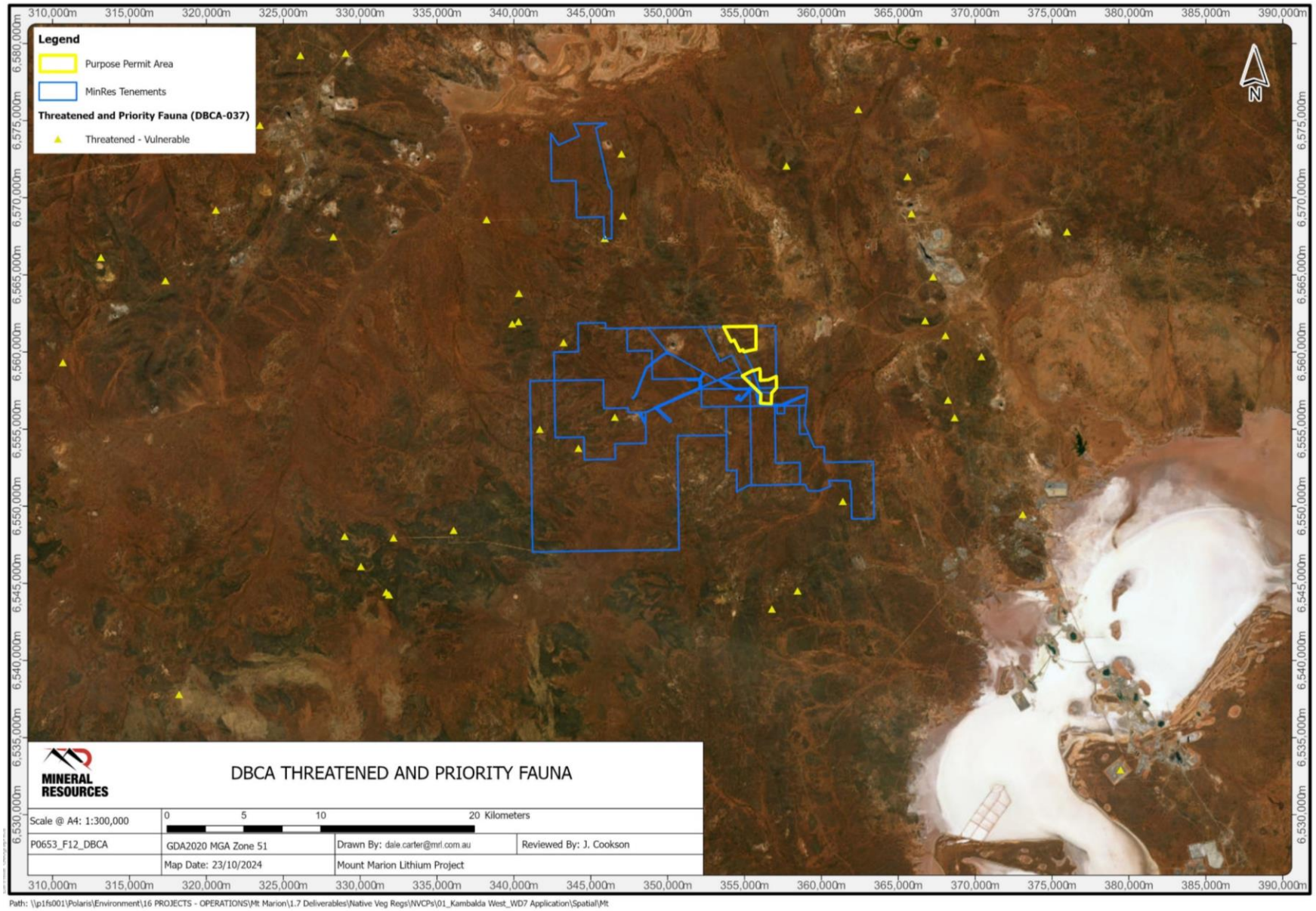

Figure 15: DBCA Threatened and Priority Fauna Records

6.2 Fauna Habitat

SLR Consulting (2024b) mapped ten Fauna Habitat types across the wider survey boundary covering 30,924 ha. Eight of these Fauna Habitats fall within the Purpose Permit Area. These are described in **Table 12** and shown in **Figure 16**. Most of the survey area contains intact Eucalypt woodland or Mallee over a range of understorey types (ranging from Melaleuca and Acacia thickets, Eremophila shrub lands or sparsely vegetated).

The below habitat types within the Purpose Permit Area have some local or regional significance:

- **Drainage Lines** - Highest value to significant fauna due to dense fringing shrubland, and higher foraging potential.

Eucalyptus Woodlands are important as they may host the ABAB host ant *Camponotus* sp. nr. *terebrans,* however are widespread and not considered to be significantly impacted by any clearing activities. Large Salmon Gums (*Eucalyptus almonophloia*) provide important nesting opportunities for fauna and dense vegetation provide cover and habitat for species such as the Golden Whistler, Western Yellow Robin and Malleefowl.

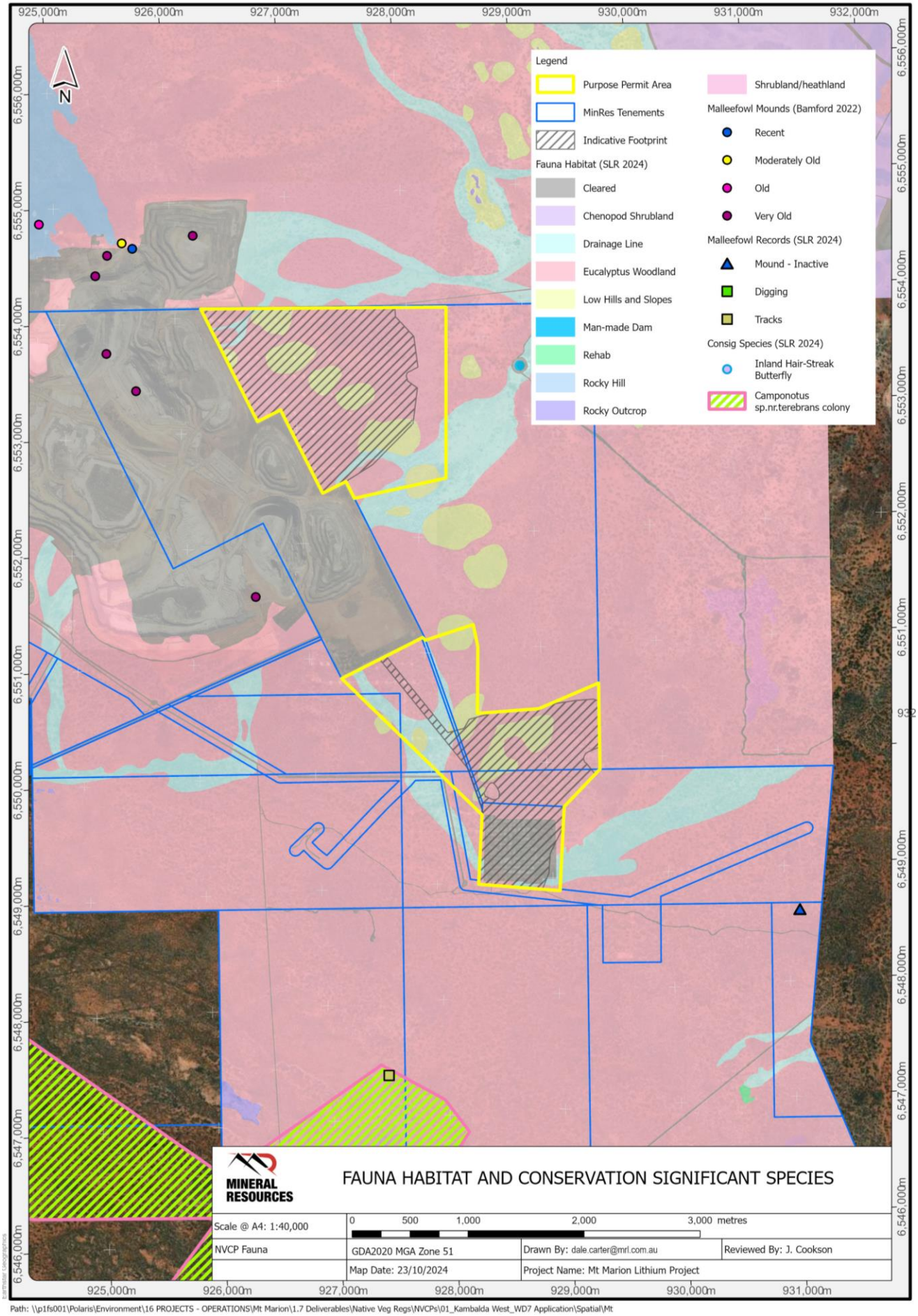

Figure 16: Fauna Habitat and Conservation Significant Species

Table 12: Fauna Habitats

Fauna Habitats	Habitat Description	Total Surveyed (ha)	Within the Purpose Permit Area (ha)	Within Disturbance Footprint (ha)	Potentially cleared under CPS 8632 (ha)	Proposed habitat remaining (ha)	Percentage of habitat disturbed
Cleared	Disturbed land	N/A	33.56	31.96	N/A	N/A	N/A
Drainage Line	Areas that are often inundated with water after rainfall events, with a mixed eucalyptus overstorey, an open to sparse mid-storey of acacia and melaleuca and a sparse understorey of solanum and *atriplex* spp.	3,295.83	45.3	9.8	27.12	3,258.91	1.12 %
Eucalyptus Woodlands	Moderately undulating plains of mixed eucalyptus woodland overstorey, and open to closed shrubland/heathland of melaleuca, acacia, hakea, and *allocasuarina*, with isolated to sparse understorey of *atriplex* spp., *solanum* spp.	22,733.52	331.16	231.71	309.2	22,192.61	2.38 %
Low Hills and Slopes	Areas of undulating hills with ironstone/greenstone rubble. Eucalyptus woodland cover storey and sparse mid-storey of mixed acacia and melaleuca, over a sparse forbland of atriplex and mixed sedges/herbs.	626.89	78.15	56.55	0.00	570.34	9.02 %
Totals			**488.17**	**330.02**			

6.3 Conservation Significant Fauna

Species of conservation significant were assessed based on classification under the State Biodiversity *Conservation (BC) Act* 2016 and the Federal EPBC Act 1999.

The below species of conservation significance were present in the fauna survey area, or have a high likelihood of occurring in the survey area:

Recorded During Surveys

- Malleefowl (*Leipoa ocellata*) – VU (BC Act), VU (EPBC Act).
- Inland Hairstreak Butterfly (*Jalmenus aridus*) – Priority 1 (BC Act).

High Likelihood of Occurrence

- Arid Bronze Azure Butterfly (*Ogyris petrina*) – CR (BC Act), CR (EPBC Act).

Medium Likelihood of Occurrence

- Carnaby's Cockatoo (*Zanda latirostris*) - EN (BC Act), EN (EPBC Act)

Table 13 shows the significant fauna species recorded or likely to be expected within the survey area. These species are discussed further below.

Table 13: Significant Fauna Likelihood of Occurrence (SLR 2024)

Family	Scientific Name	Conservation Status		Habitat	Previous Records	Likelihood of Occurrence
		State	Federal			
Birds						
Scolopacidae	*Actitis hypoleucos* Common Sandpiper	MI	MI, MA	This taxon prefers coastal and interior wetlands, narrow muddy edges of billabongs, river pools, mangroves, rocky beaches, estuaries, near-coastal salt lakes, lagoons, claypans, sewage ponds.	The DBCA database identified nine records within 100 km of the Survey Area, including 21.2 km north west in 2013 and 21.4 km north west in 2014	**Low** No suitable habitat within the Survey Area
Maluridae	*Amytornis textilis textilis* Western Grasswren	P4	(*A. modestus* VU)	Located in the Shark Bay region, this taxon prefers acacia shrubland with dense shrub clumps and lower recumbent shrubs (<1 m high) in which foliage extends to ground.	The DBCA database identified one record within 100 km of the Survey Area, 59.6 km north east in 1908.	**Low** Outside current distribution of taxon
Acanthizidae	*Aphelocephala leucopsis* Southern Whiteface	-	VU	This taxon prefers dry, sparse open forest/woodland and inland scrubland.	No nearby records identified from the database searches or literature. Species only returned from PMST which measures distribution, not individual records.	**Low** No nearby records
Apodidae	*Apus pacificus* Pacific Swift, Fork-tailed Swift	MI	MI, MA (overfly marine area)	This taxon occupies low to very high airspace over varied habitat.	The DBCA database identified one record within 100 km of the Survey Area, 80.9 km east in 2002.	**Low** Minimal nearby records in recent years
Scolopacidae	*Arenaria interpres* Ruddy Turnstone	MI	MI, MA	This taxon prefers coastal, tidal flats, beaches, rocky shorelines.	The DBCA database identified two records within 100 km of the Survey Area, both 86.5 km north in 2016.	**Low** No suitable habitat within the Survey Area
Scolopacidae	*Calidris acuminata*	MI	MI, MA	This taxon is commonly found in fresh and salt wetlands, muddy	The DBCA database identified nine records within 100 km of the Survey	**Low**

Family	Scientific Name	Conservation Status		Habitat	Previous Records	Likelihood of Occurrence
		State	Federal			
	Sharp-tailed Sandpiper			edges of lagoons, swamps, lakes, dams, soaks, sewage farms, temporary floodwaters.	Area, including 7.6 km east in 2012 and 18.9 km north in 1980.	No suitable habitat within the Survey Area
Scolopacidae	*Calidris alba* Sanderling	MI	MI, MA	This taxon is commonly found in beaches and sandy tidal flats.	The DBCA database identified one record within 100 km of the Survey Area, 28.3 km north of the Survey Area in 2016.	**Low** No suitable habitat within the Survey Area
Scolopacidae	*Calidris ferruginea* Curlew Sandpiper	CR	CR, MI, MA (overfly marine area)	This taxon prefers inter-tidal mudflats of estuaries, lagoons, mangrove channels, dams, floodwaters, flooded saltbush surrounds of inland lakes.	The DBCA database identified two records within 100 km of the Survey Area, 46.2 km north west in 2006 and 55.8 km north in 1999.	**Low** No suitable habitat within the Survey Area
Scolopacidae	*Calidris ruficollis* Red-necked Stint	MI	MI, MA (overfly marine area)	This taxon is commonly found in tidal mudflats, saltmarshes, sandy or shelly beaches, saline and freshwater wetlands, salt fields, sewage ponds.	The DBCA database identified three records within 100 km of the Survey Area, including 46.2 km north west in 2006 and 54.4 km east in 2012.	**Low** No suitable habitat within the Survey Area
Charadriidae	*Charadrius veredus* Oriental Plover	MI	MI, MA (overfly marine area)	This taxon is commonly found in grasslands and thinly vegetated plains.	The DBCA database identified four records within 100 km of the Survey Area, including 84.2 km north west in 2013 and two records 85.5 km north west in 2012.	**Low** Minimal nearby records in recent years
Falconidae	*Falco hypoleucos* Grey Falcon	VU	VU	This taxon prefers open plains with treed watercourses in arid inland.	The DBCA database identified one record within 100 km of the Survey Area, 81.4 km south in 1979.	**Low** Minimal nearby records in recent years
Falconidae	*Falco peregrinus* Peregrine Falcon	OS	-	This taxon is found in most environments with suitable nest sites: cliff faces preferred, including man-made ones, commonly uses stick nests built by other species. May use the Survey Area for hunting.	The DBCA database identified 12 records within 100 km of the Survey Area, including 38.0 km south in 1998, and 50.5 km south in 1994.	**Low** Minimal nearby records in recent years

Family	Scientific Name	Conservation Status		Habitat	Previous Records	Likelihood of Occurrence
		State	Federal			
Megapodiidae	*Leipoa ocellata* Malleefowl	VU	VU	This taxon is commonly found in long unburned mallee and woodland with abundant litter and low scrub.	The DBCA database identified 224 records within 100 km of the Survey Area, including 1.5 km east in 2006 and 1.6 km east in 2011.	**Recorded** Multiple records made during the field survey
Anatidae	*Oxyura australis* Blue-billed Duck	P4	-	This taxon prefers densely vegetated freshwater lakes, swamps, dams.	The DBCA database identified eight records within 100 km of the Survey Area, including 85.6 km north west in 2015 and 85.7 km north west in 2014.	**Low** Minimal nearby records in recent years
Psittaculidae	*Pezoporus occidentalis* Night Parrot	CR	EN	This taxon is not commonly found, but is believed to occupy long unburnt spinifex and samphire shrublands bordering salt lakes. The species was once widely distributed throughout arid and semi-arid Australia, but has since been declared extinct. Recent discoveries of this species have been found in Queensland and WA since 2013.	No nearby records identified from the database searches or literature. Species only returned from PMST which measures distribution, not individual records.	**Low** No nearby records
Psittaculidae	*Platycercus icterotis xanthogenys* Western Rosella	P4	-	This taxon prefers salmon gum and wandoo woodlands or farmlands; less common in heavy wet Karri and Jarrah; scarce on sandy west coastal plain.	The DBCA database identified three records within 100 km of the Survey Area, including 44.5 km east in 2008 and 52.8 km south west in 1989.	**Low** Minimal nearby records in recent years
Threskiornithidae	*Plegadis falcinellus* Glossy Ibis	MI	MI, MA (overfly marine area)	This taxon prefers shallow, fresh water, and estuarine waters, dry grasslands.	The DBCA database identified two records within 100 km if the Survey Area, including 35.6 km north in 1981 and 85.4 km north in 1981.	**Low** Minimal nearby records in recent years

Family	Scientific Name	Conservation Status		Habitat	Previous Records	Likelihood of Occurrence
		State	Federal			
Psittaculidae	*Polytelis alexandrae* Princess Parrot	P4	VU	This taxon prefers areas of spinifex with eucalypt trees, acacia shrubland, desert oaks, or hakeas around salt lakes.	No nearby records identified from the database searches or literature. Species only returned from PMST which measures distribution, not individual records.	**Low** No nearby records
Charadriidae	*Thinornis cucullatus* Hooded Dotterel	P4	MA (overfly marine area)	This taxon prefers beaches and margins of inland salt lakes.	The DBCA database identified four records within 100 km of the Survey Area, including 54.6 km north in 1980 and 54,9 km north in 2009.	**Low** Minimal nearby records in recent years
Scolopacidae	*Tringa brevipes* Grey-tailed Tattler	MI, P4	MI, MA	This taxon is commonly found in coastal areas, tidal flats, and rocky shorelines.	The DBCA database identified one record within 100 km of the Survey Area, including 24.1 km north in 2017.	**Low** No suitable habitat within the Survey Area
Scolopacidae	*Tringa glareola* Wood Sandpiper	MI	MI, MA (overfly marine area)	This taxon prefers freshwater wetlands with emergent sedges and taller fringing vegetation.	The DBCA database identified seven records within 100 km of the Survey Area, including 28.8 km north in 2005 and 29.6 km north in 2005.	**Low** No suitable habitat within the Survey Area
Scolopacidae	*Tringa nebularia* Common Greenshank	MI	MI, MA (overfly marine area)	This taxon is commonly found near permanent and temporary wetlands, billabongs, swamps, lakes, floodplains, sewage farms and salt works ponds, flooded irrigated crops, mudflats, mangrove swamps, muddy shallows of lagoons.	The DBCA database identified 10 records within 100 km of the Survey Area, including 21.2 km north east in 2013 and 37.5 km north in 2001.	**Low** Minimal nearby records in recent years
Cacatuidae	*Zanda latirostris* Carnaby's Cockatoo	EN	EN	This taxon is commonly found in forests, woodlands, heathlands, and farms. Common food sources include banksias, hakeas, and pine plantations.	The DBCA database identified six records within 100 km of the Survey Area, including 34.1 km north in 2018 and 35.2 km north in 2017.	**Medium** Suitable habitat is present within the Survey Area; low number of nearby records

Family	Scientific Name	Conservation Status		Habitat	Previous Records	Likelihood of Occurrence
		State	Federal			
Mammals						
Dasyuridae	*Dasyurus geoffroii fortis* Western Quoll, Chuditch	VU	VU	This taxon prefers sclerophyll forest or drier woodland, heath, and mallee shrubland. Often dens in deep rock crevices and hollows of fallen trees.	The DBCA database identified one record within 100 km of the Survey Area, 10.3 km east in 1974. A small and scattered population may exist within the region however is highly unlikely.	**Low** Minimal nearby records in recent years. No records were identified in the recent SLR surveys.
Thylacomyidae	*Macrotis lagotis* Bilby, Dalgyte	VU	VU	This taxon is found in areas of mitchell grass and stony downs country of cracking clays, desert sandplains and dune fields sometimes containing laterite, hummock grassland and massive red earths with *Acacia* shrubland. Was once widely distributed throughout arid and semi-arid mainland Australia, but has since been reduced to areas of the Pilbara, Kimberley, and Northern Territory, and small isolated pockets of Queensland.[9]	The DBCA database identified three records within 100 km of the Survey Area, including two records 35.5 km north and 60.0 km north.	**Low** Minimal nearby records in recent years
Myrmecobiidae	*Myrmecobius fasciatus fasciatus* Numbat, Walpurti	EN	EN	This taxon is not commonly found, but has been found in Jarrah forests, and Wandoo woodlands; requires hollow logs and branches for shelter and termites for food. Was once commonly found throughout much of the southern half of Australia, but has since been reduced to two isolated populations in southwest WA.	The DBCA database identified one record within 100 km of the Survey Area, 35.5 km north.	**Low** Minimal nearby records in recent years

Family	Scientific Name	Conservation Status		Habitat	Previous Records	Likelihood of Occurrence
		State	Federal			
Vespertilionidae	*Nyctophilus major tor* Central Long-eared Bat	P3	-	This taxon is commonly found in dry woodland and shrubland in arid and semi-arid regions.	The DBCA database identified one record within 100 km of the Survey Area, 77.1 km east in 2011.	**Low** Minimal nearby records in recent years
Dasyuridae	*Phascogale calura* Red-tailed Phascogale	CD	VU	This taxon is commonly found in *Allocasuarina* woodlands with hollow-containing eucalypts e.g. Eucalyptus wandoo) and *Gastrolobium* spp.; prefers vegetation not burnt for at least 20 years.[8]	The DBCA database identified one record within 100 km of the Survey Area, 65.5 km south east in 2005.	**Low** Minimal nearby records in recent years
Reptiles						
Scincidae	*Egernia stokesii badia* Western Spiny-tailed Skink	VU	EN	This taxon commonly occupies rock crevices and hollow timber in southwest interior of WA and on Dirk Hartog Island, Shark Bay.[11]	The DBCA database identified one record within 100 km of the Survey Area, 42.6 km north.	**Low** Minimal nearby records in recent years
Invertebrates						
Lycaenidae	*Jalmenus aridus* Inland Hairstreak Butterfly	P1 (not WAM)	-	This taxon is known only from a few localities west of Kalgoorlie-Boulder and is found in open woodland with mature *Senna artemisioides ssp. flifolia* as well as mixed flowering shrubs with open areas of well drained exposed ground adjoining the hostplants. The ant *Froggattella kirbii* must be present.	The DBCA database identified five records within 100 km of the Survey Area, all records are 26.2 km north of the Survey Area from 1985 to 1997.[3] SLR internal records returned 16 individuals within 50 km of the Survey Area in 2021.	**Recorded** The targeted survey for the ABAB L (SLR Consulting, 2024c) recorded 39 records in the survey area.
Lycaenidae	*Ogyris petrina* Arid Bronze Azure Butterfly	CR (not WAM)	CR (not WAM)	The Arid Bronze Azure butterfly is currently known from a single locality adjacent to Barbalin Nature Reserve in the northern	The DBCA database identified 17 records within 100 km of the Survey Area, including 22.5 km north in	**High**

Family	Scientific Name	Conservation Status		Habitat	Previous Records	Likelihood of Occurrence
		State	Federal			
				wheatbelt. In order to reproduce, the butterfly has an obligate association with a single form of one species of ant, the pale-coloured or 'Goldfields' form of *Camponotus* sp. nr. *terebrans*.	1991 and 11 records 24.1 km north between 1981 and 1991.	Host ant colonies are present across large portions of the Survey Area and nearby records are in close proximity

6.3.1 Malleefowl

The Malleefowl (*Leipoa ocellata*) is listed as vulnerable under the EPBC Act and BC Act. Malleefowl occur predominately in scrubs and thickets of Mallee (*Eucalyptus* spp.), Boree (*Melaleuca lanceolata*), Bowgada (*Acacia linophylla*), and other dense litter-forming shrublands including Mulga (*Acacia aneura*) shrublands. Malleefowl are known to prefer old growth vegetation (long unburnt) and require sandy substrate and an abundance of leaf litter to construct incubator nests. Malleefowl range over one to several square kilometres over a year but generally remain near their mounds during breeding season (Benshemesh, 2007). The species' distribution was once larger and less fragmented, however widespread clearing of suitable habitat along with other factors such as habitat degradation by fire and livestock, and fox predation, has reduced Malleefowl numbers considerably (Bamford Consulting Ecologists 2020).

Malleefowl could potentially forage anywhere through the Purpose Permit Area however mounds are most likely to be constructed in shrublands and thickets where dense vegetation provides leaf-litter for the mounds, and where the soil is free-draining at least to some extent; thus not clays or heavy loams. Three Vegetation and Substrate Associations (VSA#1, #2 and #7) display such characteristics.

Bamford (2022) identified fifteen Malleefowl mounds have been recorded within and around the Purpose Permit Area, these are shown in **Table 14** and mapped in **Figure 17**. Two of the mounds recorded (mound #14 and #15) were assessed as being of "Recent" age (1-5 years) however were not currently active (Bamford Consulting Ecologists 2022a). All the other mounds recorded in the previous surveys were classed as Moderately Old (5-20 years), Old (20-100 years), or Very Old (100+ years).

None of the Bamford surveys found signs of Malleefowl presence (e.g. sightings, tracks, droppings, feathers) and as all the mounds recorded are inactive, this suggests that Malleefowl may no longer nest within the area although they may use the area for foraging (Bamford Consulting Ecologists 2019;2020;2022a). Due to the absence of any evidence of Malleefowl being present in the area, no habitat within the survey area was considered critical for the survival of the Malleefowl, however it is of value (Bamford Consulting Ecologists 2020;2022a).

Of the 15 Malleefowl mounds identified by Bamford between 2019-2022, 8 have already been previous cleared. All cleared mounds were inactive and unlikely to be revisited during future breeding seasons.

Impacts to the species will be negligible if any critical habitat identified can be maintained, feral animals are controlled, roadkill is managed, and monitoring of the local population occurs.

Table 14: Malleefowl Mound Status (Bamford Consulting Ecologists 2019;2020;2022b)

No.	Easting	Northing	Habitat/ Vegetation	Mound Status	Age	Survey Year	Status
1	352822	6561252	*Eucalyptus spp.* And *Acacia acuminata* over *Melaleuca* and *Eremophila.*	Inactive	Very Old (100+ years)	2010	Cleared
2	353078	6560931	*Allocasuarina* over *Melaleuca pauperiflora* shrubland	Inactive	Very Old (100+ years)	2010	Cleared
3	352725	6561923	*Acacia quadrimarginea* over *Allocasuarina* on gravelly/rocky slight rises	Inactive	Very Old (100+ years)	2016	Cleared
4	352953	6562206	*A. quadrimarginea* shrubland, *A. acuminata*, *E. oldfieldi*	Inactive	Moderately Old (5-20 years old)	2016	Cleared
5	351715	6562579	*A. quadrimarginea* shrubland, *A. acuminata*, *E. lesouefii*	Inactive	Very Old (100+ years)	2016	2.1 km outside the Purpose Permit Area
6	352240	6562367	*Acacia, Allocasuarina, Senna,* Mallee thicket	Inactive	Old (20 – 100 years)	2016	1.5 km outside the Purpose Permit Area
7	351621	6561856	Mallee, Melaleuca thicket	Inactive	Very Old (100+ years)	2016	2.5 km outside the Purpose Permit Area
8	352017	6561688	Mallee, Melaleuca thicket	Inactive	Very Old (100+ years)	2016	2 km outside the Purpose Permit Area
9	352828	6562100	*A. quadrimarginea*, *A. acuminata*, *E. oldfieldi, E scoparia*	Inactive	Very Old (100+ years)	2016	1.9 km outside the Purpose Permit Area
10	354110	6559159	*Eucalypt* woodland over open mixed shrubland	Inactive	Very Old (100+ years)	2016	Cleared
11	352828	6562100	*A. quadrimarginea*, *A. acuminata*, *E. oldfieldi, E scoparia*	Inactive	Very Old (100+ years)	2017	Cleared
12	353566	6562272	*Acacia* spp. shrubland	Inactive	Very Old (100+ years)	2022	Cleared
13	351590	6563269	Lower slopes of acacia shrubland on rocky red loam	Inactive	Old (20 – 100 years)	2022	2.6 km outside the Purpose Permit Area
14	351804	6563508	Adjacent to drainage line in *Acacia* spp shrubland on rocky loam	Inactive	Recent (1-5 years)	2022	2.6 km outside the Purpose Permit Area
15	353045	6562160	Sump on drill pad, surrounded by Eucalypt woodland on lower hill slope	Inactive	Recent (1-5 years)	2022	Cleared

SLR identified 50 Malleefowl mounds within their extended survey area, six of which are within 5 km of the Purpose Permit Area. None of these mounds are within the Purpose Permit Area

(**Figure 17**) and will not be impacted by clearing activities. **Table 15** below summaries mounds identified by SLR Consulting, within a 5 km buffer around the Purpose Permit Area.

Table 15: SLR (2024) Malleefowl Mounds within 5 km of Clearing Permit

Mound ID[1]	Easting	Northing	Distance from Purpose Permit Area	Mound Status	Fields Observations
11	351802	6563507	2.6 km	Inactive (Malleefowl Activity present)	Mound with litter
17	356136	6564511	2.9 km	Inactive (Malleefowl Activity present)	Typical crater with raised rim
18	356891	6564551	3.1 km	Inactive (Malleefowl Activity present)	Mound fully dug out
40	358803	6556475	2.1 km	Inactive (long unused)	Mound low and flat without peak or crater
41	355939	6552493	4.2 km	Inactive (Malleefowl Activity present)	Mound fully dug out
42	355094	6552405	4.3 km	Inactive (Malleefowl Activity present)	Mound with litter

[1] From SLR 2024 Detailed and Targeted Fauna Reports

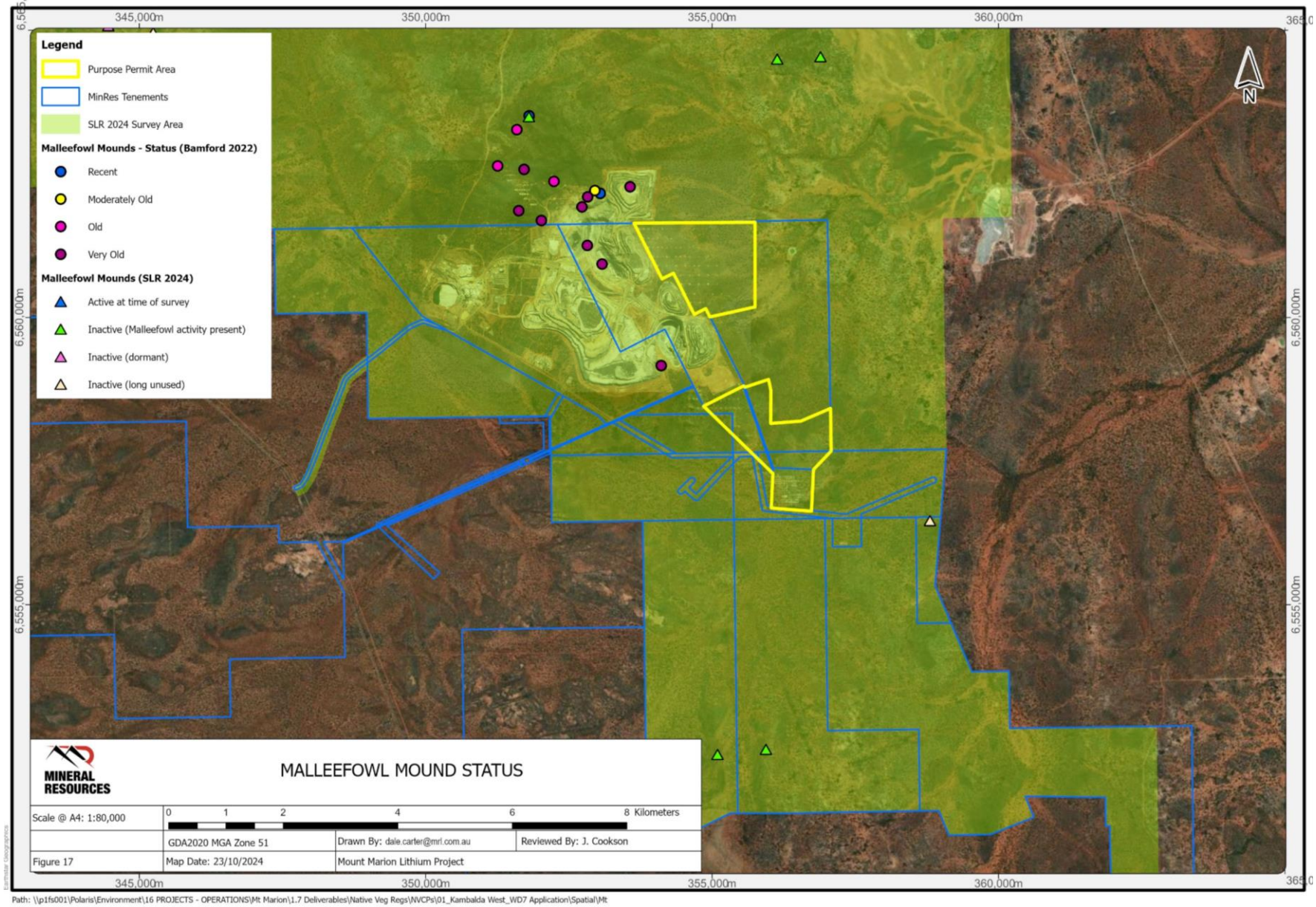

Figure 17: Malleefowl Mound Status

6.3.2 Arid Bronze Azure Butterfly (ABAB)

The ABAB (*Ogyris petrina*) is listed as Critically Endangered (CE) under the BC Act and EPBC Act. Following the extirpation of the only known population in the early 1990s, the ABAB was rediscovered at Barbalin Nature Reserve in 2006. The ABAB has an obligate association with the Sugar Ant (*Camponotus* sp. nr. *terebrans*), ABAB larva requires large ant colonies that are typically found at the base of many species of smooth-barked eucalypts including *Eucalyptus salubris and E. salmonophloia* (SLR Consulting, 2024b).

Two large colonies of *Camponotus* sp. nr. *terebrans* were identified close to the Purpose Permit Area, with the closest colony is 1.7 km outside the Purpose Permit Area (**Figure 16**). The targeted survey for ABAB recorded a total of 2576 *Camponotus spp*. nests within the Survey Area. These nests represent four separate colonies which have the potential to comprise a metapopulation. No ABAB were recorded during the targeted survey. Due to the size of the individual colonies, the proximity of the colonies to each other, and the proximity of previous records, there is the potential that the ABAB may be present at one or more of the colonies surveyed (SLR Consulting, 2024c).

However, given the delineated portions of the host ant colonies are far enough away from the Purpose Permit Area, they are unlikely to be impacted by the proposed land clearing activities.

6.3.3 Inland Hairstreak Butterfly

The Inland Hairstreak Butterfly (*Jalmenus aridus*) is listed as Priority 1 by the DBCA. There is limited knowledge of its distribution and biology; it is only known from an area near Kalgoorlie. The larvae feed on leaves and flowers of *Senna nemophila* and *Acacia tetragonophylla*, and the caterpillars are attended to by the ant species *Froggattella kirbii*. It is found in open woodland with mature *Senna artemisioides* ssp. *flifolia* as well as mixed flowering shrubs with open areas of well drained exposed ground adjoining the hostplants. The ant *Froggattella kirbii* must be present.

While none were recorded in the SLR (2024) fauna surveys or in previous surveys that were reviewed in the Bamford Consulting Ecologists (2019) report, the Targeted Survey for the ABAB recorded 39 opportunistic sightings within their wider survey area (SLR Consulting, 2024c). None of these sightings were within the Purpose Permit Area (**Figure 16**), with the closet report 2.5 km outside the Purpose Permit Area. No *Froggattella kirbii* was identified during the SLR (2024) survey. Populations of the species host plant, *Senna artemisioides* ssp. *Flifolia* were identified during the terrestrial fauna field survey however none are located within the Purpose Permit Area.

The Inland Hairstreak Butterfly is not expected to be impacted by clearing activities.

6.3.4 Carnaby's Cockatoo

The Carnaby's Cockatoo (*Zanda latirostris*) listed as Endangered under the BC Act and EPBC Act. The species was not identified within the Survey Area during the survey effort, however, the closest record to the Survey Area was 34 km north in 2018. Habitat present within the Survey Area, such as Eucalypt Woodlands, could be used by the taxon for nesting and foraging. While this species does not frequently inhabit this region, it is an uncommon vagrant that may infrequently utilise habitats within the Survey Area (SLR Consulting, 2024a).

The Carnaby's Cockatoo is not expected to be impacted by clearing activities.

6.4 Short Range Endemics

Short Range Endemic (SRE) species are important due to their limited distribution and potential impacts to populations from clearing activities.

Multiple SRE assessments have been completed over the purpose permit area, including:

- Bamford 2022 – Basic Fauna Assessment (Including SRE) (**Appendix H**)
- Bennelongia 2024 – Mt Marion Short Range Endemic Survey (**Appendix G**).

During the Bamford 2022 specimens of the Shield-backed Trapdoor Spider *Idiosoma spp* was identified north of Mt Marion. Three specimens were collected for identification and all were unidentifiable species of the genus *Idiosoma*, with two juveniles and one adult female identified. Identification to a species level was not possible. The precautionary approach was taken, and it is considered possible that the collected specimens were individuals of either one or both of the expected priority-listed Shieldbacked Trapdoor Spider: the Coolgardie Shield-backed Trapdoor Spider and/or the Central Eastern Wheatbelt Shield-backed Trapdoor Spider. The closest trapdoor spider surveyed was over 3km from the Purpose Permit Area (**Figure 18**).

Bennelongia conducted further surveys in 2024, with a memo report provided (**Appendix G**). This identified three Potential – Likely SREs within the extended survey area. None of these potential SREs were identified within the Purpose Permit Area. The closest potential SRE *Buddelundia* `BIS573` was identified 3 km from the Purpose Permit Area (**Figure 18**), details on this species below:

- *Buddelundia* `BIS573` is an isopod slater of family Armadillidae. It was collected from leaf litter at two sites and another after digging at the base of a Eucalypt tree. These sites cover different habitats including open Eucalypt woodland, floodplain and rocky hill, with a linear range of around 21 kms. The vegetation at all sites includes Eucalyptus overstorey and a shrub understorey consisting of Acacia and Melaleuca spp.

For each species, there was good connectivity to areas of habitat outside the boundary of the Survey Area.

The Shield-backed Trapdoor Spider and potential SREs identified by Bennelongia area not expected to be impacted by clearing activities.

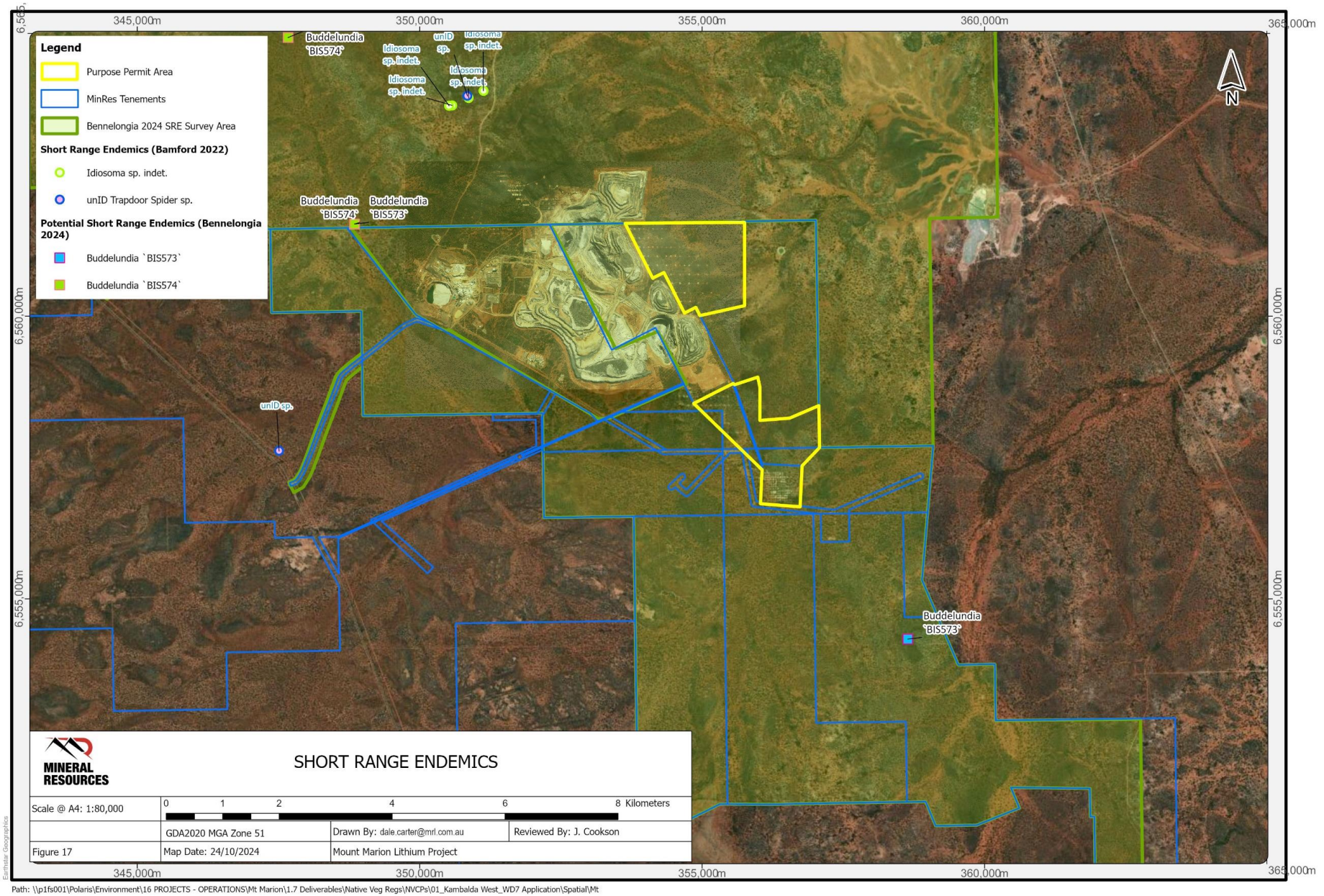

Figure 18: Short Range Endemics

7. AVOIDANCE AND MITIGATION

The identification, evaluation and management of environmental impacts associated with the Project are based on a risk management approach, consistent with the Australian Standard for Risk Management (AS/NZS ISO 31000:2009), together with the *Guidelines for Mining Proposals in Western Australia*. MinRes has adopted the mitigation sequence for environmental management, which involves avoiding, minimising, and offsetting the significant residual impacts of mining activities on the environment.

The key objectives of environmental management for the proposed Purpose Permit Area are to:

- Identify all likely environmental impacts arising from the clearing and determine significant impacts requiring the implementation of special management procedures.
- Develop and declare the environmental management commitments necessary to minimise, control, ameliorate and rehabilitate significant impacts.

Potential impacts from the proposed clearing include:

- Habitat loss leading to population decline and population fragmentation.
- Changes to local hydrology.
- Degradation of habitat due to weed invasion.
- Ongoing mortality from operations (i.e., potential roadkill of Malleefowl).
- Impacts of feral predators and an increase in abundance of predatory and/or scavenging bird species.
- Altered fire regimes and disturbance (dust, noise and light).

MinRes has an Environmental Management System (EMS); this system includes awareness training, plans, procedures and forms to avoid, minimise and ensure the effective management of environmental and heritage values.

MinRes has adopted the mitigation sequence for environmental management, which involves avoiding, minimising, and offsetting the significant residual impacts of mining activities on the environment as further defined below. These are considered sufficient to ensure the effective management of environmental risks by the proposal.

Avoid:

- Proposed clearing has been minimised as far as practicable to reduce the extent of disturbance required.
- A Land Activity Permit and the Clearing Procedure will be implemented to ensure all clearing works are compliant with regulatory requirements and are within approved boundaries.
- The area to be cleared shall be clearly demarcated and machinery operators made aware of the operational boundary, following confirmation with the relevant manager.

- Where possible, areas of confirmed Priority Flora will be avoided so that these populations are minimally affected.
- Monitor local Malleefowl population if present.
- No clearing beyond disturbance boundary.

Minimise:

- Induct and educate personnel on environmental requirements of the Proposal.
- Clearing awareness training undertaken by all personnel involved in clearing activities.
- Vegetation clearing shall be kept to the minimum amount required, as far as practicable.
- Utilise existing access tracks where possible.
- Weed control and management methods will be implemented during operations where required.
- Vehicles and equipment shall not drive over, or parked on, vegetation and/or tree roots, as far as practicable.
- Undertake staged clearing.
- Clearing will be undertaken in a slow, progressive manner towards adjacent native vegetation to allow fauna to move out of the clearing area.
- Utilise already cleared land where suitable for supporting infrastructure.
- Machinery and vehicle movements should be restricted during construction to minimise the potential for vehicle strikes, where practicable.
- Machinery and vehicle movements that must be undertaken between dusk and dawn should be limited to low speeds on access tracks.
- Excavations and trenches will be kept open only as long as needed to undertake the work and egress points will be provided dependant on depth / morphology of the excavation.
- Feral species management where required.
- Manage existing surface water flows where possible.
- Manage and contain surface water flows from disturbed areas.

Rehabilitate:

- Implement appropriate rehabilitation in accordance with the approved Mine Closure Plan (MCP)(Reg ID 120019).
- Undertake progressive rehabilitation at the mine.
- Salvage and stockpile soil and/or habitat features (e.g. vegetation, stumps, logs, boulders) for use in rehabilitation programs.'
- All exploration bores shall be capped and rehabilitated as required.

8. ASSESSMENT AGAINST THE TEN CLEARING PRINCIPLES

An assessment has been completed against the Ten Clearing Principles (EP Act 1986, Schedule 5) to determine if there is a likely significant environmental impact as a result of the clearing native vegetation proposed to be cleared in this application. Each principle was assessed in accordance with "A Guide to the Assessment of Applications to Clear Native Vegetation" (DER 2014).

In summary, the proposed clearing subject to this application is not likely to be at variance with Principles (a), (b), (c), (d), (e), (f), (h), (i) or (j) and may be at variance to Principle (g). A full assessment of the proposed NVCP Application against Clearing Principles is shown in **Table 16.**

Table 16: Assessment of the Proposal against the Ten Clearing Principles

Red – Likely to be at variance, **Orange** – May be at variance, **Green** – Not likely to be or not at variance.

Clearing Principle	Impact Category	Assessment of Clearing Principle
(a) Native vegetation should not be cleared if it comprises a high level of biological diversity	**Not likely to be at variance**	There are no TECs, PECs, Threatened Flora, Environmentally Sensitive Areas, Nature Reserves, Conservation Areas, or restricted or unique vegetation communities within the Purpose Permit Area or surrounding area. As indicated in **Section 5.2.1**, the identified Beard vegetation associations which occur within the Purpose Permit Area are considered to have between 70 - 100% of their spatial area remaining post European settlement, and are not adversely affected by extensive clearing (refer to **Table 8**). The Purpose Permit Area is located within the Coolgardie (COO) bioregion within the Eastern Goldfields (COO0) subregion, as classified in the Interim Biogeographic Regionalisation of Australia (IBRA). An audit of the biodiversity within Western Australia's biogeographical subregions identified that the Eastern Goldfields bioregion covered over 5.1 million ha (CALM 2002). A total of 25 vegetation groups were identified across the Spectrum Ecology (2024) survey area, seven of which were identified within the proposed Purpose Permit Area. The vegetation community that dominates the proposed Purpose Permit Area is Eucalypt woodlands over tall sparse shrublands, with this vegetation type typical of the region and not considered to be unusually diverse (Spectrum Ecology, 2024b). Vegetation and flora surveys across the Project area have identified a total of 333 species, none of which were flora gazetted as Threatened under the Biodiversity Conservation Act 2016 and/or the Environmental Protection and Biodiversity Conservation Act 1999. No priority flora species were identified within the Purpose Permit Area. The fauna assemblage within the Purpose Permit Area is largely intact, rich and typical of that found in Goldfields Eucalypt woodlands and expected across the Coolgardie region. The assemblage has elements from adjacent biogeographic zones (Bamford Consulting Ecologists 2019). The SLR (2024a) survey recorded a total of 91 fauna taxa from 45 families. A total of 31 conservation significant species were deemed potential to occur within the Purpose Permit Area and/or be regular visitors. Four were identified as potentially occurring during site surveys. These were: • Malleefowl (*Leipoa ocellata*) – Vu. Vu. (recorded in surveys, closest 1.5 km outside Purpose Permit Area) • Inland Hairstreak Butterfly (*Jalmenus aridus*) – P1 (recorded, closest 2.5 km outside Purpose Permit Area). • Arid Bronze Azure Butterfly (*Ogyris petrina*) – CN, CN (High likelihood of occurrence). • Carnaby's Cockatoo (*Zanda latirostris*) – EN, EN (Medium likelihood of occurrence).

Clearing Principle	Impact Category	Assessment of Clearing Principle
		Ground surveys have identified a total of 64 Malleefowl Mounds with Bamford (2022) recording 15 Malleefowl mounds and SLR (2024) recording 49 Malleefowl Mounds (**Figure 17).** None of the Malleefowl Mounds are within the Purpose Permit Area. The residual impact from the proposed clearing is considered negligible due to lack of breeding habitat and the small size of the impact area compared to the broad and largely intact surrounding landscape (Bamford Consulting Ecologists, 2019). The proposed Purpose Permit Area is not noted for a high biodiversity relative to the surrounding region and combined with the lack of conservation significant species, and well represented vegetation distribution in the greater region, MinRes considers that clearing activities proposed are unlikely to have a significant impact on the biological diversity in the area. Therefore, the proposed clearing is unlikely to be a variance to Clearing Principal (a).
(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.↓	**Not likely to be at variance**	The Purpose Permit Area and surrounding areas have the potential habitat for 31 significant species. During the onsite surveys five (5) conservation significant species were identified as potentially occurring, with two species recorded during field surveys (**Table 13**). None of the significant species identified during the fauna survey are considered to be heavily reliant on habitats within the Purpose Permit Area. Although some habitats within the Purpose Permit Area are restricted in size, and may have limited occurrence within the region, they are not considered to be particularly significant for fauna within the Purpose Permit Area. One of these species, Malleefowl (*Leipoa ocellata*) listed as Vulnerable under the EPBC Act and WA BC Act, is known to occur in the regional area and inactive breeding sites were identified during the fauna surveys. No Malleefowl Mounds were identified within 1.5 km of the Purpose Permit Area**.** With management in place, the potential impacts of the proposed clearing on this species is considered to be Negligible (Bamford Consulting Ecologists 2019;2022a). ABAB host ant colonies have been delineated, based on vegetation types and records of host ant species *Camponotus* sp. nr. *terebrans* (**Figure 16**), these colonies are entirely outside of the Purpose Permit Area and will not be impacted by land clearing activities. Carnaby's Cockatoos were not identified in any field surveys and are unlikely to be impacted by this proposal. While records of the Inland Hairstreak Butterfly were recorded within the vicinity of the Purpose Permit Area, no host ant colonies were within the Purpose Permit Area and the proposed clearing is unlikely to impact this species. (Bennelongia, 2024) Identified potential SRE around the project area (6.4). For each species, there was good connectivity to areas of habitat outside the boundary of the Survey Area. Therefore clearing activities are not expected to fragment colonies for potential SRE species.

Clearing Principle	Impact Category	Assessment of Clearing Principle
		In summary, given the lack of breeding habitat for conservation significant species and the lack of specialised vegetation groups and/or habitat types and lack of identified / records of species within the Purpose Permit Area, MinRes considers that clearing activities associated with the Proposal are unlikely to significantly impact native fauna, therefore not at variance of Clearing Principal (b).
(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.	**Not likely to be at variance**	No Threatened Flora or Priority species were identified within the Purpose Permit Area. One of the Vegetation types within the Purpose Permit Area – VT13 is locally and regionally significant as is provides refuge for P2 species *Lepidosperma* sp. Kambalda (A.A. Mitchell 5156). The closest instance of this species was 1.6 km outside the Purpose Permit Area. There are no TECs, PECs, ESAs, Nature Reserves, Conservation Areas, and restricted or unique vegetation communities within the Purpose Permit Area or surrounding area. MinRes considers that clearing activities associated with the Proposal are unlikely to be at variance with this Principle.
d) Native vegetation should not be cleared if it comprises the whole or a part of or is necessary for the maintenance of a threatened ecological community.	**Not likely to be at variance**	As indicated in **Section 5.2**, there are no State listed Threatened Ecological Communities or Priority Ecological Communities within the proposed Purpose Permit Area or surrounding area. MinRes consider that clearing activities associated with the Proposal are unlikely to be at variance with this Principle.
(e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.	**Not likely to be at variance**	As outlined by Spectrum Ecology in the 2024 report (Appendix E and Appendix F), the Beard vegetation associations, which occur within the Purpose Permit Area are considered to have between 70 – 100 % of their spatial area remaining post European settlement and are not adversely affected by extensive clearing (**Table 9**). Given the extent of the associations at a regional scale, the proposed disturbance will have negligible impact on conservation values or cause fragmentation, or result in patches of remnant vegetation. Vegetation in the Purpose Permit Area is considered to be still intact even though much of the area (local and regional) has been impacted by forestry, mining and pastoral activities. Vegetation condition in the Purpose Permit Area varies from Pristine, Excellent, to Completely Degraded condition. Most of the vegetation in the Purpose Permit Area (58%) have been identified as Excellent (**Figure 11**). The vegetation community that dominates the Purpose Permit Area is Eucalypt woodlands over mixed shrublands on broad loamy plains and low rises. This vegetation type is typical of the region and not considered to be unusually diverse. MinRes considers that clearing activities associated with the Proposal are unlikely to be at variance with this Principle.

Clearing Principle	Impact Category	Assessment of Clearing Principle
(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.	**Not likely to be at variance**	There are no rivers, creeks, wetlands or permanent watercourses located within the Purpose Permit Area. The closest wetland to the Purpose Permit Area is the ephemeral salt lake systems Brown Lake, occurring approximately 19 km to the northwest, and Lake LeFroy, occurring approximately 23 km to the southeast (**Figure 6**). Some ephemeral drainage lines pass through the application area. Drainage lines in the region are dry for most of the year, only flowing briefly immediately following significant rainfall. Vegetation growing around drainage lines are not confined to these areas and are not growing exclusively in association with drainage lines. The risk of clearing activities causing surface water quality issues is considered minimal due containment measures for potentially contaminated or sediment laden water, spill response procedures, and erosion control measure. Ephemeral surface water flows will be maintained through construction of appropriate drainage infrastructure, including culverts and specific mine design to reduce pooling and potential contamination. Surface water assessment are undertaken for all mining activities, drainage and sediment control is included in all assessments and implemented on site. While vegetation that is growing in association with a watercourse will be cleared, this is unlikely to have a significant impact on the watercourses or the quality of surface water due to the watercourses within the Purpose Permit Area being minor and non-perennial.
(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.	**Not likely to be at variance**	The Purpose Permit Area is located within the Goldfields region of WA, which consists of predominately mining, prospecting, forestry and pastoralist land uses. The mining developments associated with the Purpose Permit Area have some potential to exacerbate land degradation, although only moderately so when compared to the ubiquitous impact of pastoralism. The potential risk is from uncontrolled runoff and the channelization of sheet flow from mining developments can causing overland gullying and drilling (**Section 4.6**). This risk, however, will be mitigated as all runoff and drainage within the mining impact zone is contained with internal catchments or controlled through bunding and erosion control infrastructure. Culverts and mine design will allow for ephemeral surface flows to flow during high rainfall events to minimise impacts from erosion and pooling water. These controls will occur in the operational stages and post mining. The post mining landforms will be rehabilitated, surfaces with rocky mantles will be designed to control and appropriately manage runoff. In summary, given that the Purpose Permit Area implements staged clearing to reduce disturbance, erosion controls, and progressive rehabilitation, where practicable, it is not expected that significant land degradation will occur as a result of this Proposal.
(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the	**Not likely to be at variance**	There are no ESAs, Nature Reserves, and/or Conservation Areas within the Purpose Permit Area or surrounding area. There are no Public Drinking Water Source Areas (PDWSA) near the Purpose Permit Area. There are four conservation areas in the vicinity of the Purpose Permit Area:

Clearing Principle	Impact Category	Assessment of Clearing Principle
environmental values of any adjacent or nearby conservation area.		• Kambalda Nature Reserve (approximately 6.5 km to the southeast). • Yallari Timber Reserve (approximately 7.2 km to the west and southwest. • Karamindie State Forest (approximately 8.0 km to the northwest). • Kambalda Timber Reserve (approximately 8.0 km to the southeast). Due to the distance from the Purpose Permit Area and the conservation areas, it is considered unlikely that the proposed clearing will impact these areas. MinRes considers that clearing activities associated with the Proposal are unlikely to be at variance with this Principle.
(i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.	**Not likely to be at variance**	There are no surface water bodies or creek systems located on or near the Purpose Permit Area. Any ephemeral flows due to rainfall quickly evaporates or infiltrates leaving minimal pooling. In the North Purpose Permit Area surface drainage is to the north and south of the area within M15/841. The southern Purpose Permit Area has a drainage line running though M15/999 (**Figure 16**). The ephemeral surface flows from the north to south in the Purpose Permit Area are maintained through drainage structures. Clearing and disturbance in the main drainage line is being reduced through installation of culverts, diversion drains and sediment basins. A surface water assessment will support a Mining Proposal for activities proposed in this Purpose Permit Area, modeling a 1:100 annual recurrence interval. The groundwater table is approximately 20 - 100 m below ground level across the Purpose Permit Area, with some isolated perched water tables nearer to the surface. Groundwater quality is generally poor and highly saline. The risk of clearing causing groundwater issues is considered minimal due to groundwater quality and depth. The risk of clearing causing surface hydrology issues is thus considered low due to mine design around areas of known ephemeral flow and infrastructure to maintain flows. In summary, given there are no surface water bodies and groundwater quality is low, there are no wetlands or permanent water courses within the Purpose Permit Area and installation of appropriate surface water drainage infrastructure, including culverts and mine design will allow for ephemeral surface flows to flow during high rainfall events, MinRes considers that clearing activities associated with the Proposal are unlikely to be at variance with this Principle.
(j). Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.	**Not likely to be at variance**	There are no surface water bodies or creek systems located on or near the Purpose Permit Area. Only high intensity, prolonged rainfall events are considered as being likely to cause major surface flows and flood events. The catchment area that could potentially be formed by the Proposal's mining developments will be moderate, with runoff from operational areas to be contained within internal catchments or managed through bunding, sedimentation sumps, culverts and discharge structures.

Clearing Principle	Impact Category	Assessment of Clearing Principle
		The annual average rainfall at Kalgoorlie is 267.7 mm over an average 39.9 rain days. There is a low likelihood of extreme rainfall events and the soils mapped in the Purpose Permit Area are permeable sandy and loamy soils. The runoff from areas cleared as part of the mining developments will be contained and managed within the site drainage systems, the impacted catchment area is moderate and the surrounding areas have undisturbed vegetation and soils to manage runoff, it is considered unlikely that clearing associated with the Purpose Permit Area will exacerbate the incidence or intensity of flooding. In summary, given that there are no permanent creek systems in the Purpose Permit Area and instances of overland flow after extreme rain events will be managed via drainage infrastructure, MinRes considers that clearing activities associated with the Proposal are unlikely to be at variance with this Principle.

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TENEMENT AND OCCUPIER DETAILS

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SLR (2024) BASIC AND TARGETED FAUNA SURVEY - HAMPTONS

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SLR (2024) BASIC AND TARGETED FAUNA SURVEY – MINRES TENEMENTS

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SLR (2024) TARGETED ABAB SURVEY

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APPENDIX E

SPECTRUM (2024) FLORA AND VEGETATION ASSESSMENT - HAMPTONS

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APPENDIX F

SPECTRUM (2024) FLORA AND VEGETATION ASSESSMENT – MINRES TENEMENTS

APPENDIX G
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APPENDIX H
BAMFORD (2022) FAUNA ASSESSMENT

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APPENDIX I

BAMFORD (2022) TARGETED MALLEEFOWL SURVEY