

# Yilgarn Operations

---

## Warehouse and Powerline Expansion Project

Supporting document for a native vegetation clearing  
permit application

12 April 2023

Revision 1



Proponent: Mineral Resources Limited  
Address: 20 Walters Drive, Osborne Park, Western Australia 6017  
Postal Address: 20 Walters Drive, Osborne Park, Western Australia 6017  
Corporate contact: Belinda McCawley - Senior Environmental Advisor  
Phone: +61 8 9315 0528  
Email: [Belinda.Mccawley@mrl.com.au](mailto:Belinda.Mccawley@mrl.com.au)

## Revision History

Rev	Issue date	Prepared by	Reviewed by	Approved by	Document purpose
A	23/03/2023	B. Mccawley			Draft
1	17/04/2023	B. Mccawley	B Sterling	T. Wilson	Final

## TABLE OF CONTENTS

EXECUTIVE SUMMARY .....	2
1. INTRODUCTION .....	3
2. PURPOSE AND METHODOLOGY .....	4
3. PROJECT DESCRIPTION.....	8
3.1 Regional setting.....	8
3.2 Tenure and land access.....	8
3.3 Proximity to DBCA managed lands.....	8
3.4 Historical and future land use .....	8
4. ENVIRONMENTAL SETTING .....	10
4.1 Climate .....	10
4.2 Soil and Land Systems .....	10
4.3 Surface water .....	11
4.4 Groundwater.....	11
4.5 Land degradation.....	12
5. FLORA AND VEGETATION .....	13
5.1 Desktop assessment .....	13
5.2 Field survey .....	13
5.3 Vegetation communities and condition.....	15
6. FAUNA .....	16
6.1 Fauna Habitat.....	16
6.2 Fauna .....	16
7. AVOIDANCE AND MITIGATION .....	18
8. ENVIRONMENTAL IMPACT ASSESSMENT .....	19
8.1 Ten Clearing Principles.....	19
8.2 Very low environmental impact .....	23
9. REFERENCES .....	25
10. GLOSSARY.....	26
11. ABBREVIATIONS.....	27
APPENDICES .....	28

## Figures

Figure 1: Project location .....	5
Figure 2: Proposed 5.75 ha clearing Koolyanobbing .....	6
Figure 3: Proposed 0.75 ha clearing Windarling .....	7
Figure 4: Southern Cross Airfield (Site 012320) Temperature and rainfall .....	10

## Tables

Table 1: Soil Landscape Map Descriptions (DPIRD, 2019) .....	11
Table 2: MinRes Procedures .....	18
Table 3: Identified Impacts against Clearing Principles .....	20
Table 4: Identified Impacts against Criterion .....	23

## Appendices

Appendix A	Koolyanobbing and Windarling Powerline Corridors and Koolyanobbing Warehouse Expansion Reconnaissance Flora, Vegetation and Fauna Habitat Assessment (Ecotec, 2022)
Appendix B	Power of Attorney

## CONTACT DETAILS

Address	Key contact
20 Walters Drive, Osborne Park Western Australia 6017 <a href="http://www.mineralresources.com.au">www.mineralresources.com.au</a>	Belinda McCawley – Senior Environmental Advisor Email: <a href="mailto:Belinda.mccawley@mrl.com.au">Belinda.mccawley@mrl.com.au</a> Phone: (08) 9315 0528

## EXECUTIVE SUMMARY

The Yilgarn Iron Ore Operations comprises five individual mine sites (Koolyanobbing, Mt Jackson, Windarling, Deception and Parker Range) located in the vicinity of Southern Cross (~ 50 - 150 km) and Marvel Loch (~ 15 km) in the Yilgarn region of Western Australia. The operations extend across two local government areas, the Shire of Yilgarn and the Shire of Menzies. The mine sites, except for Parker Range, are connected by a private haul route. Haulage of ore from Parker Range currently occurs on public roads.

Mineral Resources Limited (MinRes) acquired the Koolyanobbing, Mt Jackson, Windarling and Deception operations from Cliffs Asia Pacific Iron Ore Pty Ltd (Cliffs) on 28 August 2018, and the Parker Range mine site (through Polaris Metals Pty Ltd, a 100% owned subsidiary of MinRes) from Cazaly Iron Pty Ltd in August 2019. Yilgarn Iron Ore Pty Ltd (YIPL), a wholly owned subsidiary of MinRes, owns and operates the Yilgarn Operations.

The Koolyanobbing mine site has a long history of mining, with operations commencing in 1950. Mining commenced in 2004 at Mt Jackson and Windarling, 2017 at Deception, and 2020 at Parker Range. There were several changes of ownership and periods of care and maintenance prior to acquisition of the ex-Cliff's mine sites by MinRes in 2018.

This application is to support the clearing of up to 6.5 hectares (ha) of native vegetation within Mining Tenements M77/606, M77/990, M77/1038 at Koolyanobbing and Windarling operations for the purpose of widening existing powerline maintenance corridors and the construction of a centralised warehouse to support mining operations.

A reconnaissance survey of the area proposed for clearing was undertaken in August and October 2020 'Koolyanobbing and Windarling Powerline Corridors and Koolyanobbing Warehouse Expansion Reconnaissance Flora, Vegetation and Fauna Habitat Assessment' (Ecotec, 2020). The areas proposed for clearing at Koolyanobbing and Windarling are highly disturbed and in close proximity to active mining operations and related activity. No conservation significant flora or fauna were located during the survey. There are no Threatened Ecological Communities (TEC) within the surveyed area, or in the nearby vicinity.

The proposed clearing has been assessed against criteria listed in s.51DA(4) of the *Environmental Protection Act 1986 (WA)* and *Native Vegetation Clearing Regulations 2004 (WA)*. The proposed clearing meets Criterion 1- 4 that relates to clearing with very low environmental impact and is not at variance with Clearing Principles (A) to (J). MinRes is therefore requesting for this to be assessed as a referral, in accordance with the Native Vegetation Clearing Referrals Guideline (DWER, 2021).

In summary, the environmental impacts of the proposal involving the clearing of native vegetation can be adequately managed by MinRes' Environmental Management System. Furthermore, MinRes has the environmental management resources to adequately enable this.

## 1. INTRODUCTION

The Yilgarn Iron Ore Operations comprises five individual mine sites (Koolyanobbing, Mt Jackson, Windarling, Deception and Parker Range) located in the vicinity of Southern Cross (~ 50 - 150 km) and Marvel Loch (~ 15 km) in the Yilgarn region of Western Australia. The operations extend across two local government areas, the Shire of Yilgarn and the Shire of Menzies. The mine sites, except for Parker Range, are connected by a private haul route. Haulage of ore from Parker Range currently occurs on public roads.

MinRes acquired the Koolyanobbing, Mt Jackson, Windarling and Deception operations from Cliffs Asia Pacific Iron Ore Pty Ltd (Cliffs) on 28 August 2018, and the Parker Range mine site (through Polaris Metals Pty Ltd, a 100% owned subsidiary of MinRes) from Cazaly Iron Pty Ltd in August 2019. Yilgarn Iron Ore Pty Ltd (YIPL), a wholly owned subsidiary of MinRes, owns and operates the Yilgarn Operations.

The Koolyanobbing mine site has a long history of mining, with operations commencing in 1950. Mining commenced in 2004 at Mt Jackson and Windarling, 2017 at Deception, and 2020 at Parker Range. There were several changes of ownership and periods of care and maintenance prior to acquisition of the ex-Cliff's mine sites by MinRes in 2018.

Koolyanobbing and Windarling Operations are approximately 50 km and 135 km, respectively, north of Southern Cross in the Shire of Yilgarn, Western Australia (MinRes, 2022) (Figure 1).

Permit to Clear Native Vegetation under the *Environmental Protection Act 1986* Yilgarn Iron Pty Ltd - Koolyanobbing and Windarling powerline and warehouse (CPS 9097/1) was issued on 15 January 2021 and expired on 14 January 2023. Clearing for the powerline corridor has not been commenced, however is scheduled for 2023/24.

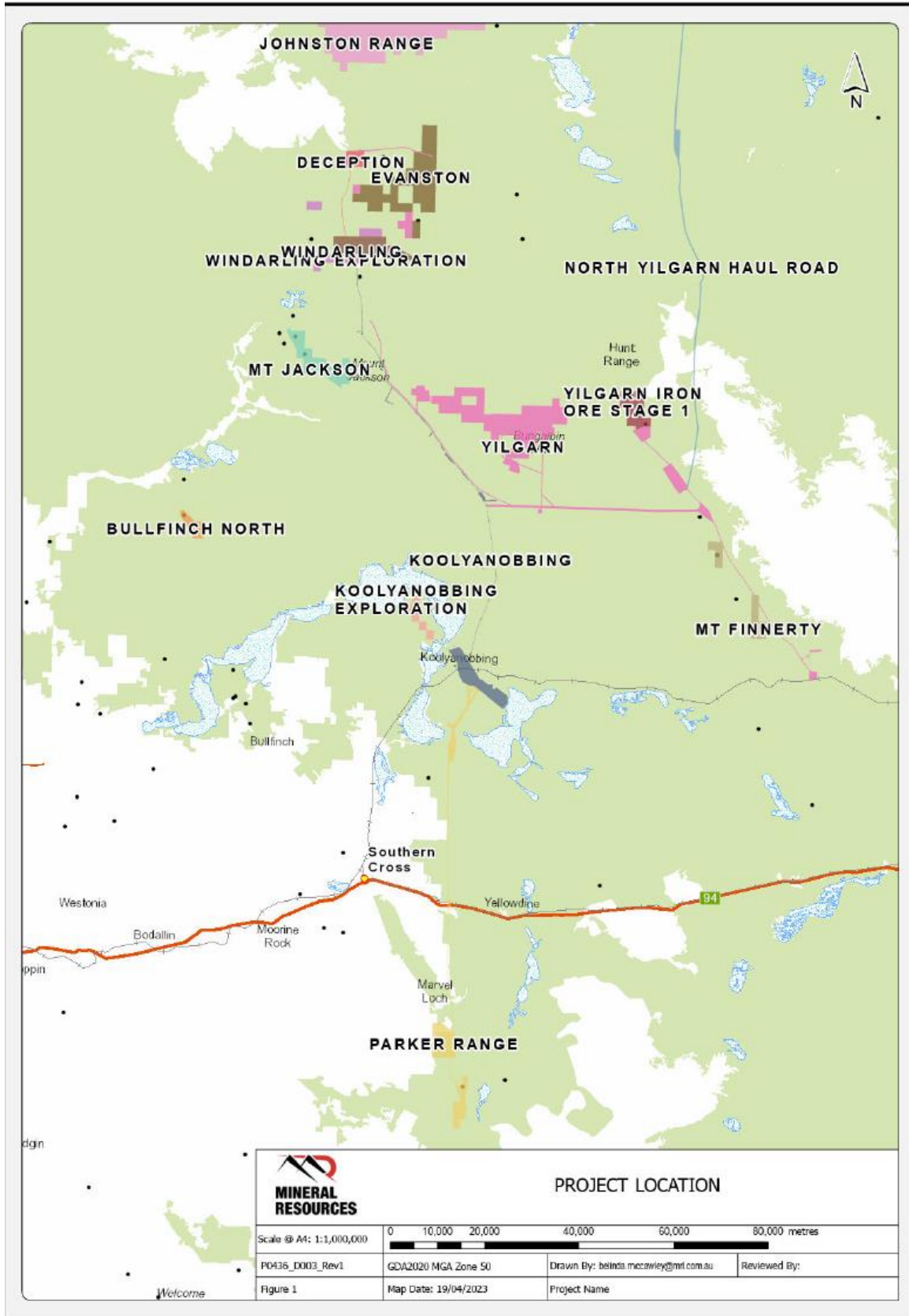
This application is to support the clearing of up to 6.5 hectares (ha) of native vegetation within Mining Tenements M77/606, M77/990, M77/1038 at Koolyanobbing and Windarling operations for the purpose of widening existing powerline maintenance corridors and the construction of a centralised warehouse to support mining operations (Figures 2 and 3). The clearing area has been reduced from 8.72 ha (CPS 9097/2) to 6.5 ha because some areas for the workshop have been previously cleared.

## 2. PURPOSE AND METHODOLOGY

The purpose of this document is to support a referral application for clearing of 6.5 ha (Figure 2 and 3).

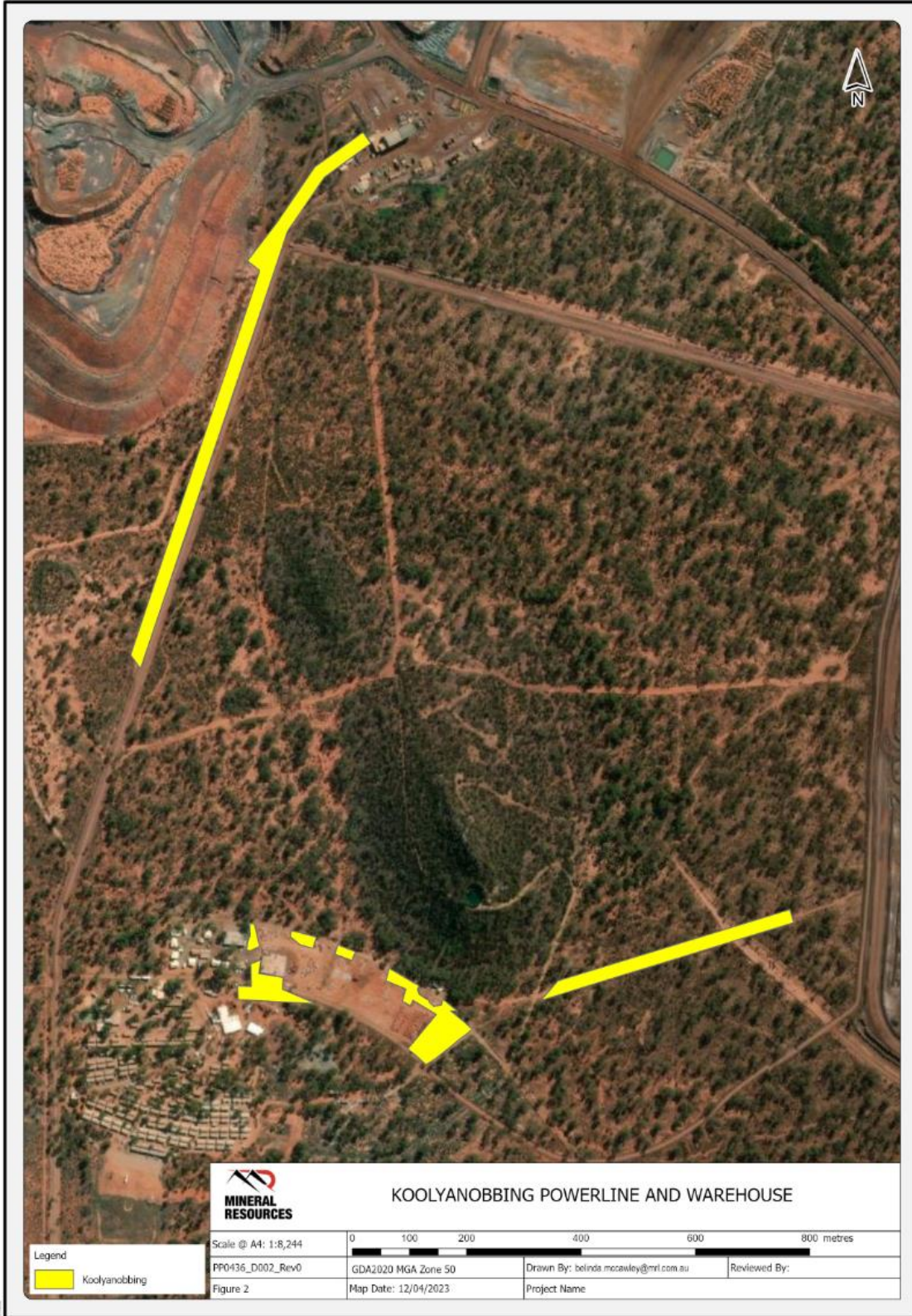
The methods employed for this assessment have included a biological assessment of the areas proposed for clearing and an assessment of the proposed clearing against s.51DA(4) of the *Environmental Protection Act 1986* (WA) and the *Native Vegetation Clearing Regulations 2004* (WA) Clearing Principles (Section 8).





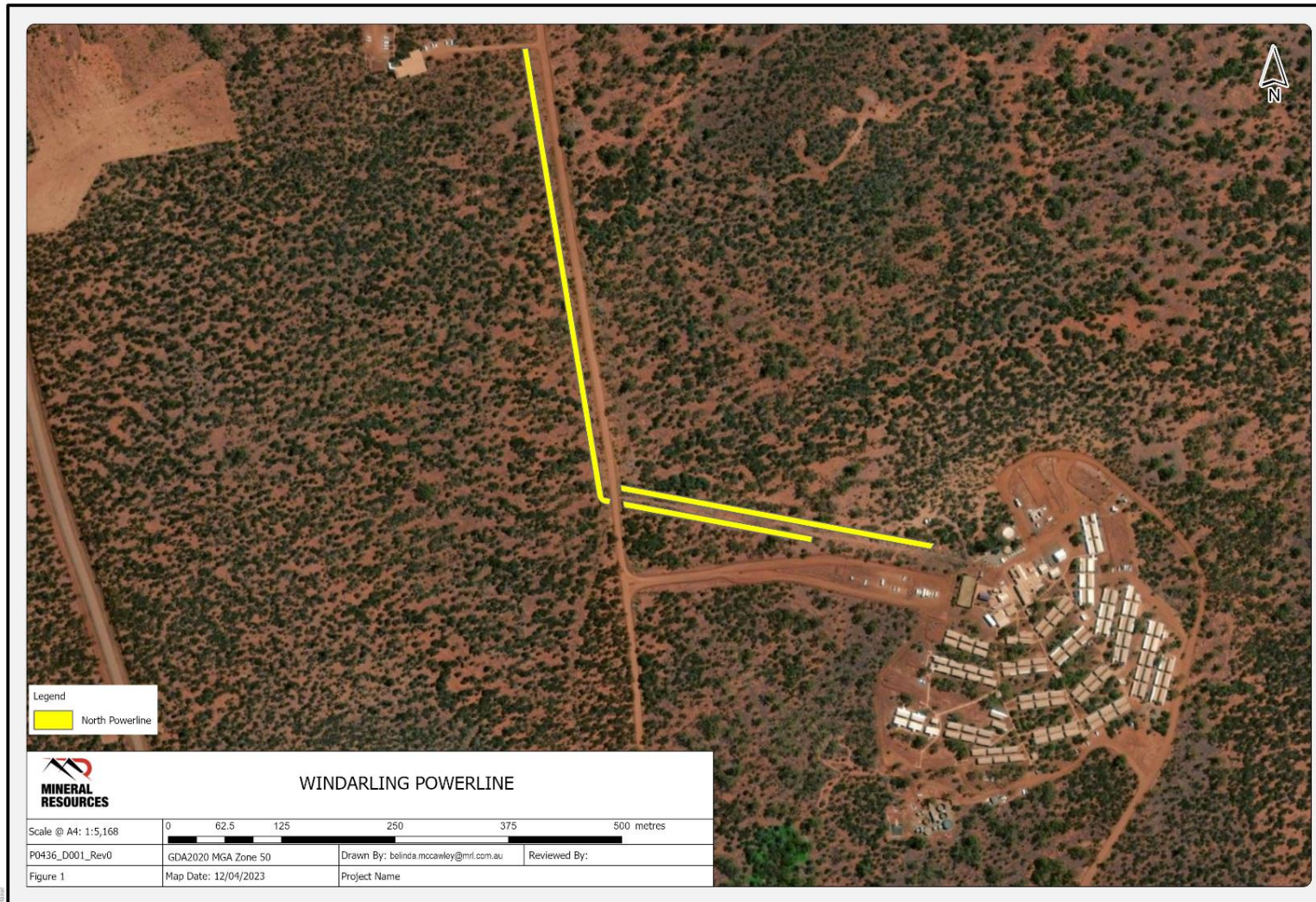
**Figure 1: Project location**

Printed copies of this document are not controlled. Please ensure that this is the latest available version before use.



**Figure 2: Proposed 5.75 ha clearing Koolyanobbing**

Printed copies of this document are not controlled. Please ensure that this is the latest available version before use.



**Figure 3: Proposed 0.75 ha clearing Windarling**

Printed copies of this document are not controlled. Please ensure that this is the latest available version before use.

### 3. PROJECT DESCRIPTION

#### 3.1 REGIONAL SETTING

Koolyanobbing and Windarling are situated within the Southern Cross subregion of the Coolgardie Bioregion (COO2) of the Interim Biogeographic Regionalisation for Australia (IBRA), located in the southern rangelands of Western Australia (DCCEEW 2022).

The Southern Cross sub-region is described as follows (Cowan, 2001):

- Characterised by subdued relief, comprising gently undulating uplands dissected by broad valleys with bands of low greenstone and ironstone hills over the underlying granite of the Yilgarn Craton. Drainage is occluded.
- Beds of banded ironstone occur sporadically within the greenstone belts and form high abrupt ridges rising conspicuously from surrounding plains. The Koolyanobbing Range is one such banded ironstone ridge. Valleys include chains of saline playa-lakes.
- Diverse woodlands rich in endemic eucalypts occur around these salt lakes, on the low greenstone hills, valley alluvials and broad plains of calcareous earths. The salt lakes support shrublands of samphire. Mallees and scrubs feature on sandplains associated with lateritised uplands, playas and granite outcrops.

#### 3.2 TENURE AND LAND ACCESS

The underlying tenure is Unallocated Crown Land. The operations are located on mining tenure M77/606, M77/990 and M77/1038, granted to Cliffs Asia Pacific Iron Ore Pty Ltd (Cliffs). Yilgarn Iron Pty Ltd (YIPL), a wholly owned subsidiary of Mineral Resources Limited (MinRes), acquired the Project from Cliffs on the 28th of August 2018. The process of transferring tenure from Cliffs to YIPL is underway. YIPL having Power of Attorney over the Project tenements (Appendix B).

#### 3.3 PROXIMITY TO DBCA MANAGED LANDS

There are no Department of Biodiversity, Conservation and Attractions (DBCA) managed lands in the area proposed for clearing. The nearest conservation area, being the Mount Manning - Helena and Aurora Ranges Conservation Park, is located approximately 30 km north of Koolyanobbing and 7 km east of Windarling.

#### 3.4 HISTORICAL AND FUTURE LAND USE

The Koolyanobbing mine site has been active for a large portion of the last 60 years and the Windarling mine site has been active for over 15 years. The surrounding areas have also been subject to exploration, pastoral activity and timber harvesting in the past.

The areas proposed for clearing are surrounded by disturbance, including roads adjacent to most of the powerline length, waste dumps, camps and other mining facilities.

Both powerline areas contain existing powerlines and have been subject to historic disturbance as a result construction and maintenance of these powerlines.

The proposed warehouse and yard expansion will extend into an area of the former Koolyanobbing townsite, previously occupied by housing.

## 4. ENVIRONMENTAL SETTING

### 4.1 CLIMATE

Temperatures for the Southern Cross Airfield (BOM site 12320), approximately 50km south of Kooyanobbing, indicate a mean maximum temperature (based on 26 years of data) of 26.0°C and minimum temperature of 10.6°C. Average maximum temperatures peak in January at 34.8°C and are lowest in July at 16.8 (BoM 2023). Average minimum temperatures range from 3.7°C in July to 17.9°C in January (BoM 2023). This is reflective of seasonal variation in the region.

Mean annual rainfall is 302.5 mm, peaking in March with an average of 36.2 mm for the month (BoM 2023). Annual precipitation falls predominantly in late summer/ early autumn (January to March). The 100-year Annual Recurrence Interval (ARI) peak rainfall event (72-hour duration) for the area equates to 1.95 mm/hr.

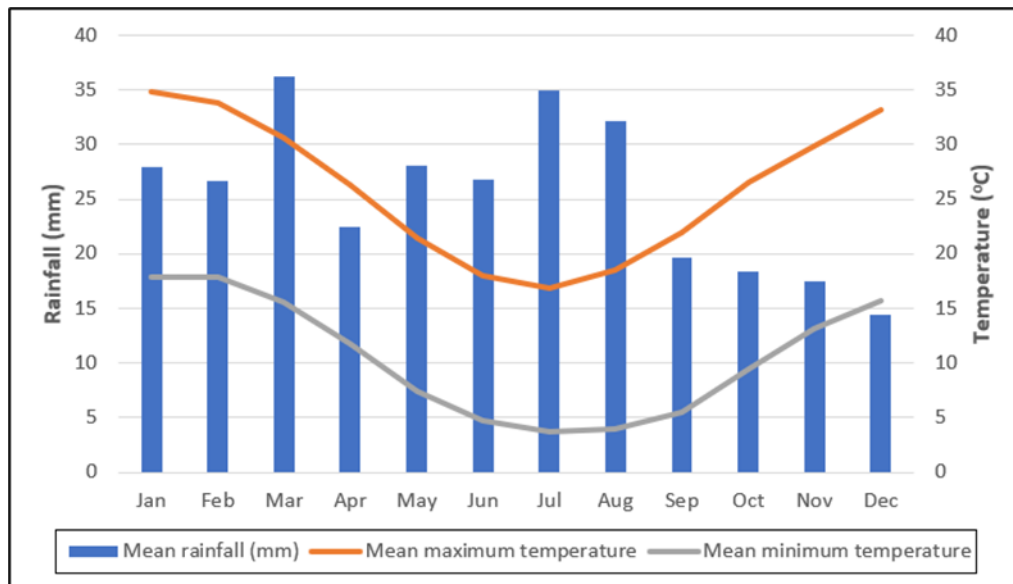


Figure 4: Southern Cross Airfield (Site 012320) Temperature and rainfall

### 4.2 SOIL AND LAND SYSTEMS

The proposed clearing is located within the Southern Cross (Kooyanobbing) and Mount Jackson Plains and Hills (Windarling) Zones of the Kalgoorlie soil-landscape province, in the central eastern portion of the Yilgarn Craton.

The Southern Cross zone (261) of the Kalgoorlie Soil – Landscape Province is described by Tille (2006) as:

- Characterised by undulating plains and uplands (with some salt lake and low hills) on deeply weathered mantle, colluvium and alluvium over greenstone and granitic rocks of the Yilgarn Craton. Calcareous loamy earths, Red and yellow loamy earths and Alkaline deep and shallow sandy duplexes with some Yellow sandy earths, Salt lake soils, Yellow deep sands and Red shallow loamy duplexes. Salmon gum-gimlet-morrel- York gum woodlands with acacia-casuarina thickets (and some mallee, scrub-heath and halophytic shrublands).

The Mount Jackson Plains and Hills zone (263) of the Kalgoorlie Soil – Landscape Province is described by Tille (2006) as:

- Characterised by undulating plains (with some hills and stony plains) on greenstone and granitic rocks of the Yilgarn Craton. Red loamy earths with Red-brown hardpan shallow loams and some Red sandy earths, Red shallow loams and Loamy gravels. York gum-salmon gum-gimlet woodland with acacia thickets and mulga scrub. This zone occupies an area of 6,350 km<sup>2</sup> in the Goldfields between Lake Barlee and Mt Jackson (Tille 2006).

The soil landscape systems for the proposed clearing are listed in Table 1.

**Table 1: Soil Landscape Map Descriptions (DPIRD, 2019)**

Soil Landscape Zone	Soil Landscape System	Map Unit Name	Description
261 Southern Cross Zone	261j1	Fa4 atlas system	Ranges with numerous rock outcrops containing basic igneous rocks (greenstones).
263 Mount Jackson Plains and Hills	263Te	Tealtoo System	Level to gently undulating loamy plains with fine ironstone gravel mantles supporting dense acacia shrublands.
263 Mount Jackson Plains and Hills	263Mo	Moriarty System	Low greenstone rises and stony plains supporting chenopod shrublands with patchy eucalypt overstoreys.

### 4.3 SURFACE WATER

Koolyanobbing clearing area is located within the Lake Deborah East surface water and Windarling clearing area is located in the Muka surface water catchment.

Surface water runoff occurs in response to large storm events or following rare periods of prolonged rainfall. The ranges in the Yilgarn region are drained by short, limited drainage gullies which shed water into the surrounding countryside after seasonal rain events. Water may be held for short periods in steep gullies following rain events.

The nearest water body to Koolyanobbing is Lake Deborah East located ~2.5km to the west of the proposed clearing area. The nearest water body to Windarling is ~8km east of the proposed clearing.

The Yilgarn operations do not intersect any Surface Water Proclamation Area, Irrigation District, Water Management Zone or Waterway Management Area under the *Rights in Water and Irrigation (RIWI) Act 1914*.

### 4.4 GROUNDWATER

The Yilgarn operations are located predominantly within the proclaimed Goldfield Groundwater Management Area (Deborah sub-area) and includes shallow ephemeral lakes or unconfined aquifers that are saline or hypersaline.

Printed copies of this document are not controlled. Please ensure that this is the latest available version before use.

The main potential groundwater receptors in the Koolyanobbing area are Lake K and Lake Seabrook which lie within 2 km of the Koolyanobbing pits, and the WA Salt operations which lie approximately 15 km to the northwest of K Pit on Lake Deborah. Groundwater at Koolyanobbing is estimated to be 20-50m below ground level (Ecotec, 2020). Across the Koolyanobbing mining areas, groundwater had TDS in the range of 8,500 mg/L (saline) and 300,000 mg/L (brine) and varied from strongly acidic (2.6 pH) to alkaline (8.16 pH) (Table 5 50) (PSM Consult Pty Ltd, 2022).

The main groundwater receptors in the Windarling area are the minor salt lakes to the south west of Windarling. The nearest salt lake is ~15 km from the site. Groundwater at Windarling is at least 30m below ground level (Ecotec, 2020). Across the Windarling mining areas, groundwater TDS has been in the range of 7,000 to 30,000 mg/L. pH has been mostly circumneutral, with the exception of W3/5 Pit where a pH of 3.9 was recorded in 2014. Since that time, pH has generally exceeded 6.5 (PSM Consult Pty Ltd, 2022).

#### **4.5 LAND DEGRADATION**

Land degradation can result from multiple processes including soil erosion, salinity, nutrient export, acidification, waterlogging, and flooding. Land degradation risk analysis within the proposal area using publicly available data was not possible due to the absence of acidity, salinity, erosion, waterlogging and flood risk data in this area.

An assessment of the project's risk on land degradation has considered the landscape units which are Southern Cross (261) and Mount Jackson Plains and Hills (263) (DPIRD, 2019).

Description of the landscape units, with the topographical and lithological features, are listed in Table 1. Both areas have similar topography with variations in calcareous loamy earths which when extensively cleared and left unrehabilitated are prone to erosion. Due to the linear nature and small area of the proposed clearing, land degradation is unlikely.



## 5. Flora and Vegetation

The vegetation proposed to be cleared in the Koolyanobbing and Windarling area are mapped as Beard Vegetation Association Jackson 141 and Jackson 18 respectively (Government of Western Australia 2019). These vegetation associations have more than 80% of their pre-European extent remaining within the Shire of Yilgarn local government boundary (Government of Western Australia, 2023).

A reconnaissance survey of the area proposed for clearing was undertaken in August and October 2020 'Koolyanobbing and Windarling Powerline Corridors and Koolyanobbing Warehouse Expansion Reconnaissance Flora, Vegetation and Fauna Habitat Assessment' (Ecotec, 2020) and is included as Appendix A.

### 5.1 DESKTOP ASSESSMENT

The desktop assessment included a review of various regulatory databases including the EPBC Protected Matters Search Tool (PMST) and DBCA database NatureMap. Flora and vegetation assessments previously undertaken in the surrounding area were also reviewed along with approved Mining Proposals and related biological surveys for activities in the surrounding area.

The desktop assessment identified;

- Seventeen species of conservation significant flora in the Koolyanobbing are 14 for the Windarling area (NatureMap).
- Five additional flora species for the Koolyanobbing area and one flora species for the Windarling area (PMST).

The results of the database searches and details of the likelihood of occurrence in the area are included in the Appendices of the Flora, Vegetation and Fauna Habitat Assessment (Ecotec, 2020).

### 5.2 FIELD SURVEY

The field work for the powerline corridors was undertaken on the 29th – 30th August (Koolyanobbing) and 2nd September (Windarling) 2020. The warehouse expansion area was surveyed on the 16th of October 2020. The field work involved a series of relevés throughout the study areas. An assessment of the vegetation, flora species and fauna habitat was undertaken of the area surrounding each point.

#### **Koolyanobbing**

The Koolyanobbing survey area was dominated by Eucalypt Open Woodland. The vegetation is consistent with Vegetation Type 1, previously mapped by Woodman Environmental Consulting during a survey of the area to the south of the rail line (Ecotec, 2020). This vegetation type was described as:

“Mid woodland of mixed species including *Eucalyptus salmonophloia*, *Eucalyptus corrugata*, *Eucalyptus salubris*, *Eucalyptus longicornis* and *Eucalyptus vittata* over tall to mid sparse shrubland dominated by *Atriplex nummularia*, *Exocarpos aphyllus*, *Eremophila scoparia*, *Scaevola spinescens* and *Senna artemisioides subsp. filifolia* over low sparse shrubland dominated by *Atriplex vesicaria*, *Maireana trichoptera*, *Olearia muelleri*, *Sclerolaena diacantha* and *Rhagodia drummondii* on red, brown, orange or red-brown clay, clay loam and sandy loam with dolerite, quartz and ironstone stones on plains, flats and low rises.”

Vegetation at Koolyanobbing survey site PWR7 was located on the margin of a low lying area with vegetation typical of salt lake fringes. It was however a very small portion of the survey area and difficult to delineate the extent within the survey area due to the high level of existing disturbance.

### **Windarling**

The Windarling area supports Eucalypt Open Woodland dominated by *Eucalyptus longissima* and *E. corrugate* with an understorey of Acacia and Eremophila shrubland. The south-western corner of the survey area supports mixed Acacia shrubland dominated by *Acacia caesaneura*, *A. acuminata*, *A. burkittii* and *A. cockertoniana*. These vegetation types are typical of the Windarling area and similar to vegetation units previously described by Western Botanical and Biota (Ecotec, 2020).

### 5.3 VEGETATION COMMUNITIES AND CONDITION

There are no Threatened Ecological Communities (TEC) within the surveyed area, or in the nearby vicinity.

A Priority Ecological Community (PEC), known as “Koolyanobbing Vegetation Complex (banded ironstone formation) Priority 1” (DBCA 2017) is located approximately 2.5 km south of the proposed area of disturbance at Koolyanobbing. There will be no impact to this area as a result of the development.

Koolyanobbing is located within the Great Western Woodlands an area recognised for its biological diversity. The Great Western Woodlands is regarded as the largest remaining area of intact Mediterranean-climate woodland left on Earth (Ecotec, 2020).

The vegetation throughout the Koolyanobbing survey area was generally considered to be in Poor to Good condition (Ecotec, 2020). Disturbance is found throughout the area resulting from long term mining activity, the existing powerline corridor and vehicle tracks. Vegetation in the area proposed for expansion of the warehouse and yard is considered to be degraded as a result of historical disturbance associated with the former Koolyanobbing town site and the abundance of weed species (Ecotec, 2020). Several species of Eucalypt not endemic to the Koolyanobbing area were found. These are thought to have been planted as street trees when the town was functioning.

The vegetation condition within the Windarling powerline corridor was considered to be Degraded (Ecotec, 2020), with significant prior disturbance resulting from maintenance of the existing powerline. Vegetation in the surrounding areas is Good to Excellent.

Extensive prior disturbance, proximity to current mining related activity and the narrow width of the proposed areas for clearing makes detailed vegetation mapping difficult and inconsistent with the surrounding vegetation. It was therefore not undertaken as part of the reconnaissance survey.

## 6. Fauna

A reconnaissance survey of the area proposed for clearing was undertaken in August and October 2020 'Koolyanobbing and Windarling Powerline Corridors and Koolyanobbing Warehouse Expansion Reconnaissance Flora, Vegetation and Fauna Habitat Assessment' (Ecotec, 2020) and is included as Appendix A.

The desktop assessment included a review of various regulatory databases including the EPBC Protected Matters Search Tool (PMST) and DBCA database NatureMap. Fauna assessments previously undertaken in the surrounding area were also reviewed along with approved Mining Proposals and related biological surveys for activities in the surrounding area.

The desktop assessment identified;

- one species of bird listed as Critically Endangered for Koolyanobbing and two species for Windarling
- two birds and one mammal listed as Vulnerable (Koolyanobbing and Windarling)
- one invertebrate listed as Priority 4 (Koolyanobbing).
- 11 bird species listed as Migratory and/or Marine.

The results of the database searches and details of the likelihood of occurrence in the area are included in the Appendices of the Flora, Vegetation and Fauna Habitat Assessment (Ecotec, 2020).

### 6.1 FAUNA HABITAT

The area surrounding the eastern end of the Koolyanobbing site may have provided habitat suitable for the tree-stem trapdoor spider (flood-prone depressions and flats that support myrtaceous shrub communities) prior to commencement of the mining operation, however is now considered unlikely to be suitable due to disturbance, dust and vibration resulting from proximity to the ROM.

The powerline survey areas at both sites are very narrow (i.e. approximately 20 m) and have been subject to significant disturbance. The corridors are generally devoid of larger trees and do not support any dense stands of vegetation. These areas therefore do not provide habitat specifically suitable for any of the conservation significant species identified in the desktop assessment (Appendix 1).

The warehouse expansion area was originally part of the Koolyanobbing townsite and was mostly cleared of native vegetation for construction of housing. A number of large trees, some dead, are found throughout the area but lower level vegetation comprises predominately low weed species.

### 6.2 FAUNA

A number of common bird species were observed during the field surveys, including:

- *Cacatua roseicapilla* (galah)
- *Coracina novaehollandiae* (black-faced cuckoo-shrike)
- *Cracticus nigrogularis* (pied butcherbird)

- *Cracticus tibicen* (Australian magpie)
- *Platycercus zonarius* subsp. *zonarius* (Australian ringneck, 28 parrot)
- *Rhipidura leucophrys* (willie wagtail)
- *Strepera versicolor* (grey currawong)

No mammal or reptile fauna species were observed in the survey areas, however common species from both orders are known to be present at times.

Due to the existing high disturbance in the areas and the proximity to well utilised roads, it is considered highly unlikely that any conservation significant fauna inhabits the survey areas.

## 7. AVOIDANCE AND MITIGATION

MinRes has an Environmental Management System (EMS) applicable to the proposed exploration activities at Yilgarn Operations. This system includes awareness training, plans, procedures and forms to avoid, minimise and ensure the effective management of environmental and heritage values. Strategies to avoid, minimise and manage environmental impacts include the maintaining of a 50 m buffer around habitat trees, malleefowl mounds and Priority flora locations.

The list of procedures applicable to exploration are provided in Table 2. These are considered sufficient to ensure the effective management of environmental and heritage risk by the proposal.

**Table 2: MinRes Procedures**

Document number	Document name
MRL-EN-PRO-0004	Land Clearing Procedure
MRL-EN-PRO-0005	Site Disturbance Procedure
MRL-EN-PRO-0001	Fauna Management Procedure
MRL-TS-WIN-0006	Clearing Work Instruction
MRL-EN-PRO-0007	Weed Hygiene and Control
MRL-EN-PRO-0009	Land Rehabilitation Procedure

## **8. ENVIRONMENTAL IMPACT ASSESSMENT**

### **8.1 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 for the purposes of this project, within the proposed application area.

Each principle was assessed in accordance with Department of Environmental Regulation's (DER) "A Guide to the Assessment of Applications to Clear Native Vegetation" (DER, 2014).

In summary, the proposed clearing is not likely to be or at variance to Clearing Principles (A) to (J), as referenced below.

**Table 3: Identified Impacts against 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
<b>(a) Native vegetation should not be cleared if it comprises a high level of biological diversity</b>	<b>Green</b>	<p>The Koolyanobbing survey recorded 82 species of native flora from 26 families. The Windarling survey recorded 47 species of native flora from 18 families.</p> <p>No conservation significant flora was located during the survey. There is no habitat considered ideally suitable for any of the conservation significant flora returned from the database searches. Prior disturbance has impacted the likelihood of the presence of those that may be suited to the habitat. Both the Koolyanobbing and Windarling areas have been extensively surveyed in the past. The locations of conservation significant flora in the areas are well known and do not coincide with these surveyed areas.</p> <p>The vegetation types are well represented in the surrounding area and do not provide specific habitat for any threatened fauna species.</p> <p>No Threatened or Priority Ecological Communities were identified within the survey area.</p> <p>No reserves, conservation areas or other DBCA Managed Estate are located within the survey area.</p> <p>Clearing of native vegetation within the area is not considered to be at variance to this principle.</p>
<b>(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.</b>	<b>Green</b>	<p>The areas proposed for clearing do not coincide with any prior records of Specially Protected Fauna declared under the <i>Biodiversity Conservation Act 2016 (WA)</i>. Although several species of conservation-significant fauna have been recorded and some may potentially utilise the area as part of a broader foraging habitat, the area is not considered to provide habitat necessary for the survival of these species. The habitat is not considered to be significant to any threatened fauna not previously recorded, but listed as potentially present, in the area.</p> <p>Clearing of native vegetation within the area is not considered to be at variance to this principle.</p>
<b>(c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.</b>	<b>Green</b>	<p>The areas proposed for clearing do not coincide with any previously recorded Rare Flora taxa, and the habitat present is not suitable for any Rare Flora species listed as potentially occurring in the area. The area is not considered necessary for the continued existence of Rare Flora.</p> <p>The clearing of native vegetation is therefore not at variance to this principle.</p>

Printed copies of this document are not controlled. Please ensure that this is the latest available version before use.



Clearing Principle	Impact Category	Assessment of Clearing Principle
<b>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.</b>	<b>Green</b>	<p>Desktop searches identified no PEC or TECs within 50 km of the areas proposed for clearing. Field surveys confirmed that there are no PEC or TECs within the areas proposed for clearing.</p> <p>The clearing of native vegetation is therefore not at variance to this principle.</p>
<b>(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.</b>	<b>Green</b>	<p>The area proposed for clearing at Koolyanobbing supports Eucalypt Open Woodland vegetation, dominated by several common Eucalyptus species. The area proposed for clearing at Windarling supports Eucalypt Open Woodland and Acacia Shrubland vegetation, dominated by common Eucalyptus and Acacia species. The vegetation types are widespread and well represented in the surrounding region, therefore are not considered significant as a remnant of native vegetation.</p> <p>The percentage of Pre-European vegetation extent remaining within the Yilgarn Shire for Beard Vegetation Associations 141 and 18 is 82%.</p> <p>Given the above, the clearing of native vegetation is not considered to be at variance to this principle.</p>
<b>(f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.</b>	<b>Green</b>	<p>There are no permanent watercourses or wetlands within or in the vicinity of the proposed clearing.</p> <p>The clearing of native vegetation is not considered to be at variance to this principle.</p>
<b>(g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.</b>	<b>Green</b>	<p>Any clearing of native vegetation within the survey area has the potential to cause soil and wind erosion. The landscape units for this survey area are Southern Cross (261) and Mount Jackson Plains and Hills (263) (DPIRD, 2019). Both have similar topography with variations in calcareous loamy earths, which when extensively cleared and left unrehabilitated, are prone to erosion. The area is arid, and unlikely to flood or become waterlogged.</p> <p>The potential for soil erosion and appreciable land degradation to occur from the implementation of this proposal is unlikely.</p> <p>The clearing of native vegetation is unlikely to be at variance to this principle.</p>

Printed copies of this document are not controlled. Please ensure that this is the latest available version before use.

Clearing Principle	Impact Category	Assessment of Clearing Principle
<p><b>(h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.</b></p>	<p><b>Green</b></p>	<p>The nearest conservation area, being the Mount Manning - Helena and Aurora Ranges Conservation Park, is located approximately 30 km north of Koolyanobbing and 7 km east of Windarling. The proposed clearing of native vegetation will not affect this conservation area.</p> <p>The clearing of native vegetation is not considered to be at variance to this principle.</p>
<p><b>(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.</b></p>	<p><b>Green</b></p>	<p>The areas proposed for clearing do not contain any permanent or temporary surface water features. There are no defined creek lines or natural drainage lines within the area. As such, clearing will not impact surface water quality.</p> <p>Groundwater at Koolyanobbing is estimated to be 20-50m below ground level and at least 30m below ground level at Windarling.</p> <p>The clearing of native vegetation is unlikely to be at variance to this principle.</p>
<p><b>(j). Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.</b></p>	<p><b>Green</b></p>	<p>The Koolyanobbing survey areas are adjacent to existing roads with surface water runoff flowing generally toward the drainage system already associated with these roads. Flooding of the area as a result of any additional clearing is considered very unlikely.</p> <p>The Windarling area is located adjacent to the accommodation camp car park and an existing mine access road. Runoff from the surveyed area will flow toward the drainage networks associated with the existing infrastructure. Flooding as a result of clearing vegetation is considered very unlikely.</p> <p>Clearing of native vegetation within the area is not considered to be at variance to this principle.</p>

Printed copies of this document are not controlled. Please ensure that this is the latest available version before use.

## 8.2 VERY LOW ENVIRONMENTAL IMPACT

An assessment has been completed against the criteria listed in s.51DA(4) of the EP Act to determine whether the clearing is very low environmental impact.

Each criterion was assessed in accordance with Department of Water and Environmental Regulation's (DWER) "Guideline Native vegetation clearing referrals (DWER, 2021).

In summary, the proposed clearing activities are considered very low environmental impact as referenced below.

**Table 4: Identified Impacts against Criterion**

Criterion	Assessment of Clearing
<b>1. The area proposed to be cleared is small relative to the total remaining vegetation</b>	<p>Both the Koolyanobbing and Windarling areas have been extensively surveyed in the past. The vegetation types are well represented in the surrounding area and do not provide specific habitat for any threatened fauna species. The percentage of Pre-European vegetation extent remaining within the Yilgarn Shire for Beard Vegetation Associations 141 and 18 is 82%.</p> <p>No Threatened or Priority Ecological Communities were identified within the survey area.</p> <p>No reserves, conservation areas or other DBCA Managed Estate are located within the survey area.</p>
<b>2. There are no known or likely significant environmental values within the area</b>	<p>The areas proposed for clearing do not coincide with any previously recorded Rare Flora taxa, and the habitat present is not suitable for any Rare Flora species listed as potentially occurring in the area.</p> <p>Field surveys confirmed that there are no PEC or TECs within the areas proposed for clearing.</p> <p>The areas proposed for clearing do not contain any conservation areas and permanent or temporary surface water features.</p>
<b>3. The state of scientific knowledge of native vegetation within the region is adequate</b>	<p>Both the Koolyanobbing and Windarling areas have been extensively surveyed in the past. The vegetation types are well represented in the surrounding area and do not provide specific habitat for any threatened fauna species.</p>

Printed copies of this document are not controlled. Please ensure that this is the latest available version before use.

Criterion	Assessment of Clearing
<p><b>4. Conditions will not be required to manage environmental impacts</b></p>	<p>MinRes has an Environmental Management System (EMS) applicable to the proposed clearing activities at Yilgarn Operations. This system includes awareness training, plans, procedures and forms to avoid, minimise and ensure the effective management of environmental and heritage values.</p>

Printed copies of this document are not controlled. Please ensure that this is the latest available version before use.

## 9. REFERENCES

Beard J.S. (1972) *The Vegetation of the Kalgoorlie Area, Western Australia. 1:250,000 map and explanatory memoir*, Vegmap Publications, Western Australia.

Bureau of Meteorology (BOM) (2023). Climate Statistics for Australia Locations: Southern Cross Airfield. Data for years 1996 to 2021. Accessed January 2023 from the Australian Bureau of Meteorology website at: [http://www.bom.gov.au/climate/averages/tables/cw\\_012320.shtml](http://www.bom.gov.au/climate/averages/tables/cw_012320.shtml).

Cowan, M. G. G. a. N. M., 2001. Coolgardie 2 (COO2 – Southern Cross subregion), s.l.: In J.E. May and N.L. McKenzie (eds) (2003) A Biodiversity Audit of Western Australia's Biogeographical Subregions in 2002.

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (2022). Australia's Bioregions (IBRA). Accessed October 2022 from the DCCEEW website at: <https://www.dcceew.gov.au/environment/land/nrs/science/ibra>

Department of Environmental Regulation (DER). (2014) A Guide to the Assessment of Applications to Clear Native Vegetation. <https://www.der.wa.gov.au/component/k2/item/3985-assessment-of-applications-to-clear-native-vegetation>

Department of Primary Industries and Regional Development (DPIRD).(2019). Soil landscape land quality – Zones (DPIRD-017). <https://catalogue.data.wa.gov.au/dataset/soil-landscape-land-quality-salinity-risk>

Department of Water and Environmental Regulation (DWER). (2021). Guideline Native vegetation clearing referrals. [https://www.wa.gov.au/system/files/2021-10/Guideline\\_Native\\_vegetation\\_clearing\\_referrals.pdf](https://www.wa.gov.au/system/files/2021-10/Guideline_Native_vegetation_clearing_referrals.pdf)

Ecotec. (2020). Koolyanobbing and Windarling Powerline Corridors and Koolyanobbing Warehouse Expansion Reconnaissance Flora, Vegetation and Fauna Habitat Assessment. Revision 0, 22-10-2022

Government of Western Australia. (2023). Clearing Statistics. WA Department of Water and Environmental Regulation. <https://www.dwer.wa.gov.au/clearingstatistics>

Government of Western Australia (2019) 2018 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of March 2019. WA Department of Biodiversity, Conservation and Attractions. <https://catalogue.data.wa.gov.au/dataset/dbca-statewide-vegetation-statistics>

Keighery, B.J. (1994) *Bushland Plant Survey; A Guide to Plant Community Survey for the Community*, Wildflower Society of Western Australia (Inc.) Nedlands

Mineral Resources Limited. (2022). 2022 Annual report. <https://www.mineralresources.com.au/investor-centre/annual-reporting-suite/>

PSM Consult Pty Ltd, 2022. Hydrogeological Considerations for the Yilgarn Operations Mine Closure Plan, s.l.: Unpublished report for Mineral Resources Limited, PSM4553-002R, 22 February 2022.

Tille, P., 2006. Soil-landscapes of Western Australia's rangelands and arid interior. , Perth: Department of Agriculture and Food, Western Australia, Perth. Report 313.

## 10. GLOSSARY

Exempt East Location	A land parcel in the Eastern Goldfields that had freehold issued prior to 1899 whereby the owner is entitled to retain the Minerals Rights where provisions under the Mining Act and Regulations 1981 do not apply.
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 (Keighery, 1994).
Habitat trees	Habitat trees are trees with a Diameter Breast Height of more than 500 mm and 300 mm.
Permit area	The within which up to 120 ha of clearing of native vegetation is proposed in the Hamptons Northern Area 53 comprising of 1,310.67 ha on EEL 53.
Priority 3 – Poorly known species	Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey
Survey area	The survey is the area surveyed by GHD in 2018 and included the Hamptons West Area 53 comprising of 1, 439 ha on EEL 53.
Study area	The study area is the area referred by NVS and BCE (2022) to the area assessed in desk environmental impact assessment used to inform the field survey.
Very Good	Vegetation structure altered, very obvious signs of disturbance. For example, disturbance to vegetation structure caused by frequent fires; the presence of some very aggressive weeds at high density; partial clearing; dieback and grazing (Keighery, 1994).

## 11. ABBREVIATIONS

BC Act	<i>Biodiversity Conservation Act 2016 (WA)</i>
CAR	Comprehensive Adequate Representative
CPS	Clearing Permit System
DBCA	Western Australian Department of Biodiversity, Conservation and Attractions
DAWE	Australian Department of Agriculture, Water and the Environment
DER	Department of Environmental Regulation
DMIRS	Department of Mines, Industry Regulation and Safety
DWER	Western Australian Department of Water and Environmental Regulation (formerly DoW)
EEL 53	Exempt East Location 53
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EP Act	<i>Environmental Protection Act 1986</i>
GIS	Geospatial Information Systems
GoWA	Government of Western Australia
ha	hectare(s)
IBRA	Interim Biogeographic Regionalisation for Australia
km	kilometre(s)
LGA	Local Government Area
LOM	Life of Mine
m	metre(s)
mg/L	milligrams per litre
Mining Act	<i>Mining Act 1978</i>
mm	millimetres
MinRes	Mineral Resources Limited
MSA	Mine Services Agreement
Mt	Mount
NSRL	Northern Star Resources Limited
P	Priority
PEC	Priority Ecological Community
pH	measure
PMI	Process Minerals International Pty Ltd
PMST	Protected Matters Search Tool
RIM	Reed Industrial Minerals
TDS	total dissolved solids
TEC	Threatened Ecological Community
VSA	Vegetation and Substrate Associations
WA	Western Australia
Westgold	Westgold Resources

Printed copies of this document are not controlled. Please ensure that this is the latest available version before use.

## APPENDICES

Appendix	Title
A	Koolyanobbing and Windarling Powerline Corridors and Koolyanobbing Warehouse Expansion Reconnaissance Flora, Vegetation and Fauna Habitat Assessment (Ecotec, 2020).
B	Power Of Attorney



**Appendix A**

**Koolyanobbing and Windarling Powerline Corridors and  
Koolyanobbing Warehouse Expansion Reconnaissance Flora,  
Vegetation and Fauna Habitat Assessment (Ecotec, 2022)**

## **Appendix B**

### **Power of Attorney**